



저작자표시-비영리-변경금지 2.0 대한민국

이용자는 아래의 조건을 따르는 경우에 한하여 자유롭게

- 이 저작물을 복제, 배포, 전송, 전시, 공연 및 방송할 수 있습니다.

다음과 같은 조건을 따라야 합니다:



저작자표시. 귀하는 원저작자를 표시하여야 합니다.



비영리. 귀하는 이 저작물을 영리 목적으로 이용할 수 없습니다.



변경금지. 귀하는 이 저작물을 개작, 변형 또는 가공할 수 없습니다.

- 귀하는, 이 저작물의 재이용이나 배포의 경우, 이 저작물에 적용된 이용허락조건을 명확하게 나타내어야 합니다.
- 저작권자로부터 별도의 허가를 받으면 이러한 조건들은 적용되지 않습니다.

저작권법에 따른 이용자의 권리는 위의 내용에 의하여 영향을 받지 않습니다.

이것은 [이용허락규약\(Legal Code\)](#)을 이해하기 쉽게 요약한 것입니다.

[Disclaimer](#)

Ph.D. Dissertation of Engineering

**The Impact of Road Infrastructure
Development on
Communities and Urban Form Changes
in Cities of Emerging Countries:
A Case Study of Danang, Vietnam**

신흥국 도시에서 도로 개발이
커뮤니티와 도시형태 변화에 미치는 영향:
베트남 다낭을 중심으로

February 2018

Seoul National University
Interdisciplinary Program in Landscape Architecture

Sehyung Won

The Impact of Road Infrastructure
Development on
Communities and Urban Form Changes
in Cities of Emerging Countries:
A Case Study of Danang, Vietnam

Advised by Prof. Saehoon Kim

Submitting a Ph.D. Dissertation of Engineering
October 2017

Seoul National University
Interdisciplinary Program in Landscape Architecture

Sehyung Won

Confirming the Ph.D. Dissertation written by
Sehyung Won

December 2017

Chair _____ (Seal)

Vice Chair _____ (Seal)

Examiner _____ (Seal)

Examiner _____ (Seal)

Examiner _____ (Seal)

ABSTRACT

The Impact of Road Infrastructure Development on Communities and Urban Form Changes in Cities of Emerging Countries: A Case Study of Danang, Vietnam

Sehyung Won

Interdisciplinary Program in Landscape Architecture
Graduate School, Seoul National University
Supervised by Professor Saehoon Kim

New road infrastructure development is known to gear local economic development, which forms, expands and changes the urban environment. However, the direct effects of road development on its immediate surroundings and local residents remain understudied. In order to create urban environments mindful of the conditions of Asian developing countries, which are rapidly urbanizing, data-based empirical studies that investigate the impact of road developments on the community and urban form need to be pursued.

This study focused on the palpable urban changes in Danang, Vietnam, where recent expansion of infrastructure and rapid urbanization

has been evident. The 40 m wide Nguyen Tat Thanh road, opened in 2003, which stretches along 12 km had been studied in particular. To understand the effects of road development on the human and physical aspects, a total of 460 building owners and residents living in the vicinity of the road were interviewed in-depth regarding the socioeconomic changes before and after the road development. Spatial user activities were also investigated. Moreover, five projects that emerged after the road development were analyzed according to its project process, urban form and design attributes. Last, stakeholder interviews of local university professors, civil servants, and private developers were conducted.

The first chapter aims to understand the overall effects of road development in the immediate neighborhoods and its residents. To better understand the relationship between infrastructure 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 showed that road development took place along with a sizable number of urban changes over time, including housing types, building densities and uses, income level, commuting distances, and the type of occupation. The changes were more striking in the area abutting the new road. This was because 46% of the residents were migrants that settled in close proximity to the road after its development. 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.

The second chapter reveals how road development impacts the residents' mobility and changes the urban landscape of the existing areas. To investigate this relationship in detail, 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.

The third chapter focuses on the new urban landscape and

morphological changes. In this chapter, five built or on-going projects near the road development had been investigated in terms of the project implementation process, building type, size and use, population density, and spatial use. As a result, the research revealed that conventional urban forms had slowly evolved to better accommodate the public purposes of the local area and that shaded paths, either intentionally designed or formed by chance, were instrumental in forming vital streetscapes and public use. On the other hand, large-scale master plans were crudely misused as means for attracting real estate investment in the efforts to globally brand the city, and finalized plans were often modified unpredictably which not only delayed projects but led to the overall decline of urban space quality. The research suggested a continuous effort towards understanding user behaviors in the neighborhood- and local-level planning, and to reflect such information into spatial designs. Furthermore, to ensure efficient project implementation, the roles of the public and private sector need to be better clarified in large-scale urban development projects.

The implications of the study are as follows. The effects of a development need to be accurately forecasted to ensure quality urban space and fair distribution of development benefits in a developing country where various urban projects take place at the same time. Spatial planning and design should be based on community needs where user behavior is considered at the neighborhood- or local-level. Furthermore, to ensure the success of a foreign capital invested urban project, the public sector needs to establish a clear vision and clarify the roles of the public and private sector.

Keywords: Road infrastructure, urban development, mobility, commuting
pattern, neighborhood environment, urban form, urban design

Student Number: 2013-31245

PUBLICATIONS

Please note that Chapters 1-3 of this dissertation proposal were written as stand-alone papers (see below). Chapter 1 and 2 were published in 2015 and 2017, and chapter 3 will be submitted to an international journal soon.

Chapter 1

Won, S. et al. (2015). The neighborhood effects of new road infrastructure: transformation of urban settlements and resident's socioeconomic characteristics in Danang, Vietnam. *Habitat International*, 50, 169-179.

Chapter 2

Won, S. & Kim, S. (2017). 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. *Cities*, 67, 63-73.

Chapter 3

Won, S. & Kim, S. The success and failure of urban-form making experimentations: case studies of new developments adjacent to the Nguyen Tat Thanh Road, Danang, Vietnam.

CONTENTS

ABSTRACT	i
PUBLICATIONS	vii
LIST OF TABLES	x
LIST OF FIGURES	xi
Introduction	1
Chapter 1. The neighborhood effects of new road infrastructure: Transformation of urban settlements and resident's socioeconomic characteristics in Danang, Vietnam	
1. Introduction	7
2. Research Methods	13
3. Results	17
4. Discussion	34
Chapter 2. 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	
1. Introduction	39
2. Research Methods	44
3. Results	48
4. Discussion	66

**Chapter 3. The success and failure of urban-form making
experimentations: Case studies of new
developments adjacent to the Nguyen Tat Thanh
Road, Danang, Vietnam**

1. Introduction	71
2. Research Methods	77
3. Results	82
4. Discussion	106

Conclusion 111

ACKNOWLEDGEMENT	115
REFERENCES	116
APPENDIX	126
ABSTRACT IN KOREAN	156

LIST OF TABLES

Table 1.	Survey contents	16
Table 2.	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)	46
Table 3.	The trends and rationales of change in job distribution and commuting pattern	53
Table 4.	The trends and rationale of changes in land (re)development and housing typology	56
Table 5.	The trends and rationale of changes in street commercialization	63
Table 6.	Mobility changes due to Nguyen Tat Thanh Road development and the subsequent changes in space utilization	67
Table 7.	Summary of the existing housing area	83
Table 8.	Summary of the row house area	85
Table 9.	Summary of the public housing estate	88
Table 10.	Summary of Futa New Town Danang	90
Table 11.	Changes to the masterplan for the development of Da Phuoc International New Town	93
Table 12.	The success and failure of the new developments	107

LIST OF FIGURES

Figure 1.	Map of Danang (Modified based on Google Earth by the authors)	9
Figure 2.	Traditional tube house and neo-tube house in Danang (Victoir & Zatsepine, 2013, 262; Quang, 1997, 98)	11
Figure 3.	Three groups of interviewees and the pattern of urban development (the map shows part of the study area)	15
Figure 4.	Change in building floors of the study area	19
Figure 5.	Change in building type of the study area	20
Figure 6.	Change in building use of the study area	21
Figure 7.	Annual income level between 2002 and 2014	22
Figure 8.	Percentage of the migrants who moved to the study area between 2002 and 2014 by groups	27
Figure 9.	Typical plan and elevation of the streets in Groups A, B, and C (Group A: Nguyen Tat Thanh Road 419-435 and Ton That Dam Road 6-32; Group B: Tran Cao Van Road 439-452; Group C: Tran Cao Van Road K368/15-31; drawn by Daewoong Choi)	33
Figure 10.	Masterplan of Danang and the study area (Modified based on the Masterplan of Danang city (2030-2050) by the authors)	42
Figure 11.	Comparison of original residents and migrants travelling distances from home to workplace, places for shopping, leisure, education and religious activities according to modes of transportation	52

Figure 12.	Locations for shopping frequented by original residents and migrants	55
Figure 13.	Comparison of the building size and spatial characteristics of buildings located on the new road by original residents and migrants	59
Figure 14.	Comparison of the building size and spatial characteristics of buildings located along an alley inside the urban block by original residents and migrants	60
Figure 15.	Location of Nguyen Tat Thanh road and the five new developments in Danang (Modified based on Google Earth Pro by the authors)	77
Figure 16.	Survey area within the existing housing area (upper left); road network (upper right); figure-ground map of spatial changes after the new road and parcel development (lower)	84
Figure 17.	Urban grid of the row house area and blocks consisting of two rows of lots	86
Figure 18.	Location and building layout of the public housing	89
Figure 19.	Final approved plan of Futa New Town (left); initial proposal of waterfront which was canceled due to lack of feasibility (upper right); typical housing block and land division with linear open space (lower right)	91
Figure 20.	Changes made to the Da Phuoc International New Town master plan, and neighborhood design with reinforced community space and green network	95
Figure 21.	Impaired roadside of Nguyen Tat Thanh (upper left); disused outdoor space in the public housing estate (lower	100

left); excessively privatized street in the row house area
(right)

Figure 22.	Pedestrian, cycling, and motorcycle activities along the shaded paths formed by artificial structures, sidewalk trees, and buildings (usually before noon and after 4PM)	104
Figure 23.	In-depth interview coverage and surrounding areas	137
Figure 24.	In-depth interview coverage area with added 5km range on East and West sides	137
Figure 25.	Map including the most urbanized areas of Danang	138
Figure 26.	Survey orientation with Vietnamese research assistants (July 2014)	151
Figure 27.	Presentation on research purpose and results at the Department of Architecture, Danang University of Science and Technology (February 2015, August 2015)	151
Figure 28.	Resident interviews at Thanh Khe district to understand the impact of new road development (July 2014)	152
Figure 29.	Resident interviews at Thanh Khe district to understand the impact of new road development (August 2015)	153
Figure 30.	Meeting with Professor Tran Duc Quang and Nguyen Anh Tuan at the Department of Architecture, Danang University of Science and Technology (August 2015)	154
Figure 31.	Questionnaire preparation for analyzing the results of in-depth interviews (July 2014, August 2015)	154
Figure 32.	Meeting with Mr. Park Heehong, the local director of Daewon Cantavil – the developer of the Da Phuoc New Town (September 2016)	155

Introduction

The world pays close attention to the unprecedented growth in emerging economies of Asia. In spite of the economic crisis of the late 1990s and mid-2000s, up to recently, emerging economies of Asia showed high growth rates at the average of 6.4%, which is three to five times higher than Western and other Asian countries (IMF, 2017). In terms of global GDP, Asian countries have geared the global economic growth since year 2000. Asian economies accounted for 22% of the global economy which by year 2025 is predicted to take up to 45% (DUP, 2016). Evidently, the share of emerging economies is predicted to continually increase in the global economy. The apparent economic growth of Asian countries is also reflected in the rate of urbanization. Urbanization rate increased from 30% in 1990 to 48% in 2014, and the urban population has doubled from 800 million to 1.5 billion in the same period (UN, 2014). However, most Asian countries, apart from Korea, Japan, and Singapore, where urbanization rate is higher than 80%, have remarkably low urbanization rates as of now, but the UN predicts that urbanization will be on the large part led by these countries and would reach 60% by year 2050. Unlike Europe and North America where the urban population had already reached 70% before the 1980s and hence show modest rates of urbanization, Asian countries are progressing at an unprecedented rate.

Many cities in the developing world are young, dynamic and are undergoing rapid urban development. Urban infrastructures such as sewage systems, transportation networks, plants, and communications are

being established, while urban areas are quickly expanding through domestic and foreign capital concentrated in cities creating new industrial complexes, housing, and tourist areas. However, behind this development, there are also socioeconomic and environmental problems of poverty, poor living and labor conditions, pollution, and the loss of valuable traditions (UN, 2011).

Public infrastructure investment has continually increased in order to progress through sustainable development and improve the overall urban environment in the developing world. For the past 50 years, mainly from the OECD countries, a large amount of money has been donated in Asia for building various urban infrastructure projects and supporting human resources. Global organizations such as the World Bank and UN-Habitat also promoted support for infrastructure, improved living, education and environmental conditions. In 2015, the Asian Infrastructure Investment Bank had also been established to support urban and infrastructure projects in underdeveloped regions of Asia.

Nonetheless, skepticism about infrastructure investment exists. In 2005, representatives of development assistance officers, civic groups, and civilian organizations from 91 countries gathered in Paris to raise the question on the effectiveness of aid which culminated in the Paris Declaration (OECD, 2005). This is because negative outcomes on the effects of aid had been reported either due to the lack of understanding of local lifestyles, culture, administrative system, and environment or because of the limited capabilities of local government and one-off plans (Reality of Aid, 2008).

Such criticism is also related to the various discourse and theory on

the normative principles of urban design. For example, in the sustainability discourse, a good city is argued to function properly within its limit, is user-friendly, and socially just (Williams et al., 2000; Ravetz, 2013). Fainstein also refined the social values of a sustainable city, contending that equity, diversity, and democracy are the three components which form a just city (Fainstein, 2014).

Urban policies in many Asian emerging economies is founded upon building sustainable urban environments. Hence, it is particularly important to consider the local technology and environmental demands in the development process as many cities are technology-wise backward and are often vulnerable to natural disasters. Projects that have been successful in the developed countries may have negative consequences if the local political, economic and cultural conditions are not understood properly. Moreover, although infrastructure is known to be a prerequisite to economic development (Straub, 2008), studies focusing on how new infrastructures affect people's life and the physical environment is rather limited. More specifically, there is a lack of empirical evidence on how new developments affect people's jobs, change the conventional way of spatial use and the various aspects of daily life that need to be adapted to the new environment. Hence, it is necessary to reconsider the impacts of infrastructure investment – a means that is often prescribed to remedy urban problems and promote growth – upon the surrounding neighborhoods and the urban environment in emerging economies of Asia.

Transportation infrastructure is one of the most frequently constructed urban projects to facilitate urban expansion, connect with

surrounding areas, and secure domestic and foreign investment for land or industrial developments. Empirically investigating a recently completed transportation infrastructure and the subsequent changes in socioeconomic characteristics and the use of space would provide evidence on the specifics of who was affected and how the environment had transformed. Against this thought, Danang, Vietnam, one of the most rapidly urbanizing areas, was considered an appropriate place of study. Danang is a well-suited testbed for understanding the impact of infrastructure development in the context of an emerging real estate market and a rapidly changing urban fabric. The central and local government of Danang vigorously invested in infrastructure and carried out urban development projects to promote the city as the main city of central Vietnam ever since it became an independent municipality in 1997. In this vein, Danang is also geographically important as it is the eastern exit of the East-West Economic Corridor (EWEC) of Indochina which runs through Myanmar, Thailand, Laos, and Vietnam. It was part of the EWEC project that the Nguyen Tat Thanh road was constructed and opened to the public in 2003 so that the hinterland would be connected to the Danang port area. The large-scale road development provided a pivotal opportunity to increase vehicle accessibility, and improve the urban landscape and neighborhood environment.

The main purpose of the study is to understand the socioeconomic impacts of road development, its subsequent spatial changes and infer implications for urban policy, planning, and design. An early interview with a resident during the preparatory stage of the research provided

the researcher insight on how road development affected occupation, income, size and use of residential space.

Before the Nguyen Tat Thanh road was developed, we were living under tough conditions with the pension that was given after I was dispatched from the army. But after the development, people started gathering to our area so our family decided to run a café and an internet game area...Our income increased by a large amount so we expanded our building. Compared to the past, we live a much more comfortable life now.

Resident interview (aged 61), 3 March 2014

The specific purposes of the study are as follows. First, the study examines the overall change in the neighborhood environment after the road development since such development induces change in socioeconomic characteristics, use of residential space, and the differences in relation to how close one settles to the new road. Second, the study aims to reveal the effects of improved mobility due to the road development. A new road may allow better mobility to all its users, however, if the purposes, method, and frequency of travel differ, likewise job distribution, commuting method, and use of space would also differ according to the user group. Third, the study traces the urban morphological changes because a new road creates opportunities for new urban spaces and transforms the urban environment.

This research is divided into three chapters using the data collected through in-depth interviews of 460 residents living in proximity to the Nguyen Tat Thanh road, stakeholder interviews, and site observations.

Each chapter is also considered an independent piece of research, whereby Chapter 1 and 2 have already been published in *Habitat International* and *Cities* respectively. Chapter 1 examined the overall effect of road development on the surrounding neighborhoods. Through the in-depth interviews, changes in socioeconomic conditions and building use prior and after the road development were surveyed. Through this, the characteristics of the overall change in people's socioeconomic life and the physical environment in a rapidly urbanizing area were understood. Chapter 2 examined how mobility affected people's travel patterns and the use of space. For this, people's workplace, shopping, leisure, education, and religious destinations and routes were surveyed. This research conveyed that the effects of mobility are different for migrants and original residents. Chapter 3 investigated the changes in urban form characteristics along the Danang coast in the aftermath of the road development. Five projects either completed or currently underway were analyzed in terms of its development process, urban form and design.

In the efforts toward creating good cities, this research argues for a community needs based urban planning through a careful prediction of the effects of infrastructure development by delineating the various impacts a new road development has had on the people and the environment. The research also implies that it is paramount for governments with limited funds and human resources to establish clear project visions and have realistic development aims.

Chapter 1

The neighborhood effects of new road infrastructure: Transformation of urban settlements and resident's socioeconomic characteristics in Danang, Vietnam

1. Introduction

A large body of research shows that capital investment in a city's major infrastructure may act as a catalyst for economic growth and social transformation (Aoyama & Kondo, 1993; Kelly, 1994; Chandra & Thompson, 2000; Cervero, 2009; Neuman & Smith, 2010; Cervero & Kang, 2011; Padeiro, 2013; Kwon, Kim, & Jeon, 2014). Among the studies, Polzin (1999) presented probably one of the most comprehensive list of the impacts of transportation infrastructure on neighborhood change. The study classified the impacts into three categories: the direct, the indirect, and the secondary impact. 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. Newly deployed public transit, for instance, may enable a market for housing and office development on a site with shorter travel time and better amenities. The indirect impacts involve incremental, catalytic influences of new infrastructure that are mediated by policy change and community responses, such as reduced development costs, tax

incentives, relaxed zoning regulations, and increased attractiveness of an area. The secondary impacts include more subtle but fundamental change in individuals' behavior and social perception about an area affected by new infrastructure. The results may manifest the agglomeration of a certain business or commercialization of a residential district associated with the aforementioned impacts.

As noted in previous studies, the effect of improved infrastructure on neighborhood change may have different influences according to the location. The impact of stream restoration and new streets with improved walkability on urban redevelopment in Seoul, for example, varied substantially depending on different locations (Kang & Cervero, 2009; Kwon, Kim, & Jeon, 2014). However, it is still unclear as to who are affected by these infrastructure-related developments and to what extent urban spaces are transformed. Especially, empirical investigation of the change in urban space created and maintained by local communities in developing countries—where households in an informal settlement, unregistered workers, independent retail entrepreneurs, individual home builders, and migrants seeking a new source of income contribute substantially to the manner that infrastructure transforms a neighborhood's urban landscape—was very limited as of today. Here, we attempted to fill the research gap by documenting the effects of new road construction in the city of Danang in Vietnam, focusing on its indirect and secondary impacts on the use and redevelopment of nearby urban space. Additionally, the research included changes in the built environment characteristics potentially associated with the development of the new road.

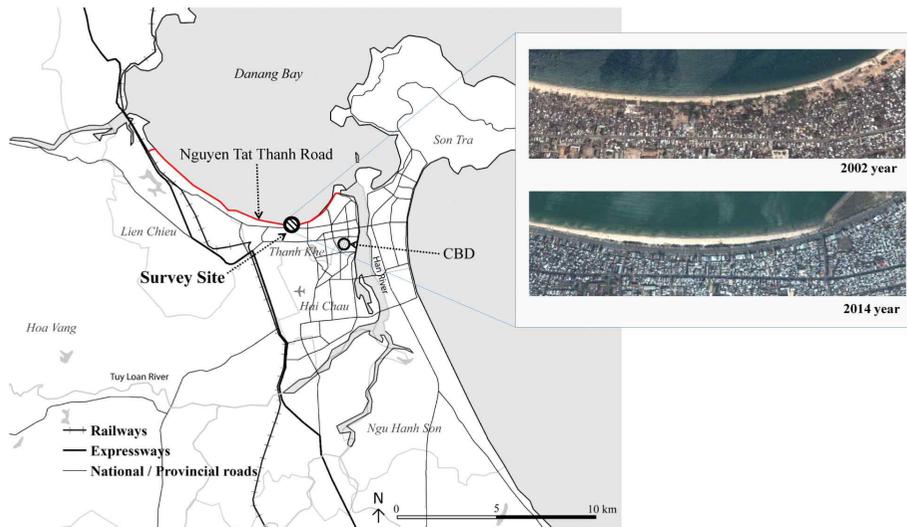


Figure 1. Map of Danang (Modified based on Google Earth by the authors).

Danang is a good test bed for investigating the effects of infrastructure within the context of emerging property markets and rapid transformations in the urban spatial structure in developing countries. As 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, Danang has become the gate of the new East-West Economic Corridor (EWEC) project which runs across the Indochina peninsula connecting Myanmar, Thailand, Laos, and Vietnam. Whereas the city government has very limited budget for the expansion of urban infrastructure, the development of large-scaled, inter-regional road provides unique opportunities for enhancing the vehicular access to and from the city and greatly improving the living environment of the urban communities.

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 infrastructure came to be engraved on the surface of the city around the late nineteenth and the early twentieth century. For instance, a gridiron layout was formed in the city's urban districts like Thach Thang and Phuoc Ninh during the period, which was later linked with the city's hinterland through a railway line. The Danang Airport was constructed under the French colonial rule in the 1930s and was used by the French Air Force during the Indochina War (1945–54) and later by the United States during the Vietnam War (1959–1975). After the establishment of the Socialist Republic of Vietnam in 1976, Danang experienced many changes. Among them, the economic reform of 1986—called Doi Moi¹—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, where urban areas increased from 6.5% of the city's total area in 1975 to 11.3% in 2003, and then to 17.9% in 2009 (Linh, Erasmi, & Kappas, 2012).

The physical development of the urban area was followed by

¹ The economic reform implemented in Vietnam since 1986 is known as “Doi Moi.” One of the fundamental strategies of Doi Moi was to motivate foreign investment in the country toward the creation of a socialist-oriented market economy. With the rapid growth of urban economy, intensive population migration took place in major cities like Hanoi in the northern part of the country and Ho Chi Minh City to the south. The city of Danang was recognized as the main city in the central region of the country in the late 1990s and was elevated to a municipal city status (Trân et al., 2012).



Figure 2. Traditional tube house and neo-tube house in Danang (Victoir & Zatspine, 2013, 262; Quang, 1997, 98).

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. More broadly, the road is part of the extensive East-West Economic Corridor (EWEC). The project was financed by Asian Development Bank and Japan Bank for International Cooperation, among others. Official construction of the road began in early 2000 and the road opened in March 2003 (Figure 1). In terms of building form, a large number of tube houses²—a narrow, street-facing multi-floor

² The tube house is a type of mixed-use residential building with a very narrow width and a depth of 20~60 m. A traditional-type tube house in Vietnam dates back

house that is called Nhà Ống in Vietnamese or ‘neo-tube house’ in contemporary terms—have been developed along the road (Figure 2). The prevalence of the tube houses along Nguyen Tat Thanh Road was partly due to the local government’s planning strategy balancing between the preference of the inhabitants and the city’s limited budget. Publicly acquired lands were subdivided into small, linear parcels along a newly-built road and then sold to the people who either invested in a single parcel with a minimum area of 100 m² or multiple parcels according to the investor’s financial capability.

With the development of the road, the city came to experience 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 by the communities, along with remarkable occupational change of the residents and emerging commercial ventures in response to the catalytic effects of road infrastructure. However, this change should not be merely attributed to improved accessibility enabled by new transport infrastructure. Although Danang does not have a city-wide mass transit system, the average commuting time was reported

to the sixteenth century, according to the study by Kien (2008), and the neo-tube house was increasingly built during the post-1980s. Both types share some similarities: each house faces a street and the owner(s) use the ground floor of the house for shops or for renting to other retailers. The residents often live on the upper floors of the building. But there are some differences. A traditional tube house is normally 1-2 stories high and is built on a parcel with a size of approximately 3.5 m x 35 m. Construction materials of a traditional tube house include ceramic roof tiles, wood beams, brick walls, and plaster. A neo-tube house is built to 3-5 floors on a parcel with a size of approximately 4~5 m x 20~40 m. Reinforced concrete with bearing frames form the major structure and building materials include brick walls and plaster.

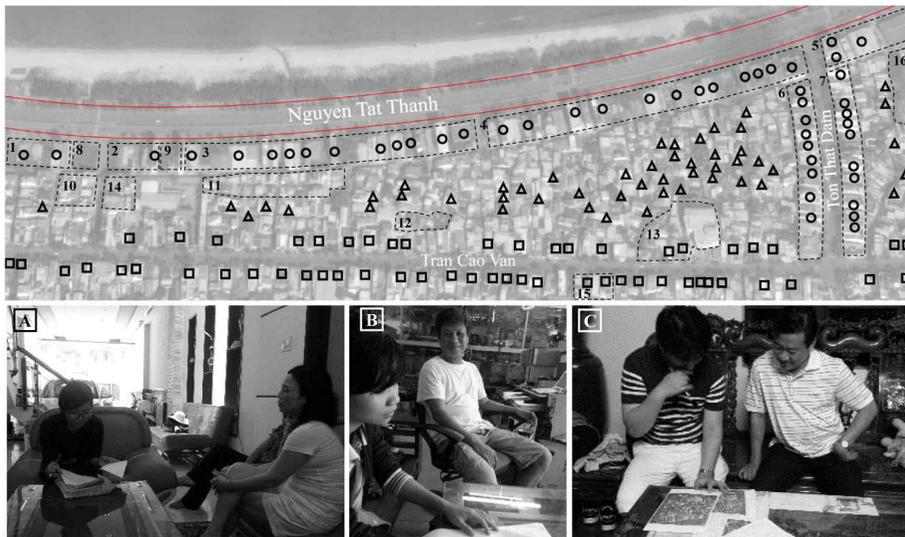
to be no more than 15 minutes, according to World Bank (2011). The exceptionally short travel time is due probably to the widespread use of motorbikes in the city and a high degree of job-housing and retail-housing balance embedded in the urban structure. Therefore, the presence of a new road may involve more fundamental socioeconomic transformation, such as community restructuring and cross-area migration, beyond the immediate impact of reduced travel time.

Against this backdrop of 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, who are likely to be risk-taking entrepreneurs, 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. In the following section, description of the study area and research methods will be presented.

2. Research Methods

The study empirically investigated a neighborhood called Thanh Khe District in Danang as shown in Figure 1. Here, field surveys and in-depth interviews were conducted, which allowed a closer understanding on how the new road construction impacted the immediate neighborhood, its community lives, and the built environment. 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. This group had the largest proportion of migrants from other districts of Danang. 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 area had the least number of migrants compared to Groups B and C. The above sites had no monumental public space, like a large public park or an urban square (Figure 3).

A preliminary field survey was conducted between February 25 and March 5, 2014 by the authors, assisted by Nguyen Thi Ngoc Ly (an instructor at Danang University Department of Tourism Management) and her colleague Nguyen Thi Xuan Huong (a translator during interviews). Then, more thorough investigation took place between July 10 and 20, 2014. During the survey, in-depth interviews with more than 600 people were conducted in the study area. Then, we chose 400



Interviewee groups

- Group A: Located directly abutting on Nguyen Tat Thanh Road
- Group B: Local community adjacent to Tran Cao Van Road
- △ Group C: Located in the landlocked site

Patterns of urban development

- 1,2,3,4,5,6,7 : New subdivision and property development
- 8,9 : New subdivision but no development
- 10,11,12,13 : Complete redevelopment
- 14, 15 : Infill development
- 16 : Demolition

Figure 3. Three groups of interviewees and the pattern of urban development (the map shows part of the study area).

interviewees who owned at least one property within Groups A, B, or C. Among the interviewees, 217 people were original residents who owned and continued to live in the study area. The rest, 183 people, were migrants from other districts in Danang or inter-city migrants from other provinces or cities who moved to the study area for various reasons—seeking a new job, running a real estate venture, managing a new hotel, or educating their children in a private institution—after the development of Nguyen Tat Thanh Road in 2003. The interview was assisted by eight students from Danang University Department of Tourism Management.

The survey questionnaires involving pre-2003 and post-2003

Table 1. Survey contents.

Category		Details
Pre-2003	Social/ Economic Characteristics	<ul style="list-style-type: none"> • Property ownership • Occupation • Income • Place of employment • Mode of transportation • Household business
	Architecture	<ul style="list-style-type: none"> • Building type and location • Building use • Ground floor use
Post-2003 (based on 2014 survey)	Social/ Economic Characteristics	<ul style="list-style-type: none"> • Property ownership • Occupation • Income • Place of employment • Mode of transportation • Changes to household business • Scope of activity
	Architecture	<ul style="list-style-type: none"> • Building type and location • Building use • Ground floor use • Physical transformation • Change of property value
General Background	Basic Information	<ul style="list-style-type: none"> • Gender, age, level of education • Size of a family, birthplace
	Building Location	<ul style="list-style-type: none"> • Place of response • Address of current residence

socioeconomic conditions and the built environment characteristics were shown in Table 1. The survey included the status of property ownership, occupation, personal/household income, the location of jobs, the mode of transportation and time for commuting, the source of income and the type of business/employment. Additionally, information

on the type of buildings they owned, its location, and different uses by floors were also collected. The pre-2003 and post-2003 questionnaires were the same except for: i) physical change of the buildings like renovation and partial redevelopment, and ii) change in the property value after 2003, which applied only to the post-2003 survey. In the last page of the survey, participants' personal information like gender, age, education, family size, birthplace, home address, and the location of an interview site were recorded. Since the pre-2003 survey was largely based on the memories of the interviewees, some incorrect information could have been reported. Additionally, some interviewees were reluctant to reveal their income during the survey. When the interviewers asked to document their income levels in the years of 2002 and 2014, for example, only 288 responses out of a total of 400 interviewees were acquired. Despite the limitation, the authors believe that no major misrepresentation was reported in the survey because a group of trained local students conducted face-to-face interviews with the property owners and spent more than one hour per person to verify the quality of the responses. Additionally, survey samples with uncertain response were discarded. Then, the survey results were first reviewed after being pooled into a complete dataset and then were examined separately by the groups of A, B, and C.

3. Results

Widespread development of tube houses and increases in the rentable space

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. 4). 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 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. In Danang, demolished houses and cut-off parcels associated with road development were acquired by the local government. Displaced households were compensated from a public funding source established by the People's Committee in the late 1990s. Then, after the road development was completed, acquired land was sold to new people through public auction. With in the study area, a large number of subdivided parcels were acquired by non-original residents, who then later developed a number of mid-rise buildings. For instance, by 2014, about 9.8% of the migrants came to own three-story buildings and another 6.0% owned four-story buildings in the area. Although the majority of migrants still lived in one to two-story buildings, this was notably different when compared to the original residents group. Nearly 60% of original

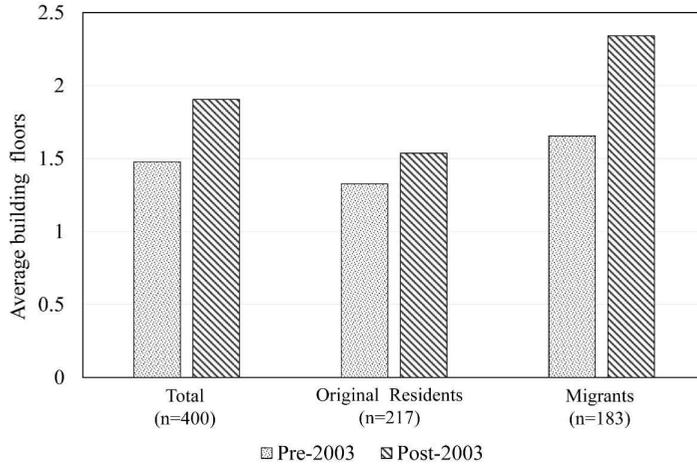


Figure 4. Change in building floors of the study area.

residents lived in a single-floor residence, and those who lived in buildings higher than three-story only accounted for 2.3%.

Among the multi-story buildings occupied or built by migrants, the tube house comprised the most typical architectural type in the study area. The study area, where tube houses already formed a large part of the built environment by the early 2000s, was characterized with a greater number of tube houses afterwards. Before 2003, 31.8% (n=127) of the total interviewees owned and lived in a tube house. The rate increased by 12.2% in 2014, amounting to a total of 44% (n=176; Figure 5). The percentage of the migrants' tube house ownership was far higher than original residents. For instance, about 35.5% of the migrants (n=65) used to live in a tube house 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

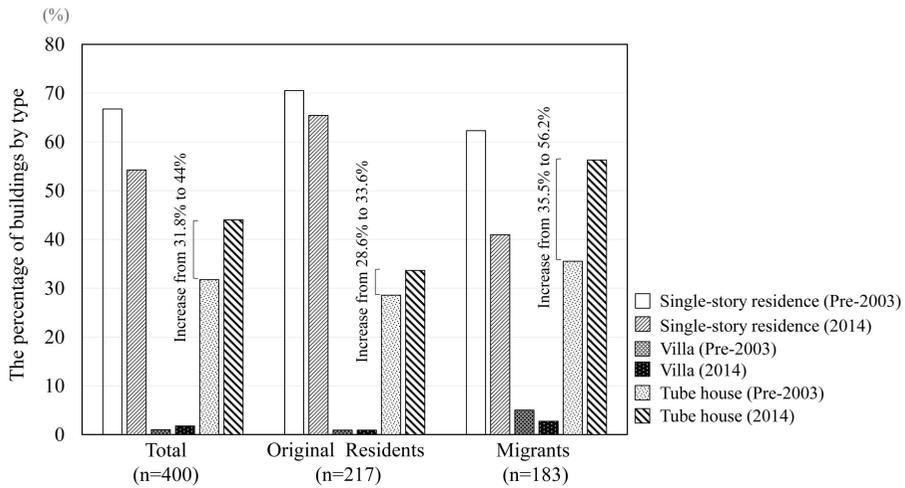


Figure 5. Change in building type of the study area.

study area. Compared to a less-convertible, single-use traditional house, contemporary tube house could host a variety of retail and amenity uses. Each floor of a typical tube house accommodated different uses, often decorated with unique materials and personal fixtures flavored with individual self-expression. At an urban scale, the area's urban blocks were filled with elongated, linearly layered parcels defined by major roads. This attracted a large number of in-migrants who hoped to build their own tube houses. The parcels, if pedestrian connectivity was greatly improved and land purchase became available in an official market, provided a highly desirable site for the development of contemporary tube houses. The following interview supported this:

Many people want to build or buy a tube house in Danang if they can afford to. I am one of them. I originally lived in an old, non-tube house building. I was born in a rural area. (After migrating

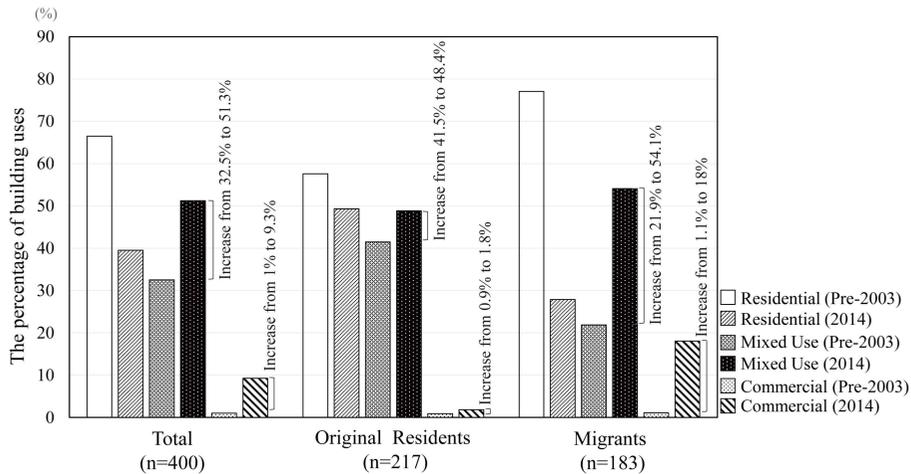


Figure 6. Change in building use of the study area.

to the city), I worked hard as a carpenter to save money. Quite recently, I could own a self-built tube house in the area...Although the first floor of my house is a family living room, I would have rented it out or used it as my own workspace if my house abutted on a road exposed to many passers-by.

An interview with ○ ○ ○ (46 years old) on March 4, 2014

The development of tube houses 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 used to own 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.

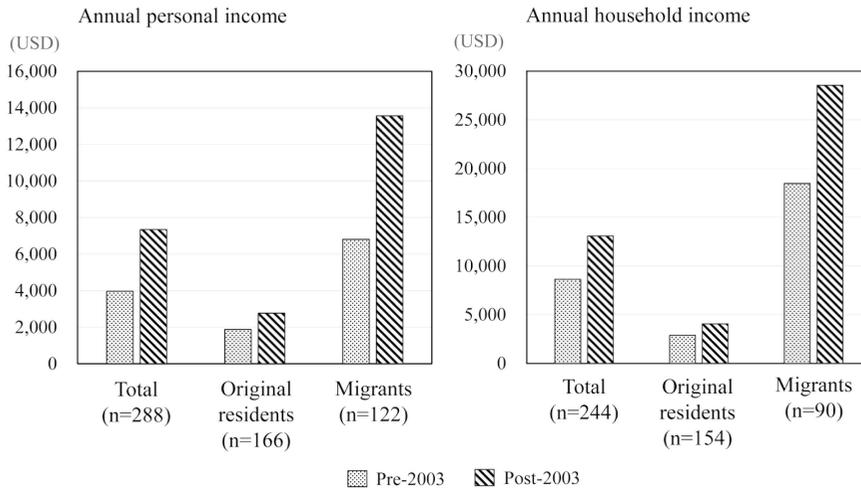


Figure 7. Annual income level between 2002 and 2014.

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; Figure 6). In other words, the percentage of the buildings with one or more floors of a non-residential use—such as a hotel, a noodle shop, a pub, a vegetable market, and a karaoke—has nearly doubled from 33.5% to 60.5% over the years. Again, the change was largely driven by the migrants who sought to expand their existing retail network or to test a new type of business through voluntary occupational change. About 72.1% of the migrants owned a building with commercial-only or mixed-use features in 2014, which is a significant increase from 23% before 2003.

Additionally, 33 out of 37 commercial-only buildings in the study area were owned and managed by migrants in 2014. For example, the owner of a six-story hotel at 21 Ton That Dam Road used to work for a travel agent in Hai Chau District before 2003. After being dissatisfied with his job, he bought a site in the study area—which was previously occupied by a residential property adjacent to Nguyen Tat Thanh Road—through public auction. He then built a hotel with twelve rooms on the first five floors of the building and placed his own residence on the top floor.

One of the most immediate impacts of the spread of mixed-use tube houses 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 7). 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. The manager of a hotel at 417 Nguyen Tat Thanh Road, for example, used to own three buildings and a restaurant in Hai Chau District in the early 2000s. His annual household income was no more than 5,000 USD. In response to the development of Nguyen Tat Thanh Road, he speculated on the chance of buying two parcels in the area and merged them into one to build a

mid-sized hotel with a restaurant. Although the site was not directly connected to the new road, he predicted that demand for tourism and dining in the nearby area would heighten. After the completion of the hotel in 2005, nearly full occupancy was recorded. His annual income soared by ten times at about 50,000 USD in 2014. However, such a dramatic increase in the income level of some migrants was a source of dissatisfaction among the Groups B and C interviewees. For instance, a fisherman who was an original resident in Group C felt strong dissatisfaction about new developments largely driven by the migrants in Group A because their close acquaintances lost their jobs and left their hometown due to the development. Another original resident born in Thanh Khe District had a negative impression about the opening of Nguyen Tat Thanh Road.

With the development of a new road, the overall living standard of the community has improved. However, I think most of the economic benefit from road development belongs to the already wealthy owners of the land directly adjoining Nguyen Tat Thanh Road. The new road did not contribute to an increase in my and other retailers' business profit near Tran Cao Van Road. Or worse. Competition became much more intense as similar types of business began to mushroom in the nearby area. I hope that Tran Cao Van Road is also widened and the nearby land acquired by the People's Committee and then resold to the original landlords after reasonably subdivided. Then I can build a new, large-sized building.

Excerpt from an interview with ○○○ (47 years old) on March 5, 2014

Proximity effects of road infrastructure on the built environment,

uses, and people

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 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 tube house. Especially, the interviewed residents preferred tube houses having both a self-owned residential unit and rentable space close to the ground floor within a single building envelope. The preference was consistent among the interviewees independent of their income level and the place of origins. Additionally, the block pattern of the area was suitable for the development of low-rise buildings than larger, taller architecture due to the narrow width of the parcels and limited vehicular access, unless large-scale merging of land ownerships was undertaken by real-estate developers. Over the last ten years, no merging was reported involving more than three parcels in the area. Additionally, the result was supported by the relatively even distribution of urban development

activities across the study area. In total, 91 new development activities were reported in the area between 2003 and 2014. Among them, 40.7% took place in Group A (n=37), followed by Group C (n=35) with 38.5% and by Group B (n=19) with 20.9%.

Nevertheless, this does not mean that the overall size of the buildings remained homogeneous. For example, increases in the area of building footprints were prominent near Nguyen Tat Thanh Road, or in Group A, compared to other areas. With the road development, the parcels in Group A were subdivided in a manner that increased the area and then were auctioned to a new property investor. This was achieved through public-led land acquisition and land readjustment processes which was favorable towards tube house development along the newly constructed road. The adjusted plots were then publicly sold with typical parcel sizes of 125 m² (5 × 25), 81 m² (4.8 × 18), and 72 m² (4.5 × 16). On the other hand, the parcels in Groups B and C remained fundamentally small, ranging from 21 m² to 90 m². Especially, Group C had the greatest number of very tiny parcels—of ten smaller than 40 m²—with irregular shapes, although some mid-sized parcels did accommodate for tube house development. Additionally, between 2003 and 2014, Group A reported the greatest number of merged parcels (n=6), compared to Group B (n=0) and Group C (n=2). The merged parcels hosted uniquely large-scaled commercial buildings, such as a seven-story hotel with a total floor area of 1,750 m² and a three-story restaurant with an area of 560 m² accommodating 135 diners.

The bigness of the parcels in Group A was closely related to the accelerated diversification of non-residential uses. For instance, in 2014,

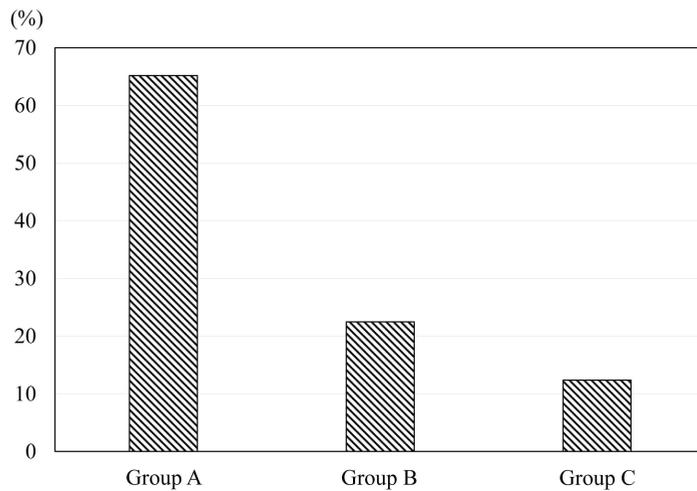


Figure 8. Percentage of the migrants who moved to the study area between 2002 and 2014 by groups.

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. Between 2003 and 2014, 45 renovations took place across the properties owned by the

interviewees. Among the three groups, Group A experienced the most frequent renovations—22 cases—followed by 16 renovations in Group C and 7 renovations in Group B. In Group A, the major purpose of the renovation was to improve the use value of rentable space, as well as to enhance the livability of self-owned residential units. This included the optimization of an interior layout for new uses, the expansion of a kitchen space, and up-scaling of the water piping system. Here, renovations did not always follow a stereotypical model of having a shop on the first floor and a private home on the second floor. For instance, the owner of a three-story café and a bar in Group A renovated the first two floors as a commercial space and the third floor as a dormitory space for the employees of the café rather than placing his own residential unit. In Group C, renovation generally involved the provision of basic space related to residential use, such as a new storage space or a children’s bedroom in the mezzanine floor of the building.

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 (Figure 8). Diversification of building uses in Group A, as noted above, was at least partly attributable to the venturing behavior of the migrants. The distribution of the people who experienced occupational change seemed fairly even across the groups. For instance, about 32.5% of the interviewees (n=74) changed their jobs in Group A, which was similar

to 34.2% (n=78) in Group B and 33.3% (n=76) in Group C. When occupational change of the migrants was analyzed by groups, however, the difference became distinctive. Among 106 migrants who changed their occupations between pre-2003 and 2014, 64.2% (n=68) belonged to Group A, 25.5% (n=27) to Group B, and 8.5% (n=9) to Group C. This implied that a neighborhood abutting on Nguyen Tat Thanh Road attracted a high proportion of migrants with greater job mobility. The opportunistic career change of the residents in Group A included becoming a motel owner, a restaurant and café manager, a retail dealer in construction materials, and a manager of an automobile repair shop. The economic impact of entrepreneurship in Group A was manifest through the very high income level of the residents. On average, the personal and the household income level of the interviewees in Group A was six to eight times higher than those in Groups B and C. For instance, average personal income in Group A was 19,093 USD (n=64), which was much higher than 3,322 USD (n=72) in Group B, and 2,636 USD (n=108) in Group C. There was little evidence to suggest that migrants sought occupational changes due to job loss from their place of origin.

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 2010, a fifty-year-old original resident in Group B extended two additional floors on top of a single-story building to enlarge his family space. The ground floor area, which used to be a residential unit, was renovated by himself and was rented for a bike

repair shop, which was run by a young migrant. Another thirty-five-year-old original resident was adaptively reusing her villa by running a fashion shop on the ground floor. The villa's courtyard was used as a display space for new clothes as well as a parking space for motorbikes. 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.³ However, in the 2000s, underutilized living spaces 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. Although the choice did not lead to far greater profitability of the land, the very basic living environment of the landlords and their family had been stabilized. The residents were very cautious about paying for higher rents if they had decided to migrate to other urban areas. This suggested a rational consolidation of affordable space in Group C with greater bottom-up demand for social

³ The People's Committee of Vietnam is the local administrative organization of the State, which carries out a number of urban policies and management duties at the local level in accordance with the law.

stability in the long run, not a return of wealthier residents with entrepreneurship to the area. Many courtyards of the houses in Group C came to be utilized as a multi-purpose communal area hosting social activities such as leisurely strolls, resting, parking, children's playing, handicraft manufacturing, pop-up markets, and informal community gathering. This has generated a highly diversified urban landscape, which on the other hand, can also become a barrier to—or at least significantly delay—large-scale urban redevelopment in the area.

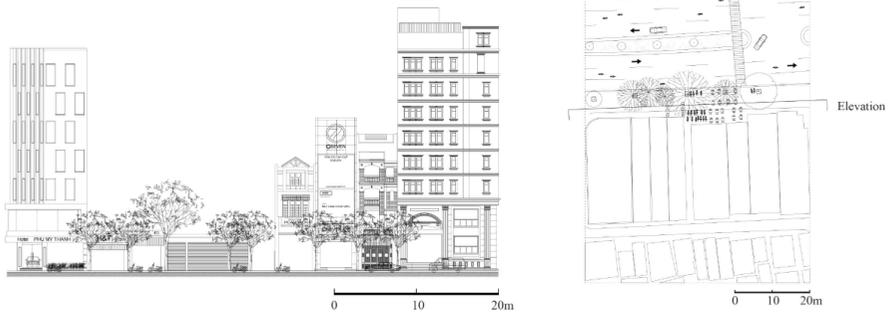
Differences in the privatization of public space by groups

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. As noted in Kim (2012) on the use of sidewalks in Vietnam, the intensity of space use fluctuated substantially due to changing number of consumers over different periods of the day. However, the person or a group who controlled the manner a public space is used did not change much by time. For example, the illegally extended dining places in the sidewalk, once occupied by the tables belonging to

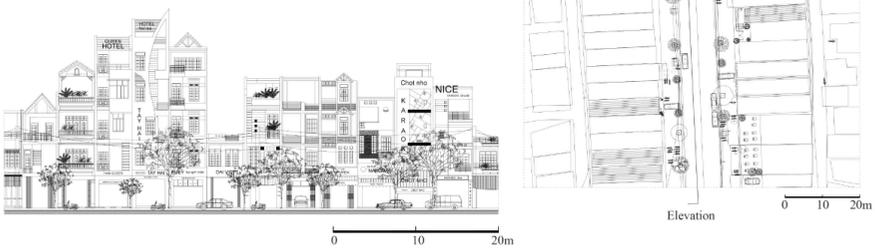
a restaurant, was also maintained by the same manager after regular operating hours of the restaurant. Chairs were stacked up and flowerpots were relocated in the late evening but the space was still under the control of the same manager. In other cases, illegal street vendors occupied the corner of major streets in order to sell drinks, snacks, or locally-caught fish. Although some vendors' cart took up part of the sidewalk connected with the entrance of a nearby retail, little conflicts were observed between the vendors and the nearby retail owner. On the other hand, illegal parking of motorbikes and automobiles was a major source of nuisance. Although some of the ground floors of the buildings had room for parking, among other uses, very little parking space was reserved for retail tenants and visitors in Group A. Although temporary parking often occupied part of the roads or the sidewalks, micro-scale built environment characteristics like the small-scaled crossings, well-maintained trees and tables, and street lamps largely generated walkable atmosphere in the area (Kim, Park, & Lee, 2014). In other words, private use of public space in Group A was largely characterized by the extension of private enterprises or functional demand like parking and storage. Despite the fact that the usage and the number of occupants of public space changed by time, unpredictable social use or change in the subject controlling the space was rarely observed in Group A.

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

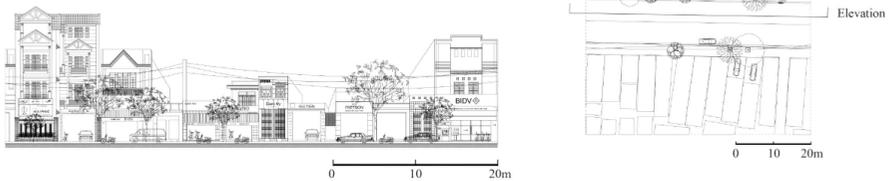
• Nguyen Tat Thanh Road (Group A)



• Ton That Dam Road (Group A)



• Tran Cao Van Road (Group B)



• Inside of the Block (Group C)



Figure 9. Typical plan and elevation of the streets in Groups A, B, and C (Group A: Nguyen Tat Thanh Road 419-435 and Ton That Dam Road 6-32; Group B: Tran Cao Van Road 439-452; Group C: Tran Cao Van Road K368/15-31; drawn by Daewoong Choi).

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. The place accommodated parking demand not only from adjacent places, but also from retails and houses in Groups A, B, and C. In many buildings, height difference between street level and the ground-floor level of the buildings was eliminated so that motorbikes could easily move around the inside and outside of the property. 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 (Figure 9).

4. 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. The observation supports the first hypothesis proposed in the Introduction. 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 tube house. The building floors of a tube house were flexibly utilized for a variety of residential and non-residential uses. Parcels abutting on Nguyen Tat Thanh Road could host a large number of migrants who invested in the development of tube houses because institutional barriers including land acquisition and development were significantly lowered under favorable urban policies. These included the local government's systematic management of land acquisition, compensation and resale of subdivided parcels, the low construction costs of tube house development carried out by local builders, and the high demand for rentable space in the area due to continued urbanization. Most importantly, the supply of mid- to large-sized linear parcels accessible from the roads was quite limited in the city, which continued to push up the profitability of tube house development in the area.

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 tube houses 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. Its walkable environment remained intact, with no thoroughfares cutting through the internal urban fabrics. Therefore, the second hypothesis proposed in the Introduction—an inner block will have experienced minimal physical change—does not seem to be supported in the study.

In Danang and elsewhere in Vietnam, investment in road infrastructure was espoused as a crucial policy vehicle toward the goal of rapid economic growth by local governments. An inflow of massive foreign capital accompanied by domestic property investment around transport corridors is one major aspect of the growth model. Indeed, many Asian investors from South Korea, Japan, and China were involved in property development in Danang. For instance, a construction company in Korea, called Daewon Cantavil, decided to invest 250 million USD for the development of Daphuoc International New Town in 2006. The project included land reclamation along Danang Bay—an eastern endpoint of Nguyen Tat Thanh Road—with an area of 210 ha and a residential complex, a golf course, and a hotel. Another example is the Golden Hills Project with an area of 400 ha, planned to be built in the Cu De River Basin to the northwest of Danang. A Vietnamese private company, called Trungnam Group, has announced an investment plan of 1.6 billion USD for the project. The

site will host a variety of programs, such as recreational amenities, a residential complex with tube houses and villas, a golf course, a marina, an amusement park, and an international school. Work on the development of infrastructure is currently underway and a global architectural design firm Skidmore, Owings & Merrill LLP (SOM) is involved with the project. Additionally, private developers from Hanoi and Ho Chi Minh City also began to invest in the development of large shopping malls and supermarkets in Danang. The local government of Danang is planning to create the bus rapid transit (BRT) system by 2025 in order to facilitate the growth of the city with mitigated traffic congestion and to improve health issues caused by air pollution.

However, since the above projects depend heavily on a large amount of capital investment from outside, the process of development has fluctuated substantially—sometimes delayed for several years in the middle of development like Daphuoc International New Town—due to market change and uncertain expectation of property sales. Additionally, the benefit gained from large-scale infrastructure development became a source of dissatisfaction among some community members as mentioned in the earlier section. 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. Although the development of Nguyen Tat Thanh Road

involved the provision of sidewalks planted with street trees, deterioration of public space was fairly rapid. The private use of sidewalks and street corners was prevalent, as shown previously, which lead to the rapid obsolescence of pavement. Additionally, illegal blocking of a walking path was frequent by motorbikes. 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.

This study empirically investigated the impacts of a new road on the urban landscape and residents in a Southeast Asian city. In future, the relationship between road development and the changes in the surrounding area may be statistically investigated and furthermore, policy implications for regional development plans require consideration.

Acknowledgments

This work was supported by the BK21 Plus Project in 2015 (Seoul National University Interdisciplinary Program in Landscape Architecture, Global leadership program towards innovative green infrastructure). Additionally, this research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT & Future Planning (NRF-2014R1A1A1037046).

Chapter 2

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

1. Introduction

One of the key principles for planning transportation infrastructure is striking a balance between mobility and livability (Cervero, 2009; Deshkar et al., 2011; Kim et al., 2015). Good mobility denotes improvements in vehicular speed and movement capacity in an urban area. The definition of livability varies according to previous studies (Smith et al., 1997; Van Kamp et al., 2003; Balsas, 2004; McCann, 2007; Wang et al., 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 (Vilhelmson, 2007; Newman & Smith, 2010). In recent decades, cities in Asia have been no exception (Lee et al., 2015). In Vietnam, which has seen an average

economic growth of 6.1%⁴ 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 place (Issah et al., 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 (Figure 10). 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

⁴ From 2006 to 2015. Retrieved from <http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?page=1>

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 et al. (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

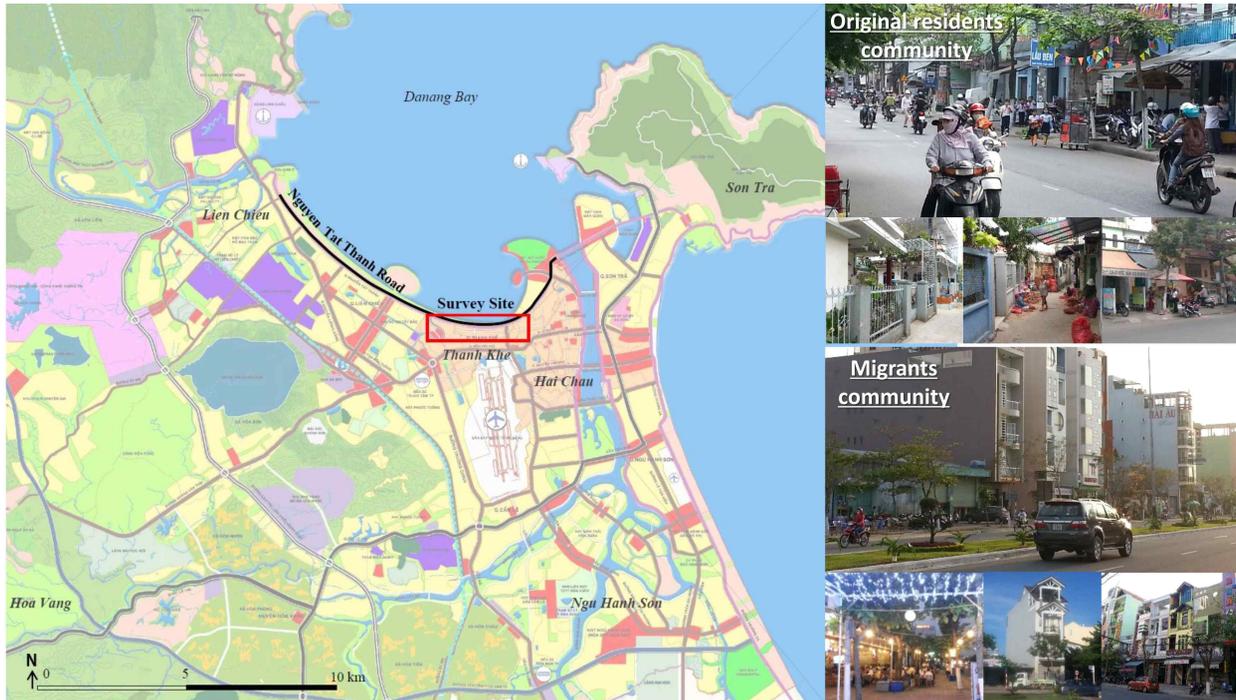


Figure 10. Masterplan of Danang and the study area (Modified based on the Masterplan of Danang city (2030-2050) by the authors).

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 (Punpuing & Ross, 2001; Krisjane et al., 2012; Marquet & Miralles-Guasch, 2015) or strong government policies (Cervero & Duncan, 2006; Lau & Chiu, 2013; Lin et al., 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 (Kelly, 1994; Polzin, 1999; Sullivan & Lovell, 2006; Cervero, 2009; Neuman & Smith, 2010). However, detailed social surveys that examine the relationship between road development and neighborhood change in terms of mobility appeared to be 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 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 Methods

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

Table 2. 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	<ul style="list-style-type: none"> • Shorter travel time • Decentralization of employment • Diversity of movement routes 	a) Job distribution, commuting frequency, commuting modes of transportation, route characteristics, commuting distance, type of vehicles owned b) Places for shopping, leisure, education, and religious activities, frequency of travel, mode of transportation
	<ul style="list-style-type: none"> • 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

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 2). 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 distance⁵, 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.

⁵ 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.

3. Results

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 minutes at non-peak hours, from 17 to 10 minutes. The travel time to Son Tra, which is a hilly area located in the northeastern corner of the city, was reduced by 20 minutes, from 35 to 15 minutes. 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), 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 m² (4.5 × 20) or 125 m² (5 × 25). 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 (Figure 11). 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 3, 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. 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

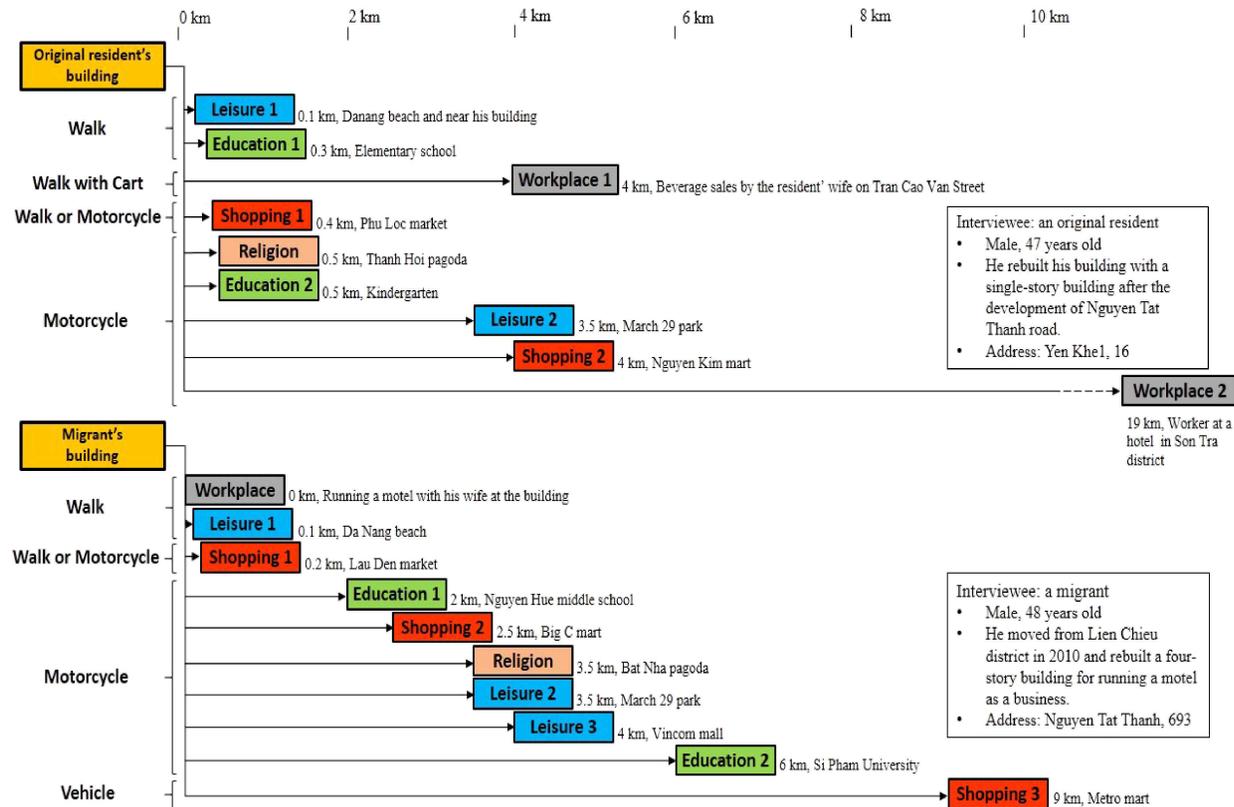


Figure 11. Comparison of original residents and migrants travelling distances from home to workplace, places for shopping, leisure, education and religious activities according to modes of transportation.

Table 3. The trends and rationales of change in job distribution and commuting pattern.

	Original residents	Migrants
Job distribution	<ul style="list-style-type: none"> • <u>Distributed across Danang</u> - 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 	<ul style="list-style-type: none"> • <u>Concentrated along the new roads</u> - Residence and workplace coincide: Operation of hotels/motels, restaurants, cafes - Along roadside: Service sector, government - Downtown: White collar employees, service sector
Chang		
es	Commuting frequency	Commuting frequency
	<ul style="list-style-type: none"> • <u>Dependent on jobs</u> 	<ul style="list-style-type: none"> • <u>Daily, regular</u>
	Commuting modes of transportation	Commuting modes of transportation
	<ul style="list-style-type: none"> • <u>In the order of Motorbike (55%) – By walking *(41.3%) – Bicycle (3.0%)</u> 	<ul style="list-style-type: none"> • <u>In the order of by Walking*(61.2%) – Motorbike (33.4%) – Vehicle (4.4%)</u>
	Commuting distance	Commuting distance
	<ul style="list-style-type: none"> • <u>Average distance 7.58 km</u> • <u>Increased</u> compared to pre-development of the road 	<ul style="list-style-type: none"> • <u>Average distance 3.68 km</u> • <u>Reduced</u> compared to pre-migration
	Type of vehicles owned per household	Type of vehicles owned per household
	<ul style="list-style-type: none"> • <u>Motorbike: 2.4 (85% increase)</u> • <u>Bicycle: 0.6 (43% decrease)</u> • <u>Vehicle: 0.02 (No change)</u> 	<ul style="list-style-type: none"> • <u>Motorbike: 2.3 (45% increase)</u> • <u>Bicycle: 0.4 (42% decrease)</u> • <u>Vehicle: 0.3 (240% increase)</u>

Rationale	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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
-----------	--	---

* includes cases where place of residence and work coincide

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 development⁶, it seemed that the original residents benefited to a lesser degree than migrants from the opening of the Nguyen Tat Thanh Road.

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

⁶ Retrieved from http://alainbertaud.com/wp-content/uploads/2013/07/AB_report_Danang_Graphs_rev.pdf

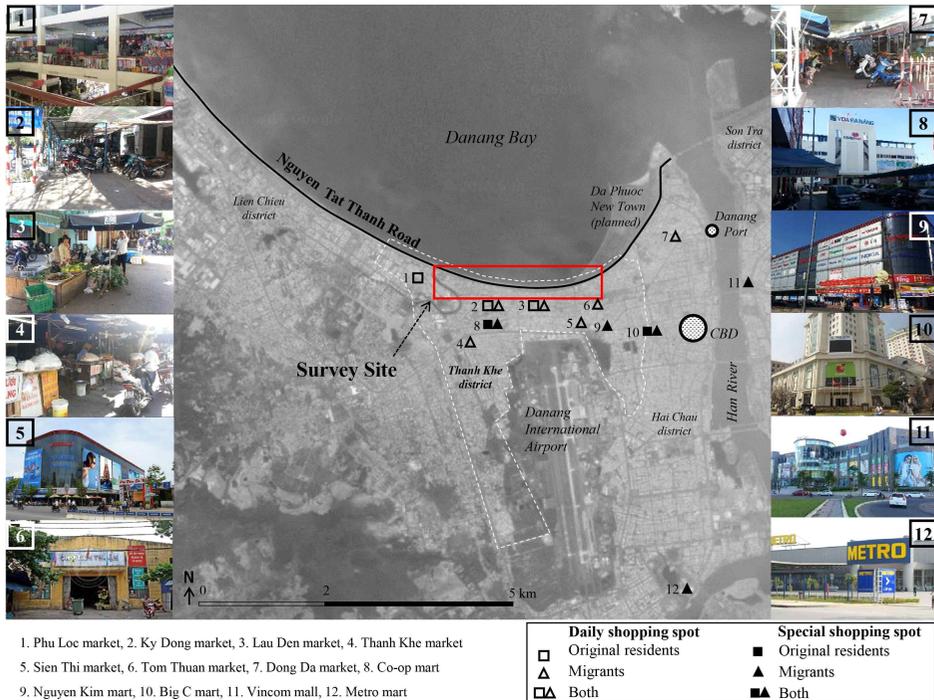


Figure 12. Locations for shopping frequented by original residents and migrants.

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 (Figure 12). 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,

Table 4. The trends and rationale of changes in land (re)development and housing typology.

		Original residents	Migrants
C h a n g e s	Location	<ul style="list-style-type: none"> • <u>Diversely distributed along new roads</u> 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) 	<ul style="list-style-type: none"> • <u>Concentrated along the new roads</u> 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	<ul style="list-style-type: none"> • <u>Mixture of elongated and atypical forms</u> • Various lot sizes 	<ul style="list-style-type: none"> • <u>Elongated</u> • 4.5 × (16~20 m), 5 × 25 m area
	Architectural characteristics	<ul style="list-style-type: none"> • <u>Average building floors: 1.5 floors</u> • 4 - 5 m in height, <u>1 - 2 stories with mezzanine accounts for 89.1% (n=220)</u> • <u>3 - 4 story buildings account for 10.9% (n=27)</u> • Simple structures utilizing iron concrete, brick walls and cement finishes. Simple in color. • Small front yards or staircases built 	<ul style="list-style-type: none"> • <u>Average building floors: 2.3 floors</u> • <u>1-2 story buildings account for 59.1% (n=126)</u> • <u>3.3 m in heights, 3 - 7 stories: 40.8% (n=87)</u> • 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	<ul style="list-style-type: none"> • <u>Residential: 51.8% (6.9% decrease)</u> • <u>Mixed-use: 46.6% (6.1% increase)</u> • <u>Commercial: 1.6% (0.8% increase)</u> 	<ul style="list-style-type: none"> • <u>Residential: 28.6% (49.3% decrease)</u> • <u>Mixed-use: 55.9% (34.7% increase)</u> • <u>Commercial: 15.5% (14.6% increase)</u>

Parking lots	<ul style="list-style-type: none"> • <u>Motorbike parked inside the first floor of building or the yard</u> • <u>Vehicles parked illegally or on sidewalks</u> 	<ul style="list-style-type: none"> • <u>Motorbike parked inside the first floor of building or sidewalk in front of building</u> • <u>Vehicles parked inside the first floor of building or (very rarely) underground or illegally on sidewalks</u>
Relation ship with sidewalk	<ul style="list-style-type: none"> • <u>Commercial buildings:</u> The sidewalk and the buildings meet directly. Awnings installed on buildings so sidewalks can be utilized for commercial spaces or parking lots. • <u>Residential buildings:</u> 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. 	<ul style="list-style-type: none"> • <u>Commercial buildings:</u> 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. • <u>Residential buildings:</u> Doors and small yards separate the building from the sidewalk.
Urban spatial characteristics	<ul style="list-style-type: none"> • <u>Increase of retail shops</u> • <u>Formation of a safe residential area</u> for the low-income class 	<ul style="list-style-type: none"> • <u>Emergence of a large-scale commercial buildings</u> • <u>Formation of high-end residential area</u>
Rationale	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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

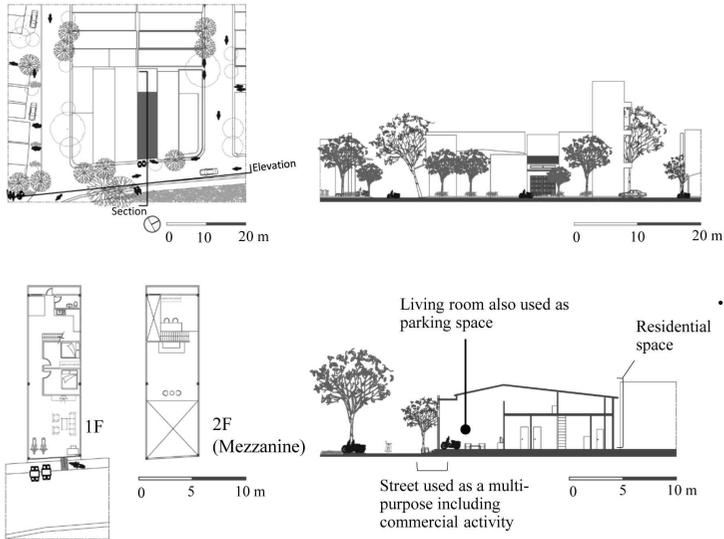
for instance, regularly traveled to a shopping mall at a distance of 9 km during the weekend and his son commuted to a university that was 6 km away from his home (Figure 11). Additionally, six children from

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.⁷ 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 (Figure 13; Figure 14). 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

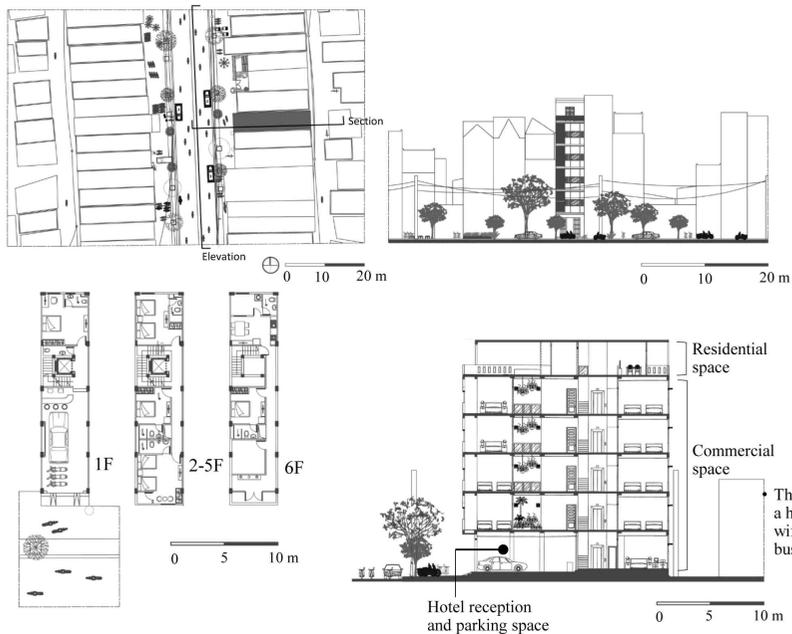
⁷ According to Won et al. (2015), the difference in personal income between the original residents and migrants was fivefold, with migrants being 5 times richer. At the time of the survey in 2014, the average personal income of the 166 original residents was USD \$2,767 and the average personal income of the 122 migrants was USD \$13,564.

- An original resident's building (Address: 16, Yen Khe 1)



- The owner's workplace is 19 km away from this building, but his wife sometimes sells beverages on the street in front of the building.

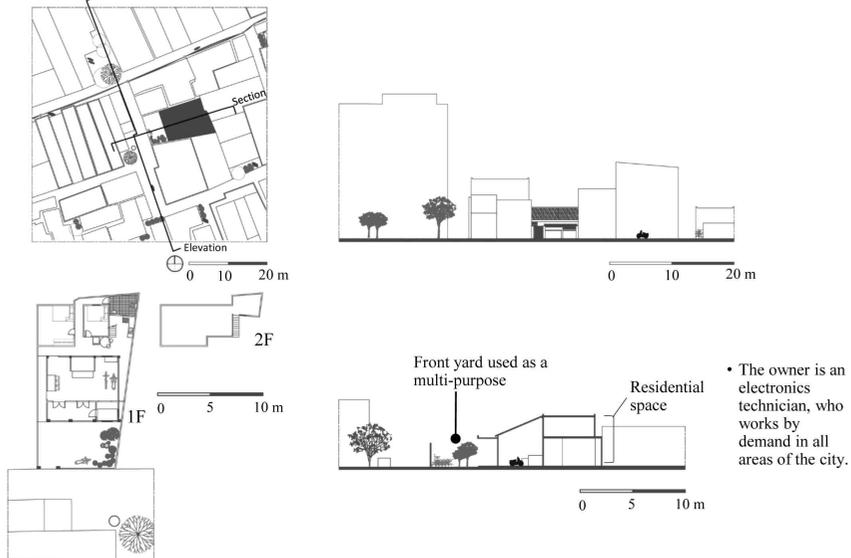
- A migrant's building (Address: 21, Ton That Dam)



- The owner runs a hotel with his wife as a business.

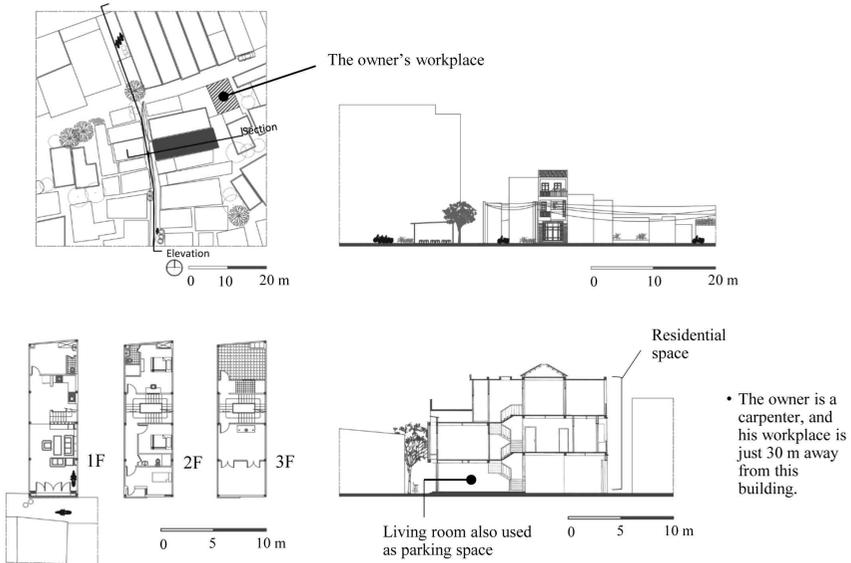
Figure 13. Comparison of the building size and spatial characteristics of buildings located on the new road by original residents and migrants.

- An original resident's building (Address: K304, Tran Cao Van)



- The owner is an electronics technician, who works by demand in all areas of the city.

- A migrant's building (Address: K386/28, Tran Cao Van)



- The owner is a carpenter, and his workplace is just 30 m away from this building.

Figure 14. Comparison of the building size and spatial characteristics of buildings located along an alley inside the urban block by original residents and migrants.

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. 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 4; Figure 14).

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 (Polzin, 1999; Cervero & Duncan, 2002; Adams & Vandrasek, 2007; Kim et al., 2014). 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 4 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 5). After the road development, a significant change was reported in the use of migrant-owned buildings. In Table 4, 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

Table 5. The trends and rationale of changes in street commercialization.

		Original residents	Migrants
C h a n g e s	Type and Size	<ul style="list-style-type: none"> • <u>Small shops</u> such as noodle shops, cafes, repair stores, beauty salons, barber shops, fruit stands, etc. account for 66% • Areas transformed into <u>commercial space showed a 6.9% increase</u> • <u>High proportion of residential area</u> and low proportion of commercial usage 	<ul style="list-style-type: none"> • <u>Large hotels, motels, high-end restaurants and cafes</u> account for 86.5% • Areas transformed into <u>commercial space showed a 49.2% increase</u> • <u>High proportion of commercial area</u>, low proportion of residential usage
	Use of sidewalk	<ul style="list-style-type: none"> • <u>Various usage for commercial activities, parking and street stalls</u> (in violation of regulations to protect pedestrian routes) • <u>Minimized use for private purposes</u> in alleyways along inner-facing blocks to allow better flow for pedestrians and motorbikes 	<ul style="list-style-type: none"> • <u>Public areas, not including the areas officially designated for pedestrians, are used for commercial use and parking</u> (in most areas regulations are being met but illegal parking is found in areas where parking space is lacking) • <u>Diversified usage of sidewalks depending on time of the day and user groups</u>
	Target population and function	<ul style="list-style-type: none"> • <u>Utilized by residents</u> • <u>Function as neighborhood living facilities</u> 	<ul style="list-style-type: none"> • <u>Local tourists</u> • <u>Function as tourist infrastructure</u>
	Management methods	<ul style="list-style-type: none"> • Retail shops are operated normally by women as <u>secondary jobs</u> • Others: Operated as a business 	<ul style="list-style-type: none"> • Typically operated <u>as a business</u> • Others: Franchise, rented commercial facilities
	Marketplace creation	<ul style="list-style-type: none"> • <u>Contribute to market formation</u> - Lau Den Market (Opened in 2006): Traditional market - Ky Dong Market (Opened in 2007): Traditional market 	<ul style="list-style-type: none"> • <u>Commercial street formed</u> - East of Nguyen Tat Thanh road: Hotel/motels, Large restaurants, Office buildings - Ton That Dam road: Hotel, office buildings, restaurants

Rationale	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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
-----------	---	--

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 m² (4.8 × 18) 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

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, 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 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,

Table 6. Mobility changes due to Nguyen Tat Thanh Road development and the subsequent changes in space utilization.

Type	Original residents	Migrants
Characteristics of mobility	<ul style="list-style-type: none"> • Commuting distance: Increased • Workplace locations: Distributed • Non-job-related travel pattern: Nearby one's home 	<ul style="list-style-type: none"> • Commuting distance: Decreased (Jobs-housing balance) • Workplace location: Concentrated along the new road • Non-job-related travel pattern: Away from one's home
Characteristics of spatial changes	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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

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 6).

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 (Giuliano, 1991; Cervero, 1996; 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 underserved area is directly related to the higher frequency of accidents and the overall quality of life (Lin et al., 1994; Jackson, 2003; Cervero & Duncan, 2006; Michelson, 2009; Cervero, 2013). Moreover, health risks that arise from air pollution negatively affect the residents (Hopke et al., 2008; Ho & Clappier, 2011; Tung et al., 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 Futa land New Town project, a 147 hectare 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.

Acknowledgments

This work was supported by the BK21 Plus Project in 2016 (Seoul National University Interdisciplinary Program in Landscape Architecture, Global leadership program towards innovative green infrastructure). For conducting field studies and discussion, this work was supported under the framework of international cooperation program managed by National Research Foundation of Korea (NRF-2015K2A1A2070994). For the editing of the manuscript, this research was financially supported by Environmental Planning Institute, Seoul National University.

Chapter 3

The success and failure of urban form-making experimentations: Case studies of new developments adjacent to the Nguyen Tat Thanh Road, Danang, Vietnam

1. Introduction

Urban expansion provides the opportunity to test and implement innovative urban forms and design (Southworth & Owens, 1993; Madanipour, 2006; Zacharias & Blik, 2008). According to Gospodini (2010), since the economic globalization of the late 20th Century, cities of various sizes have re-evaluated the value of urban design in respect to attracting capital and new industries, along with the modernization of transportation and communication infrastructure. High-quality urban environment was created toward the goal of economic development in the face of increasing inter-city competition.

Asian cities are no exception. Despite the economic downturn of the late 1990s and mid-2000s, the emerging economies of Asia repeatedly tested a number of urban forms doing the implementation of development projects. New urban areas were formed through expanded transportation networks outside traditional urban boundaries to deter overpopulation or to strengthen the connections with surrounding areas (Warlters, 2006; Zhao et al., 2017). For example, more than 400 new

towns were planned in China in the next 20 years to accommodate for the unprecedented migrant influx of approximately 30 million people (Cheng & Hu, 2010). Sometimes, urban planning and design strategies that have been successful in other regions are actively imported to a new area for faster and more efficient urban development. For instance, China had enthusiastically imported American, German, and British planning methods in establishing urban master plans (Chaolin et al., 2010).

However, the problem of such development is that unverified urban-form making strategies are imposed through and reproduced numerous urban projects. Even without recognizing the fact that urbanization is an evolutionary cycle (Antrop, 2004), the issue of the urban environment should be dealt with caution since the built environment is interconnected with other developmental activities as well as social aspects of human activities (Nedovic-Budic et al., 2016). Furthermore, the physical environment of the city is closely connected to energy use, traffic loads, and the normative designs of neighborhoods encompassing issues of walkability and the everyday lives of the community (Davies & Townshend, 2015; Handy, 1996a; Handy, 1996b; Jabareen, 2006; Mehaffy et al., 2010; Mehaffy et al., 2015; Ozbil et al., 2011).

Vietnam has a rapidly changing emerging economy with a high economic growth rate of 7% on average. Danang, the central city of Vietnam with a population of 1.05 million, is undergoing numerous urban infrastructure and development projects. However, up until now, Danang has shown a relatively low urbanization rate of 17.9% (Linh et

al., 2012). It is only in 2012 that the Danang local government established an urban master plan aiming to build a city for a population of 2 million by the year of 2030. Driven by this impetus, new urban areas are being rapidly formed, and therefore, Danang is an appropriate area for investigating recent urban spatial changes and transformations. For instance, seven large-scale development projects are taking place over the last ten years, including FTP City, Da Phuoc international new town and Golden Hills. The combined population projection for these projects is 200 thousand, which accounts roughly for 20% of the total of existing population in the city. In conjunction with these major projects, foreign and domestic capital are being poured in the city to build new roads and rail networks. One of the prominent projects is the development of a coastal road along Danang Bay. The project was financed by Japanese funds, which has restructured the coastal area through a number of urban projects in its proximity. In this respect, this site is considered suitable to study the recent formation and changes of urban spaces.

There have been studies on the Vietnamese urban transformation and its characteristics, which reported the land use change under market socialism and the subsequent deterioration of urban space qualities, and the mismatch of spatial demands (Jung & Lee, 2017; Labbé & Musil, 2014; McGee, 2009; Tran, 2015; Zhu, 2012). However, there is limited knowledge on how the urban spaces are formed and change over time in respect to a specific developmental axis under the unique urban context of Vietnam. Therefore, this research aims to understand the process and spatial attributes of the five main urban development

projects completed or being constructed near the Nguyen Tat Thanh road in Danang, which opened to the public in 2003. The research analyses the development process, and the urban morphology of the projects. Then the success and failures of the projects will be discussed.

Literature Review

Prior to discussing the urban spatial changes of Vietnam, understanding how the economic reforms of Doi Moi in 1986 had influenced the land regulations and development system is required. The initial land reforms started with the recognition of the land use rights in 1993 (Labbé & Musil, 2014), which greatly impacted housing supply in urban Vietnam. For example, 80% of new housing construction in Hanoi were undertaken by individual households between 1993 and 2001 (Quang & Kammeier, 2002), which signified a momentous change since land use rights became a catalyst for households to become major suppliers of housing units in the country (Tran, 2015).

McGee (2009) explained that the urbanization process of Vietnam after the economic reforms is not to be understood as an outright transition into capitalism but a hybrid of market economy and socialism. This notion had been further developed by Labbé & Musil (2014). They argued that such hybrid works under the property mechanisms like the Land Pricing Framework (LPF) and Land-for-Infrastructure (LFI). For instance, the LPF system allows the government to keep land price 30-70% lower than the market price to attract quick investment from private developers in a promising area so that urbanization and industrialization can be propelled. As local

governments obtained the legal right to autonomously develop land in the mid-1990s, this system benefited both the public and private sector, especially in cases where the local government lacked financial sources by which land could be sold to private developers at a reasonable price. Also, through LFI, developers became responsible for building infrastructure in exchange for securing land over a long period of time at a low cost. The LFI became instrumental for local governments with financial constraints since for projects exceeding a certain area developers were solely responsible for building road and sewage systems, schools, medical and community facilities, and public housing. Furthermore, changed foreign investment regulations since the economic reforms which allowed expanded foreign capital inflow acted as an important factor of urban change in Vietnam.

Within such a framework of urban development, Nguyen (2015) contended that cyclical success and failures of urban development increasingly characterize today's Vietnam. According to the study, the successes come from the quick provision of large undeveloped land for major urban projects, which enabled potential residents to enjoy public services and urban amenities at reasonable costs. However, greater involvement of private sector into urban development was not without problem. For example, Labbé & Musil (2014) pointed out that the dependence on the private sector for infrastructure building caused several problems such as the unpredictable changes in approved projects as the public sector lacked control, deterioration of construction quality due to cost-cutting, and in the worst case where planned infrastructure projects came to a halt.

Tran (2015) argued that the fundamental alliance of developers, civil servants, and investors as beneficiaries of the development projects result in the incompetence of the public sector. This arguably causes problems of closed communities, disconnectedness, socio-spatial segregation, environmental issues, the division between the urban and the rural, and imbalanced infrastructures (Labbé & Musil, 2014; Labbé & Boudreau, 2015; Nguyen, 2015).

In respect to urban planning in Vietnam, previous literature focused on the problems of the formation and mis-use of urban space urban space association with the deficiencies in the planning system. Huynh (2015) contended that urban planning increasingly came a negotiating tool for accommodating investment doing the development process of Ho Chi Minh City since the 1990s. It was only in 2010 that the urban planning regulations had become established in Vietnam. However, the regulations which benchmarked the Russian model had also come under criticism due to the lack of consistency and flexibility of spatial plans, the uncertainty of procedures, and regulations that favor the developers (Matsumura et al., 2017). In the same research, the designation of special planning areas and incentive for FARs are mentioned as improvement measures, in addition to introducing an intermediary 1:5,000 or 1:2,000 Zoning Plan. Building upon previous knowledge, it is now necessary to analyze actual developed urban areas within the development and planning frameworks of Vietnam to comprehend how urban areas are transforming today.



Figure 15. Location of Nguyen Tat Thanh road and the five new developments in Danang (Modified based on Google Earth Pro by the authors).

2. Research Methods

The Study Area: Danang, Vietnam

Danang is a Vietnamese city developed around the Han River, covering an area of 1,285 km² of which 244 km² is urban land. The two districts located to the south of the Han River, Hai Chau and Thanh Khe, account for 13% of the urban areas where 40% of the city's urban population is concentrated⁸. This is because of the geographical

⁸ Population and area are derived from the data for 2016 of the General Statistics Office of Vietnam (www.gso.gov.vn), and the population by district is based on the data for 2012 of Database of Central Coastal Area in Vietnam (<http://duyenhaimientrung.vn>).

features of Danang where a highland region is located in the West and in a flat area to the East, with main urban infrastructures formed along the port of Danang. This was the biggest port in central Vietnam in the 19th century, and its urban area had expanded during the French colonial period in the early 20th century. In the period, the urban grid system was first began to be, and large-scale manufacturing facilities were built. In the 1930s, a new airport was constructed to the West of the Han River, by which a new residential area was developed between the airport and the river. Markets and public buildings formed along the river, eventually becoming the traditional urban center of Danang. However, during the Vietnam War (1959 - 1975), mass migration of wartime refugees had settled down into the city. Despite the presence of inadequate infrastructure, a large number of refugees flowed in the Thanh Khe district and the residential area uncontrollably extended to the coast. Refugees built small alleyways to allow traffic flow in the midst of the slum-like environment, which resulted in the development of a high-density informal urban fabric along the coastline (Tran et al., 2012).

Modern infrastructure came to replace the city's deteriorated roads and sewage system only after the Doi Moi through domestic and overseas investment. The Danang government led the provision of roads, electricity, and the sewage system while taking on land development projects to improve the living environments. As domestic and foreign capital allowed a concentrated development near the Han River and the eastern area of the coast, new roads were constructed to connect the East-West axis of the city. Outdated factories and houses

along the southern part of the road were removed, and uniformly subdivided lots were developed for housing development. Existing buildings were reconstructed, increasing the overall building density near the roadside, and large-scale land developments such as supermarkets and schools also increased. As a result, two main axes were formed in the city center. One is the southern axis along the Han River, and the other is the North-West axis along the Danang coast in avoidance of the spatial constraints imposed by the existing airport. Within this context, the Nguyen Tat Thanh road opened in 2003, becoming a catalyst to the Northwestern development connecting the Danang coast and inland. With the development, the existing road network and lot sizes dramatically increased along the road. The urban landscape changed as the non-urban areas transformed into sites of new land development, factories, and sites for tourism. As shown in the 2030-2050 urban master plan, the Danang government attempted to connect the highly-dense districts of Hai Chau and Than Khe district with the waterside, and continue its road development to the Northwestern area of the airport to promote land development, manufacturing and high-tech industry complexes.

Research Methods

Here, five areas were selected to study the development process, changes in the urban form, and the environmental qualities of the new areas that emerged after the 2003 opening of the Nguyen Tat Thanh road. Sites were selected based on the development entities – the

government, private sector, and foreign capital – and the respective project objectives. The first case consists of the existing residential area of Hai Chau district. In a strict sense, this is not an entirely new development, but an area which underwent structural changes during an urban regeneration process due to the newly provided infrastructure. The second case is the row house area which had been developed by the government in conjunction with the road, from which lots had been sold to and then developed by the private sector. The third case is a public housing site with a multi-family housing units. The development was subsidized by the government for low-income households. The fourth and fifth cases are the Futa New Town and Da Phuoc International New Town projects respectively. The projects are currently under construction and are funded by Vietnamese and foreign investors like Phuong Tran group and Daewon Cantavil. In aspiring to become a world-class New Town, the latter project has been in progress for the past ten years led by foreign capital (Figure 15).

The authors visited the study areas two times in 2016 – between 1 and 10 May, and between 22 and 30 September – for detailed site investigation and stakeholder interviews. The objectives of site investigation were twofold. One was to survey the building floors, the number of households and housing unit sizes in comparison to the plans that were received from the Urban Planning Department of the city prior to the visitation in order to accurately calculate the site area, road ratio, floor area ratio, building coverage ratio and population density⁹. The other aim was to understand the physical attributes and

⁹ To identify the resident population by case, the researcher multiplied the household

user activities of main amenities, including public and commercial facilities, the ground floor areas and streets by different time and days of the week. For the uncompleted two New Town projects, plans and drawings with dimensions were obtained from the projects' websites¹⁰ for investors. The research also conducted interviews with local residents regarding the use of newly created urban areas, which was assisted by two tourism major graduates from Danang University, Miss. Truong Thi Khanh Van and Pham Thi Thanh Thuy, for Vietnamese translation.

For stakeholder interviews, the master architect of the Urban Planning Institute of Danang was interviewed regarding the city vision represented in the urban master plan, and the issues and progress of each project. The approved documents for the construction of Futa New Town and public transportation plans were also obtained. Professor Tran Duc Quang and Dr. Nguyen Anh Tuan from the architecture department at Danang University of Technology were interviewed for the urban development approval and process of Danang, and the characteristics of public area usage including the street areas. As a private sector expert, Mr. Park Heehong, the local director of Daewon Cantavil – the developer of the Da Phuoc New Town – was interviewed on site. The

number by 4.84. In a previous study by researchers (Won et al., 2015) to investigate the neighborhood environment of the Thanh Khe district in Danang bay, the average family size of 400 households surveyed was 4.84.

¹⁰ Futa New Town Danang's master plan and drawings are downloaded from the following sites; <http://diaocdanang.net/san-giao-dich-bat-dong-san-cuong-hung-thinh/tin-tuc/tin-tuc-trang-c-hu/272/23/kdt-sinh-thai-bien-phuong-trang-vinh-da-nang-khu-do-thi-pho-bien-trung-tam-mien-trung-.html> And the latest development plan of Da Phuoc international new town is confirmed at the following site; <https://batdongsanexpress.vn/sunrise-bay-da-nang.html>

initiative and progress of the project, reasons behind the changes in the development plan, and the difficulties of an overseas project were inquired.

3. Results

Five cases of new development

The following section discusses the development process, urban form characteristics, and resident characteristics of the five new development sites.

1) Existing housing area (around K112 Tran Cao Van, Hai Chau)

The area was originally a slum where a large number of refugees settled down during the Vietnam War. In the beginning of 2000, the Danang government constructed the new road along the coast, and aimed to improve the residential environment by installing proper electricity and a sewage system. The area covers an area of 9.7ha, with urban characteristics described in Table 7. Because the area was developed along the coastline, the hodgepodge development of existing housing which invaded into the coastal areas had to be removed and make way for a new urban fabric. The first change was the laying of a 40 m-wide road, of which 20m was designated for vehicle access, and 10m on each side for pedestrian use. The irregular lots were transformed into uniform lots (125 m², 5 × 25). And a 5 m-width motor

Table 7. Summary of the existing housing area.

Time / Subject	• Early 2000s / Danang Government	
Block	Total area	• 97,090 m ²
	Land area	• 84,373 m ²
	Road area	• 12,717 m ² (13.1%)
	Driveway	• 3,069 m ² (3.2%)
	Sidewalk	• 7,868 m ² (9.9%)
Lots	Number	• Existing lots: 766 (including 14 unused lots) • Newly formed lots: 35 (including 6 undeveloped lots)
	Size	• Existing lots: various lot sizes • New lots: evenly divided into 125 m ² (5 × 25)
Building type	• Buildings of existing lots: elongated or atypical 1-4 story buildings, average 1.6 floors • Building of new lots: elongated form of high-rise buildings, average 6.2 floors	
Coverage / FAR	• 70% / 133%	
Number of household / Population	• 780 (80/ha) / 3,776 (389/ha)	
Features of planning	• Supply of wider and identical lots to meet tourism demand • Separated into new urban tissue and existing tissue based on newly formed 5 m wide road	
Characteristics of development	• Induction of urban regeneration by urban infrastructure such as electricity, water supply and sewerage supplied with new road development	

and pedestrian route had been created in between the new lots and the existing residential area as a back road (Figure 16). The existing average building height was 1.6 floors, however, buildings on the new lots were on average 6.2 floors, which were mostly big hotels or restaurants. Migrants with economic capability had moved into the new lots and started to run private businesses. Although some original

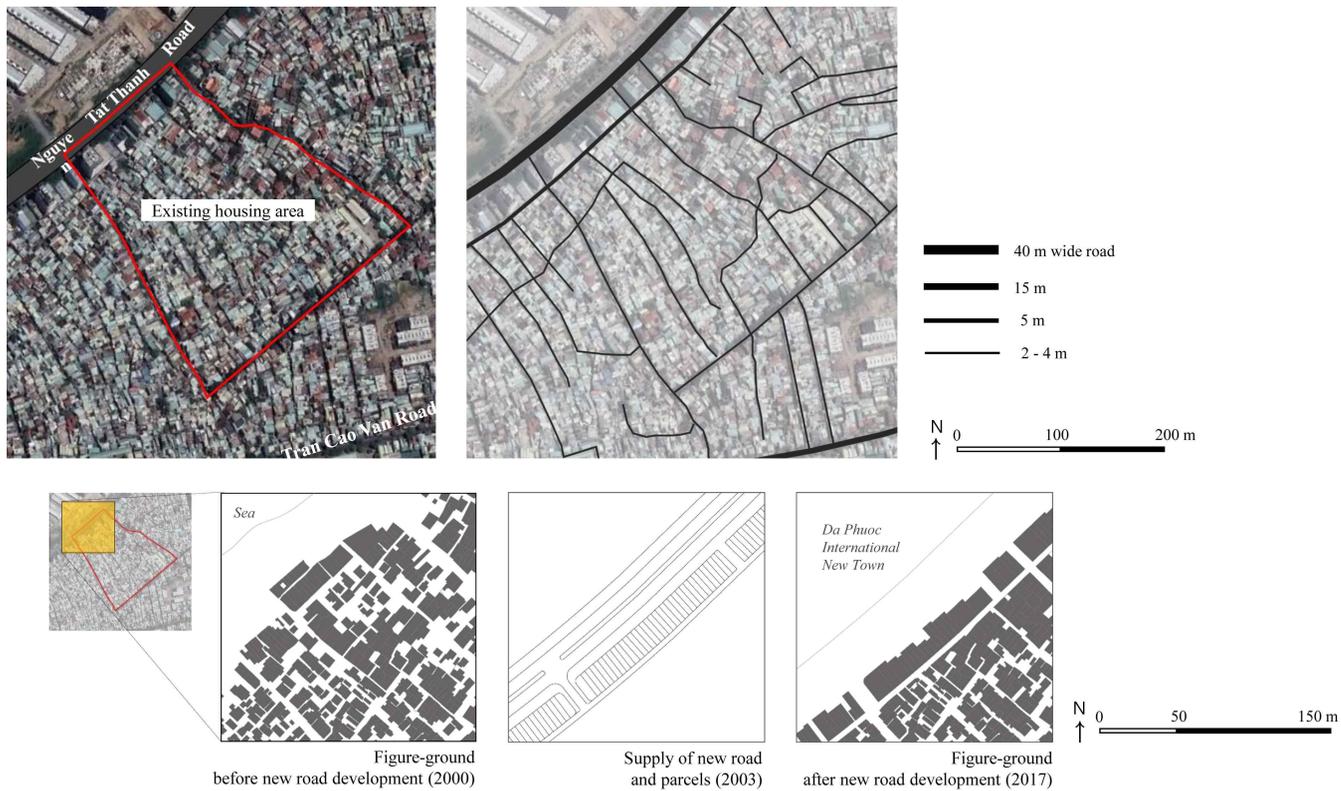


Figure 16. Survey area within the existing housing area (upper left); road network (upper right); figure-ground map of spatial changes after the new road and parcel development (lower).

Table 8. Summary of the row house area.

Time / Subject	• Early 2000s / Danang Government
Block	Total area • 163,797 m ²
	Land area • 106,192 m ²
	Road area • 57,605 m ² (35.1%)
	Driveway • 35,221 m ² (21.5%)
	Sidewalk • 22,384 m ² (13.6%)
Lots	Number • 989 (including 4 undeveloped lots)
	Size • 120 m ² (5 × 24), 70 m ² (5 × 14)
Building type	• 1 - 4 story row houses, average 1.9 floors
Coverage / FAR	• 91% / 178%
Number of household / Population	• 941 (58/ha) / 4,555 (278/ha)
Features of planning	<ul style="list-style-type: none"> • Grid network by vertical and horizontal roads • Place childcare facilities and schools for public services placed inside the block • Comprised of small blocks consisting of two rows of lots
Characteristics of development	<ul style="list-style-type: none"> • Homogeneous urban typology • Enhanced communities around internal roads

residents were relocated after the developments, most of them continued to stay due to the benefits of increased mobility and easier access to their workplaces (Won & Kim, 2017). Hence, in the aftermath of the new road construction, new large-scale buildings had been built, and in the existing areas, building expansion and reconstruction had been apparent, increasing floor area ratio and population density. The population density was found to be up to three times higher than the average of Hai Chau district (129/ha¹¹) at 389/ha.

¹¹ The overall population density of Hai Chau district is 88/ha, however, the research calculated the population density by excluding the airport area and the reclaimed site which covers a large area but have very small population.

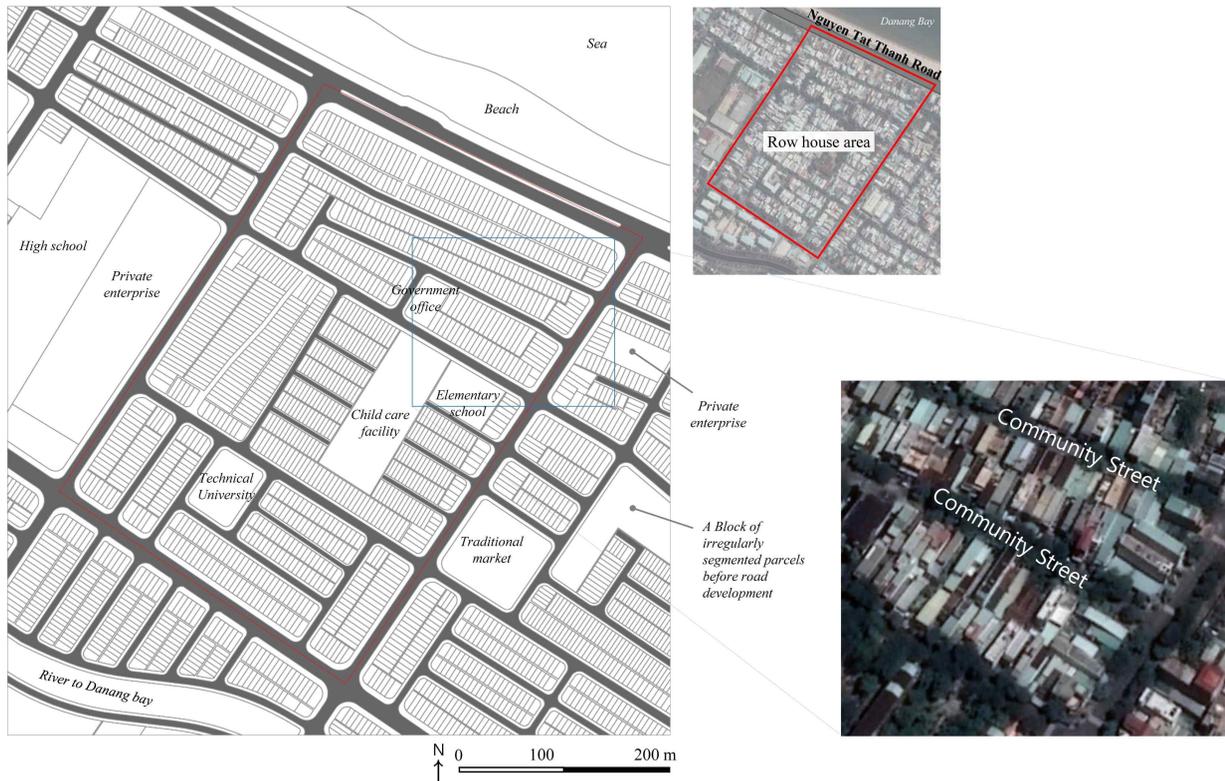


Figure 17. Urban grid of the row house area and blocks consisting of two rows of lots.

2) Row house area (around Phan Phu Tien, Lien Chieu)

This area, 5.5 km away from the city center, used to be a non-urban area with a mix of farmlands and poor houses. The Danang government developed lots for housing in conjunction with the construction of the new road, by which 96% has already been developed. A 21 m-width road was situated every 300–400m on the North-South axis, with 11m-width streets linking the inner parts of Danang with the Row house area. Two rows of uniform lots, with an area of 70 m² (5 × 14) or 120 m² (5 × 24), were formed in the urban blocks along the new road. and Public facilities including child care centers and schools were located within the blocks (Table 8, Figure 17). Apart from a number of houses adjacent to the coast, most buildings were one to four floors high, with an average of 1.9 floors. There was a high usage of the internal streets on the East-West axis where lots faced each other, with building entrances being used as resting or working space.

3) Public housing (around Xuan Thieu 1, Lien Chieu)

Adequate housing supply for low-income households became critical social issue in the process of rapid urbanization in Danang. This multi-family housing estate was developed in 2011 as part of the public housing program proposed by the Danang government. It is located on the Western edge of the new road, which is 12 km away from the city center. The site includes apartment buildings of 7 floors, which is a relatively new building typology in the area. There are five identical blocks (72 × 18 m) with two motorcycle parking areas (Figure 18). Each

Table 9. Summary of the public housing estate.

Time / Subject	• 2011 / Danang Government
Block	Total area • 24,200 m ²
	Land area • 20,173 m ²
	Road area 4,027 m ² (16.6%)
	Driveway 1,970 m ² (8.1%)
	Sidewalk 2,057 m ² (8.5%)
Building	• 7 story buildings of 1,296 m ² (72 × 18), Five buildings
Household	• 62 m ² (7.8 × 8), 16 households in each floor
Coverage / FAR	• 39% / 224%
Number of household / Population	• 545 (227/ha) / 2,637 (1,099/ha)
Features of planning	• Two motorcycle parking lots and gardens in the outdoor space • First floor space allocated for operating convenience facilities
Characteristics of development	• Introducing of an apartment type completely different from surrounding residential forms

floor houses 16 units (individual unit size 62 m²) facing one another along an internal corridor, and has a staircase and an elevator. The building coverage ratio is only 39%, allowing for a large open space within the block in comparison to other areas where the building coverage ratio is sometimes as high as 70%. On the other hand, the floor area ratio is considerably high at about 224%, and the housing density is 227/ha, which is three times higher than the nearby areas and four times higher than the average row house area (Table 9). Current residents mostly had lost their homes in the urbanization process, or were living in poor conditions in illegal settlements. Other residents include those who are disabled or of old age who need subsidized housing.



Figure 18. Urban grid of the row house area and blocks consisting of two rows of lots.

4) Futa New Town Danang (around Nguyen Sinh Sac, Lien Chieu)

In 2000, the Danang government established the Urban Spatial Plan for 2020 and designated a number of sub-centers to alleviate the effects of overly intense migration into the city center, Futa was one of the newly planned towns for a sub-center in the city. In 2006, a Vietnamese real estate developer called the Phuong Trang group invested USD 39 million and started to develop a site of 114ha. As of now, the site has been prepared with the development of internal streets, and individual lots are being sold. Examining the plans, the percentage of the road area in terms of land-use accounts for about 44%, which is relatively higher than other typical Row house area.

Table 10. Summary of Futa New Town Danang.

Time / Subject	• 2006 - / Phuong Trang Group (Vietnam)
Total	• 1,142,200 m ²
Area	• Land 643,800 m ²
	• Road 503,900 m ² (44.1%)
Building type	• 2 - 6 story row houses, 3 story villas, high-rise buildings
Size of lots	• 120, 140, 408 m ² (5 × 24, 7 × 20, 17 × 24) for row houses
	• 360 m ² (15 × 24) for villas
Coverage / FAR	• 72% / 191%
Features of planning	• 60 m wide vertical road connecting the Nguyen Tat Thanh road
	• Luxury accommodations, villas and supermarket layouts near the waterfront
	• Linear open spaces called a flower garden
Characteristics of development	• Considering the role of the subcenter, placed commercial and business facilities in the center
	• Increase of public spaces including a large park in the neighborhood

Note: Projected population of this project was not known. To calculate the coverage and FAR, the area of 'Zone A' shown in Figure 19 was calculated.

According to the interviews, the difference is due to the 60 m wide roads on the vertical axis, in preparation for future transportation loads including increased public transportation. Similar to other cases, coastal areas were preserved for high-end accommodation, and areas around the main intersection were planned as large blocks for office and commercial facilities. Apart from the five child care and educational facilities scattered around the site, blocks are divided into various-sized lots along a grid structure (Table 10, Figure 19). However, the

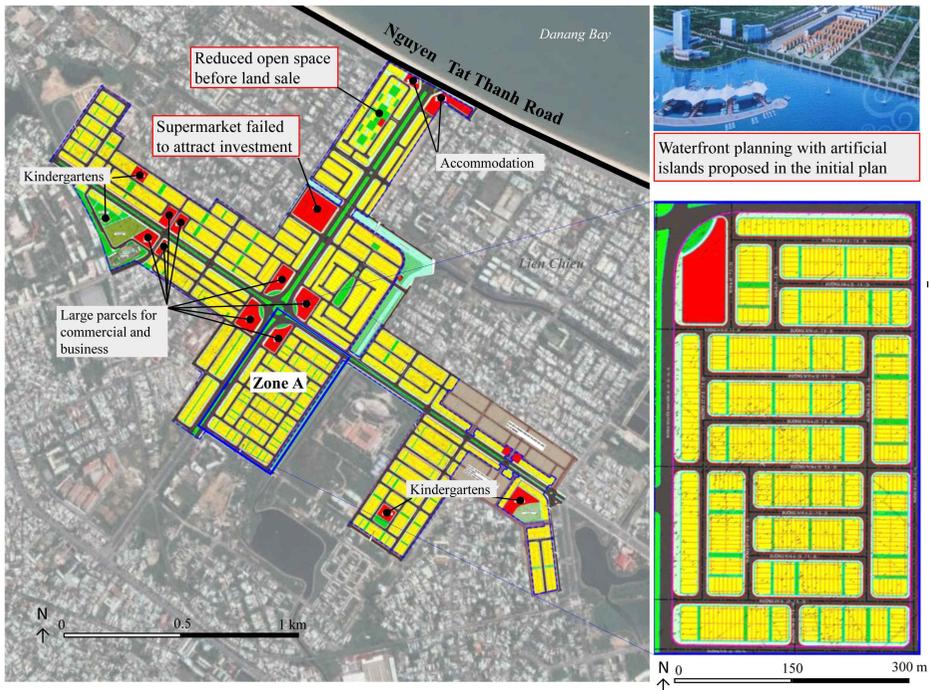


Figure 19. Final approved plan of Futa New Town (left); initial proposal of waterfront which was canceled due to lack of feasibility (upper right); typical housing block and land division with linear open space called flower garden (lower right).

completion of this project is facing difficulties due to the frequent changes associated with plan making. First, the issue of properly compensating the original residents led to the reduction in the site area and the overall delay of the project. Initially, the site area was 147ha, but was reduced by 22% due to the lack of funds for compensation. In addition, the initial plans for an 8ha artificial island with a marina, a large supermarket, and a hospital were canceled due to lack of feasibility.

5) Da Phuoc International New Town (Khu Do Thi Da Phuoc, Hai Chau)

The New Town project site is located only 2 km away from the Danang CBD, and is a large-scale urban development project planned on top of a 189ha of reclaimed land. A Korean company called Daewon Cantavil led the project between 2007 and early 2016, then was overtaken by a Vietnamese company called Novaland. The initiative had started with the construction of the Nguyen Tat Thanh road in early 2000. The government then aimed for an innovative urban design for a reclaimed site, which will successfully brand the entire city. Vietnamese, Chinese and Korean companies had proposed plans, of which the concept of a ‘D - City’ by a Korean company Daewon Cantavil was selected. This plan included a luxury golf course, high-rise hotels and high-end housing. The investment was worth USD 250 million – the largest amount of FDI invested in a single project in Danang. The first phase of the landfill was completed from 2008 until 2010, which accounted for half of the total site area. During this time, the plan for the golf course was canceled, and the luxury apartments lining the coast were moved to another location. The government requested a coastal road instead for the area to be easily accessed by a wide range of population. Therefore, plans were changed and the project was stalled for a number of years due to the dampened global real estate market. In 2015, a revised master plan was proposed (Table 11). In this revised plan, the number of high-rise apartments was significantly reduced, whereas the number of the more readily salable row houses and shophouses were increased. However,

Table 11. Change to the masterplan for the development of Da Phuoc International New Town.

	Initial plan	Modified plan	New plan
Time	• 2007 - 2017	• 2015 - 2025	• 2017 -
Project name	• D - City	• D - City	• The Sunrise Bay
Subject	• Daewon Cantavil (S. Korea)	• Daewon Cantavil (S. Korea)	• Novaland group (Vietnam)
Area	• 223ha	• 223ha	• 189ha
Designers	• HAEAHN	• HAEAHN + Local partners	• Safdie Architecture, Aedas, and EDAS
Planned population	• 40,000 (191/ha)	• 43,000 (203/ha)	-
Building type	<ul style="list-style-type: none"> • 8 - 60 story apartments • 2 - 3 story villas 	<ul style="list-style-type: none"> • 8 - 42 story apartments • 2 - 6 story row houses • 2 - 4 story villas 	<ul style="list-style-type: none"> • 4 - 6 story row houses • 3 - 4 story villas • High-rise buildings
Coverage	<ul style="list-style-type: none"> • 40% in the block with apartments • 25% in the block with villas 	<ul style="list-style-type: none"> • 40% in the block with apartments • 60% in the block with row houses • 40% in the block with villas 	<ul style="list-style-type: none"> • 40-60% in the block with row houses • 30% in the block with villas
FAR	<ul style="list-style-type: none"> • 200 - 500% in the block with apartments • 60% in the block with villas 	<ul style="list-style-type: none"> • 200 - 400% in the block with apartments • 100% in the block with row houses • 100% in the block with villas 	<ul style="list-style-type: none"> • 115% in the block with row houses • 100% in the block with villas
Lot's size	-	<ul style="list-style-type: none"> • 126, 198 m² (7, 11 × 18) for row houses • 247 m² (13 × 19) for villas 	<ul style="list-style-type: none"> • 80, 90, 100, 108 m² (5 × 16, 18, 20), (6 × 18) for row houses • 150, 160, 200, 300 m² • (7.5, 8, 10, 15 × 20) for villas

Features of planning	<ul style="list-style-type: none"> • Golf course (82ha) • Waterway (2.2 km) • Luxury hotels, resorts, international convention centers, and marinas • A large shopping area • International school • High-rise apartment-type residential 	<ul style="list-style-type: none"> • Cancellation of golf course and waterway construction • Change to grid-type road network • A big city park (7 ha) • A large hospital • Decrease of high-rise apartments and increase of row houses 	<ul style="list-style-type: none"> • Linear green network (20ha) instead of wide park • Compromised road network with lattice type and radial type • Entertainment-enhanced shopping spaces • Luxury row houses and villas instead of high-rise apartment
Characteristics of development	<ul style="list-style-type: none"> • Increase in land area through reclamation project (the first case in new town development of Vietnam) • High-rise apartment building on the coast as a landmark for branding the city 	<ul style="list-style-type: none"> • Placement of clustered apartments on a road network • Designing roads on the coast to enhance accessibility from the outside 	<ul style="list-style-type: none"> • Low density and low coverage rate inherited from existing urban organization • The largest proportion of open spaces in new towns of Vietnam • Marketing the place with a unique type of architecture designed by world-class architects

due to frequent changes made to the plan with the burden of having to build infrastructure and the delay in project, the Korean company sold the development rights to a Vietnamese company. The new master plan known as ‘The Sunrise Bay’ has the following characteristics. First, a block which compromises the grid and the radial structure is proposed in relation to the undulating coastline, and the main building types are



Figure 20. Changes made to the Da Phuoc International New Town master plan, and neighborhood design with reinforced community space and green network.

row houses, shophouses and villas which have low building area ratio and floor area ratio. Second, 10% of the total area is proposed as a linear green network, and the waterfront area is easily accessible by neighborhoods nearby (Figure 20). Third, as a means of place marketing, unique architectural designs are proposed to attract investors. Well-known architectural firms such as Safdie Architecture and Aedas will be designing major buildings.

The characteristics of the new development projects near the Nguyen Tat Thanh road

1) Increased area of road and open space in relation to neighborhood planning

The development of Nguyen Tat Thanh road allowed for various urban development projects in response to the rapid urbanization. Despite potential problems of overcrowding due to the geographical and infrastructural constraints, positive aspects were found. Planning efforts to improve the quality of neighborhood had been consistently reflected in the spatial designs. In this process, the quality of roads and open spaces had been significantly increased.

The row house, being the typical housing type in Danang, was found in similar forms in the Row house area, Futa New Town, and Da Phuoc New Town. But the typology evolved progressively in respect to the demand of each neighborhood environment. First, although row houses were commonly built in Danang prior to 2000, few urban blocks with uniform lot size were to be found unlike the Row house area investigated in the study. Because the transportation system and land-use patterns were comprehensively planned in the area, three planning aspects made it differed from other areas. First, as a site where the principles of neighborhood unit planning were introduced, schools and childcare facilities were situated within the urban blocks to improve accessibility. This compares to schools in other areas where they are located along main roads. Second, as part of community planning, large blocks were divided into two rows of lots with narrow street frontage, in order to encourage social activities along the shared roads. Half of the 8-11 m wide roads were used as routes for both pedestrians and vehicles, while the rest of the road being used as

privatized space by the residents of adjacent buildings, which served as a vibrant community street (Figure 17). Lastly, road areas were adequately provided for in comparison to existing urban environments. In existing housing areas, roadways increased to 3.2%, amounting to 13.1% of the total land-use (Table 7). In contrast, roadways in the Row house area reached 35.1% (vehicle traffic 21.5%; pedestrian 13.6%), almost three times higher than existing areas, while the development conditions remained similar with a development density of 115% and building coverage ratio of 59.2% (Table 8). This was possible due to the lower density plan aimed for a population density of 278/ha – approximately 70% of existing areas – and housing lots of 60/ha.

Futa New Town, initially planned to alleviate intense migration into the city center, shared similar urban form attributes with the Row house area, but in order to function as a sub-center and adapt to future changes, roadway had been increased to 44.1% of land-use with larger and more diversified lot sizes. The most prominent characteristic was the effort to tackle into the problem of the lack public space within housing blocks. For example, depending on the housing block size, one to four linear green spaces (2.5~10 × 50 m) known as the ‘Flower gardens’ were inserted in each block. In addition, a 3.7ha open area was also included in the land-use plan (Figure 19). Furthermore, efforts to vitalize pedestrian and community activities were notable in Da Phuoc New Town. Using two rows of lots as a small urban block for the basis of constructing row houses is similar to existing practices; however, there are a number of differences as well. In other areas, the

spaces between the back of housing buildings used to be left as dead spaces. However, in this area, the in-between spaces were designed as promenades or green spaces, and had been enlarged accordingly for pedestrian activities while vehicle access is not allowed. Another characteristic is that community-centered areas with sports or commercial facilities were located within the pedestrian zones in order to create a pedestrian-friendly neighborhood environment (Figure 20).

Alternatives to high-density row houses were made, as illustrated by some public housing development project. A high-rise complex – a housing typology which had not existed in this area – with the provision of large open space and parking areas. Also, in the initial modifications of the Da Phuoc New Town plan, clustered high-rise mixed-developments intended to provide large outdoor areas as well (Figure 20). Based on the interviews, the developer of Daewon Cantavil considered that in the long run these high-rises would not only become landmarks of the area, but would adequately accommodate for a population of 40,000 and a floating population of 30,000.

2) Inept planning and the misuse of the master plan to attract investment

Urban areas were formed as a result of rapid infrastructure expansion. However, inept spatial planning and the misuse of the master plan led to the deterioration of urban space quality. Huynh (2015) reprimanded the irrationality of Vietnamese urban planning, which was in part confirmed in this research. The most notable problem was the disuse of certain areas such as the pedestrian spaces

in the existing housing area near Nguyen Tat Thanh road, and the outdoor areas of the public housing estate. The new road not only provided a vehicular route but also a 10 m wide walkway. Although privatization of streets is closely related to urban vitality (Kim, 2012), in order to regulate excessive privatization, the Danang government designated a pedestrian-only route of width 1.5 - 2 m on the roadside. This was considered one of the feasible efforts to create a pedestrian-friendly urban environment. However, even considering that pedestrian activities are generally low due to high motorcycle usage, these areas inherited difficult conditions for comfortable walking because of high heat and humidity throughout the day (Figure 21). Furthermore, the shops along the road are large-scale commercial facilities, which are not often used by the residents, and because the privatized areas are either used for motorcycle parking or laying out tables, it makes it very difficult for pedestrians to walk through. In addition, because the pedestrian zone is not properly managed, these areas are left deteriorated with missing paving blocks and dumped garbage. In terms of the public housing estate, despite ensuring a large outdoor area through considerably lower building coverage ratio, it was actually not being used actively. Residents did not use the space because the concrete-finished ground became extremely hot throughout the day, which became useful for merely drying fruits or vegetables. With the disuse of the outdoor space, the entrance of the buildings or the narrow internal corridors were used for resting or parking motorcycles. However, in the Row house area, contrastingly, there was overuse of the provided infrastructure leading towards a degraded



Figure 21. Impaired roadside of Nguyen Tat Thanh (upper left); disused outdoor space in the public housing estate (lower left); excessively privatized street in the row house area (right).

urban environment. The 3 m - wide street in front of the lots was excessively privatized where residents had gone beyond parking and commercial uses, removing parts of the pavement blocks to privately plant or installing permanent concrete structures. The active use of the ground floor due to privatization was an attractive aspect of the area, but the public purposes of the space had been completely lost (Figure 21).

Public housing development had also exacerbated spatial segregation of the lower-income households. Despite the project objectives of providing social welfare, segregation rising from the location and the building type characteristics were predictable. Because the site is located

at the very end of the road development, with a railroad on its side, access to the city center is constricted (Figure 15). Considering that city connections and accessibility is crucial for lower-income households (Cervero, 2013), the failure to ensure sites closer to the city for the public housing project, and instead selling it off to private investors, was found to be a drawback by the government. Second, introducing a high-rise housing typology without considering that residents are primarily used to row houses compounded to the problems of low housing environment quality. Also, living in the estate had only reinforced the stigmatization of being economically marginalized. On the other end of the spectrum, problems of a gated community are probable in Da Phuoc New Town. Luxury villas and townhouses occupy most of the newly created coastal area, making it difficult for other residents to use coastal amenities, which are a public good. This contrasts from the emphasis on public qualities of these coastal areas in the first and initially modified plans. In particular, a coastal road had been planned by the strong request of the local government, but this has been lost in the final modification of the plan (Figure 20).

The biggest problem of the two New Town projects is that the master plan is being misused as a means of attracting real estate investment. The projects had undergone without fully understanding the demands or evaluating its feasibility, and had been delayed due to the numerous changes to the plan in the negotiation process between the government and the developers. In Futa New Town, establishing the site and approving the master plan took ten years because the project proceeded without a proper evaluation of demands or migration plans.

A more serious problem is that the canceled plans due to lack of business viability are still being used to recruit new investors, by which the eventual plans are different from the approved ones. For example, the canceled coastal waterside plan is still being used to attract investors, and lots within the block where a 1.74ha supermarket and open space was planned but failed to find investment, are being sold. Despite the ambitious plans for creating a sub-center to Danang, Vietnamese experts have expressed doubts on how this area would function in relation to the city center, and in this process, major projects are being canceled while lots are irresponsibly sold.

Da Phuoc New Town is also experiencing difficulties, where over the ten years of development only 47% of the site is completed, and is only now recruiting individual investors. Daewon Cantavil, the previous developer, expressed concerns over the uncertain work scope of the private developer explaining it as the reason why development rights had been transferred to a Vietnamese company. For example, the roles of the public and private were not set out clearly from the beginning of the project, and the government had requested the developer to build and manage the sewage system for the New Town. The scope of work changed unpredictably throughout the project delaying the whole process, and increasing business risks. Afterwards, the newly appointed Vietnamese developer had created a completely new master plan, and investors are being recruited based on this. In addition, the high-rise apartments that were the winning element of the previous developer, which had been approved by the government in hopes for branding the city, is also criticized for ill-considering the housing culture and income

levels of the area. The first plan proposed mostly luxury apartments for a population of 40,000 which is hardly relevant to a city of total population 970,000 with an income per capita 1,900 USD, living in low-rise row houses or shophouses.

3) Shaded paths: Street vitalization and the formation of community street

People adapted spaces to their needs in midst of the success and failures of urban development projects. As it is widely known, different people use street sides in Vietnam for various purposes throughout the day (Drummond, 2000; Kim, 2012), and outdoor activities are closely related to thermal comfort (Hart & Sailor, 2009; Huang et al., 2015; Johansson & Emmanuel, 2006), which was easily identified on the site as well. Especially, shaded paths that are created deliberately or by chance provided important opportunities for street vitalization, and the active use by pedestrians and cyclists. This was apparent in the existing housing area. Route [a] in Figure 22 is a newly formed 10 m-wide street. 8 m of the street adjacent to the building is used for commercial activities and parking by the building owner, with the rest of the 2 m used by pedestrians. Because of the shades either formed by trees or installed by building owners, the 8 m area is used by restaurants and cafés. In particular, the large lots provided in this area had allowed for the formation of various amenities such as hotels, large restaurants and cafes, which enliven the area especially after 5PM. However, because most users travel by motorcycle and need to park in front of the buildings, there is hardly any pedestrian activity in the 2 m-width

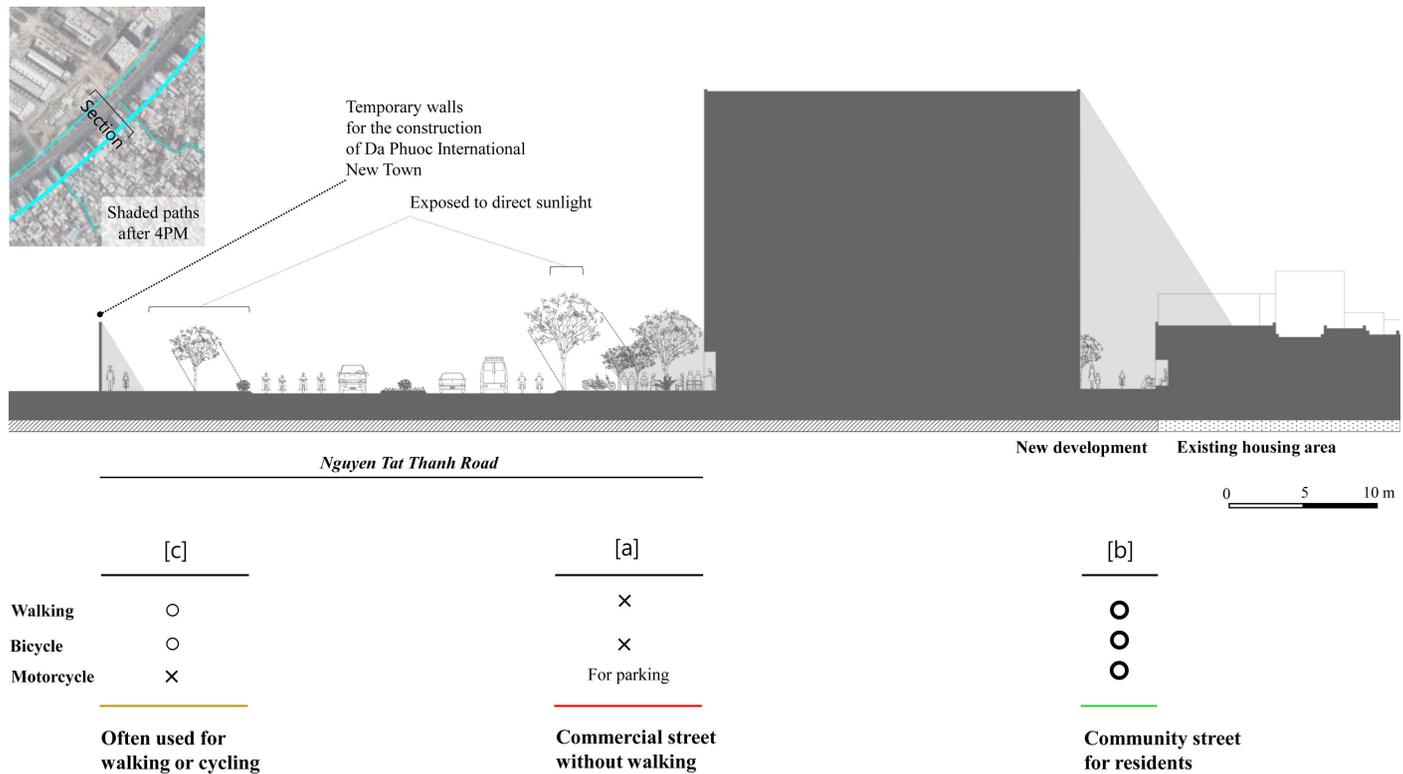


Figure 22. Pedestrian, cycling, and motorcycle activities along the shaded paths formed by artificial structures, sidewalk trees, and buildings (usually before noon and after 4PM).

street. Furthermore, the pedestrian routes are exposed to direct sunlight which discourages usage, hence, despite the high residential density, there are hardly people who use these streets. Therefore, the streetscape is unique in that it is active yet devoid of pedestrian activities. Section [b] is a pedestrian-vehicle route formed along with the new road development, which played an important role as a community street due to the shades provided by the newly constructed high-rise buildings and existing buildings. Various uses and activities were observed during the daytime until 4PM when shades formed. The most prominent feature was that everyday pedestrian activities and cycling co-existed in these streets. It is known that there is a lack of pedestrian and cycling activities in Vietnam due to the motorcycle-oriented transportation culture (Bertaud, 2011; Hansen, 2017; Truitt, 2008), however, this area was notable because not only pedestrian activities were found, certain areas were used as play areas. For example, this street was a shopping route, a leisurely walkway, a cycling route for school children and a play area. Hence, the 5 m-width street was mostly used for movement with the exception of the 0.5 - 1 m width segment being used for private use. As the resident use increased, small-scale commercial facilities and amenities such as restaurants and shops started to form along the street making it an active community street. Additionally, the road adjacent to Da Phuoc New Town, section [c], was observed to be used in late afternoon or weekends for leisurely walks and cycling due to the shades formed by the high construction site barriers. In short, for high street activities in these areas, apart from the well-known conditions such as high density,

good design, diversity (Cervero & Kockelman, 1997), mixed-use and the presence of retail (Ozbil et al., 2011), a certain length of shaded path is necessary.

4. Discussion

In the effort to brand Danang as a world-class tourist city as well as an environmentally friendly industrial city, the new road development had prevented uncontrolled sprawling to the coastal area, and formed a development axis for future urban expansion. In this process diverse urban forms and designs were attempted, however, rather than implementing innovative design solutions, existing urban forms had slowly adapted to new conditions. This research investigated five newly developed areas along the new road to understand the pros and cons of these changes. As a result, in response to alleviating high-density development, design efforts to qualitatively improve the neighborhood environment through increased road and open spaces were identified. On the other hand, due to inept spatial planning, certain areas were either disused or excessively used causing deterioration. Also, master plans were misused to attract investments, hence were often changed, causing time, cost and administrative efforts (Table 12). The most important characteristic of urban space use in midst of the success and failures of the changes is the active use of shaded paths, which is related to active street environments and the formation of community

Table 12. The success and failure of the new developments.

Cases	Goal	Execution	Positive	Negative
Existing housing area	<ul style="list-style-type: none"> Improvement of residential environment 	<ul style="list-style-type: none"> Supply of urban infrastructure 	<ul style="list-style-type: none"> Induction of urban regeneration 	<ul style="list-style-type: none"> Rapid erosion of public space due to disuse
Row house area	<ul style="list-style-type: none"> Urbanization in non-urban areas near the city center 	<ul style="list-style-type: none"> Development of residential land with good marketability 	<ul style="list-style-type: none"> Quick formation of homogeneous residential areas 	<ul style="list-style-type: none"> Excessive privatization of the public space
Public housing	<ul style="list-style-type: none"> Housing supply for the vulnerable 	<ul style="list-style-type: none"> Construction of an apartment complex 	<ul style="list-style-type: none"> Introduction of new housing types 	<ul style="list-style-type: none"> Class segregation reinforcement and unused outdoor space
Futa New Town Danang	<ul style="list-style-type: none"> Development of subcenter 	<ul style="list-style-type: none"> New town development by private capital 	<ul style="list-style-type: none"> Design of neighborhood environment with broader public space 	<ul style="list-style-type: none"> Misuse of masterplan for investment
Da Phuoc International New Town	<ul style="list-style-type: none"> Creating an international level urban space for city branding 	<ul style="list-style-type: none"> New town development by foreign and private capital 	<ul style="list-style-type: none"> Design of walk-friendly neighborhood environment considering community 	<ul style="list-style-type: none"> Waste of time and administration due to frequent changes of plan

st

streets even if pedestrian activities are low.

The urban design and policy implications of the results are as follows. In terms of urban design, it is important to predict street usage in the newly formed urban spaces and reflect these findings in future designs. Although efforts were made to create good urban environments, infrastructure and urban development projects undertaken without the understanding of the housing and street activity culture eventually worsened the urban space qualities. In this respect, new housing typologies should be noted such as that proposed by Rockwood & Tran (2016) which combines the elements of a typical row house with multi-family housing. Another urban development project in Son Tra district, known as the 'Nest Home' also provides an alternative where a multi-family housing incorporates commercial facilities on the lower floors and direct access to housing from the ground floor, which are advantages of the row house typology. Furthermore, it is important to incorporate shaded paths into spatial planning to encourage public space use. Shaded paths integrate sustainable transportation, passive solar design, and greening which are elements closely related to sustainability in urban design (Jabareen, 2006). Just as individuals plant trees or install shades in front of their houses, natural and artificial shading is required on an urban design scale, as well as efforts to utilize shaded areas which matches local characteristics. This is important because neighborhood and public transportation system need to be connected on an urban design scale (Kutani et al., 2015) to tackle the problems of air pollution and energy consumption due to excessive use of motorcycles (Dhondt et al., 2011; Ostojic et al., 2013). Currently, the

government is trying to introduce new transportation systems such as the Bus Rapid Transit, of which its success would partly rely on efficient and pleasant pedestrian routes from neighborhoods to bus stations.

In terms of policy, a clear designation of public and private sector roles is required to implement transparent and efficient urban development projects. In the negotiation process, interests of the existing and future residents could be overlooked in pursuit of the respective benefits of the public and private sector, and the government may not be able to demonstrate strong leadership in the situation where the private sector bears a large part in providing infrastructures (Nguyen, 2015; Tran, 2015). Furthermore, experts have pointed out that the lack of public resources and urban professionals are the biggest constraint of urban development projects in Danang. Therefore, for the government to take stronger leadership without wasting human resources and capital, an administrative process which clarifies the roles of the two entities, and ensures efficient progress is needed. A clear vision and capability to lead a project by the government are extremely important where most economic developments are supported by FDI, and the efficient use of domestic and foreign capital in urban projects need to be ensured.

Last, the research is limited where two of the five projects are not yet completed but are in the construction process. Nonetheless, the problems identified in the process of the projects carry strong implications for rapidly urbanizing areas in the developing world.

Acknowledgments

This work was supported by the BK21 Plus Project in 2017 (Seoul National University Interdisciplinary Program in Landscape Architecture, Global leadership program towards innovative green infrastructure).

Conclusion

Urban infrastructure expansion as a result of new road development precipitated in-migration and drastically changed the urban landscape. This brought about an improved quality of life for those living in the proximity of the road development through better public areas, increased income, and improved mobility. To obtain a finer understanding of how the road affected the neighborhoods, this research interviewed 460 building owners, conducted stakeholder interviews, observed spatial use and user behavior, and examined urban development case studies. Based on the specific aims of the research, the following conclusions were derived.

The first chapter confirmed that the Danang coastal road development affected the residents' socioeconomic condition such as their occupation and income, and also transformed the physical environment. Road development was closely related to the increase in building floors, the number of mixed-use developments, household income, and changes in occupation. Furthermore, depending on the community, the effects of the road development manifested in different ways. Migrants mostly settled near the large lots adjacent to the new road in order to capitalize land and ran comparatively large businesses which contributed to an income five times higher than the original residents. The indigenous population remained in their original areas to benefit from the new road development while making small changes on a lot basis to adapt to the new urban environment and actively re-use space.

The second chapter identified that improved mobility due to the road development had different impacts on people's travel patterns and use of space. Wider access to the job market was particularly pertinent among the original residents who traveled more than twice the distance of migrants to their workplaces. On the other hand, migrants traveled further to diverse destinations in order to enjoy shopping and leisure activities. Such travel patterns were subsequently closely related to space utilization. Original residents who enjoyed shopping and leisure near their place of residence used small-scale outdoor spaces as places of rest or co-work with neighbors, while migrants who mostly owned large hotels or restaurants brought active commercial activities into the streets.

Last, the third chapter discusses the key urban morphological changes in the aftermath of the road development by examining five development case studies. Despite the genuine attempt to introduce new housing types such as high-rise apartments, the conventional row house, which has a comparatively higher building coverage ratio and lower floor area ratio, had evolved to better accommodate everyday purposes. On the other hand, although plans for large urban projects were being canceled due to miscalculation of business feasibility, they were still promoted and misused to attract real estate investments. Moreover, urban space quality declined as public spaces were either disused or excessively used, and also due to the problems of ambiguous roles of the private and public sector in large development projects.

Upon this, the research has the following implications. First, this study is an empirical examination of the effectiveness of public goods.

Road development largely impacts people's jobs, income, lifestyle, use of space, and the physical environment. Once constructed it is difficult to remedy a situation when problems arise afterward, and improvements may require immense time, cost and manpower. If the negative impacts of a road development could be predicted from the outset, this would contribute to the fair distribution of the development benefits among various stakeholders on a local- and neighborhood-level, and allow for refined urban policies which ensure efficient use of urban space. In the study area, whether someone lived close to the new road development or not often determined the level of income. Also, the differences in commuting method and traveling distances adversely affected the original residents more in terms of their safety and state of health. Even more pending was the problems of deserted public areas, and the socio-spatial segregation of low-income public housing which was located far off from the main city area.

Second, urban environments need to be created on the basis of community needs in order to establish 'good cities.' Diverse yet unverified urban master plans are rapidly being introduced and implemented in the developing world. There are drawbacks in these projects as they are mostly large-scale developments run by a small number of companies. Under unstable political and economic conditions, these projects often come to a halt, fail to sell, or face unpredictable changes in the master plan. Moreover, the public sector often loses control over the private sector as they heavily rely on the private sector to build the urban infrastructures. In this process, community sustainability is threatened where the opinions of residents are

overlooked, and old but important urban structures are destroyed. To minimize such shortcomings and create good urban environments, planning which reflects people-oriented spatial use based on community needs is required, especially in the process of establishing urban master plans and large urban projects. Sustainable and just cities in the developing world rely on the understanding of how people use public and private space, how they make a living, and foreseeing the changes that the new development would bring to the people and the physical environment.

Third, where the public sector lacks funds and human resources in implementing an urban project, a system which ensures the public sector to provide a clear project vision and clarified roles of the public and private sector is all the more important. Many untested urban projects are simultaneously being undertaken in the developing world. Because private developers are responsible for much of the urban infrastructure development, the public sector often loses control over the project and plans frequently change. Under such process, there is also a high possibility of corruption as developers, local government officials, and investors are closely related. This not only results in the waste of time and administrative efforts but leads to a serious decline in the urban environment in terms of public goods and services.

Although this research is limited to studying just one city from the developing world, it provides invaluable evidence regarding the effects of development and its problems to various other cities in the emerging economies where good cities are strived for in midst of rapid change and limited resources.

ACKNOWLEDGEMENT

1. This work was supported by the BK21 Plus Project in 2013 - 17 (Seoul National University Interdisciplinary Program in Landscape Architecture, Global leadership program towards innovative green infrastructure).
2. This research has been supported by 2017 Seoul National University Asia Center (SNUAC) Dissertation Writing Fellowship Program.

REFERENCES

- Adams, J. S., & Vandrasek, B. J. (2007). Transportation as catalyst for community economic development. Center for Transportation Studies, University of Minnesota, Minneapolis. Retrieved from <http://hdl.handle.net/11299/5557>
- Antrop, M. (2004). Landscape change and the urbanization process in Europe. *Landscape and urban planning*, 67(1), 9-26.
- Aoyama, Y., & Kondo, A. (1993). The impact of major road developments on the spheres of urban influence of Japanese cities. *Transportation*, 20(3), 305-323.
- Balsas, C. J. (2004). Measuring the livability of an urban centre: an exploratory study of key performance indicators. *Planning, Practice & Research*, 19(1), 101-110.
- Bertaud, A. (2011). Da Nang urban structure: the motorcycle, provides a significant advantage for mobility and housing affordability. Retrieved from http://alainbertaud.com/wp-content/uploads/2013/07/AB_report_Danang_Graphs_rev.pdf
- Bissio, R. (2008). Paris declaration on aid effectiveness. Presented at Human Rights Council, Session of the Working Group on the Right to Development, High Task Force on the Implementation of the Right to Development, January 7-15, Geneva. Retrieved from http://www.gendermatters.eu/resources_documents/UserFiles/File/Resourse/HRC_PD_RtDevelopment.pdf
- Bryan, J., Hill, S., Munday, M., & Roberts, A. (1997). Road infrastructure and economic development in the periphery: the case of A55 improvements in North Wales. *Journal of Transport Geography*, 5(4), 227-237.
- Cervero, R. (1996). Jobs-housing balance revisited: trends and impacts in the San Francisco Bay Area. *Journal of the American Planning*

Association, 62(4), 492-511.

- Cervero, R., & Kockelman, K. (1997). Travel demand and the 3Ds: density, diversity, and design. *Transportation Research Part D: Transport and Environment*, 2(3), 199-219.
- Cervero, R., & Duncan, M. (2002). Transit's value-added effects: light and commuter rail services and commercial land values. *Transportation Research Record*, 1805, 8-15.
- Cervero, R., & Duncan, M. (2006). Which reduces vehicle travel more: jobs-housing balance or retail-housing mixing?. *Journal of the American planning association*, 72(4), 475-490.
- Cervero, 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.
- Cervero, R., & Kang, C. D. (2011). Bus rapid transit impacts on land uses and land values in Seoul, Korea. *Transport Policy*, 18(1), 102-116.
- Cervero, R. B. (2013). Linking urban transport and land use in developing countries. *Journal of Transport and Land Use*, 6(1), 7-24.
- Chandra, A., & Thompson, E. (2000). Does public infrastructure affect economic activity? Evidence from the rural interstate highway system. *Regional Science and Urban Economics*, 30(4), 457-490.
- Chaolin, G., Xiaohui, Y., & Jing, G. (2010). China's master planning system in transition: case study of Beijing. In *46th ISOCARP Congress 2010*. Retrieved from http://www.isocarp.net/data/case_studies/1657.pdf
- Cheng, H., & Hu, Y. (2010). Planning for sustainability in China's urban development: status and challenges for Dongtan eco-city project. *Journal of Environmental Monitoring*, 12(1), 119-126.
- Davies, P. W. K., & Townshend, P. I. J. (2015). New urbanisms: from neo-traditional neighbourhoods to new regionalism. In *theme cities: solutions for urban problems*. Springer, Dordrechts, 17-61. Retrieved from https://link.springer.com/chapter/10.1007/978-94-017-9655-2_2
- Deshkar, S., Hayashia, Y., & Mori, Y. (2011). An alternative approach for planning the resilient cities in developing countries. *International*

Journal of Urban Sciences, 15(1), 1-14.

- OECD, DAC (2005). 'The paris declaration on aid effectiveness and the accra agenda for action', Paris: OECD.
- Dhondt, S., Le Xuan, Q., Van, H. V., & Hens, L. (2011). Environmental health impacts of mobility and transport in Hai Phong, Vietnam. *Stochastic Environmental Research and Risk Assessment*, 25(3), 363-376.
- Drummond, L. B. (2000). Street scenes: practices of public and private space in urban Vietnam. *Urban Studies*, 37(12), 2377-2391.
- DUP. (2016). The article, "Packing a mightier punch: Asia's economic growth among global markets continues", Deloitte University Press, 2016, Retrieved from <https://dupress.deloitte.com/dup-us-en/economy/asia-pacific-economic-outlook/2016/q1-asia-economic-growth-continues.html>
- Garside, P. L. (2003). From garden city to green city: the legacy of Ebenezer Howard. *The Town Planning Review*, 74(3), 352.
- Giuliano, G. (1991). Is jobs-housing balance a transportation issue?. *Transportation Research Record*, 1305, 305-312.
- Gospodini, A. (2002). European cities in competition and the new 'uses' of urban design. *Journal of Urban Design*, 7(1), 59-73.
- Gough, K. V., & Tran, H. A. (2009). Changing housing policy in Vietnam: emerging inequalities in a residential area of Hanoi. *Cities*, 26(4), 175-186.
- Handy, S. (1996a). Methodologies for exploring the link between urban form and travel behavior. *Transportation Research Part D: Transport and Environment*, 1(2), 151-165.
- Handy, S. (1996b). Urban form and pedestrian choices: study of Austin neighborhoods. *Transportation Research Record: Journal of the Transportation Research Board*, (1552), 135-144.
- Hansen, A. (2017). Hanoi on wheels: emerging automobility in the land of the motorbike. *Mobilities*, 12(5), 628-645.

- Hart, M. A., & Sailor, D. J. (2009). Quantifying the influence of land-use and surface characteristics on spatial variability in the urban heat island. *Theoretical and applied climatology*, 95(3-4), 397-406.
- Ho, B. Q., & Clappier, A. (2011). Road traffic emission inventory for air quality modelling and to evaluate the abatement strategies: a case of Ho Chi Minh City, Vietnam. *Atmospheric environment*, 45(21), 3584-3593.
- Hopke, P. K., Cohen, D. D., Begum, B. A., Biswas, S. K., Ni, B., Pandit, G. G., ... & Waheed, S. (2008). Urban air quality in the Asian region. *Science of the Total Environment*, 404(1), 103-112.
- Huynh, D. (2015). The misuse of urban planning in Ho Chi Minh City. *Habitat International*, 48, 11-19.
- Huang, K. T., Lin, T. P., & Lien, H. C. (2015). Investigating thermal comfort and user behaviors in outdoor spaces: a seasonal and spatial perspective. *Advances in Meteorology*, 2015.
- IMF. (2017). Regional Economic Outlook: Asia and Pacific, 2017. Retrieved from <https://www.imf.org/en/Publications/REO/APAC/Issues/2017/10/09/areo1013>
- Issah, I., Khan, T. Y., & Sasaki, K. (2005). Do migrants react to infrastructure difference between urban and rural areas? Development of an extended Harris–Todaro model. *Review of Urban & Regional Development Studies*, 17(1), 68-88.
- Jabareen, Y. R. (2006). Sustainable urban forms: their typologies, models, and concepts. *Journal of planning education and research*, 26(1), 38-52.
- Jackson, L. E. (2003). The relationship of urban design to human health and condition. *Landscape and urban planning*, 64(4), 191-200.
- Johansson, E., & Emmanuel, R. (2006). The influence of urban design on outdoor thermal comfort in the hot, humid city of Colombo, Sri Lanka. *International journal of biometeorology*, 51(2), 119-133.
- Jung, S., & Lee, J. S. (2017). Korean developers in Vietnam: the

mechanism of transnational large-scale property development and its planning. *Sustainability*, 9(5), 748.

- Kang, C. D., & Cervero, R. (2009). From elevated freeway to urban greenway: land value impacts of the CGC project in Seoul, Korea. *Urban Studies*, 46(13), 2771-2794.
- Kelly, E. D. (1994). The transportation land-use link. *Journal of Planning Literature*, 9(2), 128-145.
- Kien, T. (2008). "Tube house" and "neo tube house" in Hanoi: a comparative study on identity and typology. *Journal of Asian Architecture and Building Engineering*, 7(2), 255-262.
- 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.
- Kim, A. M. (2015). *Sidewalk city: remapping public space in Ho Chi Minh City*. Chicago: University of Chicago Press.
- Kim, D., Lee, J., & Choi, S. (2015). Balancing mobility and CO2 reduction by a mode share scheme: a comparison of Los Angeles and Seoul metropolitan areas. *International Journal of Urban Sciences*, 19(2), 168-181.
- Kim, S., Park, S., & Lee, J. S. (2014). Meso-or micro-scale? Environmental factors influencing pedestrian satisfaction. *Transportation Research Part D: Transport and Environment*, 30, 10-20.
- Krisjane, Z., Berzins, M., Ivlevs, A., & Bauls, A. (2012). Who are the typical commuters in the post-socialist metropolis? The case of Riga, Latvia. *Cities*, 29(5), 334-340.
- Kutani, I., Sudo, Y., & Li, Y. (2015). Energy efficiency improvement in the transport sector through transport improvement and smart community development in urban areas. Retrieved from <http://www.eria.org/RPR-FY2014-38.pdf>
- Kwon, Y., Kim, S., & Jeon, B. (2014). Unraveling the factors determining the redevelopment of Seoul's historic hanoks. *Habitat International*, 41, 280-289.

- Labbé, D., & Boudreau, J. A. (2015). Local integration experiments in the new urban areas of Hanoi. *South East Asia Research*, 23(2), 245-262.
- Labbé, D., & Musil, C. (2014). Periurban land redevelopment in Vietnam under market socialism. *Urban Studies*, 51(6), 1146-1161.
- Lau, J. C. Y., & Chiu, C. C. (2013). Dual-track urbanization and co-location travel behavior of migrant workers in new towns in Guangzhou, China. *Cities*, 30, 89-97.
- Lee, J. S., Won, S., & Kim, S. (2015). Describing changes in the built environment of shrinking cities: case study of Incheon, South Korea. *Journal of Urban Planning and Development*, 142(2), 05015010.
- Levine, J. (1998). Rethinking accessibility and jobs-housing balance. *Journal of the American Planning Association*, 64(2), 133-149.
- Lin, D., Allan, A., & Cui, J. (2015). The impact of polycentric urban development on commuting behaviour in urban China: evidence from four sub-centres of Beijing. *Habitat International*, 50, 195-205.
- Lin, T. D., Jovanis, P. P., & Yang, C. Z. (1994). Time of day models of motor carrier accident risk. *Transportation Research Record*, 1467, 1-8.
- Linh, N. H. K., Erasmi, S., & Kappas, M. (2012). Quantifying land use/cover change and landscape fragmentation in Danang City, Vietnam: 1979-2009. International archives of the photogrammetry. *Remote Sensing and Spatial Information Sciences*, Vol. XXXIX-B8, 2012 XXII ISPRS Congress, Melbourne, Australia.
- Marquet, O., & Miralles-Guasch, C. (2015). The walkable city and the importance of the proximity environments for Barcelona's everyday mobility. *Cities*, 42, 258-266.
- Matsumura, S., Hoa, N. T., & Kien, T. T. (2017). New approach and issues for the urban planning system in Vietnam. *Urban and Regional Planning Review*, 4, 58-70.
- McCann, E. J. (2007). Inequality and politics in the creative city-region: questions of livability and state strategy. *International Journal of Urban and Regional Research*, 31(1), 188-196.
- Madanipour, A. (2006). Roles and challenges of urban design. *Journal of*

Urban Design, 11(2), 173-193.

McGee, T. G. (2009). Interrogating the production of urban space in China and Vietnam under market socialism. *Asia Pacific Viewpoint*, 50(2), 228-246.

Mehaffy, M., Porta, S., Rofe, Y., & Salingaros, N. (2010). Urban nuclei and the geometry of streets: the 'emergent neighborhoods' model. *Urban Design International*, 15(1), 22-46.

Mehaffy, M. W., Porta, S., & Romice, O. (2015). The "neighborhood unit" on trial: a case study in the impacts of urban morphology. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*, 8(2), 199-217.

Michelson, W. (2009). Variations in the rational use of time—the travel pulse of commutes between home and job. *Electronic International Journal of Time Use Research*, 6(2), 269-285.

Nedovic-Budic, Z., Knaap, G. J., Shahumyan, H., Williams, B., & Slaev, A. (2016). Measuring urban form at community scale: case study of Dublin, Ireland. *Cities*, 55, 148-164.

Neuman, M., & Smith, S. (2010). City planning and infrastructure: once and future partners. *Journal of Planning History*, 9(1), 21-42.

Nguyen, H. K. L. (2013). Detecting and modeling the changes of land use/cover for land use planning in Da Nang City, Viet Nam. *Göttingen, Georg-August Universität, Diss.* Retrieved from <https://d-nb.info/1044870680/34>

Nguyen, N. T. (2015). Vietnamese regional planning: problems in implementation and international experiences. *Journal of Sustainable Development*, 8(8), 86.

Ostojic, D. R., Bose, R. K., Krambeck, H., Lim, J., & Zhang, Y. (2013). Energizing green cities in Southeast Asia: applying sustainable urban energy and emissions planning. World Bank Publications. Retrieved from <http://documents.worldbank.org/curated/en/890271468247821479/pdf/811110PUB0Gree0Box0379830B00PUBLIC0.pdf>

- Ozbil, A., Peponis, J., & Stone, B. (2011). Understanding the link between street connectivity, land use and pedestrian flows. *Urban Design International*, 16(2), 125-141.
- 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.
- Padeiro, M. (2013). Transport infrastructures and employment growth in the Paris metropolitan margins. *Journal of Transport Geography*, 31, 44-53.
- Punpuing, S., & Ross, H. (2001). Commuting: the human side of Bangkok's transport problems. *Cities*, 18(1), 43-50.
- Quang, H. (1997). Hanoi, past and present. Ho Chi Minh City: Culture-Information Publishing House.
- Quang, N., & Kammeier, H. D. (2002). Changes in the political economy of Vietnam and their impacts on the built environment of Hanoi. *Cities*, 19(6), 373-388.
- Reality of Aid (2008). The reality of aid 2008: aid effectiveness, democratic ownership and human rights. Quezon City: Ibon.
- Rockwood, D., & Tran, D. Q. (2016). Urban immigrant worker housing research and design for Da Nang, Viet Nam. *Sustainable Cities and Society*, 26, 108-118.
- Smith, T., Nelischer, M., & Perkins, N. (1997). Quality of an urban community: a framework for understanding the relationship between quality and physical form. *Landscape and Urban Planning*, 39(2), 229-241.
- Southworth, M., & Owens, P. M. (1993). The evolving metropolis: studies of community, neighborhood, and street form at the urban edge. *Journal of the American Planning Association*, 59(3), 271-287.
- Straub, S. (2008). Infrastructure and growth in developing countries (Vol. 4460). World Bank Publications. Retrieved from <http://documents.worldbank.org/curated/en/349701468138569134/pdf/wps4460.pdf>
- Sullivan, W. C., & Lovell, S. T. (2006). Improving the visual quality of

commercial development at the rural–urban fringe. *Landscape and urban planning*, 77(1), 152-166.

Tran, H. A. (2015). Urban space production in transition: The cases of the new urban areas of Hanoi. *Urban Policy and Research*, 33(1), 79-97.

Trần, T. N. Q., Quertamp Nguyen, F., Miras, C. D., Vinh, N. Q., & Truong, T. H. (2012). Trends of urbanization and suburbanization in Southeast Asia. Ho Chi Minh City: General Publishing House.

Truitt, A. (2008). On the back of a motorbike: middle-class mobility in Ho Chi Minh City, Vietnam. *American Ethnologist*, 35(1), 3-19.

Tung, H. D., Tong, H. Y., Hung, W. T., & Anh, N. T. N. (2011). Development of emission factors and emission inventories for motorcycles and light duty vehicles in the urban region in Vietnam. *Science of the Total Environment*, 409(14), 2761-2767.

UN, DESA (2011). Population distribution, urbanization, internal migration and development: an international perspective. Department of economic and social affairs population division, United Nations, Retrieved from http://wedocs.unep.org/bitstream/handle/20.500.11822/18920/Population_Distribution_Urbanization.pdf?sequence=1&isAllowed=y

UN, DESA (2014). World urbanization prospects: the 2014 revision, highlights (ST/ESA/SER.A/352). Department of economic and social affairs, Population Division. Retrieved from <https://esa.un.org/unpd/wup/publications/files/wup2014-highlights.pdf>

Van Kamp, I., Leidelmeijer, K., Marsman, G., & De Hollander, A. (2003). Urban environmental quality and human well-being: towards a conceptual framework and demarcation of concepts; a literature study. *Landscape and urban planning*, 65(1), 5-18.

Victoir, L., & Zatsopine, V. (2013). *Harbin to Hanoi: the colonial built environment in Asia, 1840 to 1940*. Hong Kong: Hong Kong University Press.

Vilhelmson, B. (2007). The use of the car—mobility dependencies of urban everyday life. In T. Gärling & L. Steg (Eds.), *Threats to the quality of urban life from car traffic: Problems, causes, and solutions* (pp. 145–164). Amsterdam: Elsevier.

- Wang, J., Su, M., Chen, B., Chen, S., & Liang, C. (2011). A comparative study of Beijing and three global cities: a perspective on urban livability. *Frontiers of Earth Science*, 5(3), 323-329.
- Warlters, M. (2006). Vietnam's infrastructure challenge—infrastructure strategy: cross-sectoral issues. World Bank Publications. Retrieved from <http://documents.worldbank.org/curated/en/918311468308974645/pdf/371840VN0Cross17184to3718901PUBLIC1.pdf>
- Won, S., Cho, S. E., & Kim, S. (2015). The neighborhood effects of new road infrastructure: transformation of urban settlements and resident's socioeconomic characteristics in Danang, Vietnam. *Habitat International*, 50, 169-179.
- Won, S., & Kim, S. (2017). 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. *Cities*, 67, 63-73.
- World Bank. (2011). Vietnam urbanization review: technical assistance report. World Bank Publications. Retrieved from <http://documents.worldbank.org/curated/en/225041468177548577/pdf/669160ESW0P1130Review000Full0report.pdf>
- Xue, C. Q., & Zhou, M. (2007). Importation and adaptation: building 'one city and nine towns' in Shanghai: a case study of Vittorio Gregotti's plan of Pujiang Town. *Urban Design International*, 12(1), 21-40.
- Zacharias, J., & Blik, D. (2008). The role of urban planning in the spontaneous redevelopment of Huaqianbei, Shenzhen. *Journal of Urban Design*, 13(3), 345-360.
- Zhu, J. (2012). Development of sustainable urban forms for high-density low-income Asian countries: the case of Vietnam: the institutional hindrance of the commons and anticommons. *Cities*, 29(2), 77-87.
- Zhao, G., Zheng, X., Yuan, Z., & Zhang, L. (2017). Spatial and temporal characteristics of road networks and urban expansion. *Land*, 6(2), 30.

APPENDIX

Appendix 1. Questionnaire for in-depth interview (in English)

No. _____

Questionnaire

Dear Sir or Madame,

My name is Sehyung Won, a Ph.D. candidate studying urban design at Seoul National University in South Korea. This questionnaire intends to understand the process of urbanization caused by construction of new roads, Nguyen Tat Thanh.

Your response will only be used for academic purposes.

Thank you for your participation.

July. 2014

Department of Graduate School of Environmental Studies

Seoul National University

Sehyung Won

Mobile phone: +82-10-3892-0000

E-mail: yan799@snu.ac.kr

- The urban environment of Thank Khe district, the site of this research, has undergone a big change since the Nguyen Tat Thanh road along Danang Bay was opened in 2003.
- This questionnaire is divided into two parts: one part inquiring about urban conditions before 2002 when Nguyen Tat Thanh road had not been developed; and the other part about the conditions after the road was opened in 2003. Please respond to the questions with this structure in mind.

I. Pre-2002: Before Development of Nguyen Tat Thanh Road

Category		Question
Property Ownership and Type	<p>Case A <u>If property owned then is same as property currently owned in 2014</u></p>	<ol style="list-style-type: none"> Did you or your family own the same property before 2002? or rent? ① Owned ② Rented If you answered above, how many years until now (2014) has the property been owned/rented by you or your family? ① Owned About () years ② Rented About () years What is the type of the property? ① Elongated House ② Villa ③ Simple House ④ High-rise building ⑤ Other (specify): () Do you or your family own/rent any additional properties? (Multiple answers allowed) ① Yes (Total number of owned properties:) ② Yes (Total number of rented properties:) ③ No
	<p>Case B <u>If property owned then is different from property currently owned in 2014</u></p>	<ol style="list-style-type: none"> Did you owned or rented a different property in 2002? ① Owned ② Rented the property was located: 1-1. In which district, if located in Danang? ① Hai Chau ② Thank Khe ③ Son Tra ④ Ngu Hanh Son ⑤ Lien Chieu ⑥ Cam Le 1-2. In what city, if located outside Danang? () What was the type of the property? ① Elongated House ② Villa ③ Simple House ④ High-rise building ⑤ Other (specify): () Which year did you or your family own/rent the property? () year Did you or your family own/rent any additional properties? (Multiple answers allowed) ① Yes (Total number of owned properties:) ② Yes (Total number of rented properties:) ③ No
Socia	Occu Individual	1. What was your occupation before 2002? ()

I Stand ing	patio n	Members of household	1. Who most provided for your family before 2002? What was his/her occupation? (_____)
	Place fo Empl oyme nt	Individual	1. Where was your work/office located before 2002? <u>① Hai Chau ② Thank Khe ③ Son Tra ④ Ngu Hanh Son ⑤ Lien Chieu ⑥ Cam Le</u>
		Members of household	1. Where was the main provider's work/office located before 2002? <u>① Hai Chau ② Thank Khe ③ Son Tra ④ Ngu Hanh Son ⑤ Lien Chieu ⑥ Cam Le</u>
	Inco me	Individual	1. How much, approximately, was your gross annual income in 2002? (_____ VND)
Household		1. How much, approximately, was your gross annual household income in 2002? (_____ VND)	
Spati al Chan ge	Build ing Prope rty	Bui ldin g Use	<p>Cas e A</p> <p>1. How many stories did this building have in 2002? (_____) stories</p> <p>2. What was the main use of each story in 2002? (1st (ground): _____ 2nd: _____ 3rd: _____ 4th: _____ 5th: _____ 6th and up: _____ Rooftop: _____)</p>
			<p>Cas e B</p> <p>1. How many stories did the building you owned then have? (_____) stories</p> <p>2. What was the main use of each stories of the building you (or your family member) owned then? (1st (ground): _____ 2nd: _____ 3rd: _____ 4th: _____ 5th: _____ 6th and up: _____ Rooftop: _____)</p>
	Gro und Flo or Use	Cas e A	<p>1. Did you or your family member(s) use the 1st (ground) floor of this building or rent it out to others in 2002? <u>① Used by myself or my family member</u> <u>② Rented it out to others for profit</u></p> <p>2. What was the specific use(s) of the 1st (ground) floor in 2002? (Multiple answers allowed) <u>① Commercial use (Type of business: _____)</u> <u>② Office</u> <u>③ Reception or kitchen ④ Storage</u> <u>⑤ Motorcycle parking ⑥ Car parking</u></p>

			⑦ Other (specify): (_____)
		Case B	<p>1. Did you or your family member(s) use the 1st (ground) floor of the building you (or your family member) owned, or rent it out to others in 2002?</p> <p>① Used by myself or my family member ② Rented it out to others for profit</p> <p>2. What was the specific use(s) of the 1st (ground) floor of the building you (or your family member) owned in 2002? (Multiple answers allowed)</p> <p>① Commercial use (Type of business: _____) ② Office ③ Reception or kitchen ④ Storage ⑤ Motorcycle parking ⑥ Car parking ⑦ Other (specify): (_____)</p>
Transportation Ownership	Motorcycle		1. How many motorcycles did you and your family members own in 2002? (_____)
	Bicycle		1. How many bicycles did you and your family members own in 2002? (_____)
	Car (including trucks)		1. How many cars (including trucks) did you and your family members own in 2002? (_____)

II. Post-2003: After Development of Nguyen Tat Thanh Road

	Category	Question
Property Ownership and Type	Case A <u>If still living in the same property</u>	<p>1. Have you or your family member(s) owned the current property continuously since 2003?</p> <p>① Yes ② No</p>
	Case B <u>If purchased the property</u>	<p>1. Did you or your family member(s) purchase the current property after 2003? ① Yes ② No</p> <p>2. If so, what year was the purchase made? (_____) year</p> <p>3. What is the type of the property?</p> <p>① Elongated House ② Villa ③ Simple House ④ High-rise building ⑤ Other (specify): (_____)</p> <p>4. What is the main purpose of the purchase?</p> <p>① Residence ② Commercial use ③ Rent profit</p>

		④ Other (specify): (_____)	
	Case C <u>If (re)developed the property</u>	1. Did you or your family member(s) (re)developed the current property after 2003? ① Yes ② No 2. If so, what year was the property (re)developed? (_____) year 3. What is the type of the (re)developed property? ① Elongated House ② Villa ③ Simple House ④ High-rise building ⑤ Other (specify): (_____) 4. What is the main purpose of the (re)development? ① Residence ② Commercial use ③ Rent profit ④ Other (specify): (_____)	
	Case D <u>If rented the property</u>	1. Did you or your family member(s) rent the current property after 2003? ① Yes ② No 2. If so, what year was the property rented? (_____) year 3. What is the type of the (re)developed property? ① Elongated House ② Villa ③ Simple House ④ High-rise building ⑤ Other (specify): (_____) 4. What is the main purpose of the rent? ① Residence ② Commercial use ③ Rent profit ④ Other (specify): (_____)	
Social Standing	Occupation	Individual	1. Has your occupation changed since 2003? ① Yes ② No 2. If yes, what is the cause of the change(s)? (_____)
		Members of household	1. Has the occupation of your family member(s) changed since 2003? ① Yes ② No 2. If yes, what is the cause of the change(s)? (_____)
	Place of Employment	Individual	1. Has the location of your work/office changed since 2003? ① Yes ② No
		Members of household	1. Has the location of your family member(s)' work/office changed since 2003? ① Yes ② No

	Income	Individual	1. How much, approximately, was your gross annual income in 2013? (_____)VND
		Household	1. How much, approximately, was your gross annual household income in 2013? (_____)VND
	Spatial Change	Building Property	Building Use and Transition
1st(Ground) Floor Use and Transition			<p>1. What is the current specific use(s) of the 1st (ground) floor? (Multiple answers allowed) ① Commercial use (Type of business: _____) ② Office ③ Reception or kitchen ④ Storage ⑤ Motorcycle parking ⑥ Car parking ⑦ Other (specify): (_____)</p> <p>2. Has the 1st (ground) floor use(s) changed since 2003? 2-1. ① Yes ② No 2-2. If yes, what are the details of the change(s)? (_____) 2-3. What are details of change(s) made to business operation? (Multiple answers allowed) ① Change of business type ② Increased number of employees ③ Franchise agreement ④ Others (specify): (_____)</p>
Case A		<p>1. Has the number of stories (height) increased since 2003? ① Yes (_____) stories increased ② No</p> <p>2. Have you (or your family member) purchased adjacent lot(s) and expanded the building since 2003? ① Yes ② No</p> <p>3. Has the structure of the building changed in any</p>	

Physical Transformation		<p>part? (ex. location of bathroom, main entrance, windows, etc.)</p> <p><u>① Yes (specify: _____)</u> <u>② No</u></p> <p>4. Has the exterior of the building been upgraded by additionally using premium materials?</p> <p><u>① Yes (specify: _____)</u> <u>② No</u></p> <p>5. Other than those mentioned above, what other change(s) were made to the building?</p> <p>(_____)</p> <p>6. Did you (or your family member) receive government subsidy or incentives for any expansion work or changes made to the building?</p> <p><u>① Yes (specify: _____)</u> <u>② No</u></p>
	Case B	<p>1. Has the number of stories (height) increased since 2003?</p> <p><u>① Yes (_____) stories increased</u> <u>② No</u></p> <p>2. Have you (or your family member) purchased adjacent lot(s) and expanded the building since 2003?</p> <p><u>① Yes</u> <u>② No</u></p> <p>3. Has the structure of the building changed in any part? (ex. location of bathroom, main entrance, windows)</p> <p><u>① Yes (specify: _____)</u> <u>② No</u></p> <p>4. Has the exterior of the building been upgraded by additionally using premium materials?</p> <p><u>① Yes (specify: _____)</u> <u>② No</u></p> <p>5. Other than those mentioned above, what other change(s) were made to the building?</p> <p>(_____)</p> <p>6. Did you (or your family member) receive government subsidy or incentives for purchasing the building?</p> <p><u>① Yes (specify: _____)</u> <u>② No</u></p>
	Case C	<p>1. Has the number of stories (height) increased since 2003?</p> <p><u>① Yes (_____) stories increased</u> <u>② No</u></p> <p>2. Have you (or your family member) purchased adjacent lot(s) and expanded the building since 2003?</p> <p><u>① Yes</u> <u>② No</u></p> <p>3. Has the structure of the building changed in any part? (ex. location of bathroom, main entrance, windows, etc.)</p>

			<p><input type="radio"/> Yes (specify: _____) <input type="radio"/> No</p> <p>4. Has the exterior of the building been upgraded by additionally using premium materials? <input type="radio"/> Yes (specify: _____) <input type="radio"/> No</p> <p>5. Other than those mentioned above, what other change(s) were made to the building? (_____)</p> <p>6. Did you (or your family member) receive government subsidy or incentives for the (re)development of the building? <input type="radio"/> Yes (specify: _____) <input type="radio"/> No</p>
		Case D	<p>1. Has the number of stories (height) increased since 2003? <input type="radio"/> Yes (_____) stories increased <input type="radio"/> No</p> <p>2. Have you (or your family member) purchased adjacent lot(s) and expanded the building since 2003? <input type="radio"/> Yes <input type="radio"/> No</p> <p>3. Has the structure of the building changed in any part? (ex. location of bathroom, main entrance, windows) <input type="radio"/> Yes (specify: _____) <input type="radio"/> No</p> <p>4. Has the exterior of the building been upgraded by additionally using premium materials? <input type="radio"/> Yes (specify: _____) <input type="radio"/> No</p> <p>5. Other than those mentioned above, what other change(s) were made to the building? (_____)</p> <p>6. Did you (or your family member) receive government subsidy or incentives for rent the building? <input type="radio"/> Yes (specify: _____) <input type="radio"/> No</p>
Chan ge of Prope rty Valu (Rent Price)	Case A		<p>1. How much was the approximate property value of the building in 2002? (_____ VND)</p> <p>2. How much is the current approximate property value of the building in 2014? (_____ VND)</p>
	Case B		<p>1. How much was the approximate property value of the building at the time of purchase? (_____ VND)</p> <p>2. How much is the current approximate property value of the building in 2014? (_____ VND)</p>
	Case C		<p>1. How much was the approximate property value of the</p>

		<p>building at the time of (re)development? (_____ VND)</p> <p>2. How much is the current approximate property value of the building in 2014? (_____ VND)</p>	
	Case D	<p>1. How much was the approximate rent fee of the building at the first time of rent ? (_____ VND)</p> <p>2. How much is the current approximate rent fee of the building in 2014? (_____ VND)</p>	
Travel Behaviour	Ownership	Motorcycle	1. How many motorcycles did you and your family members own in 2014? (_____)
		Bicycle	1. How many bicycles did you and your family members own in 2014? (_____)
		Car (including trucks)	1. How many cars (including trucks) did you and your family members own in 2014? (_____)
	Scope of Activity	Work	<p>1. Please indicate the route by which you or your family members travel to work. # Draw on the map Who are the travelers? (_____)</p> <p>2. What is the mode of transportation you or your family members take to work? ① Walking ② Bicycle ③ Motorcycle ④ Car ⑤ Other (specify: _____)</p>
		Education	<p>1. Please indicate the location of your children's school and the route traveled. # Draw on the map</p> <p>2. What is the mode of transportation your children take to school? ① Walking ② Bicycle ③ Motorcycle, with parent ④ Car, with parent ⑤ Other (specify: _____)</p>
		Shopping	<p>1. Please indicate the location of large market or supermarket frequented by you or your family members and the route traveled. # Draw on the map</p> <p>2. What is the mode of transportation you or your family members take to the market? ① Walking ② Bicycle ③ Motorcycle ④ Car ⑤ Other (specify: _____)</p>
		Religious	1. Please indicate the location of religious facility

		<p>Activities</p>	<p>frequented by you or your family members and the route traveled. # Draw on the map 2. What is the mode of transportation you or your family members take to the religious facility? ① Walking ② Bicycle ③ Motorcycle ④ Car ⑤ Other (specify: _____)</p>
		<p>Leisure</p>	<p>1. Please indicate the location of place or facility frequented by you or your family members for leisure activities, and the route traveled. (ex. park, theme park, theaters, etc.) # Draw on the map 2. What is the mode of transportation you or your family members take to the leisure spot? ① Walking ② Bicycle ③ Motorcycle ④ Car ⑤ Other (specify: _____)</p>
<p>Improvement of Amenity and Safety</p>		<p>1. Has any voluntary community improvement effort been made by the residents since 2003, to improve design or environment of the building or space around it? ① Yes ② No 1-1. What are the details of such efforts? (_____) 2. How is it to walk around alone in this area at night, compared to years before 2003? ① It has become very dangerous ② It has become dangerous ③ It is the same ④ It has become safe ⑤ It has become very safe</p>	
<p>Changes of Personal / Household Business</p>		<p>1. Have you or your family members started a new business since 2003? ① Yes ② No 1-1. If yes, what was the type of the business started? (_____) 1-2. If yes, what year was the business started? (_____) 2. Has there been any change(s) since 2003 to the size and/or type of the business run by you or your family members? ① Yes ② No 2-1. If yes, what is the type to which the business changed? (_____) 2-2. If yes, which year(s) was the change(s) made?</p>	

	<p>() yaer</p> <p>3. Has there been any change(s) since 2003 to operation method of the business run by you or your family members?</p> <p>① Yes ② No</p> <p>3-1. If yes, what are the details of the change(s)? ()</p> <p>3-2. If yes, which year(s) was the change(s) made? () year</p>
--	--

III. General Background

Category	Question
Gender	1. What is your gender? ① Male ② Female
Age	1. What is your age? () years old
Level of Education	1. What is your highest educational qualification? ① Elementary school ② Middle school ③ High school ④ Institution of technical training ⑤ Baccalaureate degree and beyond
Household	1. How many members, including yourself, are in your household? () persons
Birthplace	1. Where is your birthplace? () City () District
Place of Response	1. Where did you fill out this questionnaire? () City () District () Street () No.
Address of Current Residence	1. Is the address above same as the address of your current residence? ① Yes ② No 2. If you answered no to the above question, please tell us your current address of residence. () City () District () Street () No.

Annex: Maps for Indicating the Route of Activity Scope



Figure 23. In-depth interview coverage and surrounding areas.

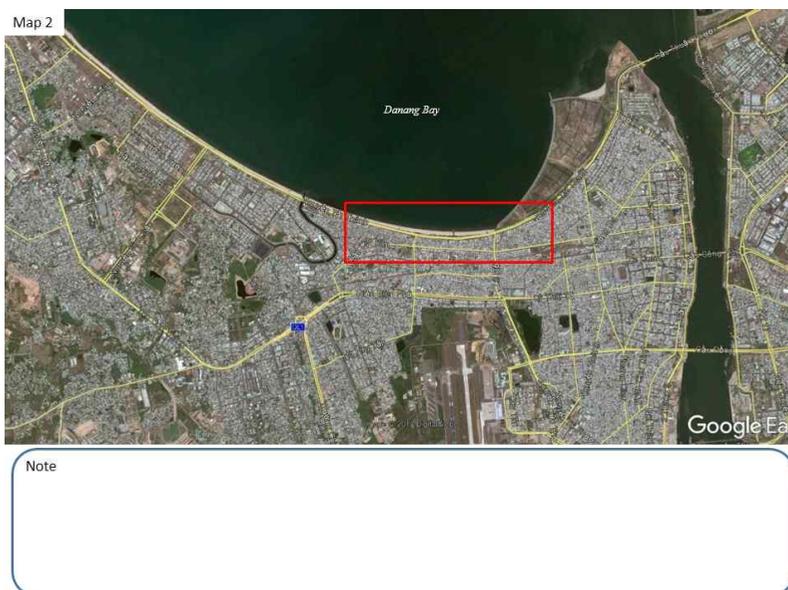


Figure 24. In-depth interview coverage area with added 5km range on East and West sides.



Figure 25. Map including the most urbanized areas of Danang.

Appendix 2. Questionnaire for in-depth interview (in Vietnamese)

Số _____

Phiếu câu hỏi

Xin chào

Tôi là Won Sehyung, nghiên cứu sinh về các vấn đề đô thị đến từ trường Đại học Quốc gia Seoul, Hàn Quốc. Bảng câu hỏi này nhằm mục đích giúp tôi hiểu thêm về quá trình đô thị hóa do việc xây dựng hình thành những tuyến đường mới.

Phản hồi của bạn sẽ chỉ được sử dụng cho mục đích học tập.

Xin chân thành cảm ơn về sự giúp đỡ nhiệt tình của quý vị.

Tháng 7 2014

Trường Nghiên cứu Môi trường,

Đại học Quốc gia Seoul

Won, Sehyung

Di động: +82-10-3892-0000

E-mail: yan799@snu.ac.kr

- Môi trường đô thị của khu vực Thanh Khê nằm trong phạm vi nghiên cứu của nghiên cứu này đã trải qua những thay đổi to lớn kể từ khi đường Nguyễn Tất Thành dọc vịnh Đà Nẵng được xây dựng vào năm 2003.
- Bảng câu hỏi này được chia thành 2 phần: 1 phần tìm hiểu về hiện trạng đô thị trước năm 2002 thời điểm đường Nguyễn Tất Thành chưa được xây dựng; và phần còn lại là về tình trạng sau khi con đường này được xây dựng vào năm 2003. Vui lòng trả lời các câu hỏi theo mẫu dưới đây.

I. Trước 2002: Trước khi phát triển đường Nguyễn Tất Thành

Phân loại		Câu hỏi	
Quy ền sở hữu nhà đất và loại đất	<p>Trường hợp A Nếu mảnh đất sở hữu trước đây cũng chính là mảnh đất vào thời điểm năm 2014</p>	<ol style="list-style-type: none"> Cô/ chú (anh/ chị/ bạn) hoặc gia đình đã sở hữu cũng mảnh đất này trước năm 2002? ① Đúng ② Không phải Nếu câu trả lời là “Đúng” thì tính đến nay (tức 2014) cô/ chú (anh/ chị/ bạn) hoặc gia đình đã sở hữu mảnh đất này bao nhiêu năm rồi? Khoảng () năm Kiểu nhà của cô/ chú (anh/ chị/ bạn) là gì? ① Nhà hộp ② Biệt thự ③ Nhà đơn giản ④ Nhà cao tầng ⑤ Khác (Cụ thể là: ()) Ngoài ra thì cô/ chú (anh/ chị/ bạn) hoặc gia đình còn sở hữu mảnh đất nào khác nữa không? ① Có (Tổng số lượng mảnh đất đang sở hữu:) ② Không 	
	<p>Trường hợp B Nếu mảnh đất sở hữu trước đây khác với mảnh đất sở hữu vào thời điểm năm 2014</p>	<ol style="list-style-type: none"> Nếu năm 2002 cô/ chú (anh/ chị/ bạn) sở hữu 1 mảnh đất thì nó? (ở:) 1-1. Quận/ huyện nào của Đà Nẵng? ① Hải Châu ② Thanh Khê ③ Sơn Trà ④ Ngũ Hành Sơn ⑤ Liên Chiểu ⑥ Cẩm Lệ 1-2. Tỉnh/ thành phố nào? () Kiểu nhà của cô/ chú (anh/ chị/ bạn) là gì ① Nhà hộp ② Biệt thự ③ Nhà đơn giản ④ Nhà cao tầng ⑤ Khác (Cụ thể là: ()) Khoảng năm nào thì cô/ chú (anh/ chị/ bạn) hoặc gia đình được thừa hưởng quyền sở hữu mảnh đất này? () Ngoài ra thì cô/ chú (anh/ chị/ bạn) hoặc gia đình còn sở hữu mảnh đất nào khác nữa không? ① Có (Tổng số lượng mảnh đất đang sở hữu:) ② Không 	
Địa vị xã hội	Ngh ề nghi ệp	Cá nhân	1. Trước năm 2002, cô/ chú (anh/ chị/ bạn) làm nghề gì? ()
		Thành viên trong gia đình	1. Trước năm 2002 ai là người chủ yếu lo liệu mọi việc trong gia đình? Nghề nghiệp gì? ()
	Nơi làm việc	Cá nhân	1. Trước năm 2002 thì văn phòng/ nơi làm việc của cô/ chú (anh/ chị/ bạn) ở đâu ① Hải Châu ② Thanh Khê ③ Sơn Trà

			④ Ngũ Hành Sơn ⑤ Liên Chiểu ⑥ Cẩm Lệ
		Thành viên trong gia đình	1. Trước năm 2002 thì nơi làm việc của lao động chính trong gia đình ở đâu? ① Hải Châu ② Thanh Khê ③ Sơn Trà ④ Ngũ Hành Sơn ⑤ Liên Chiểu ⑥ Cẩm Lệ
	Thu nhập	Cá nhân	1. Tổng thu nhập cả năm của cô/ chú (anh/ chị/ bạn) năm 2002 khoảng? (_____ VND)
		Cả hộ gia đình	1. Tổng thu nhập cả năm của cả gia đình năm 2002 khoảng bao nhiêu? (_____ VND)
Thay đổi không gian	Sử dụng nhà ở	TH. A	1. Ngôi nhà/ tòa nhà này năm 2002 có mấy tầng? (_____) tầng 2. Năm 2002, mục đích sử dụng chính của mỗi tầng là gì? (1trệt: _____ 2: _____ 3: _____ 4: _____ 5: _____ 6 và trên nữa: _____ Tầng áp mái: _____)
		TH. B	1. Ngôi nhà/ tòa nhà này cô/ chú (anh/ chị/ bạn) hiện tại có mấy tầng? (_____) tầng 2. Mục đích sử dụng chính của mỗi tầng trong ngôi nhà/ tòa nhà của cô/ chú (anh/ chị/ bạn) hoặc gia đình là gì? (1trệt: _____ 2: _____ 3: _____ 4: _____ 5: _____ 6 và trên nữa: _____ Tầng áp mái: _____)
	Việc sử dụng tầng trệt	TH. A	1. Năm 2002 cô/ chú (anh/ chị/ bạn) hay các thành viên trong gia đình có sử dụng tầng 1 trong ngôi nhà/ tòa nhà hoặc cho người khác thuê không? ① Gia đình sử dụng ② Cho thuê kiếm thêm thu nhập 2. Năm 2002 các mục đích sử dụng cụ thể của tầng 1 là gì? (Lựa chọn các phương án trả lời dưới đây) ① Mục đích thương mại (Kiểu kinh doanh: _____) ② Văn phòng ③ Tiếp khách hoặc nhà bếp ④ Kho chứa đồ ⑤ Nơi để xe máy ⑥ Nơi để xe ô tô ⑦ Khác (Cụ thể): (_____)
		TH.	1. Năm 2002 cô/ chú (anh/ chị/ bạn) hay các thành viên

			<p>trong gia đình có sử dụng tầng 1 trong ngôi nhà/ tòa nhà hoặc cho người khác thuê không?</p> <p><u>① Gia đình sử dụng</u></p> <p><u>② Cho thuê kiếm thêm thu nhập</u></p> <p>2. Năm 2002 các mục đích sử dụng cụ thể của tầng 1 của ngôi nhà/ tòa nhà cô/ chú (anh/ chị/ bạn) hay gia đình sở hữu năm 2002? (Lựa chọn các phương án trả lời dưới đây)</p> <p><u>① Mục đích thương mại (Kiểu kinh doanh: _____)</u></p> <p><u>② Văn phòng</u> <u>③ Tiếp khách hoặc nhà bếp</u></p> <p><u>④ Kho chứa đồ</u> <u>⑤ Nơi để xe máy</u></p> <p><u>⑥ Nơi để xe ô tô</u></p> <p><u>⑦ Khác (Cụ thể): (_____)</u></p>
Việc sở hữu các phương tiện giao thông	Xe máy	1. Năm 2002 gia đình cô/ chú (anh/ chị/ bạn) có bao nhiêu xe máy? (_____)	
	Xe đạp	1. Năm 2002 gia đình cô/ chú (anh/ chị/ bạn) có bao nhiêu xe đạp? (_____)	
	Ô tô (kể cả xe tải)	1. Năm 2002 gia đình cô/ chú (anh/ chị/ bạn) có bao nhiêu ô tô (kể cả xe tải)? (_____)	

II. Từ năm 2003: Sau khi xây dựng đường Nguyễn Tất Thành

Phân loại	Câu hỏi
<p>Trường hợp A Nếu vẫn tiếp tục sống trên mảnh đất này</p>	<p>1. Từ năm 2003, cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình vẫn tiếp tục sở hữu mảnh đất này phải không? <u>① Đúng</u> <u>② Không phải</u></p>
<p>Trường hợp B Nếu mua lại mảnh đất này</p>	<p>1. Từ năm 2003, cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình đã mua lại mảnh đất này phải không? <u>① Đúng</u> <u>② Không phải</u></p> <p>2. Nếu vậy thì mảnh đất này được mua lại từ năm nào? Năm (_____)</p> <p>3. Kiểu nhà của cô/ chú (anh/ chị/ bạn) là gì? <u>① Nhà hộp</u> <u>② Biệt thự</u> <u>③ Nhà đơn giản</u> <u>④ Nhà cao tầng</u> <u>⑤ Khác (Cụ thể): (_____)</u></p> <p>4. Mục đích mua mảnh đất này là gì? <u>① Ở</u> <u>② Mục đích thương mại</u> <u>③ Cho thuê</u> <u>④ Khác (Cụ thể): (_____)</u></p>
Việc	

c sở hữu đất và loại	Trường hợp C Nếu mảnh đất này đã được tái xây dựng lại		1. Từ năm 2003, cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình đã tái xây dựng lại mảnh đất này? <input type="radio"/> Đúng <input type="radio"/> Không phải 2. Nếu vậy, mảnh đất này được xây dựng lại vào năm nào? Năm (_____) 3. Kiểu nhà của cô/ chú (anh/ chị/ bạn) sau khi được xây dựng lại là gì? <input type="radio"/> Nhà hộp <input type="radio"/> Biệt thự <input type="radio"/> Nhà đơn giản <input type="radio"/> Nhà cao tầng <input type="radio"/> Khác (Cụ thể): (_____) 4. Mục đích của việc xây dựng lại là gì? <input type="radio"/> Ở <input type="radio"/> Mục đích thương mại <input type="radio"/> Cho thuê <input type="radio"/> Khác (Cụ thể): (_____)
	Trường hợp D Nếu bạn thuê một tòa nhà		1. Từ năm 2003, cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình đã tái xây dựng lại mảnh đất này? <input type="radio"/> Đúng <input type="radio"/> Không phải 2. Nếu vậy, mảnh đất này được xây dựng lại vào năm nào? Năm (_____) 3. Kiểu nhà của cô/ chú (anh/ chị/ bạn) sau khi được xây dựng lại là gì? <input type="radio"/> Nhà hộp <input type="radio"/> Biệt thự <input type="radio"/> Nhà đơn giản <input type="radio"/> Nhà cao tầng <input type="radio"/> Khác (Cụ thể): (_____) 4. Mục đích của việc xây dựng lại là gì? <input type="radio"/> Ở <input type="radio"/> Mục đích thương mại <input type="radio"/> Cho thuê <input type="radio"/> Khác (Cụ thể): (_____)
Địa vị xã hội	Ng hệ ngh iệp	Cá nhân	1. Từ 2003, công việc của cô/ chú (anh/ chị/ bạn) có thay đổi không? <input type="radio"/> Có <input type="radio"/> Không 2. Nếu có thì tại sao lại thay đổi? (_____)
		Thành viên trong gia đình	1. Từ 2003 công việc của các thành viên trong gia đình có thay đổi không? <input type="radio"/> Có <input type="radio"/> Không 2. Nếu có thì tại sao lại thay đổi? (_____)
	Nơi làm việc	Cá nhân	1. Từ năm 2003 địa chỉ văn phòng/ nơi làm việc của cô/ chú (anh/ chị/ bạn) có thay đổi không? <input type="radio"/> Có <input type="radio"/> Không
		Thành viên trong gia	1. Từ năm 2003 địa chỉ văn phòng/ nơi làm việc của các thành viên trong gia đình có thay đổi không? <input type="radio"/> Có <input type="radio"/> Không

		đình	
	Thu nhậ p	Cá nhân	1. Tổng thu nhập cả năm của cô/ chú (anh/ chị/ bạn) năm 2013 khoảng bao nhiêu? (_____ VND)
		Hộ gia đình	1. Tổng thu nhập cả năm của cả gia đình năm 2013 khoảng bao nhiêu? (_____ VND)
	Thay đổi khô ng gia	Việc sử dụng nhà cửa và sự thay đổi về mặt kiến trúc	1. Ngôi nhà/ tòa nhà hiện tại có mấy tầng? (_____) tầng 2. Hiện tại, mục đích sử dụng chính của mỗi tầng là gì? (1trệt: _____ 2: _____ 3: _____ 4: _____ 5: _____ 6 và trên nữa: _____) Tầng áp mái: (_____) 3. Tầng nào đang được cho thuê nếu có? ① Không ② (_____) 4. Từ 2003, việc sử dụng ngôi nhà/ tòa nhà này có thay đổi? ① Có ② Không 5. Nếu có thì cụ thể thay đổi như thế nào? (_____)
		Việc sử dụng tầng trệt và sự thay đổi về kiến trúc	1. Mục đích sử dụng hiện tại của tầng trệt là gì? (Chọn các phương án trả lời bên dưới) ① Mục đích thương mại (Kiểu kinh doanh: _____) ② Văn phòng ③ Tiếp khách hoặc nhà bếp ④ Kho chứa đồ ⑤ Nơi để xe máy ⑥ Nơi để ô tô ⑦ Khác(Cụ thể): (_____) 2. Từ 2003, việc sử dụng tầng 1 có thay đổi? 2-1. ① Có ② Không 2-2. Nếu có thì cụ thể thay đổi như thế nào? (_____) 2-3. Những thay đổi cụ thể nào để phù hợp với việc hoạt động kinh doanh? (Chọn các phương án trả lời bên dưới) ① Thay đổi loại hình kinh doanh ② Số nhân viên tăng ③ Việc cấp phép kinh doanh ④ Khác (Cụ thể): (_____)
		Việc xây dựng nhà	TH. A

n	ở	Sự Thay đổi kết cấu xây dựng nhà ở	<p>3. Cấu trúc của ngôi nhà có thay đổi chỗ nào không? (Ví dụ: vị trí của nhà tắm, cửa chính, cửa sổ) ① Có (Cụ thể: _____) ② Không</p> <p>4. Mặt ngoài của ngôi nhà/ tòa nhà đã được nâng cấp bằng cách sử dụng thêm những vật liệu có giá trị cao không? ① Có (Cụ thể : _____) ② Không</p> <p>5. Ngoài những điều trên, ngôi nhà/ tòa nhà còn có những thay đổi nào khác không? (_____)</p> <p>6. Cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình có được nhận trợ cấp hay sự hỗ trợ bằng vật chất của Nhà nước để phát triển công việc hoặc thay đổi ngôi nhà này hay không? ① Có (Cụ thể: _____) ② Không</p>
			<p>1. Từ năm 2003, số tầng của ngôi nhà/ tòa nhà có tăng không? ① Có, tăng (_____) tầng ② Không</p> <p>2. Từ 2003 cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình có mua thêm mảnh đất bên cạnh để mở rộng diện tích không? ① Có ② Không</p> <p>3. Cấu trúc của ngôi nhà có thay đổi chỗ nào không? (Ví dụ: vị trí của nhà tắm, cửa chính, cửa sổ) ① Có (Cụ thể: _____) ② Không</p> <p>4. Mặt ngoài của ngôi nhà/ tòa nhà đã được nâng cấp bằng cách sử dụng thêm những vật liệu có giá trị cao không? ① Có (Cụ thể: _____) ② Không</p> <p>5. Ngoài những điều trên, ngôi nhà/ tòa nhà còn có những thay đổi nào khác không? (_____)</p> <p>6. Cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình có được nhận nguồn trợ cấp hay sự hỗ trợ bằng vật chất nào của Nhà nước hay không mua ngôi nhà/ tòa nhà này không? ① Có(Cụ thể: _____) ② Không</p>
			<p>1. Từ năm 2003, số tầng của ngôi nhà/ tòa nhà có tăng không? ① Có, tăng (_____) ② Không</p>

			<p>2. Từ 2003 cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình có mua thêm mảnh đất bên cạnh để mở rộng diện tích không? <input type="radio"/> ① Có <input type="radio"/> ② Không</p> <p>3. Cấu trúc của ngôi nhà có thay đổi chỗ nào không? (Ví dụ: vị trí của nhà tắm, cửa chính, cửa sổ...) <input type="radio"/> ① Có (Cụ thể: _____) <input type="radio"/> ② Không</p> <p>4. Mặt ngoài của ngôi nhà/ tòa nhà đã được nâng cấp bằng cách sử dụng thêm những vật liệu có giá trị cao không? <input type="radio"/> ① Có (Cụ thể: _____) <input type="radio"/> ② Không</p> <p>5. Ngoài những điều trên, ngôi nhà/ tòa nhà còn có những thay đổi nào khác không? (_____)</p> <p>6. Cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình có được nhận nguồn trợ cấp hay sự hỗ trợ bằng vật chất nào của Nhà nước để xây dựng lại ngôi nhà/ tòa nhà này không? <input type="radio"/> ① Có (Cụ thể: _____) <input type="radio"/> ② Không</p>
		<p>TH. D</p>	<p>1. Từ năm 2003, số tầng của ngôi nhà/ tòa nhà có tăng không? <input type="radio"/> ① Có, tăng (_____) <input type="radio"/> ② Không</p> <p>2. Từ 2003 cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình có mua thêm mảnh đất bên cạnh để mở rộng diện tích không? <input type="radio"/> ① Có <input type="radio"/> ② Không</p> <p>3. Cấu trúc của ngôi nhà có thay đổi chỗ nào không? (Ví dụ: vị trí của nhà tắm, cửa chính, cửa sổ...) <input type="radio"/> ① Có (Cụ thể: _____) <input type="radio"/> ② Không</p> <p>4. Mặt ngoài của ngôi nhà/ tòa nhà đã được nâng cấp bằng cách sử dụng thêm những vật liệu có giá trị cao không? <input type="radio"/> ① Có (Cụ thể: _____) <input type="radio"/> ② Không</p> <p>5. Ngoài những điều trên, ngôi nhà/ tòa nhà còn có những thay đổi nào khác không? (_____)</p> <p>6. Cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình có được nhận nguồn trợ cấp hay sự hỗ trợ bằng vật chất nào của Nhà nước để xây dựng lại ngôi nhà/ tòa nhà này không? <input type="radio"/> ① Có (Cụ thể: _____) <input type="radio"/> ② Không</p>

Thay đổi giá bất động sản	Trường hợp A		1. Năm 2002 giá đất của ngôi nhà/ tòa nhà này khoảng bao nhiêu? (_____ VND) 2. Năm 2014 giá đất của ngôi nhà/ tòa nhà hiện tại này khoảng bao nhiêu? (_____ VND)
	Trường hợp B		1. Giá đất của ngôi nhà/ tòa nhà này tại thời điểm mua khoảng bao nhiêu? (_____ VND) 2. Năm 2014 giá đất của ngôi nhà/ tòa nhà hiện tại này khoảng bao nhiêu? (_____ VND)
	Trường hợp C		1. Giá đất của ngôi nhà/ tòa nhà này tại thời điểm xây dựng lại khoảng bao nhiêu? (_____ VND) 2. Năm 2014 giá đất của ngôi nhà/ tòa nhà hiện tại này khoảng bao nhiêu? (_____ VND)
	Trường hợp D		1. Giá đất của ngôi nhà/ tòa nhà này tại thời điểm xây dựng lại khoảng bao nhiêu? (_____ VND) 2. Năm 2014 giá đất của ngôi nhà/ tòa nhà hiện tại này khoảng bao nhiêu? (_____ VND)
Thời điểm đi lại	Việc sở hữu	Xe máy	1. Năm 2002 gia đình có bao nhiêu xe máy? (_____)
		Xe đạp	1. Năm 2002 gia đình có bao nhiêu xe đạp? (_____)
		Ô tô (kể cả xe tải)	1. Năm 2002 gia đình có bao nhiêu ô tô (kể cả xe tải)? (_____)
	Phạm vi hoạt động	Công việc	1. Cô/ chú (anh/ chị/ bạn) hay gia đình vui lòng mô tả lộ trình đi đến nơi làm việc được không ạ? # Hiện thị đường dẫn trên bản đồ <u>Ai đi?</u> (_____) 2. Loại phương tiện mà cô/ chú (anh/ chị/ bạn) sử dụng để đi làm là gì? <u>① Đi bộ ② Xe đạp ③ Xe máy ④ Ô tô</u> <u>⑤ Khác (Cụ thể: _____)</u>
		Giáo dục	1. Cô/ chú (anh/ chị/ bạn) hay gia đình vui lòng cho biết vị trí trường học và lộ trình đến trường của con mình được không ạ? # Hiện thị đường dẫn trên bản đồ 2. Con của cô/ chú (anh/ chị/ bạn) đi học bằng phương tiện gì? <u>① Đi bộ ② Xe đạp ③ Xe máy cùng với bố mẹ</u> <u>④ Ô tô cùng với bố mẹ ⑤ Khác (Cụ thể: _____)</u>

		<p>Mua sắm</p>	<p>1. Cô/ chú (anh/ chị/ bạn) hay gia đình vui lòng cho biết vị trí của chợ lớn hoặc siêu thị mà gia đình thường đi và lộ trình đi được không ạ? # Hiện thị đường dẫn trên bản đồ</p> <p>2. Loại phương tiện mà cô/ chú (anh/ chị/ bạn) sử dụng để đi chợ là gì? ① Đi bộ ② Xe đạp ③ Xe máy ④ Ô tô ⑤ Khác (Cụ thể: _____)</p>
		<p>Các hoạt động tôn giáo</p>	<p>1. Cô/ chú (anh/ chị/ bạn) hay gia đình vui lòng cho biết vị trí của cơ sở tôn giáo mà gia đình thường đến và lộ trình đi được không ạ? # Hiện thị đường dẫn trên bản đồ</p> <p>2. Loại phương tiện mà cô/ chú (anh/ chị/ bạn) sử dụng để đi đến đó là gì? ① Đi bộ ② Xe đạp ③ Xe máy ④ Ô tô ⑤ Khác (Cụ thể: _____)</p>
		<p>Giải trí</p>	<p>1. Cô/ chú (anh/ chị/ bạn) hay gia đình vui lòng cho biết vị trí của những nơi vui chơi giải trí mà gia đình thường đến và lộ trình đi được không ạ? Ví dụ công viên, công viên giải trí, rạp xem phim..) # Hiện thị đường dẫn trên bản đồ</p> <p>2. Loại phương tiện mà cô/ chú (anh/ chị/ bạn) sử dụng để đi đến các điểm vui chơi giải trí là gì? ① Đi bộ ② Xe đạp ③ Xe máy ④ Ô tô ⑤ Khác (Cụ thể: _____)</p>
<p>Sự cải thiện về sự thoải mái và sự an toàn</p>	<p>1. Từ năm 2003, khu vực này có bất kỳ hoạt động tình nguyện nào của người dân ở đây để cải thiện môi trường của các ngôi nhà/ tòa nhà hay không gian sống quanh đây không? ① Có ② Không 1-1. Cụ thể là chương trình gì? (_____)</p> <p>2. So với trước năm 2003 thì việc đi bộ quanh khu vực này 1 mình vào ban đêm thì như thế nào? ① Trở nên rất nguy hiểm ② Trở nên nguy hiểm ③ Giống nhau ④ Trở nên an toàn ⑤ Rất an toàn</p>		
	<p>1. Cô/ chú (anh/ chị/ bạn) hoặc gia đình bắt đầu kinh doanh mới từ năm 2003? ① Đúng ② Không</p>		

<p>Những thay đổi về việc kinh doanh cá nhân/hộ gia đình</p>	<p>1-1. Nếu đúng, bắt đầu kinh doanh cái gì? (_____)</p> <p>1-2. Nếu đúng, bắt đầu kinh doanh từ năm nào? (_____)</p> <p>2. Từ năm 2003 đến nay có điều gì thay đổi về qui mô/ loại hình kinh doanh của cô/ chú.. hoặc là gia đình không? ① Có ② Không</p> <p>2-1. Nếu có thì chuyển sang kinh doanh cái gì? (_____)</p> <p>2-2. Nếu có thì vào năm nào? Năm (_____)</p> <p>3. Từ năm 2003 đến nay có điều gì thay đổi về phương thức hoạt động kinh doanh của cô/ chú.. hoặc là gia đình không? ① Có ② Không</p> <p>3-1. Nếu có thì cụ thể là thay đổi những gì? (_____)</p> <p>3-2. Nếu có thì xảy ra vào năm nào? Năm (_____)</p>
--	---

III. Thông tin chung

Phân loại	Câu hỏi
Giới tính	1. Giới tính của cô/ chú (anh/ chị/ bạn) là gì? ① Nam ② Nữ
Tuổi	1. Tuổi của cô/ chú (anh/ chị/ bạn) là gì? (_____) <u>Tuổi</u>
Trình độ học vấn	1. Trình độ học vấn cao nhất của cô/ chú (anh/ chị/ bạn) là gì? ① Tiểu học ② Trung học cơ sở ③ Trung học phổ thông ④ Trung tâm dạy nghề kỹ thuật ⑤ Bằng cử nhân và cao hơn
Gia đình	1. Trong gia đình cô/ chú (anh/ chị/ bạn) có bao nhiêu người? (_____) người
Nơi sinh	1. Nơi sinh của cô/ chú (anh/ chị/ bạn) ở đâu? Thành phố (_____) Quận/ huyện (_____)
Nơi khảo sát	1. Nơi cô/ chú (anh/ chị/ bạn) thực hiện bản khảo sát này? (_____) Thành phố (_____) Quận/ huyện (_____) Đường (_____) Số.

Địa chỉ ở hiện tại	<ol style="list-style-type: none">Địa chỉ ở trên có giống với địa chỉ hiện tại không? ① Có ② KhôngNếu không thì vui lòng cho biết địa chỉ ở hiện tại của cô/ chú (anh/ chị/ bạn). () Thành phố () Quận/ huyện () Đường () Số.
--------------------	---

Tệp đính kèm: Bản đồ cho biết lộ trình thực hiện cho hoạt động chính

Appendix 3. Photographs of research activities in Danang



Figure 26. Survey orientation with Vietnamese research assistants (July 2014).



Figure 27. Presentation on research purpose and results at the Department of Architecture at Danang University of Science and Technology (February 2015, August 2015).



Figure 28. Resident interviews at Thanh Khe district to understand the impact of new road development (July 2014).



Figure 29. Resident interview at Thanh Khe district to understand the impact of new road development (August 2015).



Figure 30. Meeting with Professor Tran Duc Quang and Nguyen Anh Tuan at the Department of Architecture, Danang University of Science and Technology (August 2015).



Figure 31. Questionnaire preparation for analyzing the results of in-depth interviews (July 2014, August 2015).



Figure 32. Meeting with Mr. Park Heehong, the local director of Daewon Cantavil – the developer of the Da Phuoc New Town (September 2016).

국문초록

신흥국 도시에서 도로 개발이 커뮤니티와 도시형태 변화에 미치는 영향: 베트남 다낭을 중심으로

원 세 형

서울대학교 대학원
협동과정조경학 전공

새로운 도로 인프라스트럭처의 건설은 지역 경제성장을 이끄는 요소로 간주되어 왔으며, 도시 공간을 형성하거나 확장시키면서 도시 형태를 변화시키고 있다. 그럼에도 불구하고 도로 개발이 주변의 사람과 주변 환경에 미치는 직접적인 효과에 대한 연구는 잘 알려지지 않았다. 도시화가 빠르게 진행 중인 아시아 신흥국의 상황에 맞는 좋은 도시 환경을 조성하기 위해서는 도로 개발이 커뮤니티와 도시형태 변화에 미치는 효과를 파악하고 이를 공간계획에 반영하기 위한 도시 데이터 기반의 실증 연구가 필요한 시점이다.

본 연구는 최근 도시 인프라를 활발하게 확충하며 빠른 도시화와 높은 경제성장을 이루고 있는 베트남 다낭의 도시환경 변화를 주목했다. 그 중에서도 2003년에 다낭만을 따라 개통된 폭 40 m, 길이 12 km 의 Nguyen Tat Thanh 도로 주변이 연구대상지로 선정되었다.

도로 개발이 주변 사람과 물리적 환경 변화에 미치는 영향을 파악하기 위하여 도로주변에 살고 있는 건물주인 혹은 직계 가족 총 460명을 대상으로 도로 개발을 전후로 사람들의 사회경제적 변화에 대한 심층인터뷰가 이루어졌으며, 이용하는 공간의 특징이 조사되었다. 그리고 도로 개발 후 도로에 인접하여 형성된 다섯 개의 신시가지 조성 프로젝트에 대한 건설과 진행과정, 형태와 디자인의 특성 등이 분석되었다. 마지막으로 현지 대학 교수진들과 담당 공무원, 민간 개발자에 대하여 전문가 인터뷰가 실시되었다.

첫 번째 챕터는 도로개발이 인근의 주민과 근린환경 변화에 미치는 전반적인 효과를 파악하기 위한 연구이다. 새로운 도로인프라와 도시 변화 사이의 관계를 더 잘 이해하기 위해 다음의 영역 중 하나에 거주하는 400명의 부동산 소유주에 대한 심층 면접 조사가 이루어졌다. 1) 새로운 도로에 직접 인접한 영역, 2) 기존 도로에 인접하지만 새로운 도로와는 떨어진 영역, 3) 차량접근이 불가능한 도시 블록 내부 영역으로 나누어 조사가 진행되었다. 결과는 주택 개발, 건물 밀도 및 용도, 소득 수준, 출퇴근 거리 및 직업 유형을 포함하여 도로 개발은 시간 경과에 따라 상당수의 도시 변화와 밀접하게 관련 있었다. 이 변화는 새로운 도로에 인접한 지역에서 더욱 두드러졌다. 거주민 중 약 46%의 사람들이 도로건설 후에 유입된 이주민들이었는데 이들 중 상당수가 새로운 도로에 인접하여 정착했기 때문이다. 상대적으로 경제적 여유가 있는 이주민들은 도로에서 떨어진 다른 지역과 비교하여 비교적 큰 규모의 상업 용도를 수용함으로써 토지를 자본화했다. 이와는 달리, 블록 내부 영역은 도로 개발 후 주거 지역을 더욱 살기 좋은 근린 환경으로 유지하고자하는 원주민들에 의해 필지단위에서 작은 규모의 공간이 변화된 도시환경에 적응 가능한 형태로 활발하게 재이용되면서 근린 환경이 변화

되었다.

두 번째 챕터는 도로 개발로 인하여 발생하는 이동성의 변화가 이전의 주거 지역에서 도시 경관의 변화에 어떻게 영향을 미칠 수 있는지를 보여 주는 연구이다. 이를 위하여 거주민 460명에 대하여 사람들이 직장, 쇼핑, 여가, 교육, 종교 활동을 위해 이용하는 장소와 경로가 지도상에서 파악되었다. 연구결과, 전반적인 이동성이 향상되었음에도 불구하고, 그 효과는 원주민과 이주민에게 다르게 작용했다. 분석 결과, 원주민들은 이주민보다 더 긴 통근 거리를 감내했으며 이는 도로 개발 후 일자리가 크게 분산되는 것과 관련 있었다. 원주민과 비교했을 때, 이주민들은 종종 직주균형을 이룬 혼합 용도의 커뮤니티를 형성하며, 새로운 도로 가까이에 정착했다. 그러나 이들은 통근과 관련없는 이동에서는 원주민보다 훨씬 긴 거리를 이동했다. 도시 공간 이용의 측면에서 원주민들은 개인 소유의 옥외 공간을 소규모로 변형시켜 일상적 삶의 공간을 개선했다. 반면에 이주민들은 규모가 큰 숙박 시설과 고급 주거용 건물을 소유하여 이 지역의 상업가로 형성에 기여했다.

세 번째 챕터는 도로 개발 후 도시형태 변화의 특징을 다루고 있다. 이를 위해 도로 주변에 형성되었거나 현재 건설 중인 다섯 개의 주요 도시개발 프로젝트의 사업 실행과정과 건물 종류와 규모, 용도, 인구밀도를 포함한 형태와 설계의 측면, 그리고 공간 이용 방식이 분석되었다. 그 결과, 도시개발과정에서 관습적 도시형태가 일상에서 더 많은 공공공간 이용에 편리한 구조로 진화중임을 확인할 수 있었다. 이 과정에서 의도되거나 우연히 형성된 그늘진 구간은 가로 공간의 활발한 이용을 위한 핵심적인 요소였다. 그럼에도 불구하고, 도시브랜딩을 위한 대규모 도시개발 사업의 마스터플랜은 부동산 투자를 위한 수단으로 전략했고, 승인된 계획안이 빈번하게 변

화되면서 과도한 공기 지연과 도시 공간의 질 하락에 영향을 미치고 있었다.

이 연구는 다음의 시사점을 갖는다. 인프라건설과 개발 사업이 거의 동시에 이루어지는 신흥국의 도시 환경에서 개발의 이익을 다양한 주체가 조화롭게 공유하면서 도시 공간의 질을 담보하기 위해서는 개발이 주변에 미치는 효과를 예측하고 이용자 행태가 근린이나 지역계획 수준에서 충분히 고려된 커뮤니티 니즈 기반의 정교한 계획과 설계가 이루어져야 한다. 그리고 국내외 자본에 의해 이루어지는 다양한 도시개발사업을 성공적으로 이끌기 위해서는 공공이 개발에 대한 뚜렷한 비전을 수립하고 공공과 민간의 역할이 매우 구체화된 상태에서 개발이 진행되어야 한다.

주요어: 도로 인프라스트럭처, 도시개발, 이동성, 통근패턴,
근린환경, 도시형태, 도시설계

학 번: 2013 - 31245



저작자표시-비영리-변경금지 2.0 대한민국

이용자는 아래의 조건을 따르는 경우에 한하여 자유롭게

- 이 저작물을 복제, 배포, 전송, 전시, 공연 및 방송할 수 있습니다.

다음과 같은 조건을 따라야 합니다:



저작자표시. 귀하는 원저작자를 표시하여야 합니다.



비영리. 귀하는 이 저작물을 영리 목적으로 이용할 수 없습니다.



변경금지. 귀하는 이 저작물을 개작, 변형 또는 가공할 수 없습니다.

- 귀하는, 이 저작물의 재이용이나 배포의 경우, 이 저작물에 적용된 이용허락조건을 명확하게 나타내어야 합니다.
- 저작권자로부터 별도의 허가를 받으면 이러한 조건들은 적용되지 않습니다.

저작권법에 따른 이용자의 권리는 위의 내용에 의하여 영향을 받지 않습니다.

이것은 [이용허락규약\(Legal Code\)](#)을 이해하기 쉽게 요약한 것입니다.

[Disclaimer](#)

Ph.D. Dissertation of Engineering

**The Impact of Road Infrastructure
Development on
Communities and Urban Form Changes
in Cities of Emerging Countries:
A Case Study of Danang, Vietnam**

신흥국 도시에서 도로 개발이
커뮤니티와 도시형태 변화에 미치는 영향:
베트남 다낭을 중심으로

February 2018

Seoul National University
Interdisciplinary Program in Landscape Architecture

Sehyung Won

The Impact of Road Infrastructure
Development on
Communities and Urban Form Changes
in Cities of Emerging Countries:
A Case Study of Danang, Vietnam

Advised by Prof. Saehoon Kim

Submitting a Ph.D. Dissertation of Engineering
October 2017

Seoul National University
Interdisciplinary Program in Landscape Architecture

Sehyung Won

Confirming the Ph.D. Dissertation written by
Sehyung Won

December 2017

Chair _____ (Seal)

Vice Chair _____ (Seal)

Examiner _____ (Seal)

Examiner _____ (Seal)

Examiner _____ (Seal)

ABSTRACT

The Impact of Road Infrastructure Development on Communities and Urban Form Changes in Cities of Emerging Countries: A Case Study of Danang, Vietnam

Sehyung Won

Interdisciplinary Program in Landscape Architecture
Graduate School, Seoul National University
Supervised by Professor Saehoon Kim

New road infrastructure development is known to gear local economic development, which forms, expands and changes the urban environment. However, the direct effects of road development on its immediate surroundings and local residents remain understudied. In order to create urban environments mindful of the conditions of Asian developing countries, which are rapidly urbanizing, data-based empirical studies that investigate the impact of road developments on the community and urban form need to be pursued.

This study focused on the palpable urban changes in Danang, Vietnam, where recent expansion of infrastructure and rapid urbanization

has been evident. The 40 m wide Nguyen Tat Thanh road, opened in 2003, which stretches along 12 km had been studied in particular. To understand the effects of road development on the human and physical aspects, a total of 460 building owners and residents living in the vicinity of the road were interviewed in-depth regarding the socioeconomic changes before and after the road development. Spatial user activities were also investigated. Moreover, five projects that emerged after the road development were analyzed according to its project process, urban form and design attributes. Last, stakeholder interviews of local university professors, civil servants, and private developers were conducted.

The first chapter aims to understand the overall effects of road development in the immediate neighborhoods and its residents. To better understand the relationship between infrastructure 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 showed that road development took place along with a sizable number of urban changes over time, including housing types, building densities and uses, income level, commuting distances, and the type of occupation. The changes were more striking in the area abutting the new road. This was because 46% of the residents were migrants that settled in close proximity to the road after its development. 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.

The second chapter reveals how road development impacts the residents' mobility and changes the urban landscape of the existing areas. To investigate this relationship in detail, 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.

The third chapter focuses on the new urban landscape and

morphological changes. In this chapter, five built or on-going projects near the road development had been investigated in terms of the project implementation process, building type, size and use, population density, and spatial use. As a result, the research revealed that conventional urban forms had slowly evolved to better accommodate the public purposes of the local area and that shaded paths, either intentionally designed or formed by chance, were instrumental in forming vital streetscapes and public use. On the other hand, large-scale master plans were crudely misused as means for attracting real estate investment in the efforts to globally brand the city, and finalized plans were often modified unpredictably which not only delayed projects but led to the overall decline of urban space quality. The research suggested a continuous effort towards understanding user behaviors in the neighborhood- and local-level planning, and to reflect such information into spatial designs. Furthermore, to ensure efficient project implementation, the roles of the public and private sector need to be better clarified in large-scale urban development projects.

The implications of the study are as follows. The effects of a development need to be accurately forecasted to ensure quality urban space and fair distribution of development benefits in a developing country where various urban projects take place at the same time. Spatial planning and design should be based on community needs where user behavior is considered at the neighborhood- or local-level. Furthermore, to ensure the success of a foreign capital invested urban project, the public sector needs to establish a clear vision and clarify the roles of the public and private sector.

Keywords: Road infrastructure, urban development, mobility, commuting
pattern, neighborhood environment, urban form, urban design

Student Number: 2013-31245

PUBLICATIONS

Please note that Chapters 1-3 of this dissertation proposal were written as stand-alone papers (see below). Chapter 1 and 2 were published in 2015 and 2017, and chapter 3 will be submitted to an international journal soon.

Chapter 1

Won, S. et al. (2015). The neighborhood effects of new road infrastructure: transformation of urban settlements and resident's socioeconomic characteristics in Danang, Vietnam. *Habitat International*, 50, 169-179.

Chapter 2

Won, S. & Kim, S. (2017). 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. *Cities*, 67, 63-73.

Chapter 3

Won, S. & Kim, S. The success and failure of urban-form making experimentations: case studies of new developments adjacent to the Nguyen Tat Thanh Road, Danang, Vietnam.

CONTENTS

ABSTRACT	i
PUBLICATIONS	vii
LIST OF TABLES	x
LIST OF FIGURES	xi
Introduction	1
Chapter 1. The neighborhood effects of new road infrastructure: Transformation of urban settlements and resident's socioeconomic characteristics in Danang, Vietnam	
1. Introduction	7
2. Research Methods	13
3. Results	17
4. Discussion	34
Chapter 2. 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	
1. Introduction	39
2. Research Methods	44
3. Results	48
4. Discussion	66

**Chapter 3. The success and failure of urban-form making
experimentations: Case studies of new
developments adjacent to the Nguyen Tat Thanh
Road, Danang, Vietnam**

1. Introduction	71
2. Research Methods	77
3. Results	82
4. Discussion	106

Conclusion 111

ACKNOWLEDGEMENT	115
REFERENCES	116
APPENDIX	126
ABSTRACT IN KOREAN	156

LIST OF TABLES

Table 1.	Survey contents	16
Table 2.	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)	46
Table 3.	The trends and rationales of change in job distribution and commuting pattern	53
Table 4.	The trends and rationale of changes in land (re)development and housing typology	56
Table 5.	The trends and rationale of changes in street commercialization	63
Table 6.	Mobility changes due to Nguyen Tat Thanh Road development and the subsequent changes in space utilization	67
Table 7.	Summary of the existing housing area	83
Table 8.	Summary of the row house area	85
Table 9.	Summary of the public housing estate	88
Table 10.	Summary of Futa New Town Danang	90
Table 11.	Changes to the masterplan for the development of Da Phuoc International New Town	93
Table 12.	The success and failure of the new developments	107

LIST OF FIGURES

Figure 1.	Map of Danang (Modified based on Google Earth by the authors)	9
Figure 2.	Traditional tube house and neo-tube house in Danang (Victoir & Zatsepine, 2013, 262; Quang, 1997, 98)	11
Figure 3.	Three groups of interviewees and the pattern of urban development (the map shows part of the study area)	15
Figure 4.	Change in building floors of the study area	19
Figure 5.	Change in building type of the study area	20
Figure 6.	Change in building use of the study area	21
Figure 7.	Annual income level between 2002 and 2014	22
Figure 8.	Percentage of the migrants who moved to the study area between 2002 and 2014 by groups	27
Figure 9.	Typical plan and elevation of the streets in Groups A, B, and C (Group A: Nguyen Tat Thanh Road 419-435 and Ton That Dam Road 6-32; Group B: Tran Cao Van Road 439-452; Group C: Tran Cao Van Road K368/15-31; drawn by Daewoong Choi)	33
Figure 10.	Masterplan of Danang and the study area (Modified based on the Masterplan of Danang city (2030-2050) by the authors)	42
Figure 11.	Comparison of original residents and migrants travelling distances from home to workplace, places for shopping, leisure, education and religious activities according to modes of transportation	52

Figure 12.	Locations for shopping frequented by original residents and migrants	55
Figure 13.	Comparison of the building size and spatial characteristics of buildings located on the new road by original residents and migrants	59
Figure 14.	Comparison of the building size and spatial characteristics of buildings located along an alley inside the urban block by original residents and migrants	60
Figure 15.	Location of Nguyen Tat Thanh road and the five new developments in Danang (Modified based on Google Earth Pro by the authors)	77
Figure 16.	Survey area within the existing housing area (upper left); road network (upper right); figure-ground map of spatial changes after the new road and parcel development (lower)	84
Figure 17.	Urban grid of the row house area and blocks consisting of two rows of lots	86
Figure 18.	Location and building layout of the public housing	89
Figure 19.	Final approved plan of Futa New Town (left); initial proposal of waterfront which was canceled due to lack of feasibility (upper right); typical housing block and land division with linear open space (lower right)	91
Figure 20.	Changes made to the Da Phuoc International New Town master plan, and neighborhood design with reinforced community space and green network	95
Figure 21.	Impaired roadside of Nguyen Tat Thanh (upper left); disused outdoor space in the public housing estate (lower	100

left); excessively privatized street in the row house area
(right)

Figure 22.	Pedestrian, cycling, and motorcycle activities along the shaded paths formed by artificial structures, sidewalk trees, and buildings (usually before noon and after 4PM)	104
Figure 23.	In-depth interview coverage and surrounding areas	137
Figure 24.	In-depth interview coverage area with added 5km range on East and West sides	137
Figure 25.	Map including the most urbanized areas of Danang	138
Figure 26.	Survey orientation with Vietnamese research assistants (July 2014)	151
Figure 27.	Presentation on research purpose and results at the Department of Architecture, Danang University of Science and Technology (February 2015, August 2015)	151
Figure 28.	Resident interviews at Thanh Khe district to understand the impact of new road development (July 2014)	152
Figure 29.	Resident interviews at Thanh Khe district to understand the impact of new road development (August 2015)	153
Figure 30.	Meeting with Professor Tran Duc Quang and Nguyen Anh Tuan at the Department of Architecture, Danang University of Science and Technology (August 2015)	154
Figure 31.	Questionnaire preparation for analyzing the results of in-depth interviews (July 2014, August 2015)	154
Figure 32.	Meeting with Mr. Park Heehong, the local director of Daewon Cantavil – the developer of the Da Phuoc New Town (September 2016)	155

Introduction

The world pays close attention to the unprecedented growth in emerging economies of Asia. In spite of the economic crisis of the late 1990s and mid-2000s, up to recently, emerging economies of Asia showed high growth rates at the average of 6.4%, which is three to five times higher than Western and other Asian countries (IMF, 2017). In terms of global GDP, Asian countries have geared the global economic growth since year 2000. Asian economies accounted for 22% of the global economy which by year 2025 is predicted to take up to 45% (DUP, 2016). Evidently, the share of emerging economies is predicted to continually increase in the global economy. The apparent economic growth of Asian countries is also reflected in the rate of urbanization. Urbanization rate increased from 30% in 1990 to 48% in 2014, and the urban population has doubled from 800 million to 1.5 billion in the same period (UN, 2014). However, most Asian countries, apart from Korea, Japan, and Singapore, where urbanization rate is higher than 80%, have remarkably low urbanization rates as of now, but the UN predicts that urbanization will be on the large part led by these countries and would reach 60% by year 2050. Unlike Europe and North America where the urban population had already reached 70% before the 1980s and hence show modest rates of urbanization, Asian countries are progressing at an unprecedented rate.

Many cities in the developing world are young, dynamic and are undergoing rapid urban development. Urban infrastructures such as sewage systems, transportation networks, plants, and communications are

being established, while urban areas are quickly expanding through domestic and foreign capital concentrated in cities creating new industrial complexes, housing, and tourist areas. However, behind this development, there are also socioeconomic and environmental problems of poverty, poor living and labor conditions, pollution, and the loss of valuable traditions (UN, 2011).

Public infrastructure investment has continually increased in order to progress through sustainable development and improve the overall urban environment in the developing world. For the past 50 years, mainly from the OECD countries, a large amount of money has been donated in Asia for building various urban infrastructure projects and supporting human resources. Global organizations such as the World Bank and UN-Habitat also promoted support for infrastructure, improved living, education and environmental conditions. In 2015, the Asian Infrastructure Investment Bank had also been established to support urban and infrastructure projects in underdeveloped regions of Asia.

Nonetheless, skepticism about infrastructure investment exists. In 2005, representatives of development assistance officers, civic groups, and civilian organizations from 91 countries gathered in Paris to raise the question on the effectiveness of aid which culminated in the Paris Declaration (OECD, 2005). This is because negative outcomes on the effects of aid had been reported either due to the lack of understanding of local lifestyles, culture, administrative system, and environment or because of the limited capabilities of local government and one-off plans (Reality of Aid, 2008).

Such criticism is also related to the various discourse and theory on

the normative principles of urban design. For example, in the sustainability discourse, a good city is argued to function properly within its limit, is user-friendly, and socially just (Williams et al., 2000; Ravetz, 2013). Fainstein also refined the social values of a sustainable city, contending that equity, diversity, and democracy are the three components which form a just city (Fainstein, 2014).

Urban policies in many Asian emerging economies is founded upon building sustainable urban environments. Hence, it is particularly important to consider the local technology and environmental demands in the development process as many cities are technology-wise backward and are often vulnerable to natural disasters. Projects that have been successful in the developed countries may have negative consequences if the local political, economic and cultural conditions are not understood properly. Moreover, although infrastructure is known to be a prerequisite to economic development (Straub, 2008), studies focusing on how new infrastructures affect people's life and the physical environment is rather limited. More specifically, there is a lack of empirical evidence on how new developments affect people's jobs, change the conventional way of spatial use and the various aspects of daily life that need to be adapted to the new environment. Hence, it is necessary to reconsider the impacts of infrastructure investment – a means that is often prescribed to remedy urban problems and promote growth – upon the surrounding neighborhoods and the urban environment in emerging economies of Asia.

Transportation infrastructure is one of the most frequently constructed urban projects to facilitate urban expansion, connect with

surrounding areas, and secure domestic and foreign investment for land or industrial developments. Empirically investigating a recently completed transportation infrastructure and the subsequent changes in socioeconomic characteristics and the use of space would provide evidence on the specifics of who was affected and how the environment had transformed. Against this thought, Danang, Vietnam, one of the most rapidly urbanizing areas, was considered an appropriate place of study. Danang is a well-suited testbed for understanding the impact of infrastructure development in the context of an emerging real estate market and a rapidly changing urban fabric. The central and local government of Danang vigorously invested in infrastructure and carried out urban development projects to promote the city as the main city of central Vietnam ever since it became an independent municipality in 1997. In this vein, Danang is also geographically important as it is the eastern exit of the East-West Economic Corridor (EWEC) of Indochina which runs through Myanmar, Thailand, Laos, and Vietnam. It was part of the EWEC project that the Nguyen Tat Thanh road was constructed and opened to the public in 2003 so that the hinterland would be connected to the Danang port area. The large-scale road development provided a pivotal opportunity to increase vehicle accessibility, and improve the urban landscape and neighborhood environment.

The main purpose of the study is to understand the socioeconomic impacts of road development, its subsequent spatial changes and infer implications for urban policy, planning, and design. An early interview with a resident during the preparatory stage of the research provided

the researcher insight on how road development affected occupation, income, size and use of residential space.

Before the Nguyen Tat Thanh road was developed, we were living under tough conditions with the pension that was given after I was dispatched from the army. But after the development, people started gathering to our area so our family decided to run a café and an internet game area...Our income increased by a large amount so we expanded our building. Compared to the past, we live a much more comfortable life now.

Resident interview (aged 61), 3 March 2014

The specific purposes of the study are as follows. First, the study examines the overall change in the neighborhood environment after the road development since such development induces change in socioeconomic characteristics, use of residential space, and the differences in relation to how close one settles to the new road. Second, the study aims to reveal the effects of improved mobility due to the road development. A new road may allow better mobility to all its users, however, if the purposes, method, and frequency of travel differ, likewise job distribution, commuting method, and use of space would also differ according to the user group. Third, the study traces the urban morphological changes because a new road creates opportunities for new urban spaces and transforms the urban environment.

This research is divided into three chapters using the data collected through in-depth interviews of 460 residents living in proximity to the Nguyen Tat Thanh road, stakeholder interviews, and site observations.

Each chapter is also considered an independent piece of research, whereby Chapter 1 and 2 have already been published in *Habitat International* and *Cities* respectively. Chapter 1 examined the overall effect of road development on the surrounding neighborhoods. Through the in-depth interviews, changes in socioeconomic conditions and building use prior and after the road development were surveyed. Through this, the characteristics of the overall change in people's socioeconomic life and the physical environment in a rapidly urbanizing area were understood. Chapter 2 examined how mobility affected people's travel patterns and the use of space. For this, people's workplace, shopping, leisure, education, and religious destinations and routes were surveyed. This research conveyed that the effects of mobility are different for migrants and original residents. Chapter 3 investigated the changes in urban form characteristics along the Danang coast in the aftermath of the road development. Five projects either completed or currently underway were analyzed in terms of its development process, urban form and design.

In the efforts toward creating good cities, this research argues for a community needs based urban planning through a careful prediction of the effects of infrastructure development by delineating the various impacts a new road development has had on the people and the environment. The research also implies that it is paramount for governments with limited funds and human resources to establish clear project visions and have realistic development aims.

Chapter 1

The neighborhood effects of new road infrastructure: Transformation of urban settlements and resident's socioeconomic characteristics in Danang, Vietnam

1. Introduction

A large body of research shows that capital investment in a city's major infrastructure may act as a catalyst for economic growth and social transformation (Aoyama & Kondo, 1993; Kelly, 1994; Chandra & Thompson, 2000; Cervero, 2009; Neuman & Smith, 2010; Cervero & Kang, 2011; Padeiro, 2013; Kwon, Kim, & Jeon, 2014). Among the studies, Polzin (1999) presented probably one of the most comprehensive list of the impacts of transportation infrastructure on neighborhood change. The study classified the impacts into three categories: the direct, the indirect, and the secondary impact. 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. Newly deployed public transit, for instance, may enable a market for housing and office development on a site with shorter travel time and better amenities. The indirect impacts involve incremental, catalytic influences of new infrastructure that are mediated by policy change and community responses, such as reduced development costs, tax

incentives, relaxed zoning regulations, and increased attractiveness of an area. The secondary impacts include more subtle but fundamental change in individuals' behavior and social perception about an area affected by new infrastructure. The results may manifest the agglomeration of a certain business or commercialization of a residential district associated with the aforementioned impacts.

As noted in previous studies, the effect of improved infrastructure on neighborhood change may have different influences according to the location. The impact of stream restoration and new streets with improved walkability on urban redevelopment in Seoul, for example, varied substantially depending on different locations (Kang & Cervero, 2009; Kwon, Kim, & Jeon, 2014). However, it is still unclear as to who are affected by these infrastructure-related developments and to what extent urban spaces are transformed. Especially, empirical investigation of the change in urban space created and maintained by local communities in developing countries—where households in an informal settlement, unregistered workers, independent retail entrepreneurs, individual home builders, and migrants seeking a new source of income contribute substantially to the manner that infrastructure transforms a neighborhood's urban landscape—was very limited as of today. Here, we attempted to fill the research gap by documenting the effects of new road construction in the city of Danang in Vietnam, focusing on its indirect and secondary impacts on the use and redevelopment of nearby urban space. Additionally, the research included changes in the built environment characteristics potentially associated with the development of the new road.

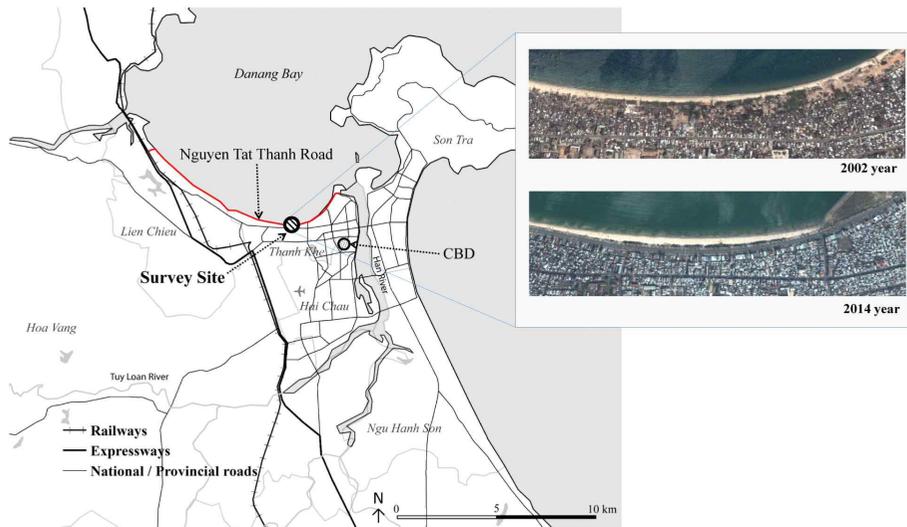


Figure 1. Map of Danang (Modified based on Google Earth by the authors).

Danang is a good test bed for investigating the effects of infrastructure within the context of emerging property markets and rapid transformations in the urban spatial structure in developing countries. As 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, Danang has become the gate of the new East-West Economic Corridor (EWEC) project which runs across the Indochina peninsula connecting Myanmar, Thailand, Laos, and Vietnam. Whereas the city government has very limited budget for the expansion of urban infrastructure, the development of large-scaled, inter-regional road provides unique opportunities for enhancing the vehicular access to and from the city and greatly improving the living environment of the urban communities.

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 infrastructure came to be engraved on the surface of the city around the late nineteenth and the early twentieth century. For instance, a gridiron layout was formed in the city's urban districts like Thach Thang and Phuoc Ninh during the period, which was later linked with the city's hinterland through a railway line. The Danang Airport was constructed under the French colonial rule in the 1930s and was used by the French Air Force during the Indochina War (1945–54) and later by the United States during the Vietnam War (1959–1975). After the establishment of the Socialist Republic of Vietnam in 1976, Danang experienced many changes. Among them, the economic reform of 1986—called Doi Moi¹—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, where urban areas increased from 6.5% of the city's total area in 1975 to 11.3% in 2003, and then to 17.9% in 2009 (Linh, Erasmi, & Kappas, 2012).

The physical development of the urban area was followed by

¹ The economic reform implemented in Vietnam since 1986 is known as “Doi Moi.” One of the fundamental strategies of Doi Moi was to motivate foreign investment in the country toward the creation of a socialist-oriented market economy. With the rapid growth of urban economy, intensive population migration took place in major cities like Hanoi in the northern part of the country and Ho Chi Minh City to the south. The city of Danang was recognized as the main city in the central region of the country in the late 1990s and was elevated to a municipal city status (Trân et al., 2012).



Figure 2. Traditional tube house and neo-tube house in Danang (Victoir & Zatspine, 2013, 262; Quang, 1997, 98).

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. More broadly, the road is part of the extensive East-West Economic Corridor (EWEC). The project was financed by Asian Development Bank and Japan Bank for International Cooperation, among others. Official construction of the road began in early 2000 and the road opened in March 2003 (Figure 1). In terms of building form, a large number of tube houses²—a narrow, street-facing multi-floor

² The tube house is a type of mixed-use residential building with a very narrow width and a depth of 20~60 m. A traditional-type tube house in Vietnam dates back

house that is called Nhà Ống in Vietnamese or ‘neo-tube house’ in contemporary terms—have been developed along the road (Figure 2). The prevalence of the tube houses along Nguyen Tat Thanh Road was partly due to the local government’s planning strategy balancing between the preference of the inhabitants and the city’s limited budget. Publicly acquired lands were subdivided into small, linear parcels along a newly-built road and then sold to the people who either invested in a single parcel with a minimum area of 100 m² or multiple parcels according to the investor’s financial capability.

With the development of the road, the city came to experience 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 by the communities, along with remarkable occupational change of the residents and emerging commercial ventures in response to the catalytic effects of road infrastructure. However, this change should not be merely attributed to improved accessibility enabled by new transport infrastructure. Although Danang does not have a city-wide mass transit system, the average commuting time was reported

to the sixteenth century, according to the study by Kien (2008), and the neo-tube house was increasingly built during the post-1980s. Both types share some similarities: each house faces a street and the owner(s) use the ground floor of the house for shops or for renting to other retailers. The residents often live on the upper floors of the building. But there are some differences. A traditional tube house is normally 1-2 stories high and is built on a parcel with a size of approximately 3.5 m x 35 m. Construction materials of a traditional tube house include ceramic roof tiles, wood beams, brick walls, and plaster. A neo-tube house is built to 3-5 floors on a parcel with a size of approximately 4~5 m x 20~40 m. Reinforced concrete with bearing frames form the major structure and building materials include brick walls and plaster.

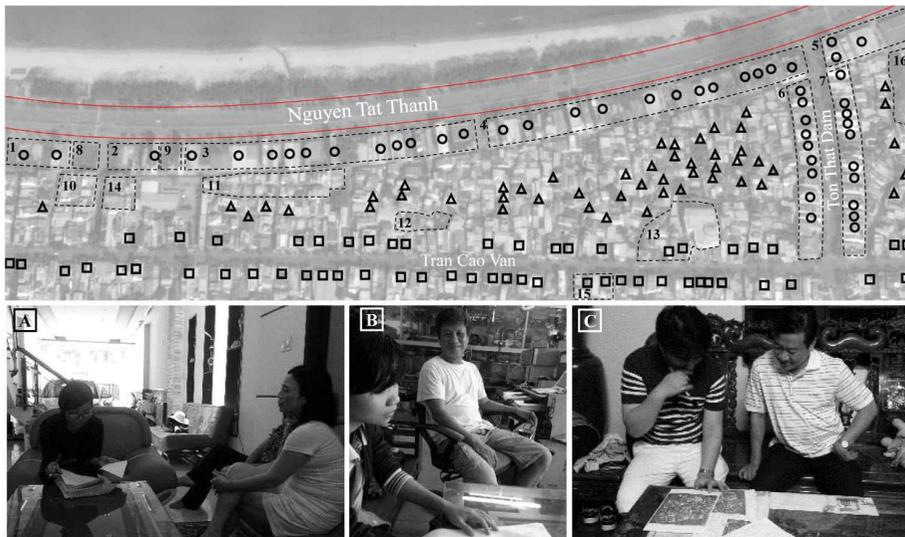
to be no more than 15 minutes, according to World Bank (2011). The exceptionally short travel time is due probably to the widespread use of motorbikes in the city and a high degree of job-housing and retail-housing balance embedded in the urban structure. Therefore, the presence of a new road may involve more fundamental socioeconomic transformation, such as community restructuring and cross-area migration, beyond the immediate impact of reduced travel time.

Against this backdrop of 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, who are likely to be risk-taking entrepreneurs, 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. In the following section, description of the study area and research methods will be presented.

2. Research Methods

The study empirically investigated a neighborhood called Thanh Khe District in Danang as shown in Figure 1. Here, field surveys and in-depth interviews were conducted, which allowed a closer understanding on how the new road construction impacted the immediate neighborhood, its community lives, and the built environment. 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. This group had the largest proportion of migrants from other districts of Danang. 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 area had the least number of migrants compared to Groups B and C. The above sites had no monumental public space, like a large public park or an urban square (Figure 3).

A preliminary field survey was conducted between February 25 and March 5, 2014 by the authors, assisted by Nguyen Thi Ngoc Ly (an instructor at Danang University Department of Tourism Management) and her colleague Nguyen Thi Xuan Huong (a translator during interviews). Then, more thorough investigation took place between July 10 and 20, 2014. During the survey, in-depth interviews with more than 600 people were conducted in the study area. Then, we chose 400



Interviewee groups

- Group A: Located directly abutting on Nguyen Tat Thanh Road
- Group B: Local community adjacent to Tran Cao Van Road
- △ Group C: Located in the landlocked site

Patterns of urban development

- 1,2,3,4,5,6,7 : New subdivision and property development
- 8,9 : New subdivision but no development
- 10,11,12,13 : Complete redevelopment
- 14, 15 : Infill development
- 16 : Demolition

Figure 3. Three groups of interviewees and the pattern of urban development (the map shows part of the study area).

interviewees who owned at least one property within Groups A, B, or C. Among the interviewees, 217 people were original residents who owned and continued to live in the study area. The rest, 183 people, were migrants from other districts in Danang or inter-city migrants from other provinces or cities who moved to the study area for various reasons—seeking a new job, running a real estate venture, managing a new hotel, or educating their children in a private institution—after the development of Nguyen Tat Thanh Road in 2003. The interview was assisted by eight students from Danang University Department of Tourism Management.

The survey questionnaires involving pre-2003 and post-2003

Table 1. Survey contents.

	Category	Details
Pre-2003	Social/ Economic Characteristics	<ul style="list-style-type: none"> • Property ownership • Occupation • Income • Place of employment • Mode of transportation • Household business
	Architecture	<ul style="list-style-type: none"> • Building type and location • Building use • Ground floor use
Post-2003 (based on 2014 survey)	Social/ Economic Characteristics	<ul style="list-style-type: none"> • Property ownership • Occupation • Income • Place of employment • Mode of transportation • Changes to household business • Scope of activity
	Architecture	<ul style="list-style-type: none"> • Building type and location • Building use • Ground floor use • Physical transformation • Change of property value
General Background	Basic Information	<ul style="list-style-type: none"> • Gender, age, level of education • Size of a family, birthplace
	Building Location	<ul style="list-style-type: none"> • Place of response • Address of current residence

socioeconomic conditions and the built environment characteristics were shown in Table 1. The survey included the status of property ownership, occupation, personal/household income, the location of jobs, the mode of transportation and time for commuting, the source of income and the type of business/employment. Additionally, information

on the type of buildings they owned, its location, and different uses by floors were also collected. The pre-2003 and post-2003 questionnaires were the same except for: i) physical change of the buildings like renovation and partial redevelopment, and ii) change in the property value after 2003, which applied only to the post-2003 survey. In the last page of the survey, participants' personal information like gender, age, education, family size, birthplace, home address, and the location of an interview site were recorded. Since the pre-2003 survey was largely based on the memories of the interviewees, some incorrect information could have been reported. Additionally, some interviewees were reluctant to reveal their income during the survey. When the interviewers asked to document their income levels in the years of 2002 and 2014, for example, only 288 responses out of a total of 400 interviewees were acquired. Despite the limitation, the authors believe that no major misrepresentation was reported in the survey because a group of trained local students conducted face-to-face interviews with the property owners and spent more than one hour per person to verify the quality of the responses. Additionally, survey samples with uncertain response were discarded. Then, the survey results were first reviewed after being pooled into a complete dataset and then were examined separately by the groups of A, B, and C.

3. Results

Widespread development of tube houses and increases in the rentable space

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. 4). 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 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. In Danang, demolished houses and cut-off parcels associated with road development were acquired by the local government. Displaced households were compensated from a public funding source established by the People's Committee in the late 1990s. Then, after the road development was completed, acquired land was sold to new people through public auction. Within the study area, a large number of subdivided parcels were acquired by non-original residents, who then later developed a number of mid-rise buildings. For instance, by 2014, about 9.8% of the migrants came to own three-story buildings and another 6.0% owned four-story buildings in the area. Although the majority of migrants still lived in one to two-story buildings, this was notably different when compared to the original residents group. Nearly 60% of original

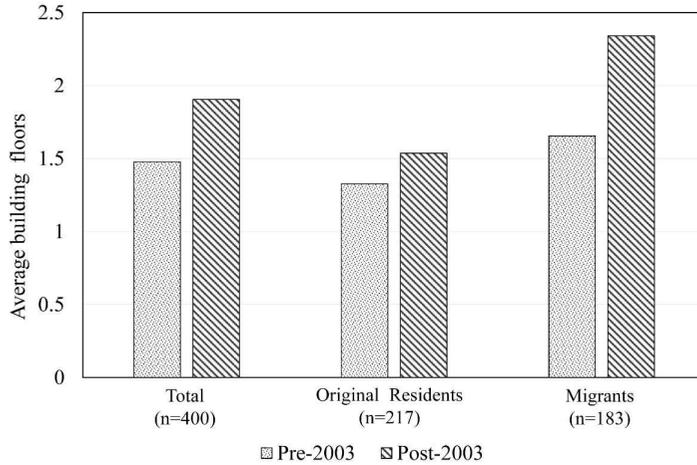


Figure 4. Change in building floors of the study area.

residents lived in a single-floor residence, and those who lived in buildings higher than three-story only accounted for 2.3%.

Among the multi-story buildings occupied or built by migrants, the tube house comprised the most typical architectural type in the study area. The study area, where tube houses already formed a large part of the built environment by the early 2000s, was characterized with a greater number of tube houses afterwards. Before 2003, 31.8% (n=127) of the total interviewees owned and lived in a tube house. The rate increased by 12.2% in 2014, amounting to a total of 44% (n=176; Figure 5). The percentage of the migrants' tube house ownership was far higher than original residents. For instance, about 35.5% of the migrants (n=65) used to live in a tube house 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

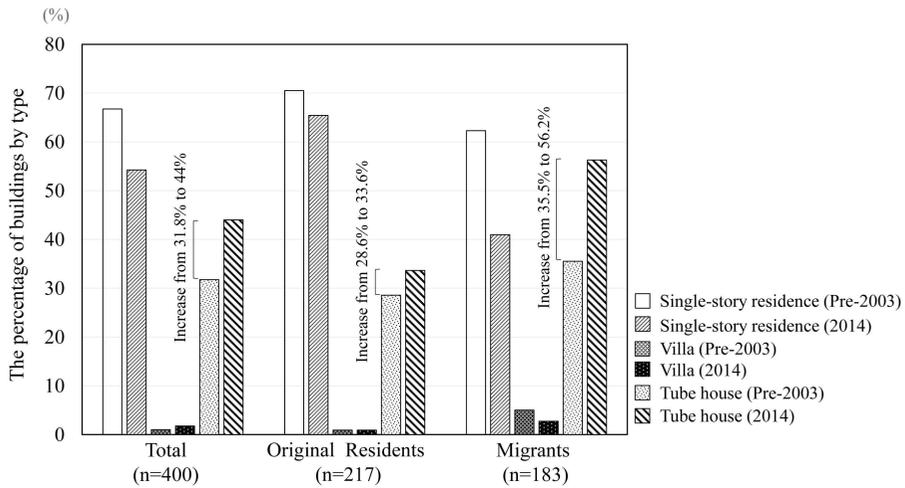


Figure 5. Change in building type of the study area.

study area. Compared to a less-convertible, single-use traditional house, contemporary tube house could host a variety of retail and amenity uses. Each floor of a typical tube house accommodated different uses, often decorated with unique materials and personal fixtures flavored with individual self-expression. At an urban scale, the area's urban blocks were filled with elongated, linearly layered parcels defined by major roads. This attracted a large number of in-migrants who hoped to build their own tube houses. The parcels, if pedestrian connectivity was greatly improved and land purchase became available in an official market, provided a highly desirable site for the development of contemporary tube houses. The following interview supported this:

Many people want to build or buy a tube house in Danang if they can afford to. I am one of them. I originally lived in an old, non-tube house building. I was born in a rural area. (After migrating

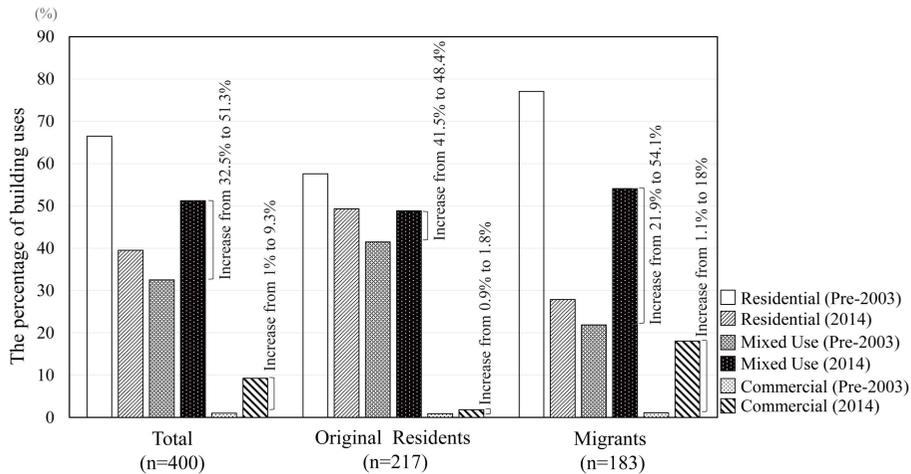


Figure 6. Change in building use of the study area.

to the city), I worked hard as a carpenter to save money. Quite recently, I could own a self-built tube house in the area...Although the first floor of my house is a family living room, I would have rented it out or used it as my own workspace if my house abutted on a road exposed to many passers-by.

An interview with ○ ○ ○ (46 years old) on March 4, 2014

The development of tube houses 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 used to own 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.

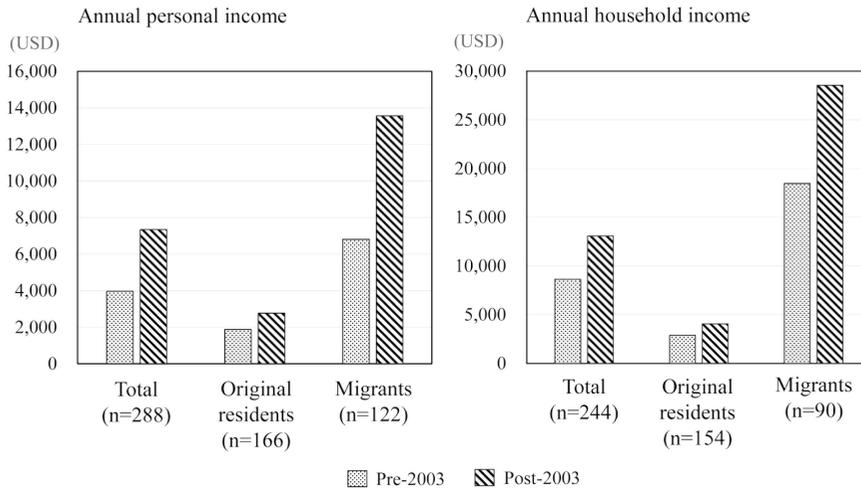


Figure 7. Annual income level between 2002 and 2014.

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; Figure 6). In other words, the percentage of the buildings with one or more floors of a non-residential use—such as a hotel, a noodle shop, a pub, a vegetable market, and a karaoke—has nearly doubled from 33.5% to 60.5% over the years. Again, the change was largely driven by the migrants who sought to expand their existing retail network or to test a new type of business through voluntary occupational change. About 72.1% of the migrants owned a building with commercial-only or mixed-use features in 2014, which is a significant increase from 23% before 2003.

Additionally, 33 out of 37 commercial-only buildings in the study area were owned and managed by migrants in 2014. For example, the owner of a six-story hotel at 21 Ton That Dam Road used to work for a travel agent in Hai Chau District before 2003. After being dissatisfied with his job, he bought a site in the study area—which was previously occupied by a residential property adjacent to Nguyen Tat Thanh Road—through public auction. He then built a hotel with twelve rooms on the first five floors of the building and placed his own residence on the top floor.

One of the most immediate impacts of the spread of mixed-use tube houses 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 7). 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. The manager of a hotel at 417 Nguyen Tat Thanh Road, for example, used to own three buildings and a restaurant in Hai Chau District in the early 2000s. His annual household income was no more than 5,000 USD. In response to the development of Nguyen Tat Thanh Road, he speculated on the chance of buying two parcels in the area and merged them into one to build a

mid-sized hotel with a restaurant. Although the site was not directly connected to the new road, he predicted that demand for tourism and dining in the nearby area would heighten. After the completion of the hotel in 2005, nearly full occupancy was recorded. His annual income soared by ten times at about 50,000 USD in 2014. However, such a dramatic increase in the income level of some migrants was a source of dissatisfaction among the Groups B and C interviewees. For instance, a fisherman who was an original resident in Group C felt strong dissatisfaction about new developments largely driven by the migrants in Group A because their close acquaintances lost their jobs and left their hometown due to the development. Another original resident born in Thanh Khe District had a negative impression about the opening of Nguyen Tat Thanh Road.

With the development of a new road, the overall living standard of the community has improved. However, I think most of the economic benefit from road development belongs to the already wealthy owners of the land directly adjoining Nguyen Tat Thanh Road. The new road did not contribute to an increase in my and other retailers' business profit near Tran Cao Van Road. Or worse. Competition became much more intense as similar types of business began to mushroom in the nearby area. I hope that Tran Cao Van Road is also widened and the nearby land acquired by the People's Committee and then resold to the original landlords after reasonably subdivided. Then I can build a new, large-sized building.

Excerpt from an interview with ○○○ (47 years old) on March 5, 2014

Proximity effects of road infrastructure on the built environment,

uses, and people

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 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 tube house. Especially, the interviewed residents preferred tube houses having both a self-owned residential unit and rentable space close to the ground floor within a single building envelope. The preference was consistent among the interviewees independent of their income level and the place of origins. Additionally, the block pattern of the area was suitable for the development of low-rise buildings than larger, taller architecture due to the narrow width of the parcels and limited vehicular access, unless large-scale merging of land ownerships was undertaken by real-estate developers. Over the last ten years, no merging was reported involving more than three parcels in the area. Additionally, the result was supported by the relatively even distribution of urban development

activities across the study area. In total, 91 new development activities were reported in the area between 2003 and 2014. Among them, 40.7% took place in Group A (n=37), followed by Group C (n=35) with 38.5% and by Group B (n=19) with 20.9%.

Nevertheless, this does not mean that the overall size of the buildings remained homogeneous. For example, increases in the area of building footprints were prominent near Nguyen Tat Thanh Road, or in Group A, compared to other areas. With the road development, the parcels in Group A were subdivided in a manner that increased the area and then were auctioned to a new property investor. This was achieved through public-led land acquisition and land readjustment processes which was favorable towards tube house development along the newly constructed road. The adjusted plots were then publicly sold with typical parcel sizes of 125 m² (5 × 25), 81 m² (4.8 × 18), and 72 m² (4.5 × 16). On the other hand, the parcels in Groups B and C remained fundamentally small, ranging from 21 m² to 90 m². Especially, Group C had the greatest number of very tiny parcels—of ten smaller than 40 m²—with irregular shapes, although some mid-sized parcels did accommodate for tube house development. Additionally, between 2003 and 2014, Group A reported the greatest number of merged parcels (n=6), compared to Group B (n=0) and Group C (n=2). The merged parcels hosted uniquely large-scaled commercial buildings, such as a seven-story hotel with a total floor area of 1,750 m² and a three-story restaurant with an area of 560 m² accommodating 135 diners.

The bigness of the parcels in Group A was closely related to the accelerated diversification of non-residential uses. For instance, in 2014,

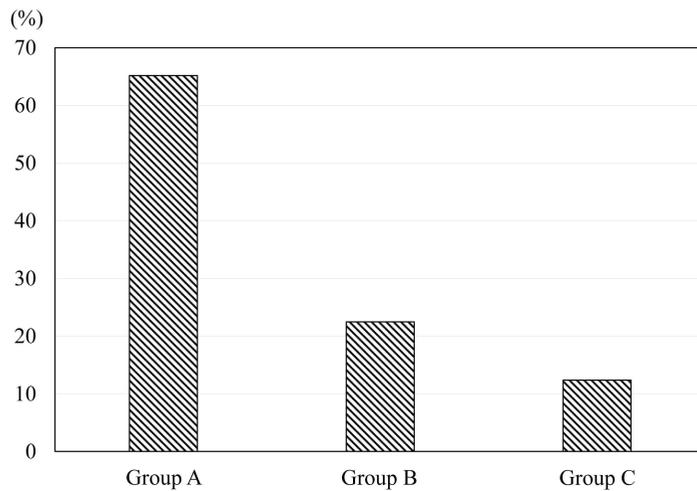


Figure 8. Percentage of the migrants who moved to the study area between 2002 and 2014 by groups.

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. Between 2003 and 2014, 45 renovations took place across the properties owned by the

interviewees. Among the three groups, Group A experienced the most frequent renovations—22 cases—followed by 16 renovations in Group C and 7 renovations in Group B. In Group A, the major purpose of the renovation was to improve the use value of rentable space, as well as to enhance the livability of self-owned residential units. This included the optimization of an interior layout for new uses, the expansion of a kitchen space, and up-scaling of the water piping system. Here, renovations did not always follow a stereotypical model of having a shop on the first floor and a private home on the second floor. For instance, the owner of a three-story café and a bar in Group A renovated the first two floors as a commercial space and the third floor as a dormitory space for the employees of the café rather than placing his own residential unit. In Group C, renovation generally involved the provision of basic space related to residential use, such as a new storage space or a children’s bedroom in the mezzanine floor of the building.

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 (Figure 8). Diversification of building uses in Group A, as noted above, was at least partly attributable to the venturing behavior of the migrants. The distribution of the people who experienced occupational change seemed fairly even across the groups. For instance, about 32.5% of the interviewees (n=74) changed their jobs in Group A, which was similar

to 34.2% (n=78) in Group B and 33.3% (n=76) in Group C. When occupational change of the migrants was analyzed by groups, however, the difference became distinctive. Among 106 migrants who changed their occupations between pre-2003 and 2014, 64.2% (n=68) belonged to Group A, 25.5% (n=27) to Group B, and 8.5% (n=9) to Group C. This implied that a neighborhood abutting on Nguyen Tat Thanh Road attracted a high proportion of migrants with greater job mobility. The opportunistic career change of the residents in Group A included becoming a motel owner, a restaurant and café manager, a retail dealer in construction materials, and a manager of an automobile repair shop. The economic impact of entrepreneurship in Group A was manifest through the very high income level of the residents. On average, the personal and the household income level of the interviewees in Group A was six to eight times higher than those in Groups B and C. For instance, average personal income in Group A was 19,093 USD (n=64), which was much higher than 3,322 USD (n=72) in Group B, and 2,636 USD (n=108) in Group C. There was little evidence to suggest that migrants sought occupational changes due to job loss from their place of origin.

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 2010, a fifty-year-old original resident in Group B extended two additional floors on top of a single-story building to enlarge his family space. The ground floor area, which used to be a residential unit, was renovated by himself and was rented for a bike

repair shop, which was run by a young migrant. Another thirty-five-year-old original resident was adaptively reusing her villa by running a fashion shop on the ground floor. The villa's courtyard was used as a display space for new clothes as well as a parking space for motorbikes. 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.³ However, in the 2000s, underutilized living spaces 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. Although the choice did not lead to far greater profitability of the land, the very basic living environment of the landlords and their family had been stabilized. The residents were very cautious about paying for higher rents if they had decided to migrate to other urban areas. This suggested a rational consolidation of affordable space in Group C with greater bottom-up demand for social

³ The People's Committee of Vietnam is the local administrative organization of the State, which carries out a number of urban policies and management duties at the local level in accordance with the law.

stability in the long run, not a return of wealthier residents with entrepreneurship to the area. Many courtyards of the houses in Group C came to be utilized as a multi-purpose communal area hosting social activities such as leisurely strolls, resting, parking, children's playing, handicraft manufacturing, pop-up markets, and informal community gathering. This has generated a highly diversified urban landscape, which on the other hand, can also become a barrier to—or at least significantly delay—large-scale urban redevelopment in the area.

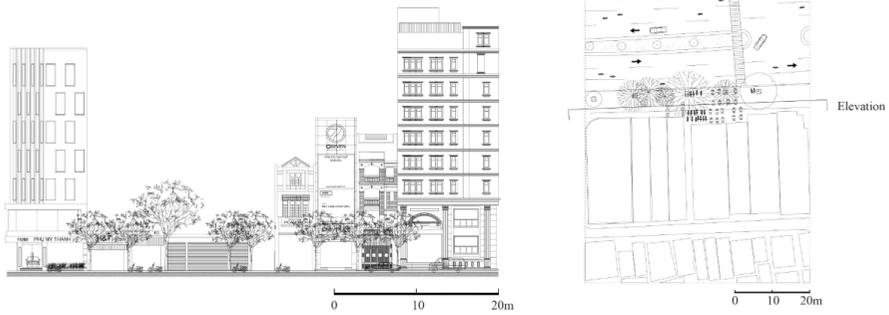
Differences in the privatization of public space by groups

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. As noted in Kim (2012) on the use of sidewalks in Vietnam, the intensity of space use fluctuated substantially due to changing number of consumers over different periods of the day. However, the person or a group who controlled the manner a public space is used did not change much by time. For example, the illegally extended dining places in the sidewalk, once occupied by the tables belonging to

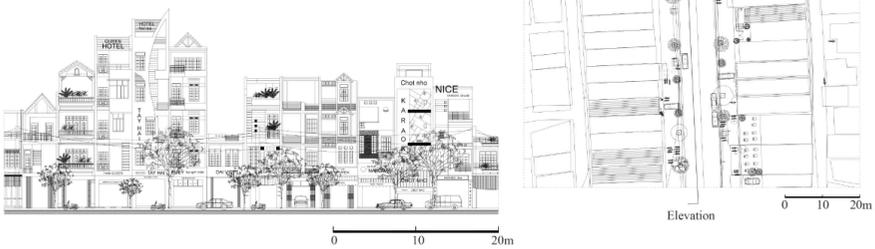
a restaurant, was also maintained by the same manager after regular operating hours of the restaurant. Chairs were stacked up and flowerpots were relocated in the late evening but the space was still under the control of the same manager. In other cases, illegal street vendors occupied the corner of major streets in order to sell drinks, snacks, or locally-caught fish. Although some vendors' cart took up part of the sidewalk connected with the entrance of a nearby retail, little conflicts were observed between the vendors and the nearby retail owner. On the other hand, illegal parking of motorbikes and automobiles was a major source of nuisance. Although some of the ground floors of the buildings had room for parking, among other uses, very little parking space was reserved for retail tenants and visitors in Group A. Although temporary parking often occupied part of the roads or the sidewalks, micro-scale built environment characteristics like the small-scaled crossings, well-maintained trees and tables, and street lamps largely generated walkable atmosphere in the area (Kim, Park, & Lee, 2014). In other words, private use of public space in Group A was largely characterized by the extension of private enterprises or functional demand like parking and storage. Despite the fact that the usage and the number of occupants of public space changed by time, unpredictable social use or change in the subject controlling the space was rarely observed in Group A.

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

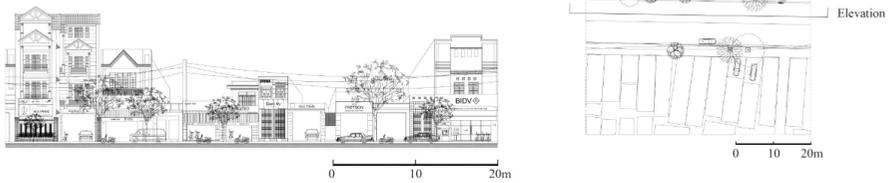
• Nguyen Tat Thanh Road (Group A)



• Ton That Dam Road (Group A)



• Tran Cao Van Road (Group B)



• Inside of the Block (Group C)



Figure 9. Typical plan and elevation of the streets in Groups A, B, and C (Group A: Nguyen Tat Thanh Road 419-435 and Ton That Dam Road 6-32; Group B: Tran Cao Van Road 439-452; Group C: Tran Cao Van Road K368/15-31; drawn by Daewoong Choi).

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. The place accommodated parking demand not only from adjacent places, but also from retails and houses in Groups A, B, and C. In many buildings, height difference between street level and the ground-floor level of the buildings was eliminated so that motorbikes could easily move around the inside and outside of the property. 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 (Figure 9).

4. 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. The observation supports the first hypothesis proposed in the Introduction. 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 tube house. The building floors of a tube house were flexibly utilized for a variety of residential and non-residential uses. Parcels abutting on Nguyen Tat Thanh Road could host a large number of migrants who invested in the development of tube houses because institutional barriers including land acquisition and development were significantly lowered under favorable urban policies. These included the local government's systematic management of land acquisition, compensation and resale of subdivided parcels, the low construction costs of tube house development carried out by local builders, and the high demand for rentable space in the area due to continued urbanization. Most importantly, the supply of mid- to large-sized linear parcels accessible from the roads was quite limited in the city, which continued to push up the profitability of tube house development in the area.

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 tube houses 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. Its walkable environment remained intact, with no thoroughfares cutting through the internal urban fabrics. Therefore, the second hypothesis proposed in the Introduction—an inner block will have experienced minimal physical change—does not seem to be supported in the study.

In Danang and elsewhere in Vietnam, investment in road infrastructure was espoused as a crucial policy vehicle toward the goal of rapid economic growth by local governments. An inflow of massive foreign capital accompanied by domestic property investment around transport corridors is one major aspect of the growth model. Indeed, many Asian investors from South Korea, Japan, and China were involved in property development in Danang. For instance, a construction company in Korea, called Daewon Cantavil, decided to invest 250 million USD for the development of Daphuoc International New Town in 2006. The project included land reclamation along Danang Bay—an eastern endpoint of Nguyen Tat Thanh Road—with an area of 210 ha and a residential complex, a golf course, and a hotel. Another example is the Golden Hills Project with an area of 400 ha, planned to be built in the Cu De River Basin to the northwest of Danang. A Vietnamese private company, called Trungnam Group, has announced an investment plan of 1.6 billion USD for the project. The

site will host a variety of programs, such as recreational amenities, a residential complex with tube houses and villas, a golf course, a marina, an amusement park, and an international school. Work on the development of infrastructure is currently underway and a global architectural design firm Skidmore, Owings & Merrill LLP (SOM) is involved with the project. Additionally, private developers from Hanoi and Ho Chi Minh City also began to invest in the development of large shopping malls and supermarkets in Danang. The local government of Danang is planning to create the bus rapid transit (BRT) system by 2025 in order to facilitate the growth of the city with mitigated traffic congestion and to improve health issues caused by air pollution.

However, since the above projects depend heavily on a large amount of capital investment from outside, the process of development has fluctuated substantially—sometimes delayed for several years in the middle of development like Daphuoc International New Town—due to market change and uncertain expectation of property sales. Additionally, the benefit gained from large-scale infrastructure development became a source of dissatisfaction among some community members as mentioned in the earlier section. 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. Although the development of Nguyen Tat Thanh Road

involved the provision of sidewalks planted with street trees, deterioration of public space was fairly rapid. The private use of sidewalks and street corners was prevalent, as shown previously, which lead to the rapid obsolescence of pavement. Additionally, illegal blocking of a walking path was frequent by motorbikes. 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.

This study empirically investigated the impacts of a new road on the urban landscape and residents in a Southeast Asian city. In future, the relationship between road development and the changes in the surrounding area may be statistically investigated and furthermore, policy implications for regional development plans require consideration.

Acknowledgments

This work was supported by the BK21 Plus Project in 2015 (Seoul National University Interdisciplinary Program in Landscape Architecture, Global leadership program towards innovative green infrastructure). Additionally, this research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT & Future Planning (NRF-2014R1A1A1037046).

Chapter 2

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

1. Introduction

One of the key principles for planning transportation infrastructure is striking a balance between mobility and livability (Cervero, 2009; Deshkar et al., 2011; Kim et al., 2015). Good mobility denotes improvements in vehicular speed and movement capacity in an urban area. The definition of livability varies according to previous studies (Smith et al., 1997; Van Kamp et al., 2003; Balsas, 2004; McCann, 2007; Wang et al., 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 (Vilhelmson, 2007; Newman & Smith, 2010). In recent decades, cities in Asia have been no exception (Lee et al., 2015). In Vietnam, which has seen an average

economic growth of 6.1%⁴ 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 place (Issah et al., 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 (Figure 10). 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

⁴ From 2006 to 2015. Retrieved from <http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?page=1>

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 et al. (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

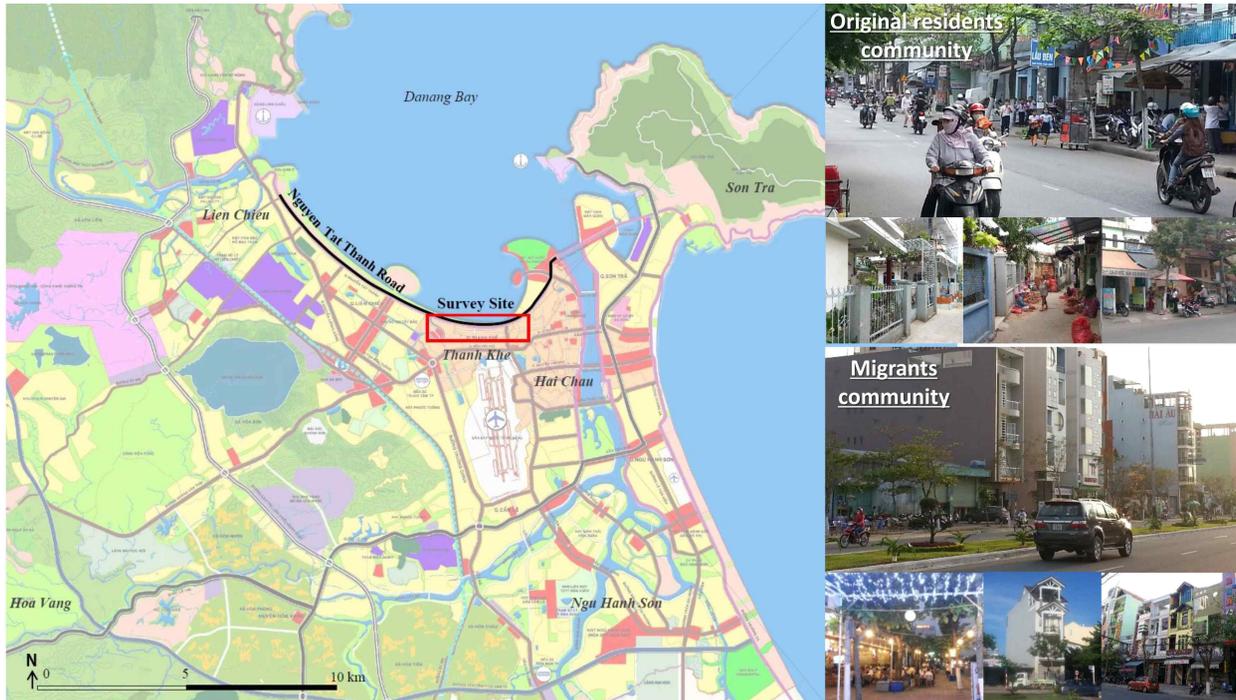


Figure 10. Masterplan of Danang and the study area (Modified based on the Masterplan of Danang city (2030-2050) by the authors).

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 (Punpuing & Ross, 2001; Krisjane et al., 2012; Marquet & Miralles-Guasch, 2015) or strong government policies (Cervero & Duncan, 2006; Lau & Chiu, 2013; Lin et al., 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 (Kelly, 1994; Polzin, 1999; Sullivan & Lovell, 2006; Cervero, 2009; Neuman & Smith, 2010). However, detailed social surveys that examine the relationship between road development and neighborhood change in terms of mobility appeared to be 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 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 Methods

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

Table 2. 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	<ul style="list-style-type: none"> • Shorter travel time • Decentralization of employment • Diversity of movement routes 	<p>a) Job distribution, commuting frequency, commuting modes of transportation, route characteristics, commuting distance, type of vehicles owned</p> <p>b) Places for shopping, leisure, education, and religious activities, frequency of travel, mode of transportation</p>
	<ul style="list-style-type: none"> • Land (re)development • Increase of commercial facilities 	<p>c) Location for (re)development, plots, architectural characteristics, building use, parking lots, relationship with sidewalks, urban spatial characteristics</p> <p>d) Type and size of commercial facilities, use of sidewalk, target population and function, management methods, marketplace creation</p>

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 2). 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 distance⁵, 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.

⁵ 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.

3. Results

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 minutes at non-peak hours, from 17 to 10 minutes. The travel time to Son Tra, which is a hilly area located in the northeastern corner of the city, was reduced by 20 minutes, from 35 to 15 minutes. 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), 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 m² (4.5 × 20) or 125 m² (5 × 25). 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 (Figure 11). 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 3, 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. 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

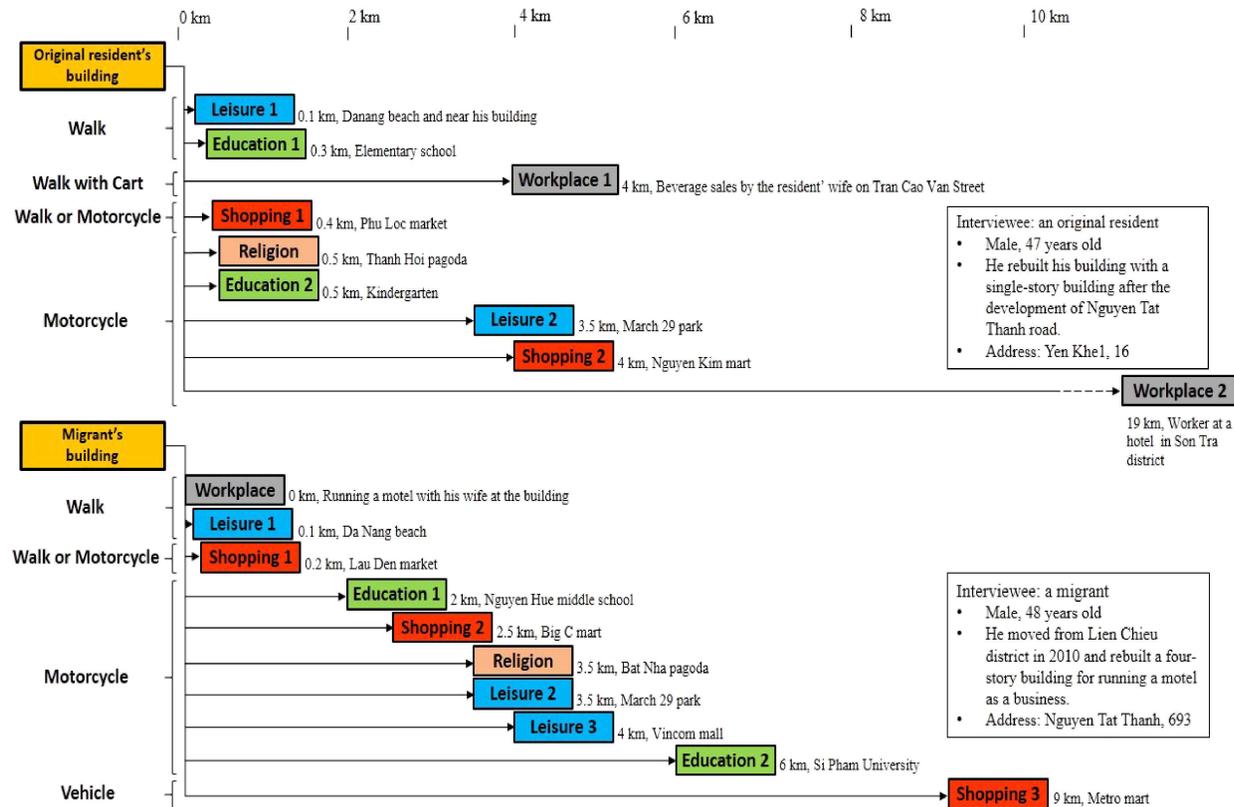


Figure 11. Comparison of original residents and migrants travelling distances from home to workplace, places for shopping, leisure, education and religious activities according to modes of transportation.

Table 3. The trends and rationales of change in job distribution and commuting pattern.

	Original residents	Migrants
Job distribution	<ul style="list-style-type: none"> • <u>Distributed across Danang</u> - 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 	<ul style="list-style-type: none"> • <u>Concentrated along the new roads</u> - Residence and workplace coincide: Operation of hotels/motels, restaurants, cafes - Along roadside: Service sector, government - Downtown: White collar employees, service sector
Chang		
es	Commuting frequency	Commuting frequency
	<ul style="list-style-type: none"> • <u>Dependent on jobs</u> 	<ul style="list-style-type: none"> • <u>Daily, regular</u>
	Commuting modes of transportation	Commuting modes of transportation
	<ul style="list-style-type: none"> • <u>In the order of Motorbike (55%) – By walking *(41.3%) – Bicycle (3.0%)</u> 	<ul style="list-style-type: none"> • <u>In the order of by Walking*(61.2%) – Motorbike (33.4%) – Vehicle (4.4%)</u>
	Commuting distance	Commuting distance
	<ul style="list-style-type: none"> • <u>Average distance 7.58 km</u> • <u>Increased</u> compared to pre-development of the road 	<ul style="list-style-type: none"> • <u>Average distance 3.68 km</u> • <u>Reduced</u> compared to pre-migration
	Type of vehicles owned per household	Type of vehicles owned per household
	<ul style="list-style-type: none"> • <u>Motorbike: 2.4 (85% increase)</u> • <u>Bicycle: 0.6 (43% decrease)</u> • <u>Vehicle: 0.02 (No change)</u> 	<ul style="list-style-type: none"> • <u>Motorbike: 2.3 (45% increase)</u> • <u>Bicycle: 0.4 (42% decrease)</u> • <u>Vehicle: 0.3 (240% increase)</u>

Rationale	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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
-----------	--	---

* includes cases where place of residence and work coincide

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 development⁶, it seemed that the original residents benefited to a lesser degree than migrants from the opening of the Nguyen Tat Thanh Road.

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

⁶ Retrieved from http://alainbertaud.com/wp-content/uploads/2013/07/AB_report_Danang_Graphs_rev.pdf

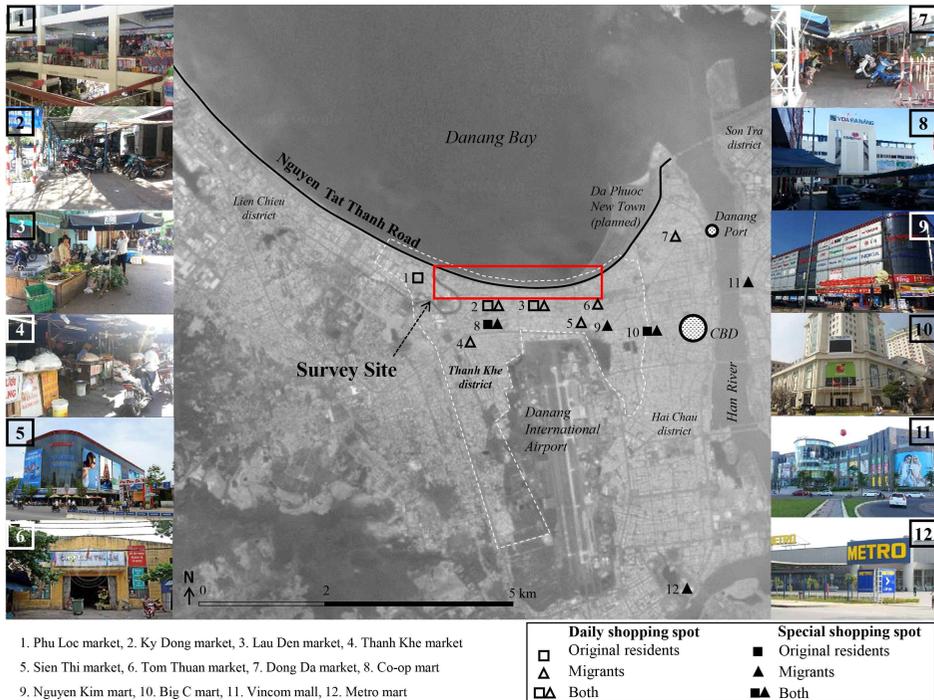


Figure 12. Locations for shopping frequented by original residents and migrants.

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 (Figure 12). 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,

Table 4. The trends and rationale of changes in land (re)development and housing typology.

		Original residents	Migrants
C h a n g e s	Location	<ul style="list-style-type: none"> • <u>Diversely distributed along new roads</u> 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) 	<ul style="list-style-type: none"> • <u>Concentrated along the new roads</u> 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	<ul style="list-style-type: none"> • <u>Mixture of elongated and atypical forms</u> • Various lot sizes 	<ul style="list-style-type: none"> • <u>Elongated</u> • 4.5 × (16~20 m), 5 × 25 m area
	Architectural characteristics	<ul style="list-style-type: none"> • <u>Average building floors: 1.5 floors</u> • 4 - 5 m in height, <u>1 - 2 stories with mezzanine accounts for 89.1% (n=220)</u> • <u>3 - 4 story buildings account for 10.9% (n=27)</u> • Simple structures utilizing iron concrete, brick walls and cement finishes. Simple in color. • Small front yards or staircases built 	<ul style="list-style-type: none"> • <u>Average building floors: 2.3 floors</u> • <u>1-2 story buildings account for 59.1% (n=126)</u> • <u>3.3 m in heights, 3 - 7 stories: 40.8% (n=87)</u> • 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	<ul style="list-style-type: none"> • <u>Residential: 51.8% (6.9% decrease)</u> • <u>Mixed-use: 46.6% (6.1% increase)</u> • <u>Commercial: 1.6% (0.8% increase)</u> 	<ul style="list-style-type: none"> • <u>Residential: 28.6% (49.3% decrease)</u> • <u>Mixed-use: 55.9% (34.7% increase)</u> • <u>Commercial: 15.5% (14.6% increase)</u>

Parking lots	<ul style="list-style-type: none"> • <u>Motorbike parked inside the first floor of building or the yard</u> • <u>Vehicles parked illegally or on sidewalks</u> 	<ul style="list-style-type: none"> • <u>Motorbike parked inside the first floor of building or sidewalk in front of building</u> • <u>Vehicles parked inside the first floor of building or (very rarely) underground or illegally on sidewalks</u>
Relation ship with sidewalk	<ul style="list-style-type: none"> • <u>Commercial buildings:</u> The sidewalk and the buildings meet directly. Awnings installed on buildings so sidewalks can be utilized for commercial spaces or parking lots. • <u>Residential buildings:</u> 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. 	<ul style="list-style-type: none"> • <u>Commercial buildings:</u> 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. • <u>Residential buildings:</u> Doors and small yards separate the building from the sidewalk.
Urban spatial characteristics	<ul style="list-style-type: none"> • <u>Increase of retail shops</u> • <u>Formation of a safe residential area for the low-income class</u> 	<ul style="list-style-type: none"> • <u>Emergence of a large-scale commercial buildings</u> • <u>Formation of high-end residential area</u>
Rationale	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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

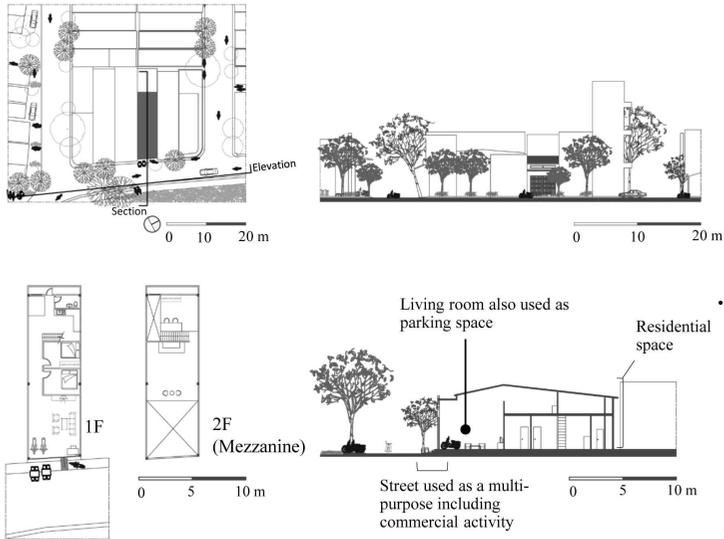
for instance, regularly traveled to a shopping mall at a distance of 9 km during the weekend and his son commuted to a university that was 6 km away from his home (Figure 11). Additionally, six children from

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.⁷ 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 (Figure 13; Figure 14). 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

⁷ 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 \$2,767 and the average personal income of the 122 migrants was USD \$13,564.

- An original resident's building (Address: 16, Yen Khe 1)



- A migrant's building (Address: 21, Ton That Dam)

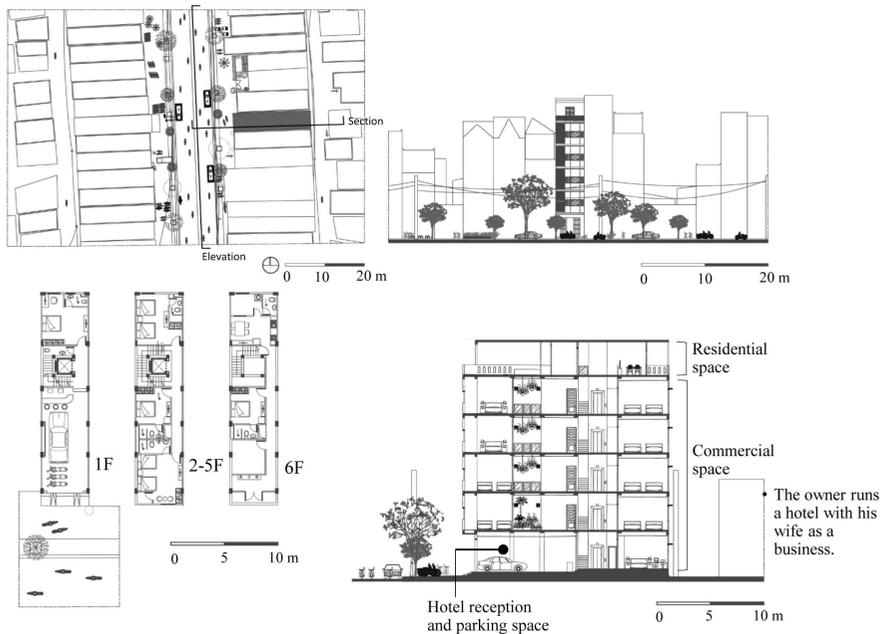
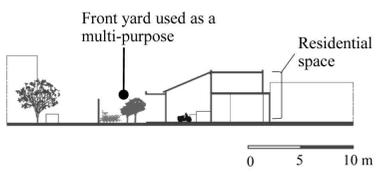
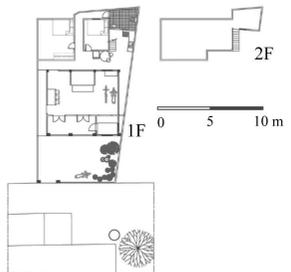
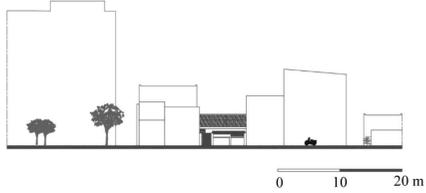
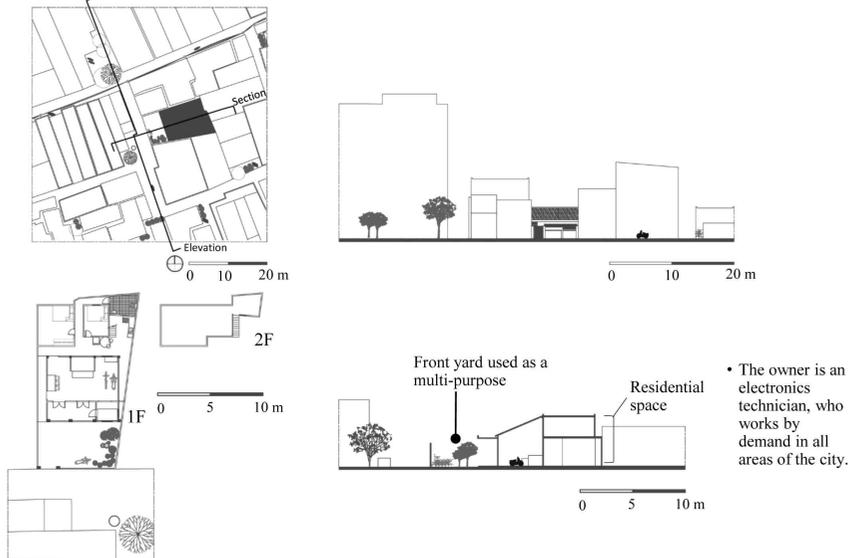


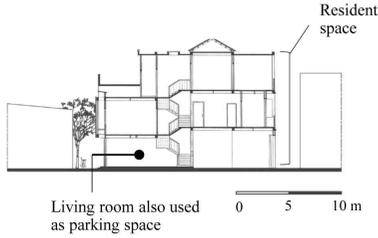
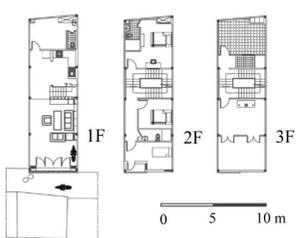
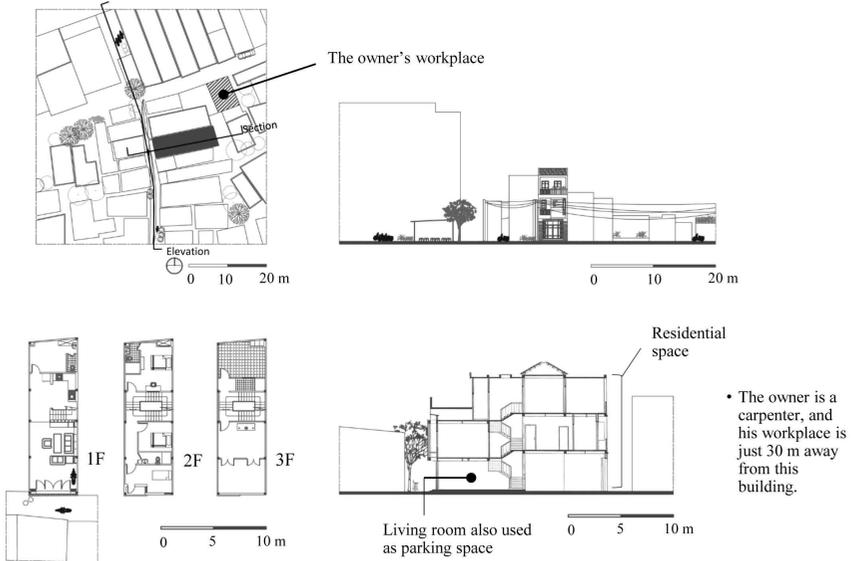
Figure 13. Comparison of the building size and spatial characteristics of buildings located on the new road by original residents and migrants.

- An original resident's building (Address: K304, Tran Cao Van)



- The owner is an electronics technician, who works by demand in all areas of the city.

- A migrant's building (Address: K386/28, Tran Cao Van)



- The owner is a carpenter, and his workplace is just 30 m away from this building.

Figure 14. Comparison of the building size and spatial characteristics of buildings located along an alley inside the urban block by original residents and migrants.

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. 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 4; Figure 14).

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 (Polzin, 1999; Cervero & Duncan, 2002; Adams & Vandrasek, 2007; Kim et al., 2014). 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 4 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 5). After the road development, a significant change was reported in the use of migrant-owned buildings. In Table 4, 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

Table 5. The trends and rationale of changes in street commercialization.

		Original residents	Migrants
C h a n g e s	Type and Size	<ul style="list-style-type: none"> • <u>Small shops</u> such as noodle shops, cafes, repair stores, beauty salons, barber shops, fruit stands, etc. account for 66% • Areas transformed into <u>commercial space showed a 6.9% increase</u> • <u>High proportion of residential area</u> and low proportion of commercial usage 	<ul style="list-style-type: none"> • <u>Large hotels, motels, high-end restaurants and cafes</u> account for 86.5% • Areas transformed into <u>commercial space showed a 49.2% increase</u> • <u>High proportion of commercial area</u>, low proportion of residential usage
	Use of sidewalk	<ul style="list-style-type: none"> • <u>Various usage for commercial activities, parking and street stalls</u> (in violation of regulations to protect pedestrian routes) • <u>Minimized use for private purposes</u> in alleyways along inner-facing blocks to allow better flow for pedestrians and motorbikes 	<ul style="list-style-type: none"> • <u>Public areas, not including the areas officially designated for pedestrians, are used for commercial use and parking</u> (in most areas regulations are being met but illegal parking is found in areas where parking space is lacking) • <u>Diversified usage of sidewalks depending on time of the day and user groups</u>
	Target population and function	<ul style="list-style-type: none"> • <u>Utilized by residents</u> • <u>Function as neighborhood living facilities</u> 	<ul style="list-style-type: none"> • <u>Local tourists</u> • <u>Function as tourist infrastructure</u>
	Management methods	<ul style="list-style-type: none"> • Retail shops are operated normally by women as <u>secondary jobs</u> • Others: Operated as a business 	<ul style="list-style-type: none"> • Typically operated <u>as a business</u> • Others: Franchise, rented commercial facilities
	Marketplace creation	<ul style="list-style-type: none"> • <u>Contribute to market formation</u> - Lau Den Market (Opened in 2006): Traditional market - Ky Dong Market (Opened in 2007): Traditional market 	<ul style="list-style-type: none"> • <u>Commercial street formed</u> - East of Nguyen Tat Thanh road: Hotel/motels, Large restaurants, Office buildings - Ton That Dam road: Hotel, office buildings, restaurants

Rationale	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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
-----------	---	--

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 m² (4.8 × 18) 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

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, 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 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,

Table 6. Mobility changes due to Nguyen Tat Thanh Road development and the subsequent changes in space utilization.

Type	Original residents	Migrants
Characteristics of mobility	<ul style="list-style-type: none"> • Commuting distance: Increased • Workplace locations: Distributed • Non-job-related travel pattern: Nearby one's home 	<ul style="list-style-type: none"> • Commuting distance: Decreased (Jobs-housing balance) • Workplace location: Concentrated along the new road • Non-job-related travel pattern: Away from one's home
Characteristics of spatial changes	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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

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 6).

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 (Giuliano, 1991; Cervero, 1996; 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 underserved area is directly related to the higher frequency of accidents and the overall quality of life (Lin et al., 1994; Jackson, 2003; Cervero & Duncan, 2006; Michelson, 2009; Cervero, 2013). Moreover, health risks that arise from air pollution negatively affect the residents (Hopke et al., 2008; Ho & Clappier, 2011; Tung et al., 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 Futa land New Town project, a 147 hectare 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.

Acknowledgments

This work was supported by the BK21 Plus Project in 2016 (Seoul National University Interdisciplinary Program in Landscape Architecture, Global leadership program towards innovative green infrastructure). For conducting field studies and discussion, this work was supported under the framework of international cooperation program managed by National Research Foundation of Korea (NRF-2015K2A1A2070994). For the editing of the manuscript, this research was financially supported by Environmental Planning Institute, Seoul National University.

Chapter 3

The success and failure of urban form-making experimentations: Case studies of new developments adjacent to the Nguyen Tat Thanh Road, Danang, Vietnam

1. Introduction

Urban expansion provides the opportunity to test and implement innovative urban forms and design (Southworth & Owens, 1993; Madanipour, 2006; Zacharias & Blik, 2008). According to Gospodini (2010), since the economic globalization of the late 20th Century, cities of various sizes have re-evaluated the value of urban design in respect to attracting capital and new industries, along with the modernization of transportation and communication infrastructure. High-quality urban environment was created toward the goal of economic development in the face of increasing inter-city competition.

Asian cities are no exception. Despite the economic downturn of the late 1990s and mid-2000s, the emerging economies of Asia repeatedly tested a number of urban forms doing the implementation of development projects. New urban areas were formed through expanded transportation networks outside traditional urban boundaries to deter overpopulation or to strengthen the connections with surrounding areas (Warlters, 2006; Zhao et al., 2017). For example, more than 400 new

towns were planned in China in the next 20 years to accommodate for the unprecedented migrant influx of approximately 30 million people (Cheng & Hu, 2010). Sometimes, urban planning and design strategies that have been successful in other regions are actively imported to a new area for faster and more efficient urban development. For instance, China had enthusiastically imported American, German, and British planning methods in establishing urban master plans (Chaolin et al., 2010).

However, the problem of such development is that unverified urban-form making strategies are imposed through and reproduced numerous urban projects. Even without recognizing the fact that urbanization is an evolutionary cycle (Antrop, 2004), the issue of the urban environment should be dealt with caution since the built environment is interconnected with other developmental activities as well as social aspects of human activities (Nedovic-Budic et al., 2016). Furthermore, the physical environment of the city is closely connected to energy use, traffic loads, and the normative designs of neighborhoods encompassing issues of walkability and the everyday lives of the community (Davies & Townshend, 2015; Handy, 1996a; Handy, 1996b; Jabareen, 2006; Mehaffy et al., 2010; Mehaffy et al., 2015; Ozbil et al., 2011).

Vietnam has a rapidly changing emerging economy with a high economic growth rate of 7% on average. Danang, the central city of Vietnam with a population of 1.05 million, is undergoing numerous urban infrastructure and development projects. However, up until now, Danang has shown a relatively low urbanization rate of 17.9% (Linh et

al., 2012). It is only in 2012 that the Danang local government established an urban master plan aiming to build a city for a population of 2 million by the year of 2030. Driven by this impetus, new urban areas are being rapidly formed, and therefore, Danang is an appropriate area for investigating recent urban spatial changes and transformations. For instance, seven large-scale development projects are taking place over the last ten years, including FTP City, Da Phuoc international new town and Golden Hills. The combined population projection for these projects is 200 thousand, which accounts roughly for 20% of the total of existing population in the city. In conjunction with these major projects, foreign and domestic capital are being poured in the city to build new roads and rail networks. One of the prominent projects is the development of a coastal road along Danang Bay. The project was financed by Japanese funds, which has restructured the coastal area through a number of urban projects in its proximity. In this respect, this site is considered suitable to study the recent formation and changes of urban spaces.

There have been studies on the Vietnamese urban transformation and its characteristics, which reported the land use change under market socialism and the subsequent deterioration of urban space qualities, and the mismatch of spatial demands (Jung & Lee, 2017; Labbé & Musil, 2014; McGee, 2009; Tran, 2015; Zhu, 2012). However, there is limited knowledge on how the urban spaces are formed and change over time in respect to a specific developmental axis under the unique urban context of Vietnam. Therefore, this research aims to understand the process and spatial attributes of the five main urban development

projects completed or being constructed near the Nguyen Tat Thanh road in Danang, which opened to the public in 2003. The research analyses the development process, and the urban morphology of the projects. Then the success and failures of the projects will be discussed.

Literature Review

Prior to discussing the urban spatial changes of Vietnam, understanding how the economic reforms of Doi Moi in 1986 had influenced the land regulations and development system is required. The initial land reforms started with the recognition of the land use rights in 1993 (Labbé & Musil, 2014), which greatly impacted housing supply in urban Vietnam. For example, 80% of new housing construction in Hanoi were undertaken by individual households between 1993 and 2001 (Quang & Kammeier, 2002), which signified a momentous change since land use rights became a catalyst for households to become major suppliers of housing units in the country (Tran, 2015).

McGee (2009) explained that the urbanization process of Vietnam after the economic reforms is not to be understood as an outright transition into capitalism but a hybrid of market economy and socialism. This notion had been further developed by Labbé & Musil (2014). They argued that such hybrid works under the property mechanisms like the Land Pricing Framework (LPF) and Land-for-Infrastructure (LFI). For instance, the LPF system allows the government to keep land price 30-70% lower than the market price to attract quick investment from private developers in a promising area so that urbanization and industrialization can be propelled. As local

governments obtained the legal right to autonomously develop land in the mid-1990s, this system benefited both the public and private sector, especially in cases where the local government lacked financial sources by which land could be sold to private developers at a reasonable price. Also, through LFI, developers became responsible for building infrastructure in exchange for securing land over a long period of time at a low cost. The LFI became instrumental for local governments with financial constraints since for projects exceeding a certain area developers were solely responsible for building road and sewage systems, schools, medical and community facilities, and public housing. Furthermore, changed foreign investment regulations since the economic reforms which allowed expanded foreign capital inflow acted as an important factor of urban change in Vietnam.

Within such a framework of urban development, Nguyen (2015) contended that cyclical success and failures of urban development increasingly characterize today's Vietnam. According to the study, the successes come from the quick provision of large undeveloped land for major urban projects, which enabled potential residents to enjoy public services and urban amenities at reasonable costs. However, greater involvement of private sector into urban development was not without problem. For example, Labbé & Musil (2014) pointed out that the dependence on the private sector for infrastructure building caused several problems such as the unpredictable changes in approved projects as the public sector lacked control, deterioration of construction quality due to cost-cutting, and in the worst case where planned infrastructure projects came to a halt.

Tran (2015) argued that the fundamental alliance of developers, civil servants, and investors as beneficiaries of the development projects result in the incompetence of the public sector. This arguably causes problems of closed communities, disconnectedness, socio-spatial segregation, environmental issues, the division between the urban and the rural, and imbalanced infrastructures (Labbé & Musil, 2014; Labbé & Boudreau, 2015; Nguyen, 2015).

In respect to urban planning in Vietnam, previous literature focused on the problems of the formation and mis-use of urban space urban space association with the deficiencies in the planning system. Huynh (2015) contended that urban planning increasingly came a negotiating tool for accommodating investment doing the development process of Ho Chi Minh City since the 1990s. It was only in 2010 that the urban planning regulations had become established in Vietnam. However, the regulations which benchmarked the Russian model had also come under criticism due to the lack of consistency and flexibility of spatial plans, the uncertainty of procedures, and regulations that favor the developers (Matsumura et al., 2017). In the same research, the designation of special planning areas and incentive for FARs are mentioned as improvement measures, in addition to introducing an intermediary 1:5,000 or 1:2,000 Zoning Plan. Building upon previous knowledge, it is now necessary to analyze actual developed urban areas within the development and planning frameworks of Vietnam to comprehend how urban areas are transforming today.



Figure 15. Location of Nguyen Tat Thanh road and the five new developments in Danang (Modified based on Google Earth Pro by the authors).

2. Research Methods

The Study Area: Danang, Vietnam

Danang is a Vietnamese city developed around the Han River, covering an area of 1,285 km² of which 244 km² is urban land. The two districts located to the south of the Han River, Hai Chau and Thanh Khe, account for 13% of the urban areas where 40% of the city's urban population is concentrated⁸. This is because of the geographical

⁸ Population and area are derived from the data for 2016 of the General Statistics Office of Vietnam (www.gso.gov.vn), and the population by district is based on the data for 2012 of Database of Central Coastal Area in Vietnam (<http://duyenhaimientrung.vn>).

features of Danang where a highland region is located in the West and in a flat area to the East, with main urban infrastructures formed along the port of Danang. This was the biggest port in central Vietnam in the 19th century, and its urban area had expanded during the French colonial period in the early 20th century. In the period, the urban grid system was first began to be, and large-scale manufacturing facilities were built. In the 1930s, a new airport was constructed to the West of the Han River, by which a new residential area was developed between the airport and the river. Markets and public buildings formed along the river, eventually becoming the traditional urban center of Danang. However, during the Vietnam War (1959 - 1975), mass migration of wartime refugees had settled down into the city. Despite the presence of inadequate infrastructure, a large number of refugees flowed in the Thanh Khe district and the residential area uncontrollably extended to the coast. Refugees built small alleyways to allow traffic flow in the midst of the slum-like environment, which resulted in the development of a high-density informal urban fabric along the coastline (Tran et al., 2012).

Modern infrastructure came to replace the city's deteriorated roads and sewage system only after the Doi Moi through domestic and overseas investment. The Danang government led the provision of roads, electricity, and the sewage system while taking on land development projects to improve the living environments. As domestic and foreign capital allowed a concentrated development near the Han River and the eastern area of the coast, new roads were constructed to connect the East-West axis of the city. Outdated factories and houses

along the southern part of the road were removed, and uniformly subdivided lots were developed for housing development. Existing buildings were reconstructed, increasing the overall building density near the roadside, and large-scale land developments such as supermarkets and schools also increased. As a result, two main axes were formed in the city center. One is the southern axis along the Han River, and the other is the North-West axis along the Danang coast in avoidance of the spatial constraints imposed by the existing airport. Within this context, the Nguyen Tat Thanh road opened in 2003, becoming a catalyst to the Northwestern development connecting the Danang coast and inland. With the development, the existing road network and lot sizes dramatically increased along the road. The urban landscape changed as the non-urban areas transformed into sites of new land development, factories, and sites for tourism. As shown in the 2030-2050 urban master plan, the Danang government attempted to connect the highly-dense districts of Hai Chau and Than Khe district with the waterside, and continue its road development to the Northwestern area of the airport to promote land development, manufacturing and high-tech industry complexes.

Research Methods

Here, five areas were selected to study the development process, changes in the urban form, and the environmental qualities of the new areas that emerged after the 2003 opening of the Nguyen Tat Thanh road. Sites were selected based on the development entities – the

government, private sector, and foreign capital – and the respective project objectives. The first case consists of the existing residential area of Hai Chau district. In a strict sense, this is not an entirely new development, but an area which underwent structural changes during an urban regeneration process due to the newly provided infrastructure. The second case is the row house area which had been developed by the government in conjunction with the road, from which lots had been sold to and then developed by the private sector. The third case is a public housing site with a multi-family housing units. The development was subsidized by the government for low-income households. The fourth and fifth cases are the Futa New Town and Da Phuoc International New Town projects respectively. The projects are currently under construction and are funded by Vietnamese and foreign investors like Phuong Tran group and Daewon Cantavil. In aspiring to become a world-class New Town, the latter project has been in progress for the past ten years led by foreign capital (Figure 15).

The authors visited the study areas two times in 2016 – between 1 and 10 May, and between 22 and 30 September – for detailed site investigation and stakeholder interviews. The objectives of site investigation were twofold. One was to survey the building floors, the number of households and housing unit sizes in comparison to the plans that were received from the Urban Planning Department of the city prior to the visitation in order to accurately calculate the site area, road ratio, floor area ratio, building coverage ratio and population density⁹. The other aim was to understand the physical attributes and

⁹ To identify the resident population by case, the researcher multiplied the household

user activities of main amenities, including public and commercial facilities, the ground floor areas and streets by different time and days of the week. For the uncompleted two New Town projects, plans and drawings with dimensions were obtained from the projects' websites¹⁰ for investors. The research also conducted interviews with local residents regarding the use of newly created urban areas, which was assisted by two tourism major graduates from Danang University, Miss. Truong Thi Khanh Van and Pham Thi Thanh Thuy, for Vietnamese translation.

For stakeholder interviews, the master architect of the Urban Planning Institute of Danang was interviewed regarding the city vision represented in the urban master plan, and the issues and progress of each project. The approved documents for the construction of Futa New Town and public transportation plans were also obtained. Professor Tran Duc Quang and Dr. Nguyen Anh Tuan from the architecture department at Danang University of Technology were interviewed for the urban development approval and process of Danang, and the characteristics of public area usage including the street areas. As a private sector expert, Mr. Park Heehong, the local director of Daewon Cantavil – the developer of the Da Phuoc New Town – was interviewed on site. The

number by 4.84. In a previous study by researchers (Won et al., 2015) to investigate the neighborhood environment of the Thanh Khe district in Danang bay, the average family size of 400 households surveyed was 4.84.

¹⁰ Futa New Town Danang's master plan and drawings are downloaded from the following sites; <http://diaocdanang.net/san-giao-dich-bat-dong-san-cuong-hung-thinh/tin-tuc/tin-tuc-trang-c-hu/272/23/kdt-sinh-thai-bien-phuong-trang-vinh-da-nang-khu-do-thi-pho-bien-trung-tam-mien-trung-.html> And the latest development plan of Da Phuoc international new town is confirmed at the following site; <https://batdongsanexpress.vn/sunrise-bay-da-nang.html>

initiative and progress of the project, reasons behind the changes in the development plan, and the difficulties of an overseas project were inquired.

3. Results

Five cases of new development

The following section discusses the development process, urban form characteristics, and resident characteristics of the five new development sites.

1) Existing housing area (around K112 Tran Cao Van, Hai Chau)

The area was originally a slum where a large number of refugees settled down during the Vietnam War. In the beginning of 2000, the Danang government constructed the new road along the coast, and aimed to improve the residential environment by installing proper electricity and a sewage system. The area covers an area of 9.7ha, with urban characteristics described in Table 7. Because the area was developed along the coastline, the hodgepodge development of existing housing which invaded into the coastal areas had to be removed and make way for a new urban fabric. The first change was the laying of a 40 m-wide road, of which 20m was designated for vehicle access, and 10m on each side for pedestrian use. The irregular lots were transformed into uniform lots (125 m², 5 × 25). And a 5 m-width motor

Table 7. Summary of the existing housing area.

Time / Subject	• Early 2000s / Danang Government	
Block	Total area	• 97,090 m ²
	Land area	• 84,373 m ²
	Road area	• 12,717 m ² (13.1%)
	Driveway	• 3,069 m ² (3.2%)
	Sidewalk	• 7,868 m ² (9.9%)
Lots	Number	• Existing lots: 766 (including 14 unused lots) • Newly formed lots: 35 (including 6 undeveloped lots)
	Size	• Existing lots: various lot sizes • New lots: evenly divided into 125 m ² (5 × 25)
Building type	• Buildings of existing lots: elongated or atypical 1-4 story buildings, average 1.6 floors • Building of new lots: elongated form of high-rise buildings, average 6.2 floors	
Coverage / FAR	• 70% / 133%	
Number of household / Population	• 780 (80/ha) / 3,776 (389/ha)	
Features of planning	• Supply of wider and identical lots to meet tourism demand • Separated into new urban tissue and existing tissue based on newly formed 5 m wide road	
Characteristics of development	• Induction of urban regeneration by urban infrastructure such as electricity, water supply and sewerage supplied with new road development	

and pedestrian route had been created in between the new lots and the existing residential area as a back road (Figure 16). The existing average building height was 1.6 floors, however, buildings on the new lots were on average 6.2 floors, which were mostly big hotels or restaurants. Migrants with economic capability had moved into the new lots and started to run private businesses. Although some original

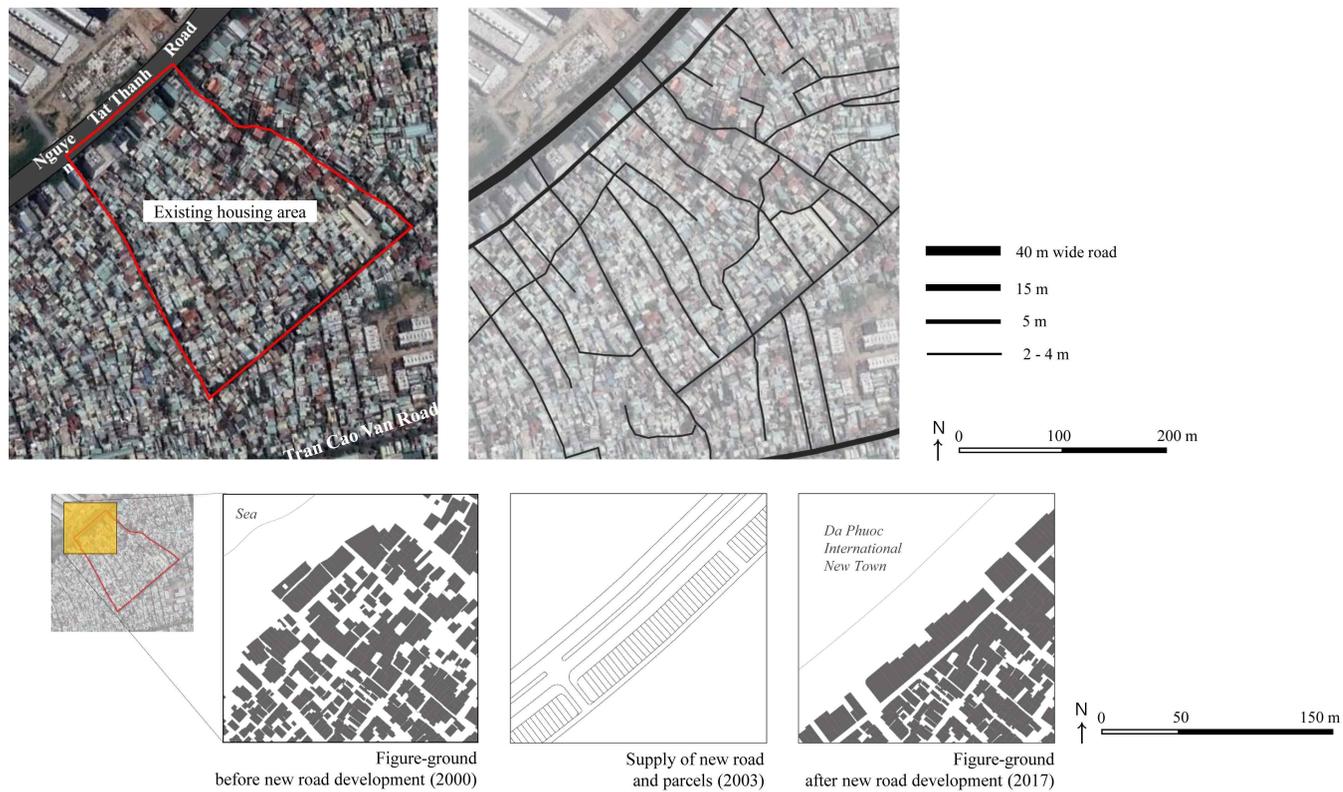


Figure 16. Survey area within the existing housing area (upper left); road network (upper right); figure-ground map of spatial changes after the new road and parcel development (lower).

Table 8. Summary of the row house area.

Time / Subject	• Early 2000s / Danang Government
Block	Total area • 163,797 m ²
	Land area • 106,192 m ²
	Road area • 57,605 m ² (35.1%)
	Driveway • 35,221 m ² (21.5%)
	Sidewalk • 22,384 m ² (13.6%)
Lots	Number • 989 (including 4 undeveloped lots)
	Size • 120 m ² (5 × 24), 70 m ² (5 × 14)
Building type	• 1 - 4 story row houses, average 1.9 floors
Coverage / FAR	• 91% / 178%
Number of household / Population	• 941 (58/ha) / 4,555 (278/ha)
Features of planning	<ul style="list-style-type: none"> • Grid network by vertical and horizontal roads • Place childcare facilities and schools for public services placed inside the block • Comprised of small blocks consisting of two rows of lots
Characteristics of development	<ul style="list-style-type: none"> • Homogeneous urban typology • Enhanced communities around internal roads

residents were relocated after the developments, most of them continued to stay due to the benefits of increased mobility and easier access to their workplaces (Won & Kim, 2017). Hence, in the aftermath of the new road construction, new large-scale buildings had been built, and in the existing areas, building expansion and reconstruction had been apparent, increasing floor area ratio and population density. The population density was found to be up to three times higher than the average of Hai Chau district (129/ha¹¹) at 389/ha.

¹¹ The overall population density of Hai Chau district is 88/ha, however, the research calculated the population density by excluding the airport area and the reclaimed site which covers a large area but have very small population.

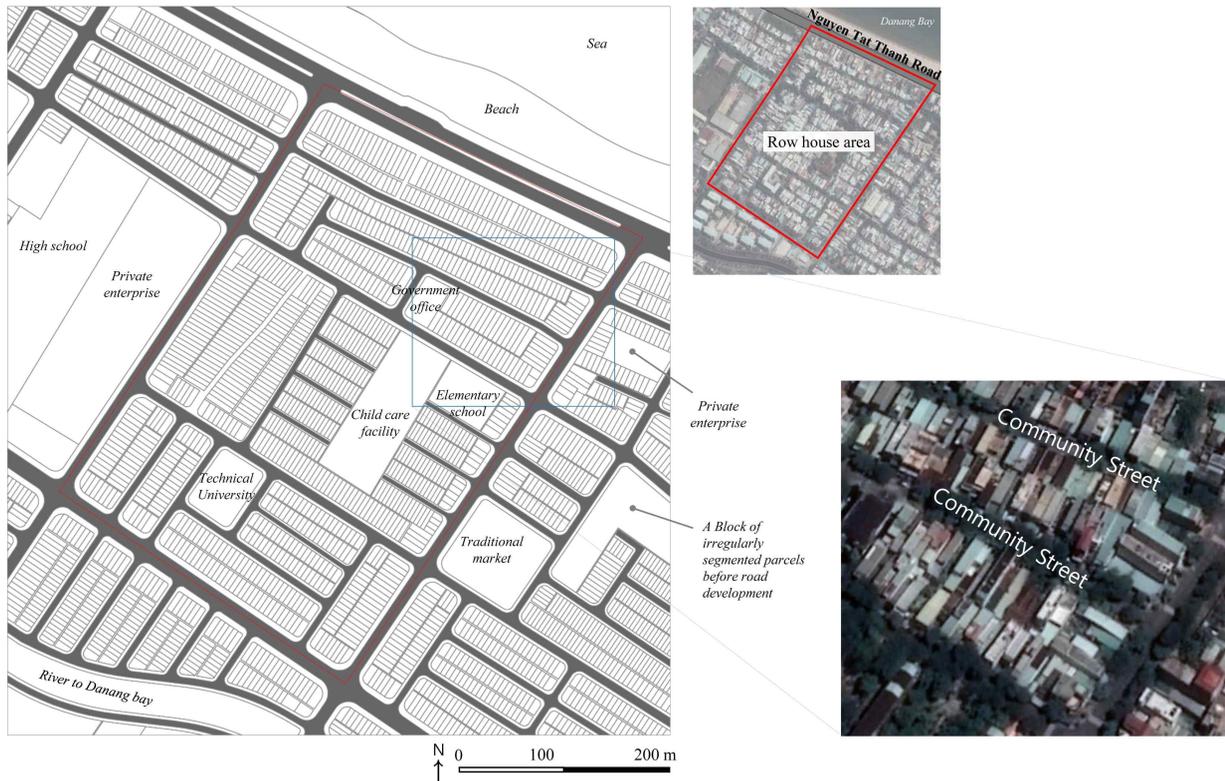


Figure 17. Urban grid of the row house area and blocks consisting of two rows of lots.

2) Row house area (around Phan Phu Tien, Lien Chieu)

This area, 5.5 km away from the city center, used to be a non-urban area with a mix of farmlands and poor houses. The Danang government developed lots for housing in conjunction with the construction of the new road, by which 96% has already been developed. A 21 m-width road was situated every 300–400m on the North-South axis, with 11m-width streets linking the inner parts of Danang with the Row house area. Two rows of uniform lots, with an area of 70 m² (5 × 14) or 120 m² (5 × 24), were formed in the urban blocks along the new road. and Public facilities including child care centers and schools were located within the blocks (Table 8, Figure 17). Apart from a number of houses adjacent to the coast, most buildings were one to four floors high, with an average of 1.9 floors. There was a high usage of the internal streets on the East-West axis where lots faced each other, with building entrances being used as resting or working space.

3) Public housing (around Xuan Thieu 1, Lien Chieu)

Adequate housing supply for low-income households became critical social issue in the process of rapid urbanization in Danang. This multi-family housing estate was developed in 2011 as part of the public housing program proposed by the Danang government. It is located on the Western edge of the new road, which is 12 km away from the city center. The site includes apartment buildings of 7 floors, which is a relatively new building typology in the area. There are five identical blocks (72 × 18 m) with two motorcycle parking areas (Figure 18). Each

Table 9. Summary of the public housing estate.

Time / Subject	• 2011 / Danang Government
Block	Total area • 24,200 m ²
	Land area • 20,173 m ²
	Road area 4,027 m ² (16.6%)
	Driveway 1,970 m ² (8.1%)
	Sidewalk 2,057 m ² (8.5%)
Building	• 7 story buildings of 1,296 m ² (72 × 18), Five buildings
Household	• 62 m ² (7.8 × 8), 16 households in each floor
Coverage / FAR	• 39% / 224%
Number of household / Population	• 545 (227/ha) / 2,637 (1,099/ha)
Features of planning	• Two motorcycle parking lots and gardens in the outdoor space • First floor space allocated for operating convenience facilities
Characteristics of development	• Introducing of an apartment type completely different from surrounding residential forms

floor houses 16 units (individual unit size 62 m²) facing one another along an internal corridor, and has a staircase and an elevator. The building coverage ratio is only 39%, allowing for a large open space within the block in comparison to other areas where the building coverage ratio is sometimes as high as 70%. On the other hand, the floor area ratio is considerably high at about 224%, and the housing density is 227/ha, which is three times higher than the nearby areas and four times higher than the average row house area (Table 9). Current residents mostly had lost their homes in the urbanization process, or were living in poor conditions in illegal settlements. Other residents include those who are disabled or of old age who need subsidized housing.



Figure 18. Urban grid of the row house area and blocks consisting of two rows of lots.

4) Futa New Town Danang (around Nguyen Sinh Sac, Lien Chieu)

In 2000, the Danang government established the Urban Spatial Plan for 2020 and designated a number of sub-centers to alleviate the effects of overly intense migration into the city center, Futa was one of the newly planned towns for a sub-center in the city. In 2006, a Vietnamese real estate developer called the Phuong Trang group invested USD 39 million and started to develop a site of 114ha. As of now, the site has been prepared with the development of internal streets, and individual lots are being sold. Examining the plans, the percentage of the road area in terms of land-use accounts for about 44%, which is relatively higher than other typical Row house area.

Table 10. Summary of Futa New Town Danang.

Time / Subject	• 2006 - / Phuong Trang Group (Vietnam)
Total	• 1,142,200 m ²
Area	Land • 643,800 m ²
	Road • 503,900 m ² (44.1%)
Building type	• 2 - 6 story row houses, 3 story villas, high-rise buildings
Size of lots	• 120, 140, 408 m ² (5 × 24, 7 × 20, 17 × 24) for row houses
	• 360 m ² (15 × 24) for villas
Coverage / FAR	• 72% / 191%
Features of planning	• 60 m wide vertical road connecting the Nguyen Tat Thanh road
	• Luxury accommodations, villas and supermarket layouts near the waterfront
	• Linear open spaces called a flower garden
Characteristics of development	• Considering the role of the subcenter, placed commercial and business facilities in the center
	• Increase of public spaces including a large park in the neighborhood

Note: Projected population of this project was not known. To calculate the coverage and FAR, the area of 'Zone A' shown in Figure 19 was calculated.

According to the interviews, the difference is due to the 60 m wide roads on the vertical axis, in preparation for future transportation loads including increased public transportation. Similar to other cases, coastal areas were preserved for high-end accommodation, and areas around the main intersection were planned as large blocks for office and commercial facilities. Apart from the five child care and educational facilities scattered around the site, blocks are divided into various-sized lots along a grid structure (Table 10, Figure 19). However, the

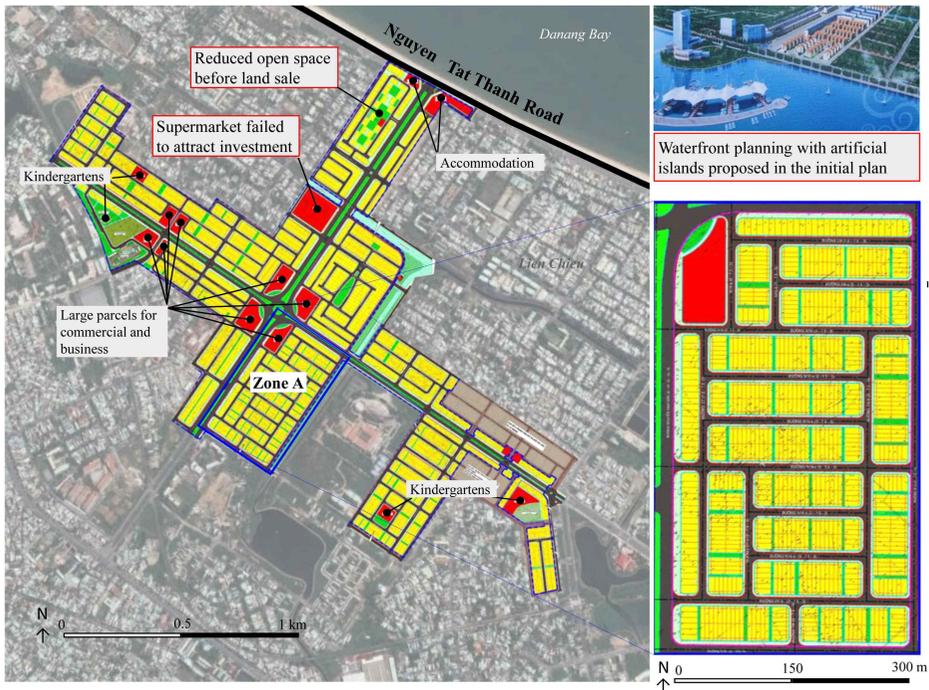


Figure 19. Final approved plan of Futa New Town (left); initial proposal of waterfront which was canceled due to lack of feasibility (upper right); typical housing block and land division with linear open space called flower garden (lower right).

completion of this project is facing difficulties due to the frequent changes associated with plan making. First, the issue of properly compensating the original residents led to the reduction in the site area and the overall delay of the project. Initially, the site area was 147ha, but was reduced by 22% due to the lack of funds for compensation. In addition, the initial plans for an 8ha artificial island with a marina, a large supermarket, and a hospital were canceled due to lack of feasibility.

5) Da Phuoc International New Town (Khu Do Thi Da Phuoc, Hai Chau)

The New Town project site is located only 2 km away from the Danang CBD, and is a large-scale urban development project planned on top of a 189ha of reclaimed land. A Korean company called Daewon Cantavil led the project between 2007 and early 2016, then was overtaken by a Vietnamese company called Novaland. The initiative had started with the construction of the Nguyen Tat Thanh road in early 2000. The government then aimed for an innovative urban design for a reclaimed site, which will successfully brand the entire city. Vietnamese, Chinese and Korean companies had proposed plans, of which the concept of a ‘D - City’ by a Korean company Daewon Cantavil was selected. This plan included a luxury golf course, high-rise hotels and high-end housing. The investment was worth USD 250 million – the largest amount of FDI invested in a single project in Danang. The first phase of the landfill was completed from 2008 until 2010, which accounted for half of the total site area. During this time, the plan for the golf course was canceled, and the luxury apartments lining the coast were moved to another location. The government requested a coastal road instead for the area to be easily accessed by a wide range of population. Therefore, plans were changed and the project was stalled for a number of years due to the dampened global real estate market. In 2015, a revised master plan was proposed (Table 11). In this revised plan, the number of high-rise apartments was significantly reduced, whereas the number of the more readily salable row houses and shophouses were increased. However,

Table 11. Change to the masterplan for the development of Da Phuoc International New Town.

	Initial plan	Modified plan	New plan
Time	• 2007 - 2017	• 2015 - 2025	• 2017 -
Project name	• D - City	• D - City	• The Sunrise Bay
Subject	• Daewon Cantavil (S. Korea)	• Daewon Cantavil (S. Korea)	• Novaland group (Vietnam)
Area	• 223ha	• 223ha	• 189ha
Designers	• HAEAHN	• HAEAHN + Local partners	• Safdie Architecture, Aedas, and EDAS
Planned population	• 40,000 (191/ha)	• 43,000 (203/ha)	-
Building type	<ul style="list-style-type: none"> • 8 - 60 story apartments • 2 - 3 story villas 	<ul style="list-style-type: none"> • 8 - 42 story apartments • 2 - 6 story row houses • 2 - 4 story villas 	<ul style="list-style-type: none"> • 4 - 6 story row houses • 3 - 4 story villas • High-rise buildings
Coverage	<ul style="list-style-type: none"> • 40% in the block with apartments • 25% in the block with villas 	<ul style="list-style-type: none"> • 40% in the block with apartments • 60% in the block with row houses • 40% in the block with villas 	<ul style="list-style-type: none"> • 40-60% in the block with row houses • 30% in the block with villas
FAR	<ul style="list-style-type: none"> • 200 - 500% in the block with apartments • 60% in the block with villas 	<ul style="list-style-type: none"> • 200 - 400% in the block with apartments • 100% in the block with row houses • 100% in the block with villas 	<ul style="list-style-type: none"> • 115% in the block with row houses • 100% in the block with villas
Lot's size	-	<ul style="list-style-type: none"> • 126, 198 m² (7, 11 × 18) for row houses • 247 m² (13 × 19) for villas 	<ul style="list-style-type: none"> • 80, 90, 100, 108 m² (5 × 16, 18, 20), (6 × 18) for row houses • 150, 160, 200, 300 m² • (7.5, 8, 10, 15 × 20) for villas

Features of planning	<ul style="list-style-type: none"> • Golf course (82ha) • Waterway (2.2 km) • Luxury hotels, resorts, international convention centers, and marinas • A large shopping area • International school • High-rise apartment-type residential 	<ul style="list-style-type: none"> • Cancellation of golf course and waterway construction • Change to grid-type road network • A big city park (7 ha) • A large hospital • Decrease of high-rise apartments and increase of row houses 	<ul style="list-style-type: none"> • Linear green network (20ha) instead of wide park • Compromised road network with lattice type and radial type • Entertainment-enhanced shopping spaces • Luxury row houses and villas instead of high-rise apartment
Characteristics of development	<ul style="list-style-type: none"> • Increase in land area through reclamation project (the first case in new town development of Vietnam) • High-rise apartment building on the coast as a landmark for branding the city 	<ul style="list-style-type: none"> • Placement of clustered apartments on a road network • Designing roads on the coast to enhance accessibility from the outside 	<ul style="list-style-type: none"> • Low density and low coverage rate inherited from existing urban organization • The largest proportion of open spaces in new towns of Vietnam • Marketing the place with a unique type of architecture designed by world-class architects

due to frequent changes made to the plan with the burden of having to build infrastructure and the delay in project, the Korean company sold the development rights to a Vietnamese company. The new master plan known as ‘The Sunrise Bay’ has the following characteristics. First, a block which compromises the grid and the radial structure is proposed in relation to the undulating coastline, and the main building types are



Figure 20. Changes made to the Da Phuoc International New Town master plan, and neighborhood design with reinforced community space and green network.

row houses, shophouses and villas which have low building area ratio and floor area ratio. Second, 10% of the total area is proposed as a linear green network, and the waterfront area is easily accessible by neighborhoods nearby (Figure 20). Third, as a means of place marketing, unique architectural designs are proposed to attract investors. Well-known architectural firms such as Safdie Architecture and Aedas will be designing major buildings.

The characteristics of the new development projects near the Nguyen Tat Thanh road

1) Increased area of road and open space in relation to neighborhood planning

The development of Nguyen Tat Thanh road allowed for various urban development projects in response to the rapid urbanization. Despite potential problems of overcrowding due to the geographical and infrastructural constraints, positive aspects were found. Planning efforts to improve the quality of neighborhood had been consistently reflected in the spatial designs. In this process, the quality of roads and open spaces had been significantly increased.

The row house, being the typical housing type in Danang, was found in similar forms in the Row house area, Futa New Town, and Da Phuoc New Town. But the typology evolved progressively in respect to the demand of each neighborhood environment. First, although row houses were commonly built in Danang prior to 2000, few urban blocks with uniform lot size were to be found unlike the Row house area investigated in the study. Because the transportation system and land-use patterns were comprehensively planned in the area, three planning aspects made it differed from other areas. First, as a site where the principles of neighborhood unit planning were introduced, schools and childcare facilities were situated within the urban blocks to improve accessibility. This compares to schools in other areas where they are located along main roads. Second, as part of community planning, large blocks were divided into two rows of lots with narrow street frontage, in order to encourage social activities along the shared roads. Half of the 8-11 m wide roads were used as routes for both pedestrians and vehicles, while the rest of the road being used as

privatized space by the residents of adjacent buildings, which served as a vibrant community street (Figure 17). Lastly, road areas were adequately provided for in comparison to existing urban environments. In existing housing areas, roadways increased to 3.2%, amounting to 13.1% of the total land-use (Table 7). In contrast, roadways in the Row house area reached 35.1% (vehicle traffic 21.5%; pedestrian 13.6%), almost three times higher than existing areas, while the development conditions remained similar with a development density of 115% and building coverage ratio of 59.2% (Table 8). This was possible due to the lower density plan aimed for a population density of 278/ha – approximately 70% of existing areas – and housing lots of 60/ha.

Futa New Town, initially planned to alleviate intense migration into the city center, shared similar urban form attributes with the Row house area, but in order to function as a sub-center and adapt to future changes, roadway had been increased to 44.1% of land-use with larger and more diversified lot sizes. The most prominent characteristic was the effort to tackle into the problem of the lack public space within housing blocks. For example, depending on the housing block size, one to four linear green spaces (2.5~10 × 50 m) known as the ‘Flower gardens’ were inserted in each block. In addition, a 3.7ha open area was also included in the land-use plan (Figure 19). Furthermore, efforts to vitalize pedestrian and community activities were notable in Da Phuoc New Town. Using two rows of lots as a small urban block for the basis of constructing row houses is similar to existing practices; however, there are a number of differences as well. In other areas, the

spaces between the back of housing buildings used to be left as dead spaces. However, in this area, the in-between spaces were designed as promenades or green spaces, and had been enlarged accordingly for pedestrian activities while vehicle access is not allowed. Another characteristic is that community-centered areas with sports or commercial facilities were located within the pedestrian zones in order to create a pedestrian-friendly neighborhood environment (Figure 20).

Alternatives to high-density row houses were made, as illustrated by some public housing development project. A high-rise complex – a housing typology which had not existed in this area – with the provision of large open space and parking areas. Also, in the initial modifications of the Da Phuoc New Town plan, clustered high-rise mixed-developments intended to provide large outdoor areas as well (Figure 20). Based on the interviews, the developer of Daewon Cantavil considered that in the long run these high-rises would not only become landmarks of the area, but would adequately accommodate for a population of 40,000 and a floating population of 30,000.

2) Inept planning and the misuse of the master plan to attract investment

Urban areas were formed as a result of rapid infrastructure expansion. However, inept spatial planning and the misuse of the master plan led to the deterioration of urban space quality. Huynh (2015) reprimanded the irrationality of Vietnamese urban planning, which was in part confirmed in this research. The most notable problem was the disuse of certain areas such as the pedestrian spaces

in the existing housing area near Nguyen Tat Thanh road, and the outdoor areas of the public housing estate. The new road not only provided a vehicular route but also a 10 m wide walkway. Although privatization of streets is closely related to urban vitality (Kim, 2012), in order to regulate excessive privatization, the Danang government designated a pedestrian-only route of width 1.5 - 2 m on the roadside. This was considered one of the feasible efforts to create a pedestrian-friendly urban environment. However, even considering that pedestrian activities are generally low due to high motorcycle usage, these areas inherited difficult conditions for comfortable walking because of high heat and humidity throughout the day (Figure 21). Furthermore, the shops along the road are large-scale commercial facilities, which are not often used by the residents, and because the privatized areas are either used for motorcycle parking or laying out tables, it makes it very difficult for pedestrians to walk through. In addition, because the pedestrian zone is not properly managed, these areas are left deteriorated with missing paving blocks and dumped garbage. In terms of the public housing estate, despite ensuring a large outdoor area through considerably lower building coverage ratio, it was actually not being used actively. Residents did not use the space because the concrete-finished ground became extremely hot throughout the day, which became useful for merely drying fruits or vegetables. With the disuse of the outdoor space, the entrance of the buildings or the narrow internal corridors were used for resting or parking motorcycles. However, in the Row house area, contrastingly, there was overuse of the provided infrastructure leading towards a degraded



Figure 21. Impaired roadside of Nguyen Tat Thanh (upper left); disused outdoor space in the public housing estate (lower left); excessively privatized street in the row house area (right).

urban environment. The 3 m - wide street in front of the lots was excessively privatized where residents had gone beyond parking and commercial uses, removing parts of the pavement blocks to privately plant or installing permanent concrete structures. The active use of the ground floor due to privatization was an attractive aspect of the area, but the public purposes of the space had been completely lost (Figure 21).

Public housing development had also exacerbated spatial segregation of the lower-income households. Despite the project objectives of providing social welfare, segregation rising from the location and the building type characteristics were predictable. Because the site is located

at the very end of the road development, with a railroad on its side, access to the city center is constricted (Figure 15). Considering that city connections and accessibility is crucial for lower-income households (Cervero, 2013), the failure to ensure sites closer to the city for the public housing project, and instead selling it off to private investors, was found to be a drawback by the government. Second, introducing a high-rise housing typology without considering that residents are primarily used to row houses compounded to the problems of low housing environment quality. Also, living in the estate had only reinforced the stigmatization of being economically marginalized. On the other end of the spectrum, problems of a gated community are probable in Da Phuoc New Town. Luxury villas and townhouses occupy most of the newly created coastal area, making it difficult for other residents to use coastal amenities, which are a public good. This contrasts from the emphasis on public qualities of these coastal areas in the first and initially modified plans. In particular, a coastal road had been planned by the strong request of the local government, but this has been lost in the final modification of the plan (Figure 20).

The biggest problem of the two New Town projects is that the master plan is being misused as a means of attracting real estate investment. The projects had undergone without fully understanding the demands or evaluating its feasibility, and had been delayed due to the numerous changes to the plan in the negotiation process between the government and the developers. In Futa New Town, establishing the site and approving the master plan took ten years because the project proceeded without a proper evaluation of demands or migration plans.

A more serious problem is that the canceled plans due to lack of business viability are still being used to recruit new investors, by which the eventual plans are different from the approved ones. For example, the canceled coastal waterside plan is still being used to attract investors, and lots within the block where a 1.74ha supermarket and open space was planned but failed to find investment, are being sold. Despite the ambitious plans for creating a sub-center to Danang, Vietnamese experts have expressed doubts on how this area would function in relation to the city center, and in this process, major projects are being canceled while lots are irresponsibly sold.

Da Phuoc New Town is also experiencing difficulties, where over the ten years of development only 47% of the site is completed, and is only now recruiting individual investors. Daewon Cantavil, the previous developer, expressed concerns over the uncertain work scope of the private developer explaining it as the reason why development rights had been transferred to a Vietnamese company. For example, the roles of the public and private were not set out clearly from the beginning of the project, and the government had requested the developer to build and manage the sewage system for the New Town. The scope of work changed unpredictably throughout the project delaying the whole process, and increasing business risks. Afterwards, the newly appointed Vietnamese developer had created a completely new master plan, and investors are being recruited based on this. In addition, the high-rise apartments that were the winning element of the previous developer, which had been approved by the government in hopes for branding the city, is also criticized for ill-considering the housing culture and income

levels of the area. The first plan proposed mostly luxury apartments for a population of 40,000 which is hardly relevant to a city of total population 970,000 with an income per capita 1,900 USD, living in low-rise row houses or shophouses.

3) Shaded paths: Street vitalization and the formation of community street

People adapted spaces to their needs in midst of the success and failures of urban development projects. As it is widely known, different people use street sides in Vietnam for various purposes throughout the day (Drummond, 2000; Kim, 2012), and outdoor activities are closely related to thermal comfort (Hart & Sailor, 2009; Huang et al., 2015; Johansson & Emmanuel, 2006), which was easily identified on the site as well. Especially, shaded paths that are created deliberately or by chance provided important opportunities for street vitalization, and the active use by pedestrians and cyclists. This was apparent in the existing housing area. Route [a] in Figure 22 is a newly formed 10 m-wide street. 8 m of the street adjacent to the building is used for commercial activities and parking by the building owner, with the rest of the 2 m used by pedestrians. Because of the shades either formed by trees or installed by building owners, the 8 m area is used by restaurants and cafés. In particular, the large lots provided in this area had allowed for the formation of various amenities such as hotels, large restaurants and cafes, which enliven the area especially after 5PM. However, because most users travel by motorcycle and need to park in front of the buildings, there is hardly any pedestrian activity in the 2 m-width

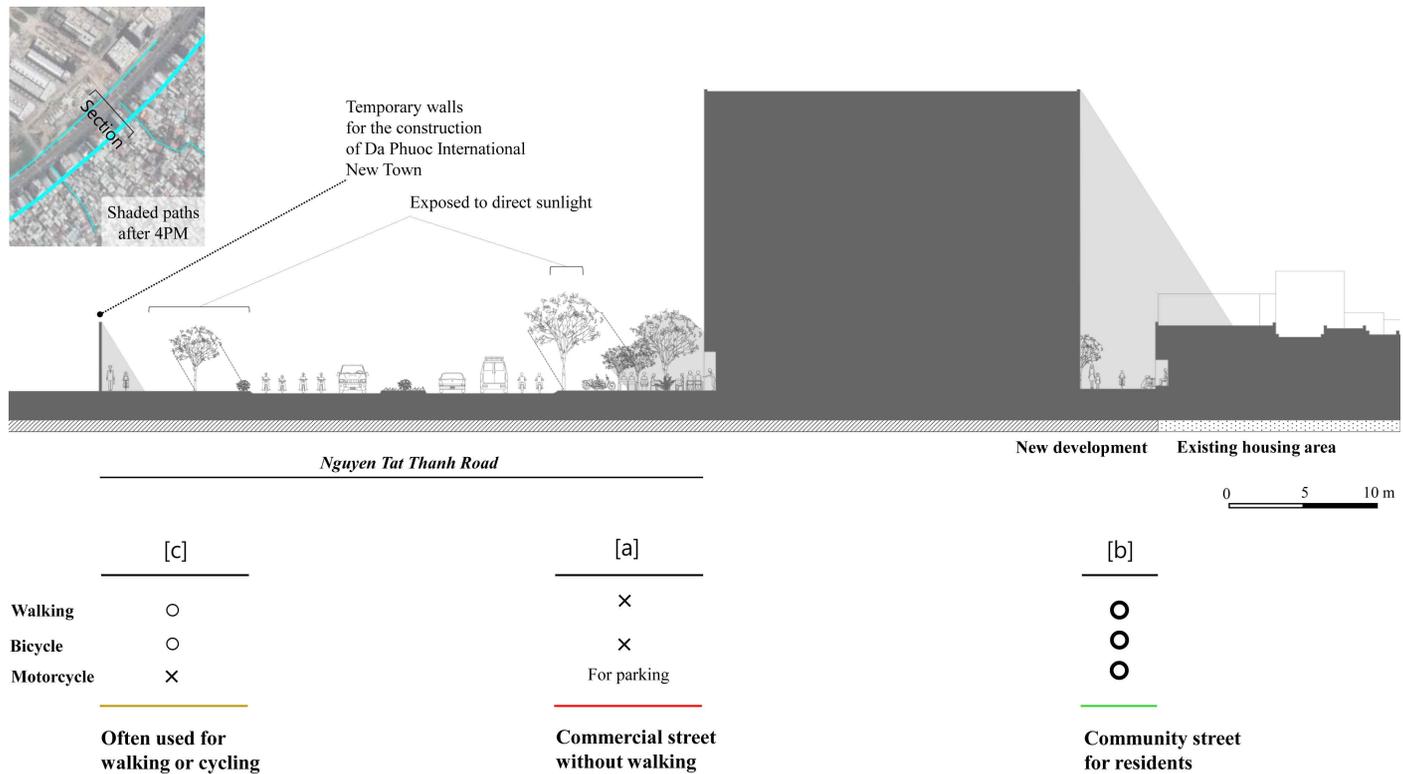


Figure 22. Pedestrian, cycling, and motorcycle activities along the shaded paths formed by artificial structures, sidewalk trees, and buildings (usually before noon and after 4PM).

street. Furthermore, the pedestrian routes are exposed to direct sunlight which discourages usage, hence, despite the high residential density, there are hardly people who use these streets. Therefore, the streetscape is unique in that it is active yet devoid of pedestrian activities. Section [b] is a pedestrian-vehicle route formed along with the new road development, which played an important role as a community street due to the shades provided by the newly constructed high-rise buildings and existing buildings. Various uses and activities were observed during the daytime until 4PM when shades formed. The most prominent feature was that everyday pedestrian activities and cycling co-existed in these streets. It is known that there is a lack of pedestrian and cycling activities in Vietnam due to the motorcycle-oriented transportation culture (Bertaud, 2011; Hansen, 2017; Truitt, 2008), however, this area was notable because not only pedestrian activities were found, certain areas were used as play areas. For example, this street was a shopping route, a leisurely walkway, a cycling route for school children and a play area. Hence, the 5 m-width street was mostly used for movement with the exception of the 0.5 - 1 m width segment being used for private use. As the resident use increased, small-scale commercial facilities and amenities such as restaurants and shops started to form along the street making it an active community street. Additionally, the road adjacent to Da Phuoc New Town, section [c], was observed to be used in late afternoon or weekends for leisurely walks and cycling due to the shades formed by the high construction site barriers. In short, for high street activities in these areas, apart from the well-known conditions such as high density,

good design, diversity (Cervero & Kockelman, 1997), mixed-use and the presence of retail (Ozbil et al., 2011), a certain length of shaded path is necessary.

4. Discussion

In the effort to brand Danang as a world-class tourist city as well as an environmentally friendly industrial city, the new road development had prevented uncontrolled sprawling to the coastal area, and formed a development axis for future urban expansion. In this process diverse urban forms and designs were attempted, however, rather than implementing innovative design solutions, existing urban forms had slowly adapted to new conditions. This research investigated five newly developed areas along the new road to understand the pros and cons of these changes. As a result, in response to alleviating high-density development, design efforts to qualitatively improve the neighborhood environment through increased road and open spaces were identified. On the other hand, due to inept spatial planning, certain areas were either disused or excessively used causing deterioration. Also, master plans were misused to attract investments, hence were often changed, causing time, cost and administrative efforts (Table 12). The most important characteristic of urban space use in midst of the success and failures of the changes is the active use of shaded paths, which is related to active street environments and the formation of community

Table 12. The success and failure of the new developments.

Cases	Goal	Execution	Positive	Negative
Existing housing area	<ul style="list-style-type: none"> Improvement of residential environment 	<ul style="list-style-type: none"> Supply of urban infrastructure 	<ul style="list-style-type: none"> Induction of urban regeneration 	<ul style="list-style-type: none"> Rapid erosion of public space due to disuse
Row house area	<ul style="list-style-type: none"> Urbanization in non-urban areas near the city center 	<ul style="list-style-type: none"> Development of residential land with good marketability 	<ul style="list-style-type: none"> Quick formation of homogeneous residential areas 	<ul style="list-style-type: none"> Excessive privatization of the public space
Public housing	<ul style="list-style-type: none"> Housing supply for the vulnerable 	<ul style="list-style-type: none"> Construction of an apartment complex 	<ul style="list-style-type: none"> Introduction of new housing types 	<ul style="list-style-type: none"> Class segregation reinforcement and unused outdoor space
Futa New Town Danang	<ul style="list-style-type: none"> Development of subcenter 	<ul style="list-style-type: none"> New town development by private capital 	<ul style="list-style-type: none"> Design of neighborhood environment with broader public space 	<ul style="list-style-type: none"> Misuse of masterplan for investment
Da Phuoc International New Town	<ul style="list-style-type: none"> Creating an international level urban space for city branding 	<ul style="list-style-type: none"> New town development by foreign and private capital 	<ul style="list-style-type: none"> Design of walk-friendly neighborhood environment considering community 	<ul style="list-style-type: none"> Waste of time and administration due to frequent changes of plan

st

streets even if pedestrian activities are low.

The urban design and policy implications of the results are as follows. In terms of urban design, it is important to predict street usage in the newly formed urban spaces and reflect these findings in future designs. Although efforts were made to create good urban environments, infrastructure and urban development projects undertaken without the understanding of the housing and street activity culture eventually worsened the urban space qualities. In this respect, new housing typologies should be noted such as that proposed by Rockwood & Tran (2016) which combines the elements of a typical row house with multi-family housing. Another urban development project in Son Tra district, known as the 'Nest Home' also provides an alternative where a multi-family housing incorporates commercial facilities on the lower floors and direct access to housing from the ground floor, which are advantages of the row house typology. Furthermore, it is important to incorporate shaded paths into spatial planning to encourage public space use. Shaded paths integrate sustainable transportation, passive solar design, and greening which are elements closely related to sustainability in urban design (Jabareen, 2006). Just as individuals plant trees or install shades in front of their houses, natural and artificial shading is required on an urban design scale, as well as efforts to utilize shaded areas which matches local characteristics. This is important because neighborhood and public transportation system need to be connected on an urban design scale (Kutani et al., 2015) to tackle the problems of air pollution and energy consumption due to excessive use of motorcycles (Dhondt et al., 2011; Ostojic et al., 2013). Currently, the

government is trying to introduce new transportation systems such as the Bus Rapid Transit, of which its success would partly rely on efficient and pleasant pedestrian routes from neighborhoods to bus stations.

In terms of policy, a clear designation of public and private sector roles is required to implement transparent and efficient urban development projects. In the negotiation process, interests of the existing and future residents could be overlooked in pursuit of the respective benefits of the public and private sector, and the government may not be able to demonstrate strong leadership in the situation where the private sector bears a large part in providing infrastructures (Nguyen, 2015; Tran, 2015). Furthermore, experts have pointed out that the lack of public resources and urban professionals are the biggest constraint of urban development projects in Danang. Therefore, for the government to take stronger leadership without wasting human resources and capital, an administrative process which clarifies the roles of the two entities, and ensures efficient progress is needed. A clear vision and capability to lead a project by the government are extremely important where most economic developments are supported by FDI, and the efficient use of domestic and foreign capital in urban projects need to be ensured.

Last, the research is limited where two of the five projects are not yet completed but are in the construction process. Nonetheless, the problems identified in the process of the projects carry strong implications for rapidly urbanizing areas in the developing world.

Acknowledgments

This work was supported by the BK21 Plus Project in 2017 (Seoul National University Interdisciplinary Program in Landscape Architecture, Global leadership program towards innovative green infrastructure).

Conclusion

Urban infrastructure expansion as a result of new road development precipitated in-migration and drastically changed the urban landscape. This brought about an improved quality of life for those living in the proximity of the road development through better public areas, increased income, and improved mobility. To obtain a finer understanding of how the road affected the neighborhoods, this research interviewed 460 building owners, conducted stakeholder interviews, observed spatial use and user behavior, and examined urban development case studies. Based on the specific aims of the research, the following conclusions were derived.

The first chapter confirmed that the Danang coastal road development affected the residents' socioeconomic condition such as their occupation and income, and also transformed the physical environment. Road development was closely related to the increase in building floors, the number of mixed-use developments, household income, and changes in occupation. Furthermore, depending on the community, the effects of the road development manifested in different ways. Migrants mostly settled near the large lots adjacent to the new road in order to capitalize land and ran comparatively large businesses which contributed to an income five times higher than the original residents. The indigenous population remained in their original areas to benefit from the new road development while making small changes on a lot basis to adapt to the new urban environment and actively re-use space.

The second chapter identified that improved mobility due to the road development had different impacts on people's travel patterns and use of space. Wider access to the job market was particularly pertinent among the original residents who traveled more than twice the distance of migrants to their workplaces. On the other hand, migrants traveled further to diverse destinations in order to enjoy shopping and leisure activities. Such travel patterns were subsequently closely related to space utilization. Original residents who enjoyed shopping and leisure near their place of residence used small-scale outdoor spaces as places of rest or co-work with neighbors, while migrants who mostly owned large hotels or restaurants brought active commercial activities into the streets.

Last, the third chapter discusses the key urban morphological changes in the aftermath of the road development by examining five development case studies. Despite the genuine attempt to introduce new housing types such as high-rise apartments, the conventional row house, which has a comparatively higher building coverage ratio and lower floor area ratio, had evolved to better accommodate everyday purposes. On the other hand, although plans for large urban projects were being canceled due to miscalculation of business feasibility, they were still promoted and misused to attract real estate investments. Moreover, urban space quality declined as public spaces were either disused or excessively used, and also due to the problems of ambiguous roles of the private and public sector in large development projects.

Upon this, the research has the following implications. First, this study is an empirical examination of the effectiveness of public goods.

Road development largely impacts people's jobs, income, lifestyle, use of space, and the physical environment. Once constructed it is difficult to remedy a situation when problems arise afterward, and improvements may require immense time, cost and manpower. If the negative impacts of a road development could be predicted from the outset, this would contribute to the fair distribution of the development benefits among various stakeholders on a local- and neighborhood-level, and allow for refined urban policies which ensure efficient use of urban space. In the study area, whether someone lived close to the new road development or not often determined the level of income. Also, the differences in commuting method and traveling distances adversely affected the original residents more in terms of their safety and state of health. Even more pending was the problems of deserted public areas, and the socio-spatial segregation of low-income public housing which was located far off from the main city area.

Second, urban environments need to be created on the basis of community needs in order to establish 'good cities.' Diverse yet unverified urban master plans are rapidly being introduced and implemented in the developing world. There are drawbacks in these projects as they are mostly large-scale developments run by a small number of companies. Under unstable political and economic conditions, these projects often come to a halt, fail to sell, or face unpredictable changes in the master plan. Moreover, the public sector often loses control over the private sector as they heavily rely on the private sector to build the urban infrastructures. In this process, community sustainability is threatened where the opinions of residents are

overlooked, and old but important urban structures are destroyed. To minimize such shortcomings and create good urban environments, planning which reflects people-oriented spatial use based on community needs is required, especially in the process of establishing urban master plans and large urban projects. Sustainable and just cities in the developing world rely on the understanding of how people use public and private space, how they make a living, and foreseeing the changes that the new development would bring to the people and the physical environment.

Third, where the public sector lacks funds and human resources in implementing an urban project, a system which ensures the public sector to provide a clear project vision and clarified roles of the public and private sector is all the more important. Many untested urban projects are simultaneously being undertaken in the developing world. Because private developers are responsible for much of the urban infrastructure development, the public sector often loses control over the project and plans frequently change. Under such process, there is also a high possibility of corruption as developers, local government officials, and investors are closely related. This not only results in the waste of time and administrative efforts but leads to a serious decline in the urban environment in terms of public goods and services.

Although this research is limited to studying just one city from the developing world, it provides invaluable evidence regarding the effects of development and its problems to various other cities in the emerging economies where good cities are strived for in midst of rapid change and limited resources.

ACKNOWLEDGEMENT

1. This work was supported by the BK21 Plus Project in 2013 - 17 (Seoul National University Interdisciplinary Program in Landscape Architecture, Global leadership program towards innovative green infrastructure).
2. This research has been supported by 2017 Seoul National University Asia Center (SNUAC) Dissertation Writing Fellowship Program.

REFERENCES

- Adams, J. S., & Vandrasek, B. J. (2007). Transportation as catalyst for community economic development. Center for Transportation Studies, University of Minnesota, Minneapolis. Retrieved from <http://hdl.handle.net/11299/5557>
- Antrop, M. (2004). Landscape change and the urbanization process in Europe. *Landscape and urban planning*, 67(1), 9-26.
- Aoyama, Y., & Kondo, A. (1993). The impact of major road developments on the spheres of urban influence of Japanese cities. *Transportation*, 20(3), 305-323.
- Balsas, C. J. (2004). Measuring the livability of an urban centre: an exploratory study of key performance indicators. *Planning, Practice & Research*, 19(1), 101-110.
- Bertaud, A. (2011). Da Nang urban structure: the motorcycle, provides a significant advantage for mobility and housing affordability. Retrieved from http://alainbertaud.com/wp-content/uploads/2013/07/AB_report_Danang_Graphs_rev.pdf
- Bissio, R. (2008). Paris declaration on aid effectiveness. Presented at Human Rights Council, Session of the Working Group on the Right to Development, High Task Force on the Implementation of the Right to Development, January 7-15, Geneva. Retrieved from http://www.gendermatters.eu/resources_documents/UserFiles/File/Resourse/HRC_PD_RtDevelopment.pdf
- Bryan, J., Hill, S., Munday, M., & Roberts, A. (1997). Road infrastructure and economic development in the periphery: the case of A55 improvements in North Wales. *Journal of Transport Geography*, 5(4), 227-237.
- Cervero, R. (1996). Jobs-housing balance revisited: trends and impacts in the San Francisco Bay Area. *Journal of the American Planning*

Association, 62(4), 492-511.

- Cervero, R., & Kockelman, K. (1997). Travel demand and the 3Ds: density, diversity, and design. *Transportation Research Part D: Transport and Environment*, 2(3), 199-219.
- Cervero, R., & Duncan, M. (2002). Transit's value-added effects: light and commuter rail services and commercial land values. *Transportation Research Record*, 1805, 8-15.
- Cervero, R., & Duncan, M. (2006). Which reduces vehicle travel more: jobs-housing balance or retail-housing mixing?. *Journal of the American planning association*, 72(4), 475-490.
- Cervero, 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.
- Cervero, R., & Kang, C. D. (2011). Bus rapid transit impacts on land uses and land values in Seoul, Korea. *Transport Policy*, 18(1), 102-116.
- Cervero, R. B. (2013). Linking urban transport and land use in developing countries. *Journal of Transport and Land Use*, 6(1), 7-24.
- Chandra, A., & Thompson, E. (2000). Does public infrastructure affect economic activity? Evidence from the rural interstate highway system. *Regional Science and Urban Economics*, 30(4), 457-490.
- Chaolin, G., Xiaohui, Y., & Jing, G. (2010). China's master planning system in transition: case study of Beijing. In *46th ISOCARP Congress 2010*. Retrieved from http://www.isocarp.net/data/case_studies/1657.pdf
- Cheng, H., & Hu, Y. (2010). Planning for sustainability in China's urban development: status and challenges for Dongtan eco-city project. *Journal of Environmental Monitoring*, 12(1), 119-126.
- Davies, P. W. K., & Townshend, P. I. J. (2015). New urbanisms: from neo-traditional neighbourhoods to new regionalism. In *theme cities: solutions for urban problems*. Springer, Dordrechts, 17-61. Retrieved from https://link.springer.com/chapter/10.1007/978-94-017-9655-2_2
- Deshkar, S., Hayashia, Y., & Mori, Y. (2011). An alternative approach for planning the resilient cities in developing countries. *International*

Journal of Urban Sciences, 15(1), 1-14.

- OECD, DAC (2005). 'The paris declaration on aid effectiveness and the accra agenda for action', Paris: OECD.
- Dhondt, S., Le Xuan, Q., Van, H. V., & Hens, L. (2011). Environmental health impacts of mobility and transport in Hai Phong, Vietnam. *Stochastic Environmental Research and Risk Assessment*, 25(3), 363-376.
- Drummond, L. B. (2000). Street scenes: practices of public and private space in urban Vietnam. *Urban Studies*, 37(12), 2377-2391.
- DUP. (2016). The article, "Packing a mightier punch: Asia's economic growth among global markets continues", Deloitte University Press, 2016, Retrieved from <https://dupress.deloitte.com/dup-us-en/economy/asia-pacific-economic-outlook/2016/q1-asia-economic-growth-continues.html>
- Garside, P. L. (2003). From garden city to green city: the legacy of Ebenezer Howard. *The Town Planning Review*, 74(3), 352.
- Giuliano, G. (1991). Is jobs-housing balance a transportation issue?. *Transportation Research Record*, 1305, 305-312.
- Gospodini, A. (2002). European cities in competition and the new 'uses' of urban design. *Journal of Urban Design*, 7(1), 59-73.
- Gough, K. V., & Tran, H. A. (2009). Changing housing policy in Vietnam: emerging inequalities in a residential area of Hanoi. *Cities*, 26(4), 175-186.
- Handy, S. (1996a). Methodologies for exploring the link between urban form and travel behavior. *Transportation Research Part D: Transport and Environment*, 1(2), 151-165.
- Handy, S. (1996b). Urban form and pedestrian choices: study of Austin neighborhoods. *Transportation Research Record: Journal of the Transportation Research Board*, (1552), 135-144.
- Hansen, A. (2017). Hanoi on wheels: emerging automobility in the land of the motorbike. *Mobilities*, 12(5), 628-645.

- Hart, M. A., & Sailor, D. J. (2009). Quantifying the influence of land-use and surface characteristics on spatial variability in the urban heat island. *Theoretical and applied climatology*, 95(3-4), 397-406.
- Ho, B. Q., & Clappier, A. (2011). Road traffic emission inventory for air quality modelling and to evaluate the abatement strategies: a case of Ho Chi Minh City, Vietnam. *Atmospheric environment*, 45(21), 3584-3593.
- Hopke, P. K., Cohen, D. D., Begum, B. A., Biswas, S. K., Ni, B., Pandit, G. G., ... & Waheed, S. (2008). Urban air quality in the Asian region. *Science of the Total Environment*, 404(1), 103-112.
- Huynh, D. (2015). The misuse of urban planning in Ho Chi Minh City. *Habitat International*, 48, 11-19.
- Huang, K. T., Lin, T. P., & Lien, H. C. (2015). Investigating thermal comfort and user behaviors in outdoor spaces: a seasonal and spatial perspective. *Advances in Meteorology*, 2015.
- IMF. (2017). Regional Economic Outlook: Asia and Pacific, 2017. Retrieved from <https://www.imf.org/en/Publications/REO/APAC/Issues/2017/10/09/areo1013>
- Issah, I., Khan, T. Y., & Sasaki, K. (2005). Do migrants react to infrastructure difference between urban and rural areas? Development of an extended Harris–Todaro model. *Review of Urban & Regional Development Studies*, 17(1), 68-88.
- Jabareen, Y. R. (2006). Sustainable urban forms: their typologies, models, and concepts. *Journal of planning education and research*, 26(1), 38-52.
- Jackson, L. E. (2003). The relationship of urban design to human health and condition. *Landscape and urban planning*, 64(4), 191-200.
- Johansson, E., & Emmanuel, R. (2006). The influence of urban design on outdoor thermal comfort in the hot, humid city of Colombo, Sri Lanka. *International journal of biometeorology*, 51(2), 119-133.
- Jung, S., & Lee, J. S. (2017). Korean developers in Vietnam: the

mechanism of transnational large-scale property development and its planning. *Sustainability*, 9(5), 748.

- Kang, C. D., & Cervero, R. (2009). From elevated freeway to urban greenway: land value impacts of the CGC project in Seoul, Korea. *Urban Studies*, 46(13), 2771-2794.
- Kelly, E. D. (1994). The transportation land-use link. *Journal of Planning Literature*, 9(2), 128-145.
- Kien, T. (2008). "Tube house" and "neo tube house" in Hanoi: a comparative study on identity and typology. *Journal of Asian Architecture and Building Engineering*, 7(2), 255-262.
- 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.
- Kim, A. M. (2015). *Sidewalk city: remapping public space in Ho Chi Minh City*. Chicago: University of Chicago Press.
- Kim, D., Lee, J., & Choi, S. (2015). Balancing mobility and CO2 reduction by a mode share scheme: a comparison of Los Angeles and Seoul metropolitan areas. *International Journal of Urban Sciences*, 19(2), 168-181.
- Kim, S., Park, S., & Lee, J. S. (2014). Meso-or micro-scale? Environmental factors influencing pedestrian satisfaction. *Transportation Research Part D: Transport and Environment*, 30, 10-20.
- Krisjane, Z., Berzins, M., Ivlevs, A., & Bauls, A. (2012). Who are the typical commuters in the post-socialist metropolis? The case of Riga, Latvia. *Cities*, 29(5), 334-340.
- Kutani, I., Sudo, Y., & Li, Y. (2015). Energy efficiency improvement in the transport sector through transport improvement and smart community development in urban areas. Retrieved from <http://www.eria.org/RPR-FY2014-38.pdf>
- Kwon, Y., Kim, S., & Jeon, B. (2014). Unraveling the factors determining the redevelopment of Seoul's historic hanoks. *Habitat International*, 41, 280-289.

- Labbé, D., & Boudreau, J. A. (2015). Local integration experiments in the new urban areas of Hanoi. *South East Asia Research*, 23(2), 245-262.
- Labbé, D., & Musil, C. (2014). Periurban land redevelopment in Vietnam under market socialism. *Urban Studies*, 51(6), 1146-1161.
- Lau, J. C. Y., & Chiu, C. C. (2013). Dual-track urbanization and co-location travel behavior of migrant workers in new towns in Guangzhou, China. *Cities*, 30, 89-97.
- Lee, J. S., Won, S., & Kim, S. (2015). Describing changes in the built environment of shrinking cities: case study of Incheon, South Korea. *Journal of Urban Planning and Development*, 142(2), 05015010.
- Levine, J. (1998). Rethinking accessibility and jobs-housing balance. *Journal of the American Planning Association*, 64(2), 133-149.
- Lin, D., Allan, A., & Cui, J. (2015). The impact of polycentric urban development on commuting behaviour in urban China: evidence from four sub-centres of Beijing. *Habitat International*, 50, 195-205.
- Lin, T. D., Jovanis, P. P., & Yang, C. Z. (1994). Time of day models of motor carrier accident risk. *Transportation Research Record*, 1467, 1-8.
- Linh, N. H. K., Erasmi, S., & Kappas, M. (2012). Quantifying land use/cover change and landscape fragmentation in Danang City, Vietnam: 1979-2009. International archives of the photogrammetry. *Remote Sensing and Spatial Information Sciences*, Vol. XXXIX-B8, 2012 XXII ISPRS Congress, Melbourne, Australia.
- Marquet, O., & Miralles-Guasch, C. (2015). The walkable city and the importance of the proximity environments for Barcelona's everyday mobility. *Cities*, 42, 258-266.
- Matsumura, S., Hoa, N. T., & Kien, T. T. (2017). New approach and issues for the urban planning system in Vietnam. *Urban and Regional Planning Review*, 4, 58-70.
- McCann, E. J. (2007). Inequality and politics in the creative city-region: questions of livability and state strategy. *International Journal of Urban and Regional Research*, 31(1), 188-196.
- Madanipour, A. (2006). Roles and challenges of urban design. *Journal of*

Urban Design, 11(2), 173-193.

McGee, T. G. (2009). Interrogating the production of urban space in China and Vietnam under market socialism. *Asia Pacific Viewpoint*, 50(2), 228-246.

Mehaffy, M., Porta, S., Rofe, Y., & Salingaros, N. (2010). Urban nuclei and the geometry of streets: the 'emergent neighborhoods' model. *Urban Design International*, 15(1), 22-46.

Mehaffy, M. W., Porta, S., & Romice, O. (2015). The "neighborhood unit" on trial: a case study in the impacts of urban morphology. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*, 8(2), 199-217.

Michelson, W. (2009). Variations in the rational use of time—the travel pulse of commutes between home and job. *Electronic International Journal of Time Use Research*, 6(2), 269-285.

Nedovic-Budic, Z., Knaap, G. J., Shahumyan, H., Williams, B., & Slaev, A. (2016). Measuring urban form at community scale: case study of Dublin, Ireland. *Cities*, 55, 148-164.

Neuman, M., & Smith, S. (2010). City planning and infrastructure: once and future partners. *Journal of Planning History*, 9(1), 21-42.

Nguyen, H. K. L. (2013). Detecting and modeling the changes of land use/cover for land use planning in Da Nang City, Viet Nam. *Göttingen, Georg-August Universität, Diss.* Retrieved from <https://d-nb.info/1044870680/34>

Nguyen, N. T. (2015). Vietnamese regional planning: problems in implementation and international experiences. *Journal of Sustainable Development*, 8(8), 86.

Ostojic, D. R., Bose, R. K., Krambeck, H., Lim, J., & Zhang, Y. (2013). Energizing green cities in Southeast Asia: applying sustainable urban energy and emissions planning. World Bank Publications. Retrieved from <http://documents.worldbank.org/curated/en/890271468247821479/pdf/811110PUB0Gree0Box0379830B00PUBLIC0.pdf>

- Ozbil, A., Peponis, J., & Stone, B. (2011). Understanding the link between street connectivity, land use and pedestrian flows. *Urban Design International*, 16(2), 125-141.
- 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.
- Padeiro, M. (2013). Transport infrastructures and employment growth in the Paris metropolitan margins. *Journal of Transport Geography*, 31, 44-53.
- Punpuing, S., & Ross, H. (2001). Commuting: the human side of Bangkok's transport problems. *Cities*, 18(1), 43-50.
- Quang, H. (1997). Hanoi, past and present. Ho Chi Minh City: Culture-Information Publishing House.
- Quang, N., & Kammeier, H. D. (2002). Changes in the political economy of Vietnam and their impacts on the built environment of Hanoi. *Cities*, 19(6), 373-388.
- Reality of Aid (2008). The reality of aid 2008: aid effectiveness, democratic ownership and human rights. Quezon City: Ibon.
- Rockwood, D., & Tran, D. Q. (2016). Urban immigrant worker housing research and design for Da Nang, Viet Nam. *Sustainable Cities and Society*, 26, 108-118.
- Smith, T., Nelischer, M., & Perkins, N. (1997). Quality of an urban community: a framework for understanding the relationship between quality and physical form. *Landscape and Urban Planning*, 39(2), 229-241.
- Southworth, M., & Owens, P. M. (1993). The evolving metropolis: studies of community, neighborhood, and street form at the urban edge. *Journal of the American Planning Association*, 59(3), 271-287.
- Straub, S. (2008). Infrastructure and growth in developing countries (Vol. 4460). World Bank Publications. Retrieved from <http://documents.worldbank.org/curated/en/349701468138569134/pdf/wps4460.pdf>
- Sullivan, W. C., & Lovell, S. T. (2006). Improving the visual quality of

commercial development at the rural–urban fringe. *Landscape and urban planning*, 77(1), 152-166.

Tran, H. A. (2015). Urban space production in transition: The cases of the new urban areas of Hanoi. *Urban Policy and Research*, 33(1), 79-97.

Trần, T. N. Q., Quertamp Nguyen, F., Miras, C. D., Vinh, N. Q., & Truong, T. H. (2012). Trends of urbanization and suburbanization in Southeast Asia. Ho Chi Minh City: General Publishing House.

Truitt, A. (2008). On the back of a motorbike: middle-class mobility in Ho Chi Minh City, Vietnam. *American Ethnologist*, 35(1), 3-19.

Tung, H. D., Tong, H. Y., Hung, W. T., & Anh, N. T. N. (2011). Development of emission factors and emission inventories for motorcycles and light duty vehicles in the urban region in Vietnam. *Science of the Total Environment*, 409(14), 2761-2767.

UN, DESA (2011). Population distribution, urbanization, internal migration and development: an international perspective. Department of economic and social affairs population division, United Nations, Retrieved from http://wedocs.unep.org/bitstream/handle/20.500.11822/18920/Population_Distribution_Urbanization.pdf?sequence=1&isAllowed=y

UN, DESA (2014). World urbanization prospects: the 2014 revision, highlights (ST/ESA/SER.A/352). Department of economic and social affairs, Population Division. Retrieved from <https://esa.un.org/unpd/wup/publications/files/wup2014-highlights.pdf>

Van Kamp, I., Leidelmeijer, K., Marsman, G., & De Hollander, A. (2003). Urban environmental quality and human well-being: towards a conceptual framework and demarcation of concepts; a literature study. *Landscape and urban planning*, 65(1), 5-18.

Victoir, L., & Zatsopine, V. (2013). *Harbin to Hanoi: the colonial built environment in Asia, 1840 to 1940*. Hong Kong: Hong Kong University Press.

Vilhelmson, B. (2007). The use of the car—mobility dependencies of urban everyday life. In T. Gärling & L. Steg (Eds.), *Threats to the quality of urban life from car traffic: Problems, causes, and solutions* (pp. 145–164). Amsterdam: Elsevier.

- Wang, J., Su, M., Chen, B., Chen, S., & Liang, C. (2011). A comparative study of Beijing and three global cities: a perspective on urban livability. *Frontiers of Earth Science*, 5(3), 323-329.
- Warlters, M. (2006). Vietnam's infrastructure challenge—infrastructure strategy: cross-sectoral issues. World Bank Publications. Retrieved from <http://documents.worldbank.org/curated/en/918311468308974645/pdf/371840VN0Cross17184to3718901PUBLIC1.pdf>
- Won, S., Cho, S. E., & Kim, S. (2015). The neighborhood effects of new road infrastructure: transformation of urban settlements and resident's socioeconomic characteristics in Danang, Vietnam. *Habitat International*, 50, 169-179.
- Won, S., & Kim, S. (2017). 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. *Cities*, 67, 63-73.
- World Bank. (2011). Vietnam urbanization review: technical assistance report. World Bank Publications. Retrieved from <http://documents.worldbank.org/curated/en/225041468177548577/pdf/669160ESW0P1130Review000Full0report.pdf>
- Xue, C. Q., & Zhou, M. (2007). Importation and adaptation: building 'one city and nine towns' in Shanghai: a case study of Vittorio Gregotti's plan of Pujiang Town. *Urban Design International*, 12(1), 21-40.
- Zacharias, J., & Blik, D. (2008). The role of urban planning in the spontaneous redevelopment of Huaqianbei, Shenzhen. *Journal of Urban Design*, 13(3), 345-360.
- Zhu, J. (2012). Development of sustainable urban forms for high-density low-income Asian countries: the case of Vietnam: the institutional hindrance of the commons and anticommons. *Cities*, 29(2), 77-87.
- Zhao, G., Zheng, X., Yuan, Z., & Zhang, L. (2017). Spatial and temporal characteristics of road networks and urban expansion. *Land*, 6(2), 30.

APPENDIX

Appendix 1. Questionnaire for in-depth interview (in English)

No. _____

Questionnaire

Dear Sir or Madame,

My name is Sehyung Won, a Ph.D. candidate studying urban design at Seoul National University in South Korea. This questionnaire intends to understand the process of urbanization caused by construction of new roads, Nguyen Tat Thanh.

Your response will only be used for academic purposes.

Thank you for your participation.

July. 2014

Department of Graduate School of Environmental Studies

Seoul National University

Sehyung Won

Mobile phone: +82-10-3892-0000

E-mail: yan799@snu.ac.kr

- The urban environment of Thank Khe district, the site of this research, has undergone a big change since the Nguyen Tat Thanh road along Danang Bay was opened in 2003.
- This questionnaire is divided into two parts: one part inquiring about urban conditions before 2002 when Nguyen Tat Thanh road had not been developed; and the other part about the conditions after the road was opened in 2003. Please respond to the questions with this structure in mind.

I. Pre-2002: Before Development of Nguyen Tat Thanh Road

Category		Question
Property Ownership and Type	<p>Case A <u>If property owned then is same as property currently owned in 2014</u></p>	<ol style="list-style-type: none"> Did you or your family own the same property before 2002? or rent? ① Owned ② Rented If you answered above, how many years until now (2014) has the property been owned/rented by you or your family? ① Owned About () years ② Rented About () years What is the type of the property? ① Elongated House ② Villa ③ Simple House ④ High-rise building ⑤ Other (specify): () Do you or your family own/rent any additional properties? (Multiple answers allowed) ① Yes (Total number of owned properties:) ② Yes (Total number of rented properties:) ③ No
	<p>Case B <u>If property owned then is different from property currently owned in 2014</u></p>	<ol style="list-style-type: none"> Did you owned or rented a different property in 2002? ① Owned ② Rented the property was located: 1-1. In which district, if located in Danang? ① Hai Chau ② Thank Khe ③ Son Tra ④ Ngu Hanh Son ⑤ Lien Chieu ⑥ Cam Le 1-2. In what city, if located outside Danang? () What was the type of the property? ① Elongated House ② Villa ③ Simple House ④ High-rise building ⑤ Other (specify): () Which year did you or your family own/rent the property? () year Did you or your family own/rent any additional properties? (Multiple answers allowed) ① Yes (Total number of owned properties:) ② Yes (Total number of rented properties:) ③ No
Socia	Occu Individual	1. What was your occupation before 2002? ()

I Stand ing	partio n	Members of household	1. Who most provided for your family before 2002? What was his/her occupation? (_____)
	Place fo Empl oyme nt	Individual	1. Where was your work/office located before 2002? <u>① Hai Chau ② Thank Khe ③ Son Tra ④ Ngu Hanh Son ⑤ Lien Chieu ⑥ Cam Le</u>
		Members of household	1. Where was the main provider's work/office located before 2002? <u>① Hai Chau ② Thank Khe ③ Son Tra ④ Ngu Hanh Son ⑤ Lien Chieu ⑥ Cam Le</u>
	Inco me	Individual	1. How much, approximately, was your gross annual income in 2002? (_____ VND)
Household		1. How much, approximately, was your gross annual household income in 2002? (_____ VND)	
Spati al Chan ge	Build ing Prope rty	Bui ldin g Use	<p>Cas e A</p> <p>1. How many stories did this building have in 2002? (_____) stories</p> <p>2. What was the main use of each story in 2002? (1st (ground): _____ 2nd: _____ 3rd: _____ 4th: _____ 5th: _____ 6th and up: _____ Rooftop: _____)</p>
			<p>Cas e B</p> <p>1. How many stories did the building you owned then have? (_____) stories</p> <p>2. What was the main use of each stories of the building you (or your family member) owned then? (1st (ground): _____ 2nd: _____ 3rd: _____ 4th: _____ 5th: _____ 6th and up: _____ Rooftop: _____)</p>
	Gro und Flo or Use	Cas e A	<p>1. Did you or your family member(s) use the 1st (ground) floor of this building or rent it out to others in 2002? <u>① Used by myself or my family member</u> <u>② Rented it out to others for profit</u></p> <p>2. What was the specific use(s) of the 1st (ground) floor in 2002? (Multiple answers allowed) <u>① Commercial use (Type of business: _____)</u> <u>② Office</u> <u>③ Reception or kitchen ④ Storage</u> <u>⑤ Motorcycle parking ⑥ Car parking</u></p>

			⑦ Other (specify): (_____)
		Case B	<p>1. Did you or your family member(s) use the 1st (ground) floor of the building you (or your family member) owned, or rent it out to others in 2002? ① Used by myself or my family member ② Rented it out to others for profit</p> <p>2. What was the specific use(s) of the 1st (ground) floor of the building you (or your family member) owned in 2002? (Multiple answers allowed) ① Commercial use (Type of business: _____) ② Office ③ Reception or kitchen ④ Storage ⑤ Motorcycle parking ⑥ Car parking ⑦ Other (specify): (_____)</p>
Transportation Ownership	Motorcycle		1. How many motorcycles did you and your family members own in 2002? (_____)
	Bicycle		1. How many bicycles did you and your family members own in 2002? (_____)
	Car (including trucks)		1. How many cars (including trucks) did you and your family members own in 2002? (_____)

II. Post-2003: After Development of Nguyen Tat Thanh Road

	Category	Question
Property Ownership and Type	Case A <u>If still living in the same property</u>	1. Have you or your family member(s) owned the current property continuously since 2003? ① Yes ② No
	Case B <u>If purchased the property</u>	<p>1. Did you or your family member(s) purchase the current property after 2003? ① Yes ② No</p> <p>2. If so, what year was the purchase made? (_____) year</p> <p>3. What is the type of the property? ① Elongated House ② Villa ③ Simple House ④ High-rise building ⑤ Other (specify): (_____)</p> <p>4. What is the main purpose of the purchase? ① Residence ② Commercial use ③ Rent profit</p>

		④ Other (specify): (_____)	
	Case C <u>If (re)developed the property</u>	1. Did you or your family member(s) (re)developed the current property after 2003? ① Yes ② No 2. If so, what year was the property (re)developed? (_____) year 3. What is the type of the (re)developed property? ① Elongated House ② Villa ③ Simple House ④ High-rise building ⑤ Other (specify): (_____) 4. What is the main purpose of the (re)development? ① Residence ② Commercial use ③ Rent profit ④ Other (specify): (_____)	
	Case D <u>If rented the property</u>	1. Did you or your family member(s) rent the current property after 2003? ① Yes ② No 2. If so, what year was the property rented? (_____) year 3. What is the type of the (re)developed property? ① Elongated House ② Villa ③ Simple House ④ High-rise building ⑤ Other (specify): (_____) 4. What is the main purpose of the rent? ① Residence ② Commercial use ③ Rent profit ④ Other (specify): (_____)	
Social Standing	Occupation	Individual	1. Has your occupation changed since 2003? ① Yes ② No 2. If yes, what is the cause of the change(s)? (_____)
		Members of household	1. Has the occupation of your family member(s) changed since 2003? ① Yes ② No 2. If yes, what is the cause of the change(s)? (_____)
	Place of Employment	Individual	1. Has the location of your work/office changed since 2003? ① Yes ② No
		Members of household	1. Has the location of your family member(s)' work/office changed since 2003? ① Yes ② No

	Inc ome	Individual	1. How much, approximately, was your gross annual income in 2013? (_____)VND
		Household	1. How much, approximately, was your gross annual household income in 2013? (_____)VND
Spati al Chan ge	Buil din g Pro pert y	Building Use and Transition	<p>1. How many storeys does the building currently have? (_____) stories</p> <p>2. What is the current main use of each storey? (1st (ground): _____ 2nd : _____ 3rd : _____ 4th: _____ 5th: _____ 6th and up: _____ Rooftop: _____)</p> <p>3. Which storey(s) are being rented out, if any? ① None ② (_____)</p> <p>4. Has the building use changed since 2003? ① Yes ② No</p> <p>5. If yes, what are the details of the change(s)? (_____)</p>
		1st(Ground) Floor Use and Transition	<p>1. What is the current specific use(s) of the 1st (ground) floor? (Multiple answers allowed) ① Commercial use (Type of business: _____) ② Office ③ Reception or kitchen ④ Storage ⑤ Motorcycle parking ⑥ Car parking ⑦ Other (specify): (_____)</p> <p>2. Has the 1st (ground) floor use(s) changed since 2003? 2-1. ① Yes ② No 2-2. If yes, what are the details of the change(s)? (_____)</p> <p>2-3. What are details of change(s) made to business operation? (Multiple answers allowed) ① Change of business type ② Increased number of employees ③ Franchise agreement ④ Others (specify): (_____)</p>
		Case A	<p>1. Has the number of stories (height) increased since 2003? ① Yes (_____) stories increased ② No</p> <p>2. Have you (or your family member) purchased adjacent lot(s) and expanded the building since 2003? ① Yes ② No</p> <p>3. Has the structure of the building changed in any</p>

Physical Transformation		<p>part? (ex. location of bathroom, main entrance, windows, etc.)</p> <p><u>① Yes (specify: _____)</u> <u>② No</u></p> <p>4. Has the exterior of the building been upgraded by additionally using premium materials?</p> <p><u>① Yes (specify: _____)</u> <u>② No</u></p> <p>5. Other than those mentioned above, what other change(s) were made to the building?</p> <p>(_____)</p> <p>6. Did you (or your family member) receive government subsidy or incentives for any expansion work or changes made to the building?</p> <p><u>① Yes (specify: _____)</u> <u>② No</u></p>
	Case B	<p>1. Has the number of stories (height) increased since 2003?</p> <p><u>① Yes (_____) stories increased</u> <u>② No</u></p> <p>2. Have you (or your family member) purchased adjacent lot(s) and expanded the building since 2003?</p> <p><u>① Yes</u> <u>② No</u></p> <p>3. Has the structure of the building changed in any part? (ex. location of bathroom, main entrance, windows)</p> <p><u>① Yes (specify: _____)</u> <u>② No</u></p> <p>4. Has the exterior of the building been upgraded by additionally using premium materials?</p> <p><u>① Yes (specify: _____)</u> <u>② No</u></p> <p>5. Other than those mentioned above, what other change(s) were made to the building?</p> <p>(_____)</p> <p>6. Did you (or your family member) receive government subsidy or incentives for purchasing the building?</p> <p><u>① Yes (specify: _____)</u> <u>② No</u></p>
	Case C	<p>1. Has the number of stories (height) increased since 2003?</p> <p><u>① Yes (_____) stories increased</u> <u>② No</u></p> <p>2. Have you (or your family member) purchased adjacent lot(s) and expanded the building since 2003?</p> <p><u>① Yes</u> <u>② No</u></p> <p>3. Has the structure of the building changed in any part? (ex. location of bathroom, main entrance, windows, etc.)</p>

			<p><input type="radio"/> Yes (specify: _____) <input type="radio"/> No</p> <p>4. Has the exterior of the building been upgraded by additionally using premium materials? <input type="radio"/> Yes (specify: _____) <input type="radio"/> No</p> <p>5. Other than those mentioned above, what other change(s) were made to the building? (_____)</p> <p>6. Did you (or your family member) receive government subsidy or incentives for the (re)development of the building? <input type="radio"/> Yes (specify: _____) <input type="radio"/> No</p>
		Case D	<p>1. Has the number of stories (height) increased since 2003? <input type="radio"/> Yes (_____) stories increased <input type="radio"/> No</p> <p>2. Have you (or your family member) purchased adjacent lot(s) and expanded the building since 2003? <input type="radio"/> Yes <input type="radio"/> No</p> <p>3. Has the structure of the building changed in any part? (ex. location of bathroom, main entrance, windows) <input type="radio"/> Yes (specify: _____) <input type="radio"/> No</p> <p>4. Has the exterior of the building been upgraded by additionally using premium materials? <input type="radio"/> Yes (specify: _____) <input type="radio"/> No</p> <p>5. Other than those mentioned above, what other change(s) were made to the building? (_____)</p> <p>6. Did you (or your family member) receive government subsidy or incentives for rent the building? <input type="radio"/> Yes (specify: _____) <input type="radio"/> No</p>
Chan ge of Prope rty Valu (Rent Price)	Case A		<p>1. How much was the approximate property value of the building in 2002? (_____ VND)</p> <p>2. How much is the current approximate property value of the building in 2014? (_____ VND)</p>
	Case B		<p>1. How much was the approximate property value of the building at the time of purchase? (_____ VND)</p> <p>2. How much is the current approximate property value of the building in 2014? (_____ VND)</p>
	Case C		<p>1. How much was the approximate property value of the</p>

		<p>building at the time of (re)development? (_____ VND)</p> <p>2. How much is the current approximate property value of the building in 2014? (_____ VND)</p>	
	Case D	<p>1. How much was the approximate rent fee of the building at the first time of rent ? (_____ VND)</p> <p>2. How much is the current approximate rent fee of the building in 2014? (_____ VND)</p>	
Travel Behaviour	Ownership	Motorcycle	1. How many motorcycles did you and your family members own in 2014? (_____)
		Bicycle	1. How many bicycles did you and your family members own in 2014? (_____)
		Car (including trucks)	1. How many cars (including trucks) did you and your family members own in 2014? (_____)
	Scope of Activity	Work	<p>1. Please indicate the route by which you or your family members travel to work. # Draw on the map Who are the travelers? (_____)</p> <p>2. What is the mode of transportation you or your family members take to work? ① Walking ② Bicycle ③ Motorcycle ④ Car ⑤ Other (specify: _____)</p>
		Education	<p>1. Please indicate the location of your children's school and the route traveled. # Draw on the map</p> <p>2. What is the mode of transportation your children take to school? ① Walking ② Bicycle ③ Motorcycle, with parent ④ Car, with parent ⑤ Other (specify: _____)</p>
		Shopping	<p>1. Please indicate the location of large market or supermarket frequented by you or your family members and the route traveled. # Draw on the map</p> <p>2. What is the mode of transportation you or your family members take to the market? ① Walking ② Bicycle ③ Motorcycle ④ Car ⑤ Other (specify: _____)</p>
		Religious	1. Please indicate the location of religious facility

		<p>Activities</p>	<p>frequented by you or your family members and the route traveled. # Draw on the map 2. What is the mode of transportation you or your family members take to the religious facility? ① Walking ② Bicycle ③ Motorcycle ④ Car ⑤ Other (specify: _____)</p>
		<p>Leisure</p>	<p>1. Please indicate the location of place or facility frequented by you or your family members for leisure activities, and the route traveled. (ex. park, theme park, theaters, etc.) # Draw on the map 2. What is the mode of transportation you or your family members take to the leisure spot? ① Walking ② Bicycle ③ Motorcycle ④ Car ⑤ Other (specify: _____)</p>
<p>Improvement of Amenity and Safety</p>		<p>1. Has any voluntary community improvement effort been made by the residents since 2003, to improve design or environment of the building or space around it? ① Yes ② No 1-1. What are the details of such efforts? (_____) 2. How is it to walk around alone in this area at night, compared to years before 2003? ① It has become very dangerous ② It has become dangerous ③ It is the same ④ It has become safe ⑤ It has become very safe</p>	
<p>Changes of Personal / Household Business</p>		<p>1. Have you or your family members started a new business since 2003? ① Yes ② No 1-1. If yes, what was the type of the business started? (_____) 1-2. If yes, what year was the business started? (_____) 2. Has there been any change(s) since 2003 to the size and/or type of the business run by you or your family members? ① Yes ② No 2-1. If yes, what is the type to which the business changed? (_____) 2-2. If yes, which year(s) was the change(s) made?</p>	

	<p>() yaer</p> <p>3. Has there been any change(s) since 2003 to operation method of the business run by you or your family members?</p> <p>① Yes ② No</p> <p>3-1. If yes, what are the details of the change(s)? ()</p> <p>3-2. If yes, which year(s) was the change(s) made? () year</p>
--	--

III. General Background

Category	Question
Gender	1. What is your gender? ① Male ② Female
Age	1. What is your age? () years old
Level of Education	1. What is your highest educational qualification? ① Elementary school ② Middle school ③ High school ④ Institution of technical training ⑤ Baccalaureate degree and beyond
Household	1. How many members, including yourself, are in your household? () persons
Birthplace	1. Where is your birthplace? () City () District
Place of Response	1. Where did you fill out this questionnaire? () City () District () Street () No.
Address of Current Residence	1. Is the address above same as the address of your current residence? ① Yes ② No 2. If you answered no to the above question, please tell us your current address of residence. () City () District () Street () No.

Annex: Maps for Indicating the Route of Activity Scope



Figure 23. In-depth interview coverage and surrounding areas.

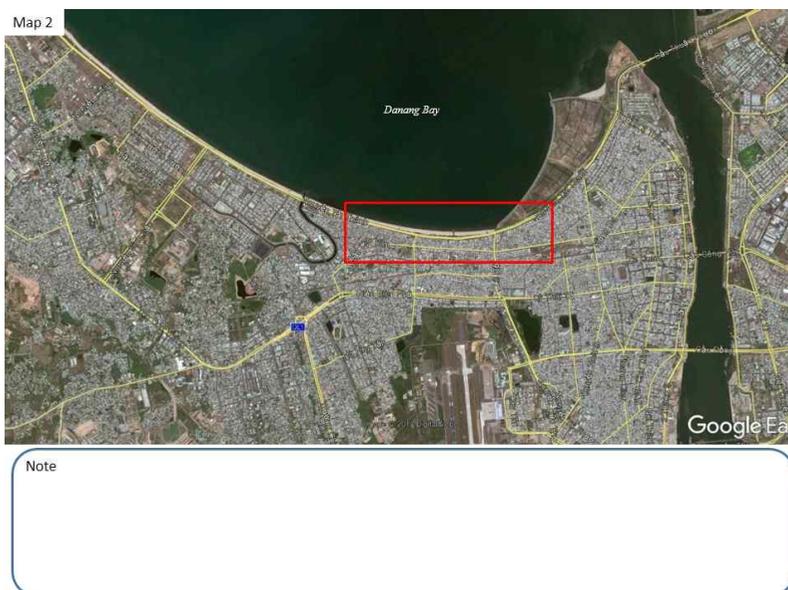


Figure 24. In-depth interview coverage area with added 5km range on East and West sides.



Figure 25. Map including the most urbanized areas of Danang.

Appendix 2. Questionnaire for in-depth interview (in Vietnamese)

Số _____

Phiếu câu hỏi

Xin chào

Tôi là Won Sehyung, nghiên cứu sinh về các vấn đề đô thị đến từ trường Đại học Quốc gia Seoul, Hàn Quốc. Bảng câu hỏi này nhằm mục đích giúp tôi hiểu thêm về quá trình đô thị hóa do việc xây dựng hình thành những tuyến đường mới.

Phản hồi của bạn sẽ chỉ được sử dụng cho mục đích học tập.

Xin chân thành cảm ơn về sự giúp đỡ nhiệt tình của quý vị.

Tháng 7 2014

Trường Nghiên cứu Môi trường,

Đại học Quốc gia Seoul

Won, Sehyung

Di động: +82-10-3892-0000

E-mail: yan799@snu.ac.kr

- Môi trường đô thị của khu vực Thanh Khê nằm trong phạm vi nghiên cứu của nghiên cứu này đã trải qua những thay đổi to lớn kể từ khi đường Nguyễn Tất Thành dọc vịnh Đà Nẵng được xây dựng vào năm 2003.
- Bảng câu hỏi này được chia thành 2 phần: 1 phần tìm hiểu về hiện trạng đô thị trước năm 2002 thời điểm đường Nguyễn Tất Thành chưa được xây dựng; và phần còn lại là về tình trạng sau khi con đường này được xây dựng vào năm 2003. Vui lòng trả lời các câu hỏi theo mẫu dưới đây.

I. Trước 2002: Trước khi phát triển đường Nguyễn Tất Thành

Phân loại		Câu hỏi	
Quy ền sở hữu nhà đất và loại đất	<p>Trường hợp A Nếu mảnh đất sở hữu trước đây cũng chính là mảnh đất vào thời điểm năm 2014</p>	<ol style="list-style-type: none"> Cô/ chú (anh/ chị/ bạn) hoặc gia đình đã sở hữu cũng mảnh đất này trước năm 2002? ① Đúng ② Không phải Nếu câu trả lời là “Đúng” thì tính đến nay (tức 2014) cô/ chú (anh/ chị/ bạn) hoặc gia đình đã sở hữu mảnh đất này bao nhiêu năm rồi? Khoảng () năm Kiểu nhà của cô/ chú (anh/ chị/ bạn) là gì? ① Nhà hộp ② Biệt thự ③ Nhà đơn giản ④ Nhà cao tầng ⑤ Khác (Cụ thể là: ()) Ngoài ra thì cô/ chú (anh/ chị/ bạn) hoặc gia đình còn sở hữu mảnh đất nào khác nữa không? ① Có (Tổng số lượng mảnh đất đang sở hữu:) ② Không 	
	<p>Trường hợp B Nếu mảnh đất sở hữu trước đây khác với mảnh đất sở hữu vào thời điểm năm 2014</p>	<ol style="list-style-type: none"> Nếu năm 2002 cô/ chú (anh/ chị/ bạn) sở hữu 1 mảnh đất thì nó? (ở:) 1-1. Quận/ huyện nào của Đà Nẵng? ① Hải Châu ② Thanh Khê ③ Sơn Trà ④ Ngũ Hành Sơn ⑤ Liên Chiểu ⑥ Cẩm Lệ 1-2. Tỉnh/ thành phố nào? () Kiểu nhà của cô/ chú (anh/ chị/ bạn) là gì ① Nhà hộp ② Biệt thự ③ Nhà đơn giản ④ Nhà cao tầng ⑤ Khác (Cụ thể là: ()) Khoảng năm nào thì cô/ chú (anh/ chị/ bạn) hoặc gia đình được thừa hưởng quyền sở hữu mảnh đất này? () Ngoài ra thì cô/ chú (anh/ chị/ bạn) hoặc gia đình còn sở hữu mảnh đất nào khác nữa không? ① Có (Tổng số lượng mảnh đất đang sở hữu:) ② Không 	
Địa vị xã hội	Ngh ề nghi ệp	Cá nhân	1. Trước năm 2002, cô/ chú (anh/ chị/ bạn) làm nghề gì? ()
		Thành viên trong gia đình	1. Trước năm 2002 ai là người chủ yếu lo liệu mọi việc trong gia đình? Nghề nghiệp gì? ()
	Nơi làm việc	Cá nhân	1. Trước năm 2002 thì văn phòng/ nơi làm việc của cô/ chú (anh/ chị/ bạn) ở đâu ① Hải Châu ② Thanh Khê ③ Sơn Trà

			④ Ngũ Hành Sơn ⑤ Liên Chiểu ⑥ Cẩm Lệ
		Thành viên trong gia đình	1. Trước năm 2002 thì nơi làm việc của lao động chính trong gia đình ở đâu? ① Hải Châu ② Thanh Khê ③ Sơn Trà ④ Ngũ Hành Sơn ⑤ Liên Chiểu ⑥ Cẩm Lệ
	Thu nhập	Cá nhân	1. Tổng thu nhập cả năm của cô/ chú (anh/ chị/ bạn) năm 2002 khoảng? (_____ VND)
		Cả hộ gia đình	1. Tổng thu nhập cả năm của cả gia đình năm 2002 khoảng bao nhiêu? (_____ VND)
Thay đổi không gian	Sử dụng nhà ở	TH. A	1. Ngôi nhà/ tòa nhà này năm 2002 có mấy tầng? (_____) tầng 2. Năm 2002, mục đích sử dụng chính của mỗi tầng là gì? (1trệt: _____ 2: _____ 3: _____ 4: _____ 5: _____ 6 và trên nữa: _____ Tầng áp mái: _____)
		TH. B	1. Ngôi nhà/ tòa nhà này cô/ chú (anh/ chị/ bạn) hiện tại có mấy tầng? (_____) tầng 2. Mục đích sử dụng chính của mỗi tầng trong ngôi nhà/ tòa nhà của cô/ chú (anh/ chị/ bạn) hoặc gia đình là gì? (1trệt: _____ 2: _____ 3: _____ 4: _____ 5: _____ 6 và trên nữa: _____ Tầng áp mái: _____)
	Việc sử dụng tầng trệt	TH. A	1. Năm 2002 cô/ chú (anh/ chị/ bạn) hay các thành viên trong gia đình có sử dụng tầng 1 trong ngôi nhà/ tòa nhà hoặc cho người khác thuê không? ① Gia đình sử dụng ② Cho thuê kiếm thêm thu nhập 2. Năm 2002 các mục đích sử dụng cụ thể của tầng 1 là gì? (Lựa chọn các phương án trả lời dưới đây) ① Mục đích thương mại (Kiểu kinh doanh: _____) ② Văn phòng ③ Tiếp khách hoặc nhà bếp ④ Kho chứa đồ ⑤ Nơi để xe máy ⑥ Nơi để xe ô tô ⑦ Khác (Cụ thể): (_____)
		TH. B	1. Năm 2002 cô/ chú (anh/ chị/ bạn) hay các thành viên

			<p>trong gia đình có sử dụng tầng 1 trong ngôi nhà/ tòa nhà hoặc cho người khác thuê không?</p> <p><u>① Gia đình sử dụng</u></p> <p><u>② Cho thuê kiếm thêm thu nhập</u></p> <p>2. Năm 2002 các mục đích sử dụng cụ thể của tầng 1 của ngôi nhà/ tòa nhà cô/ chú (anh/ chị/ bạn) hay gia đình sở hữu năm 2002? (Lựa chọn các phương án trả lời dưới đây)</p> <p><u>① Mục đích thương mại (Kiểu kinh doanh: _____)</u></p> <p><u>② Văn phòng</u> <u>③ Tiếp khách hoặc nhà bếp</u></p> <p><u>④ Kho chứa đồ</u> <u>⑤ Nơi để xe máy</u></p> <p><u>⑥ Nơi để xe ô tô</u></p> <p><u>⑦ Khác (Cụ thể): (_____)</u></p>
Việc sở hữu các phương tiện giao thông	Xe máy	1. Năm 2002 gia đình cô/ chú (anh/ chị/ bạn) có bao nhiêu xe máy? (_____)	
	Xe đạp	1. Năm 2002 gia đình cô/ chú (anh/ chị/ bạn) có bao nhiêu xe đạp? (_____)	
	Ô tô (kể cả xe tải)	1. Năm 2002 gia đình cô/ chú (anh/ chị/ bạn) có bao nhiêu ô tô (kể cả xe tải)? (_____)	

II. Từ năm 2003: Sau khi xây dựng đường Nguyễn Tất Thành

Phân loại	Câu hỏi
<p>Trường hợp A Nếu vẫn tiếp tục sống trên mảnh đất này</p>	<p>1. Từ năm 2003, cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình vẫn tiếp tục sở hữu mảnh đất này phải không? <u>① Đúng</u> <u>② Không phải</u></p>
<p>Trường hợp B Nếu mua lại mảnh đất này</p>	<p>1. Từ năm 2003, cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình đã mua lại mảnh đất này phải không? <u>① Đúng</u> <u>② Không phải</u></p> <p>2. Nếu vậy thì mảnh đất này được mua lại từ năm nào? Năm (_____)</p> <p>3. Kiểu nhà của cô/ chú (anh/ chị/ bạn) là gì? <u>① Nhà hộp</u> <u>② Biệt thự</u> <u>③ Nhà đơn giản</u> <u>④ Nhà cao tầng</u> <u>⑤ Khác (Cụ thể): (_____)</u></p> <p>4. Mục đích mua mảnh đất này là gì? <u>① Ở</u> <u>② Mục đích thương mại</u> <u>③ Cho thuê</u> <u>④ Khác (Cụ thể): (_____)</u></p>
Việc	

c sở hữu đất và loại	Trường hợp C Nếu mảnh đất này đã được tái xây dựng lại		1. Từ năm 2003, cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình đã tái xây dựng lại mảnh đất này? <input type="radio"/> Đúng <input type="radio"/> Không phải 2. Nếu vậy, mảnh đất này được xây dựng lại vào năm nào? Năm (_____) 3. Kiểu nhà của cô/ chú (anh/ chị/ bạn) sau khi được xây dựng lại là gì? <input type="radio"/> Nhà hộp <input type="radio"/> Biệt thự <input type="radio"/> Nhà đơn giản <input type="radio"/> Nhà cao tầng <input type="radio"/> Khác (Cụ thể): (_____) 4. Mục đích của việc xây dựng lại là gì? <input type="radio"/> Ở <input type="radio"/> Mục đích thương mại <input type="radio"/> Cho thuê <input type="radio"/> Khác (Cụ thể): (_____)
	Trường hợp D Nếu bạn thuê một tòa nhà		1. Từ năm 2003, cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình đã tái xây dựng lại mảnh đất này? <input type="radio"/> Đúng <input type="radio"/> Không phải 2. Nếu vậy, mảnh đất này được xây dựng lại vào năm nào? Năm (_____) 3. Kiểu nhà của cô/ chú (anh/ chị/ bạn) sau khi được xây dựng lại là gì? <input type="radio"/> Nhà hộp <input type="radio"/> Biệt thự <input type="radio"/> Nhà đơn giản <input type="radio"/> Nhà cao tầng <input type="radio"/> Khác (Cụ thể): (_____) 4. Mục đích của việc xây dựng lại là gì? <input type="radio"/> Ở <input type="radio"/> Mục đích thương mại <input type="radio"/> Cho thuê <input type="radio"/> Khác (Cụ thể): (_____)
Địa vị xã hội	Ng hệ ngh iệp	Cá nhân	1. Từ 2003, công việc của cô/ chú (anh/ chị/ bạn) có thay đổi không? <input type="radio"/> Có <input type="radio"/> Không 2. Nếu có thì tại sao lại thay đổi? (_____)
		Thành viên trong gia đình	1. Từ 2003 công việc của các thành viên trong gia đình có thay đổi không? <input type="radio"/> Có <input type="radio"/> Không 2. Nếu có thì tại sao lại thay đổi? (_____)
	Nơi làm việc	Cá nhân	1. Từ năm 2003 địa chỉ văn phòng/ nơi làm việc của cô/ chú (anh/ chị/ bạn) có thay đổi không? <input type="radio"/> Có <input type="radio"/> Không
		Thành viên trong gia	1. Từ năm 2003 địa chỉ văn phòng/ nơi làm việc của các thành viên trong gia đình có thay đổi không? <input type="radio"/> Có <input type="radio"/> Không

		đình	
	Thu nhậ p	Cá nhân	1. Tổng thu nhập cả năm của cô/ chú (anh/ chị/ bạn) năm 2013 khoảng bao nhiêu? (_____ VND)
		Hộ gia đình	1. Tổng thu nhập cả năm của cả gia đình năm 2013 khoảng bao nhiêu? (_____ VND)
	Thay đổi khô ng gia	Việc sử dụng nhà cửa và sự thay đổi về mặt kiến trúc	1. Ngôi nhà/ tòa nhà hiện tại có mấy tầng? (_____) tầng 2. Hiện tại, mục đích sử dụng chính của mỗi tầng là gì? (1trệt: _____ 2: _____ 3: _____ 4: _____ 5: _____ 6 và trên nữa: _____) Tầng áp mái: (_____) 3. Tầng nào đang được cho thuê nếu có? ① Không ② (_____) 4. Từ 2003, việc sử dụng ngôi nhà/ tòa nhà này có thay đổi? ① Có ② Không 5. Nếu có thì cụ thể thay đổi như thế nào? (_____)
		Việc sử dụng tầng trệt và sự thay đổi về kiến trúc	1. Mục đích sử dụng hiện tại của tầng trệt là gì? (Chọn các phương án trả lời bên dưới) ① Mục đích thương mại (Kiểu kinh doanh: _____) ② Văn phòng ③ Tiếp khách hoặc nhà bếp ④ Kho chứa đồ ⑤ Nơi để xe máy ⑥ Nơi để ô tô ⑦ Khác(Cụ thể): (_____) 2. Từ 2003, việc sử dụng tầng 1 có thay đổi? 2-1. ① Có ② Không 2-2. Nếu có thì cụ thể thay đổi như thế nào? (_____) 2-3. Những thay đổi cụ thể nào để phù hợp với việc hoạt động kinh doanh? (Chọn các phương án trả lời bên dưới) ① Thay đổi loại hình kinh doanh ② Số nhân viên tăng ③ Việc cấp phép kinh doanh ④ Khác (Cụ thể): (_____)
		Việc xây dựng nhà	TH. A

n	ở	Sự Thay đổi kết cấu xây dựng nhà ở	<p>3. Cấu trúc của ngôi nhà có thay đổi chỗ nào không? (Ví dụ: vị trí của nhà tắm, cửa chính, cửa sổ) ① Có (Cụ thể: _____) ② Không</p> <p>4. Mặt ngoài của ngôi nhà/ tòa nhà đã được nâng cấp bằng cách sử dụng thêm những vật liệu có giá trị cao không? ① Có (Cụ thể : _____) ② Không</p> <p>5. Ngoài những điều trên, ngôi nhà/ tòa nhà còn có những thay đổi nào khác không? (_____)</p> <p>6. Cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình có được nhận trợ cấp hay sự hỗ trợ bằng vật chất của Nhà nước để phát triển công việc hoặc thay đổi ngôi nhà này hay không? ① Có (Cụ thể: _____) ② Không</p>
			<p>1. Từ năm 2003, số tầng của ngôi nhà/ tòa nhà có tăng không? ① Có, tăng (_____) tầng ② Không</p> <p>2. Từ 2003 cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình có mua thêm mảnh đất bên cạnh để mở rộng diện tích không? ① Có ② Không</p> <p>3. Cấu trúc của ngôi nhà có thay đổi chỗ nào không? (Ví dụ: vị trí của nhà tắm, cửa chính, cửa sổ) ① Có (Cụ thể: _____) ② Không</p> <p>4. Mặt ngoài của ngôi nhà/ tòa nhà đã được nâng cấp bằng cách sử dụng thêm những vật liệu có giá trị cao không? ① Có (Cụ thể: _____) ② Không</p> <p>5. Ngoài những điều trên, ngôi nhà/ tòa nhà còn có những thay đổi nào khác không? (_____)</p> <p>6. Cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình có được nhận nguồn trợ cấp hay sự hỗ trợ bằng vật chất nào của Nhà nước hay không mua ngôi nhà/ tòa nhà này không? ① Có(Cụ thể: _____) ② Không</p>
			<p>1. Từ năm 2003, số tầng của ngôi nhà/ tòa nhà có tăng không? ① Có, tăng (_____) ② Không</p>

			<p>2. Từ 2003 cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình có mua thêm mảnh đất bên cạnh để mở rộng diện tích không? <input type="radio"/> ① Có <input type="radio"/> ② Không</p> <p>3. Cấu trúc của ngôi nhà có thay đổi chỗ nào không? (Ví dụ: vị trí của nhà tắm, cửa chính, cửa sổ...) <input type="radio"/> ① Có (Cụ thể: _____) <input type="radio"/> ② Không</p> <p>4. Mặt ngoài của ngôi nhà/ tòa nhà đã được nâng cấp bằng cách sử dụng thêm những vật liệu có giá trị cao không? <input type="radio"/> ① Có (Cụ thể: _____) <input type="radio"/> ② Không</p> <p>5. Ngoài những điều trên, ngôi nhà/ tòa nhà còn có những thay đổi nào khác không? (_____)</p> <p>6. Cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình có được nhận nguồn trợ cấp hay sự hỗ trợ bằng vật chất nào của Nhà nước để xây dựng lại ngôi nhà/ tòa nhà này không? <input type="radio"/> ① Có (Cụ thể: _____) <input type="radio"/> ② Không</p>
		<p>TH. D</p>	<p>1. Từ năm 2003, số tầng của ngôi nhà/ tòa nhà có tăng không? <input type="radio"/> ① Có, tăng (_____) <input type="radio"/> ② Không</p> <p>2. Từ 2003 cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình có mua thêm mảnh đất bên cạnh để mở rộng diện tích không? <input type="radio"/> ① Có <input type="radio"/> ② Không</p> <p>3. Cấu trúc của ngôi nhà có thay đổi chỗ nào không? (Ví dụ: vị trí của nhà tắm, cửa chính, cửa sổ...) <input type="radio"/> ① Có (Cụ thể: _____) <input type="radio"/> ② Không</p> <p>4. Mặt ngoài của ngôi nhà/ tòa nhà đã được nâng cấp bằng cách sử dụng thêm những vật liệu có giá trị cao không? <input type="radio"/> ① Có (Cụ thể: _____) <input type="radio"/> ② Không</p> <p>5. Ngoài những điều trên, ngôi nhà/ tòa nhà còn có những thay đổi nào khác không? (_____)</p> <p>6. Cô/ chú (anh/ chị/ bạn) hoặc các thành viên trong gia đình có được nhận nguồn trợ cấp hay sự hỗ trợ bằng vật chất nào của Nhà nước để xây dựng lại ngôi nhà/ tòa nhà này không? <input type="radio"/> ① Có (Cụ thể: _____) <input type="radio"/> ② Không</p>

Thay đổi giá bất động sản	Trường hợp A		1. Năm 2002 giá đất của ngôi nhà/ tòa nhà này khoảng bao nhiêu? (_____ VND) 2. Năm 2014 giá đất của ngôi nhà/ tòa nhà hiện tại này khoảng bao nhiêu? (_____ VND)
	Trường hợp B		1. Giá đất của ngôi nhà/ tòa nhà này tại thời điểm mua khoảng bao nhiêu? (_____ VND) 2. Năm 2014 giá đất của ngôi nhà/ tòa nhà hiện tại này khoảng bao nhiêu? (_____ VND)
	Trường hợp C		1. Giá đất của ngôi nhà/ tòa nhà này tại thời điểm xây dựng lại khoảng bao nhiêu? (_____ VND) 2. Năm 2014 giá đất của ngôi nhà/ tòa nhà hiện tại này khoảng bao nhiêu? (_____ VND)
	Trường hợp D		1. Giá đất của ngôi nhà/ tòa nhà này tại thời điểm xây dựng lại khoảng bao nhiêu? (_____ VND) 2. Năm 2014 giá đất của ngôi nhà/ tòa nhà hiện tại này khoảng bao nhiêu? (_____ VND)
Thời điểm đi lại	Việc sở hữu	Xe máy	1. Năm 2002 gia đình có bao nhiêu xe máy? (_____)
		Xe đạp	1. Năm 2002 gia đình có bao nhiêu xe đạp? (_____)
		Ô tô (kể cả xe tải)	1. Năm 2002 gia đình có bao nhiêu ô tô (kể cả xe tải)? (_____)
	Phạm vi hoạt động	Công việc	1. Cô/ chú (anh/ chị/ bạn) hay gia đình vui lòng mô tả lộ trình đi đến nơi làm việc được không ạ? # Hiện thị đường dẫn trên bản đồ <u>Ai đi?</u> (_____) 2. Loại phương tiện mà cô/ chú (anh/ chị/ bạn) sử dụng để đi làm là gì? <u>① Đi bộ ② Xe đạp ③ Xe máy ④ Ô tô</u> <u>⑤ Khác (Cụ thể: _____)</u>
		Giáo dục	1. Cô/ chú (anh/ chị/ bạn) hay gia đình vui lòng cho biết vị trí trường học và lộ trình đến trường của con mình được không ạ? # Hiện thị đường dẫn trên bản đồ 2. Con của cô/ chú (anh/ chị/ bạn) đi học bằng phương tiện gì? <u>① Đi bộ ② Xe đạp ③ Xe máy cùng với bố mẹ</u> <u>④ Ô tô cùng với bố mẹ ⑤ Khác (Cụ thể: _____)</u>

		<p>Mua sắm</p>	<p>1. Cô/ chú (anh/ chị/ bạn) hay gia đình vui lòng cho biết vị trí của chợ lớn hoặc siêu thị mà gia đình thường đi và lộ trình đi được không ạ? # Hiện thị đường dẫn trên bản đồ</p> <p>2. Loại phương tiện mà cô/ chú (anh/ chị/ bạn) sử dụng để đi chợ là gì? ① Đi bộ ② Xe đạp ③ Xe máy ④ Ô tô ⑤ Khác (Cụ thể: _____)</p>
		<p>Các hoạt động tôn giáo</p>	<p>1. Cô/ chú (anh/ chị/ bạn) hay gia đình vui lòng cho biết vị trí của cơ sở tôn giáo mà gia đình thường đến và lộ trình đi được không ạ? # Hiện thị đường dẫn trên bản đồ</p> <p>2. Loại phương tiện mà cô/ chú (anh/ chị/ bạn) sử dụng để đi đến đó là gì? ① Đi bộ ② Xe đạp ③ Xe máy ④ Ô tô ⑤ Khác (Cụ thể: _____)</p>
		<p>Giải trí</p>	<p>1. Cô/ chú (anh/ chị/ bạn) hay gia đình vui lòng cho biết vị trí của những nơi vui chơi giải trí mà gia đình thường đến và lộ trình đi được không ạ? Ví dụ công viên, công viên giải trí, rạp xem phim..) # Hiện thị đường dẫn trên bản đồ</p> <p>2. Loại phương tiện mà cô/ chú (anh/ chị/ bạn) sử dụng để đi đến các điểm vui chơi giải trí là gì? ① Đi bộ ② Xe đạp ③ Xe máy ④ Ô tô ⑤ Khác (Cụ thể: _____)</p>
<p>Sự cải thiện về sự thoải mái và sự an toàn</p>	<p>1. Từ năm 2003, khu vực này có bất kỳ hoạt động tình nguyện nào của người dân ở đây để cải thiện môi trường của các ngôi nhà/ tòa nhà hay không gian sống quanh đây không? ① Có ② Không 1-1. Cụ thể là chương trình gì? (_____)</p> <p>2. So với trước năm 2003 thì việc đi bộ quanh khu vực này 1 mình vào ban đêm thì như thế nào? ① Trở nên rất nguy hiểm ② Trở nên nguy hiểm ③ Giống nhau ④ Trở nên an toàn ⑤ Rất an toàn</p>		
	<p>1. Cô/ chú (anh/ chị/ bạn) hoặc gia đình bắt đầu kinh doanh mới từ năm 2003? ① Đúng ② Không</p>		

<p>Những thay đổi về việc kinh doanh cá nhân/hộ gia đình</p>	<p>1-1. Nếu đúng, bắt đầu kinh doanh cái gì? (_____)</p> <p>1-2. Nếu đúng, bắt đầu kinh doanh từ năm nào? (_____)</p> <p>2. Từ năm 2003 đến nay có điều gì thay đổi về qui mô/ loại hình kinh doanh của cô/ chú.. hoặc là gia đình không? ① Có ② Không</p> <p>2-1. Nếu có thì chuyển sang kinh doanh cái gì? (_____)</p> <p>2-2. Nếu có thì vào năm nào? Năm (_____)</p> <p>3. Từ năm 2003 đến nay có điều gì thay đổi về phương thức hoạt động kinh doanh của cô/ chú.. hoặc là gia đình không? ① Có ② Không</p> <p>3-1. Nếu có thì cụ thể là thay đổi những gì? (_____)</p> <p>3-2. Nếu có thì xảy ra vào năm nào? Năm (_____)</p>
--	---

III. Thông tin chung

Phân loại	Câu hỏi
Giới tính	1. Giới tính của cô/ chú (anh/ chị/ bạn) là gì? ① Nam ② Nữ
Tuổi	1. Tuổi của cô/ chú (anh/ chị/ bạn) là gì? (_____) Tuổi
Trình độ học vấn	1. Trình độ học vấn cao nhất của cô/ chú (anh/ chị/ bạn) là gì? ① Tiểu học ② Trung học cơ sở ③ Trung học phổ thông ④ Trung tâm dạy nghề kỹ thuật ⑤ Bằng cử nhân và cao hơn
Gia đình	1. Trong gia đình cô/ chú (anh/ chị/ bạn) có bao nhiêu người? (_____) người
Nơi sinh	1. Nơi sinh của cô/ chú (anh/ chị/ bạn) ở đâu? Thành phố (_____) Quận/ huyện (_____)
Nơi khảo sát	1. Nơi cô/ chú (anh/ chị/ bạn) thực hiện bản khảo sát này? (_____) Thành phố (_____) Quận/ huyện (_____) Đường (_____) Số.

Địa chỉ ở hiện tại	<p>1. Địa chỉ ở trên có giống với địa chỉ hiện tại không? ① Có ② Không</p> <p>2. Nếu không thì vui lòng cho biết địa chỉ ở hiện tại của cô/ chú (anh/ chị/ bạn). () Thành phố () Quận/ huyện () Đường () Số.</p>
--------------------	---

Tệp đính kèm: Bản đồ cho biết lộ trình thực hiện cho hoạt động chính

Appendix 3. Photographs of research activities in Danang



Figure 26. Survey orientation with Vietnamese research assistants (July 2014).



Figure 27. Presentation on research purpose and results at the Department of Architecture at Danang University of Science and Technology (February 2015, August 2015).



Figure 28. Resident interviews at Thanh Khe district to understand the impact of new road development (July 2014).



Figure 29. Resident interview at Thanh Khe district to understand the impact of new road development (August 2015).



Figure 30. Meeting with Professor Tran Duc Quang and Nguyen Anh Tuan at the Department of Architecture, Danang University of Science and Technology (August 2015).



Figure 31. Questionnaire preparation for analyzing the results of in-depth interviews (July 2014, August 2015).



Figure 32. Meeting with Mr. Park Heehong, the local director of Daewon Cantavil – the developer of the Da Phuoc New Town (September 2016).

국문초록

신흥국 도시에서 도로 개발이 커뮤니티와 도시형태 변화에 미치는 영향: 베트남 다낭을 중심으로

원 세 형

서울대학교 대학원
협동과정조경학 전공

새로운 도로 인프라스트럭처의 건설은 지역 경제성장을 이끄는 요소로 간주되어 왔으며, 도시 공간을 형성하거나 확장시키면서 도시 형태를 변화시키고 있다. 그럼에도 불구하고 도로 개발이 주변의 사람과 주변 환경에 미치는 직접적인 효과에 대한 연구는 잘 알려지지 않았다. 도시화가 빠르게 진행 중인 아시아 신흥국의 상황에 맞는 좋은 도시 환경을 조성하기 위해서는 도로 개발이 커뮤니티와 도시형태 변화에 미치는 효과를 파악하고 이를 공간계획에 반영하기 위한 도시 데이터 기반의 실증 연구가 필요한 시점이다.

본 연구는 최근 도시 인프라를 활발하게 확충하며 빠른 도시화와 높은 경제성장을 이루고 있는 베트남 다낭의 도시환경 변화를 주목했다. 그 중에서도 2003년에 다낭만을 따라 개통된 폭 40 m, 길이 12 km 의 Nguyen Tat Thanh 도로 주변이 연구대상지로 선정되었다.

도로 개발이 주변 사람과 물리적 환경 변화에 미치는 영향을 파악하기 위하여 도로주변에 살고 있는 건물주인 혹은 직계 가족 총 460명을 대상으로 도로 개발을 전후로 사람들의 사회경제적 변화에 대한 심층인터뷰가 이루어졌으며, 이용하는 공간의 특징이 조사되었다. 그리고 도로 개발 후 도로에 인접하여 형성된 다섯 개의 신시가지 조성 프로젝트에 대한 건설과 진행과정, 형태와 디자인의 특성 등이 분석되었다. 마지막으로 현지 대학 교수진들과 담당 공무원, 민간 개발자에 대하여 전문가 인터뷰가 실시되었다.

첫 번째 챕터는 도로개발이 인근의 주민과 근린환경 변화에 미치는 전반적인 효과를 파악하기 위한 연구이다. 새로운 도로인프라와 도시 변화 사이의 관계를 더 잘 이해하기 위해 다음의 영역 중 하나에 거주하는 400명의 부동산 소유주에 대한 심층 면접 조사가 이루어졌다. 1) 새로운 도로에 직접 인접한 영역, 2) 기존 도로에 인접하지만 새로운 도로와는 떨어진 영역, 3) 차량접근이 불가능한 도시 블록 내부 영역으로 나누어 조사가 진행되었다. 결과는 주택 개발, 건물 밀도 및 용도, 소득 수준, 출퇴근 거리 및 직업 유형을 포함하여 도로 개발은 시간 경과에 따라 상당수의 도시 변화와 밀접하게 관련 있었다. 이 변화는 새로운 도로에 인접한 지역에서 더욱 두드러졌다. 거주민 중 약 46%의 사람들이 도로건설 후에 유입된 이주민들이었는데 이들 중 상당수가 새로운 도로에 인접하여 정착했기 때문이다. 상대적으로 경제적 여유가 있는 이주민들은 도로에서 떨어진 다른 지역과 비교하여 비교적 큰 규모의 상업 용도를 수용함으로써 토지를 자본화했다. 이와는 달리, 블록 내부 영역은 도로 개발 후 주거 지역을 더욱 살기 좋은 근린 환경으로 유지하고자하는 원주민들에 의해 필지단위에서 작은 규모의 공간이 변화된 도시환경에 적응 가능한 형태로 활발하게 재이용되면서 근린 환경이 변화

되었다.

두 번째 챕터는 도로 개발로 인하여 발생하는 이동성의 변화가 이전의 주거 지역에서 도시 경관의 변화에 어떻게 영향을 미칠 수 있는지를 보여 주는 연구이다. 이를 위하여 거주민 460명에 대하여 사람들이 직장, 쇼핑, 여가, 교육, 종교 활동을 위해 이용하는 장소와 경로가 지도상에서 파악되었다. 연구결과, 전반적인 이동성이 향상되었음에도 불구하고, 그 효과는 원주민과 이주민에게 다르게 작용했다. 분석 결과, 원주민들은 이주민보다 더 긴 통근 거리를 감내했으며 이는 도로 개발 후 일자리가 크게 분산되는 것과 관련 있었다. 원주민과 비교했을 때, 이주민들은 종종 직주균형을 이룬 혼합 용도의 커뮤니티를 형성하며, 새로운 도로 가까이에 정착했다. 그러나 이들은 통근과 관련없는 이동에서는 원주민보다 훨씬 긴 거리를 이동했다. 도시 공간 이용의 측면에서 원주민들은 개인 소유의 옥외 공간을 소규모로 변형시켜 일상적 삶의 공간을 개선했다. 반면에 이주민들은 규모가 큰 숙박 시설과 고급 주거용 건물을 소유하여 이 지역의 상업가로 형성에 기여했다.

세 번째 챕터는 도로 개발 후 도시형태 변화의 특징을 다루고 있다. 이를 위해 도로 주변에 형성되었거나 현재 건설 중인 다섯 개의 주요 도시개발 프로젝트의 사업 실행과정과 건물 종류와 규모, 용도, 인구밀도를 포함한 형태와 설계의 측면, 그리고 공간 이용 방식이 분석되었다. 그 결과, 도시개발과정에서 관습적 도시형태가 일상에서 더 많은 공공공간 이용에 편리한 구조로 진화중임을 확인할 수 있었다. 이 과정에서 의도되거나 우연히 형성된 그늘진 구간은 가로 공간의 활발한 이용을 위한 핵심적인 요소였다. 그럼에도 불구하고, 도시브랜딩을 위한 대규모 도시개발 사업의 마스터플랜은 부동산 투자를 위한 수단으로 전략했고, 승인된 계획안이 빈번하게 변

화되면서 과도한 공기 지연과 도시 공간의 질 하락에 영향을 미치고 있었다.

이 연구는 다음의 시사점을 갖는다. 인프라건설과 개발 사업이 거의 동시에 이루어지는 신흥국의 도시 환경에서 개발의 이익을 다양한 주체가 조화롭게 공유하면서 도시 공간의 질을 담보하기 위해서는 개발이 주변에 미치는 효과를 예측하고 이용자 행태가 근린이나 지역계획 수준에서 충분히 고려된 커뮤니티 니즈 기반의 정교한 계획과 설계가 이루어져야 한다. 그리고 국내외 자본에 의해 이루어지는 다양한 도시개발사업을 성공적으로 이끌기 위해서는 공공이 개발에 대한 뚜렷한 비전을 수립하고 공공과 민간의 역할이 매우 구체화된 상태에서 개발이 진행되어야 한다.

주요어: 도로 인프라스트럭처, 도시개발, 이동성, 통근패턴,
근린환경, 도시형태, 도시설계

학 번: 2013 - 31245