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

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ABSTRACT

This study documented the transformation of urban landscape and residents' socioeconomic conditions associated with the development of Nguyen Tat Thanh Road in Danang, Vietnam. The road was newly built along the coastal lines of Danang Bay in 2003, linking downtown Danang with the western part of the city. 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—where relatively well-off migrants settled down and capitalized on land rents by accommodating a variety of retail uses—compared to other areas away from the road. However, the area inside the block also experienced small-scaled, parcel-level adaptive reuse of the built environment by the original residents who maintained the livable environment of the residential neighborhood.

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; Cervero, 2009; Cervero & Kang, 2011; Chandra & Thompson, 2000; Kelly, 1994; Kwon, Kim, & Jeon, 2014; Neuman & Smith, 2010; Padeiro, 2013). 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 et al., 2014). However, it is still unclear as to who are affected by these infrastructure-related

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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.

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 Moi*[1]—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 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 (Fig. 1). In terms of building form, a large number of tube houses[2]— a narrow, street-facing multi-floor house that is called *Nhà Ống* in Vietnamese or 'neo-tube house' in contemporary terms—have been developed along the road (Fig. 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 m^2 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 be no more than 15 min, 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.

[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, Quertamp Nguyen, Miras, Vinh, & Truong, 2012).

[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 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 × 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 × 20–40 m. Reinforced concrete with bearing frames form the major structure and building materials include brick walls and plaster.