Housing abandonment in shrinking cities of East Asia: Case study in Incheon, South Korea

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Abstract
Despite growing signs of urban shrinkage in countries such as Korea, Japan and China, few studies have examined the generalisable pattern of urban shrinkage and its relationship to the characteristics of housing abandonment in the East Asian context. This study explores five major paths that may explain the emergence of vacant houses in declining inner-city areas, based on empirical observations in the city of Incheon, South Korea. The paths are: (1) strong government-led new built-up area development plans (pull factor for population movement); (2) delay and cancellation of indiscriminate redevelopment projects (push factor for population movement); (3) initial poor development and concentration of substandard houses; (4) aging of the elderly population; and (5) the outflow of infrastructure and services. These paths, also found in Japan or China, are expected to be combined in a local context, leading to more serious housing abandonment. This study suggests that it is important to take appropriate countermeasures based on the identification of the paths causing vacant houses.

Keywords
aging population, developmental state, East Asia, inner city, urban shrinkage, vacant houses

摘要
尽管在韩国、日本和中国等国家，城市收缩的迹象越来越明显，但很少有研究考察城市收缩的普遍模式及其与东亚地区弃房特征的关系。本研究基于在韩国仁川市的经验观察，探索了五条主要路径，这五条路径可以解释衰退的市中心地区空置房屋的出现。这五条途径是：(1) 强有力的政府主导的新建成区发展计划（人口流动的拉动因素）；(2) 拖延和取消无差别再开发项目（人口流动的推动因素）；(3) 初始开发不良，不合格房屋集中；(4) 老年人口老龄化；(5) 基础设施和服务外流。这些途径在日本或中国也可以找到，预计将与当地情况结合导致更严重的房屋遗弃。本研究表明，在确定空置房屋产生路径的基础上采取适当的对策十分重要。

关键词
人口老龄化、发展状态、东亚、内城、城市收缩、空置房屋
Introduction

Urban shrinkage\(^1\) is a common but differentiated global phenomenon. Shrinkage is a specific trajectory of cities that follows different logics of development in economic, social and physical aspects (Großmann et al., 2013). Previous studies have shown that it is neither a short-term divergence from typical urban growth nor a marginal pattern of urban development processes (Cunningham-Sabot et al., 2013; Großmann et al., 2013; Hartt, 2018; Reckien and Martinez-Fernandez, 2011). Shrinkage is a multidimensional phenomenon that differs in type and approach by countries and cities (Martinez-Fernandez et al., 2012). Cities in East Asian countries including South Korea, Japan and China also show distinctive signs of shrinkage; however, most studies have discussed this issue from the United States’ and European perspectives (Großmann et al., 2012; Haase et al., 2013, 2014; Morckel, 2014; Ryan, 2012). These countries have different patterns of urban shrinkage in terms of time, speed and characteristics (Buhnik, 2010), despite some similarities with Western countries in the causes and effects of shrinkage (Table 1).

The major patterns of shrinkage in Western cities, such as Detroit and Milwaukee of the USA, Liverpool of the UK, and Leipzig and Halle of Germany, are generally understood as deindustrialisation, suburbanisation, and population decrease (Cunningham-Sabot et al., 2013; Haase et al., 2013; Martinez-Fernandez et al., 2016). East Asian countries have also had a similar experience in the process of shrinkage. However, the strong growth agenda under the developmental state brought about swift economic development and urbanisation in these countries. They continued their growth-oriented policies even after rapid economic growth had slowed down. They are now facing significant problems associated with rapid urban shrinkage (Joo and Park, 2016). In East Asia, the public sector monopolised land and housing development, unlike market- and private sector-led development in the European and American experience (Ekers et al., 2012; Lee and Shin, 2011). State-led suburbanisation promoted the relocation of the population and public institutions, aggravating the decline of inner-city areas. Moreover, the population of East Asia is aging more rapidly than any other region, as they move from being aging to aged societies in just two or three decades, which is much faster than the 69 years for the USA and 115 years for France (World Bank, 2016).\(^2\)

Housing abandonment poses one of the most serious problems in East Asia’s shrinking cities, especially in their inner-city areas (Accordino and Johnson, 2000; Sternlieb et al., 1974). Urban shrinkage and housing abandonment form a vicious cycle of mutual influence: urban shrinkage leads to a decrease in population and collapse of industrial bases that are associated with abandonment of houses, whereas housing abandonment brings about additional shrinkage through the deterioration of physical environment, the degradation of local vitality, decreases in property values, and increases in housing management costs (Kim, 2019). According to Japan’s Ministry

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<tr>
<th>Where</th>
<th>Pattern</th>
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<tbody>
<tr>
<td>USA</td>
<td>Deindustrialisation</td>
<td>Since the mid-20th century</td>
<td>Factory relocation, Unemployment, Urban sprawl, Residential segregation, Decrease in population</td>
</tr>
<tr>
<td>Europe</td>
<td>(Market-led) suburbanisation</td>
<td>Western</td>
<td>Residential segregation</td>
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<td></td>
<td>Demographic change</td>
<td>(Market-led) suburbanisation</td>
<td>Drop in birth rate, Out-migration, Housing vacancy</td>
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<td>Political change (post-socialist)</td>
<td>Eastern Eastern</td>
<td></td>
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<tr>
<td>East Asia</td>
<td>(In a very short period) change of industrial structure</td>
<td>Japan Japan Since the early 1990s</td>
<td>Factory relocation, Unemployment, Relocation of public institutions, Spatial disparity between inner-city areas and new built-up areas</td>
</tr>
<tr>
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<td>(State-led) construction of new towns and new built-up areas</td>
<td>Korea Korea Since the late 1990s</td>
<td>Deterioration of substandard residential areas, Rapid aging, Low fertility</td>
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<td>Initial poor development</td>
<td>China China Since the 2010s</td>
<td>Decline of resource-based cities (monotonous industrial structure)</td>
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<td>Demographic transition</td>
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<td>Out-migration of rural workers from inland cities to megacities</td>
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<td>Coexistence of the rapid and massive industrialisation and the slowdown of economic growth</td>
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<td>Oversupply of real estate, Ghost cities, Aging</td>
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<td>Uneven regional development</td>
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<td>Development of new towns as a form of suburbanisation (planned and driven by the state)</td>
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<td>Demographic transition</td>
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Notes: 

- **New towns** are small and medium cities with high-rise apartment complexes outside the metropolis planned by government intervention, and in most cases have spatial connection with the metropolitan area in Korea.
- **New built-up areas** are residential areas, smaller than new towns, primarily developed through ‘housing site development projects’ in Korea, which have been built as apartment complexes adjacent to inner-city areas.
- **Inner-city areas** include not only the downtown area but also old built-up areas which are widely located between the downtown and new built-up areas.

Source: Rewritten by the author with reference to Cunningham-Sabot et al. (2013), Großmann et al. (2013), He et al. (2017), Lee et al. (2016), Martinez-Fernandez et al. (2016), Oswalt (2005), and Yang and Dunford (2018).
of Internal Affairs and Communications, as of 2013 the number of vacant houses exceeded 8.2 million, accounting for approximately 13.5% of all houses. The Japanese government enacted the ‘Special Law on Vacant Houses’ in 2015, authorising municipalities to mandate the demolition of vacant houses. In Korea, as of 2015, the number of vacant houses nationwide was approximately 1.07 million, accounting for about 6.5% of all houses. This figure had increased by 30.5% over the previous five years (compared with 820,000 in 2010). The Korean government enacted the ‘Special Law on Regenerating Vacant and Small-scale Houses’ in 2017.

In Korea’s shrinking cities, political-economic, institutional, physical and socio-demographic factors have acted as potential paths to housing abandonment. From a political perspective, the urban development plans, backed by strong government policies in the era of compressed growth, have negatively affected structural issues of urban decline, creating urban conditions vulnerable to housing abandonment (Choi and Kim, 2018). Houses built during the rapid urbanisation were more likely to become vacant houses because of their inadequate physical characteristics in buildings and surrounding environment. The concentration of socially disadvantaged classes, such as elderly people and low-income households, have correlated with the lack of maintenance, inhibiting the inflow of new residents. Moreover, the collapse of traditional commercial districts and the outflow of amenities have aggravated the poor living environment and eventually have had a significant impact on young people’s decision whether to leave or stay.

Against this backdrop, this study examines how the dynamic of housing abandonment works in inner-city areas experiencing urban shrinkage. Specifically, this study clarifies what the facilitating factors of housing abandonment are and how they interact. The study attempts to integrate empirical evidence found in the city of Incheon, South Korea. Although Incheon has grown externally, it is one of the metropolitan cities that have been experiencing severe urban shrinkage and housing abandonment in the inner city for decades. The study can provide an opportunity to explore different paths of housing abandonment in East Asia, as distinct from those in the West, and suggest implications for urban planning and design required in shrinking cities.

**Five paths leading to housing abandonment**

This case study of Incheon utilises a literature review and field survey as qualitative research methods in order to achieve the above purpose. First, we examine previous studies on urban shrinkage and housing abandonment in East Asian and Western countries. Second, we conduct empirical observations in Incheon, using a field survey and the city’s newly generated GIS platform linked to vacancy data. Third, a comprehensive theoretical framework is established to explain five paths of housing abandonment in shrinking cities based on the case study’s findings.

The five paths concentrate on main factors that have impacts on housing abandonment (Figure 1). Path 1 relates to the state-led construction of new towns and new built-up areas with the relocation of public institutions, pulling residents out of inner-city areas. Path 2 is associated with the delay and cancellation of numerous urban redevelopment projects designated in inner-city areas, pushing residents to new built-up areas. Paths 1 and 2 have resulted from the extensive state intervention in urban planning, which is a distinctive characteristic of land and housing development in East Asia (Lee and Shin, 2011). Path 3 concerns the initially inferior construction of buildings, causing the accelerated deterioration of the
The extreme concentration of population in metropolitan areas that is still found in East Asian countries and the severely depressed birth rate have accelerated the aging of old urban centres. Path 5 relates to the reduction of infrastructure and services in the process of deepened decline, predicting the degradation of quality of life for the remaining people as well as the desolation of inner-city areas.
areas. This phenomenon of irreversible spatial disparity is also found in the cities of Kanagawa, Saitama and Gunma Prefecture of the Tokyo metropolitan area (Figure 2).

More significantly, these paths share the background of a compressed economic growth under the strong developmental regime. The adherence to traditional growth-oriented polices lasted despite the advent of the decline phase, intensifying the problems of shrinking cities (Wiechmann and Pallagst, 2012).

Incheon: A seemingly growing but virtually declining inner city

Korea is a country with an aging population and an alarmingly low birth rate, according to OECD data (OECD, 2019). With this unprecedented sociodemographic change, urban shrinkage has occurred not only in local small towns but also in inner-city areas of larger cities. Incheon, one of the major metropolitan cities in Korea, is currently suffering from urban shrinkage problems, including the stagnation of its manufacturing industry, the decline of traditional commercial districts, an increase in its elderly population, housing abandonment, and a widening spatial inequality.

Incheon developed into the country’s leading industrial city with the construction of industrial complexes in the 1960s and 1970s under the state-led export-oriented economic development policies. Additionally, Incheon became an international city after the establishment of an international airport in 2001 and the 2003 designation of the Free Economic Zone. However, ironically, Incheon’s main inner-city areas – Jung-gu, Dong-gu and Namgu – have gradually declined since the 1980s. Major urban development projects have primarily concentrated in the city’s outskirts, and many public and commercial facilities have relocated to new urban areas. The decline of the inner city has accelerated as the urban redevelopment projects have been delayed and cancelled because of a slowdown in the housing market. As in most Korean cities, this is largely because new built-up areas have been created within a short distance from inner-city areas, facilitating the movement of people who want to occupy an improved living environment. The inner city also faces problems related to the outflow of community facilities and its greater proportion of people aged 65 and over. In all, the long-term decline of the inner city has resulted in about 1200 vacant houses.

Incheon exemplifies how serious the shrinkage of inner-city areas in a large city is, which can go unnoticed because of the city’s overall growth. The case study of Incheon demonstrates how vacant houses are triggered in declining inner-city areas and how they lead to additional shrinkage.

Path 1: State-led new built-up area developments outside an existing inner city

Path 1 focuses on government-led suburbanisation as a means of economic stimulus in periods of compressed growth and its associated neglect of the relatively declining, existing inner-city areas.

Since the 1980s, Korean central and local governments have directly led the development of extensive new urban areas through growth-oriented public policies. The central government constructed two million housing units in just three years with the creation of five large-scale new towns in the metropolitan area, after the announcement of the ‘Two Million Houses Construction Plan (1988–1992)’ in 1988. Moreover, numerous new built-up areas, smaller than new towns, have been constructed adjacent to existing inner-city areas in most cities, regardless of the city’s size (Kim, 2010). These developments have been accompanied by the inevitable relocation of major public institutions
away from inner-city areas. Unlike in the USA, where private developers led suburban expansions and the role of the government was indirect, such as the construction of highways and the provision of a loan system to support suburban home ownership (Jackson, 1987), suburban developments in Korea have been conducted under state-led direction backed by strong government policies.

Figure 3. Relocation of public institutions in Incheon between 1980s and 2019.
Incheon has created modernised apartment complexes on the outskirts of the city through the housing site development projects and relocated public facilities. Starting with the relocation of the city’s education office in 1982, numerous public facilities, including the City Hall, borough office, police agency, court and schools, have moved from the inner-city areas to the newly developed areas. In Figure 3, for example, City Hall, marked with number 3, was previously located in the inner-city area, Jung-gu, and moved to the new built-up area, Namdong-gu, in 1985. At that time, the city government created a large administrative town in Namdong-gu, including the City Hall, municipal council, education office and central library. The relocation of City Hall encouraged further development of the surrounding area in the new built-up area, while promoting the decline in the inner-city area. No. 21 also represents the movement of Incheon National University from Namgu to Yeonsu-gu in 2009. After the relocation, traditional commercial districts around the university declined sharply.

As a result, as middle-class households left the inner city for more liveable and affordable living, houses became vacant in the inner city while population and employment rates declined. Table 2 shows that the population of the new built-up areas has increased while that of the inner-city areas has decreased over the last 20 years. Dong-gu, an inner-city area, had the largest population decline of about 30% over 20 years. The population of Jung-gu decreased by about 12% except for Yeongjong-do, and Nam-gu was about 7%.

**Path 2: Repeated designation and cancellation of redevelopment districts**

Path 2 explores the urban redevelopment projects excessively promoted to regenerate inner-city areas under the government’s persistent growth-oriented public policies. Over-designated project districts have had adverse effects on the areas because of delays and cancellations.

The Korean government designated a huge number of urban redevelopment districts in inner-city areas nationwide in the mid- and late 2000s, particularly after the enactment of the Act integrating various urban redevelopment projects and the introduction of the New Town Project. At that time, in accordance with the property boom, the approval requirement was relaxed, and

<table>
<thead>
<tr>
<th>Administrative district (gu) \ Year</th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
<th>2015</th>
<th>Rate of change for 20 years (%)</th>
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<tbody>
<tr>
<td>Inner-city areas</td>
<td></td>
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<tr>
<td>Jung-gu</td>
<td>68,082</td>
<td>66,642</td>
<td>86,167</td>
<td>83,623</td>
<td>112,910</td>
<td>+ 65.8</td>
</tr>
<tr>
<td>Old downtown</td>
<td>59,679</td>
<td>56,880</td>
<td>59,463</td>
<td>55,090</td>
<td>52,734</td>
<td>− 11.6</td>
</tr>
<tr>
<td>Yeongjong-do</td>
<td>8403</td>
<td>9762</td>
<td>26,704</td>
<td>28,533</td>
<td>60,176</td>
<td>+ 616.1</td>
</tr>
<tr>
<td>Dong-gu</td>
<td>100,114</td>
<td>72,792</td>
<td>74,285</td>
<td>72,794</td>
<td>69,957</td>
<td>− 30.1</td>
</tr>
<tr>
<td>Nam-gu</td>
<td>425,330</td>
<td>408,835</td>
<td>412,816</td>
<td>411,756</td>
<td>397,396</td>
<td>− 6.6</td>
</tr>
<tr>
<td>New built-up areas</td>
<td></td>
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<tr>
<td>Yeonsu-gu</td>
<td>212,541</td>
<td>259,790</td>
<td>262,782</td>
<td>274,352</td>
<td>309,541</td>
<td>+ 45.6</td>
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<tr>
<td>Namdong-gu</td>
<td>382,704</td>
<td>395,269</td>
<td>369,288</td>
<td>453,903</td>
<td>512,816</td>
<td>+ 34.0</td>
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<td>Gyeyang-gu</td>
<td>256,478</td>
<td>326,522</td>
<td>325,626</td>
<td>334,970</td>
<td>323,645</td>
<td>+ 26.2</td>
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<tr>
<td>Seo-gu</td>
<td>293,643</td>
<td>335,339</td>
<td>371,204</td>
<td>389,057</td>
<td>484,764</td>
<td>+ 65.1</td>
</tr>
</tbody>
</table>

a rise in property values was greatly expected. In the boom of the 2000s, the urban redevelopment districts in Incheon reached 212 locations. The classic formula of urban redevelopment – full demolition, compensation and privately driven redevelopment – was applied to the districts under the auspices of the local government (Lee et al., 2016). Excessive redevelopment plans that did not consider local, site-specific conditions have paradoxically led to urban decline.

In Incheon, inner-city districts designated as urban redevelopment zones are associated with the most severe problems of decline (Cho, 2015). First, areas designated as urban redevelopment districts already had a poor physical environment as they met the requirements specified in the municipal ordinance (i.e. the number of dilapidated and unauthorised buildings, the number of buildings not abutting a road, the number of very small and irregular-shaped parcels, and high dwelling density). Second, after the designation, development activities such as new construction and major repair were restricted in these areas by law along with the suspension of investment, so the districts were easily exposed to the degradation of the physical environment. Third, because of the depression of the real estate market since the 2010s and the limitation of profitability-oriented development using private funds, a large number of urban redevelopment projects were delayed or cancelled. Eventually, most of the buildings in the districts became dilapidated or neglected as inhabitants moved to other areas. According to Incheon’s data, as of 2017 about 63% of vacant houses in the inner-city areas were located in the urban redevelopment districts.

Specifically, in Incheon, 23 urban redevelopment districts were cancelled between 2012 and 2013, of which ten were located in Dong-gu and Nam-gu. Between 2013 and 2015, 26 districts were cancelled, of which 16 were located in Jung-gu, Dong-gu and Nam-gu. In most of the cancelled districts, communities did not have the capacity to improve the residential environment by their own efforts. The physical and economic decline accelerated over time after the cancellation.

Some indiscriminate urban redevelopment processes deviating from the original purpose of improving the residential environment made a difference in terms of quantitative scale and qualitative state of vacant houses. Although vacant houses are commonly scattered in one neighbourhood and found among buildings in good condition (Kim, 2010), in the case of the long-delayed and cancelled project districts, many dilapidated vacant houses are concentrated within a confined area, causing it to become a ‘ghost district’ in the middle of a neighbourhood, vulnerable to crime and disasters.

Path 3: Initial poor development and physical deterioration of housing districts

Path 3 refers to residential areas inadequately created in terms of density, structure and materials in periods of rapid urbanisation and industrialisation.

The decline of inner-city areas because of initial inadequate development can be observed in cities across Korea, especially in settlements that were formed between the period of liberation (in 1945) and the 1960s–1970s through individual land development or land readjustment projects (Kim, 2010). Soon after the outbreak of the Korean War in 1950, refugees created areas with a concentration of unlicensed shacks throughout the cities. Since the 1960s, as the urban population soared because of a great influx of rural population, most residential areas were built in poor conditions along the hills and streams without proper urban infrastructure, creating a population of urban poor.
According to World Bank data, Korea’s urbanisation rate, which was only 27.7% in 1960, reached 40.7% in 1970, 56.7% in 1980 and 73.8% in 1990. On the other hand, according to the US Bureau of Statistics, the urbanisation rate of the USA was 28.2% in 1880, 39.6% in 1900, 56.5% in 1940 and 73.7% in 1980. The 100-year urbanisation process in the USA was compressed into just 30 years in Korea.
The Korean government provided a large amount of residential land in a short period through land readjustment projects to address the severe housing shortage. In the case of Incheon, in the 1960s, large-scale land readjustment projects covering an area of 20,465,983 m² were carried out in the hinterland of industrial complexes and around the Gyeongin (Seoul–Incheon) Expressway (Incheon Development Institute, 2004). Figure 4 shows that most of the residential districts in the inner city of Incheon were formed through these projects, accounting for 46.4% of the total housing complex development area (Cho, 2015).

At that time, areas created through land readjustment projects became the newly emerging residential districts for a growing urban population. However, most of these districts, rapidly developed amidst fast-paced industrialisation and urbanisation, have become substandard residential areas over time, with characteristically narrow streets, small-scale parcels, low-rise and high-density houses, and insufficient infrastructure. The poorly developed areas have made it difficult to repair individual houses, as well as to implement essential urban redevelopment projects (Cho, 2015). As these areas failed to cope with people’s growing demands for improved physical, social and economic conditions, they have remained low-income residential or non-competitive commercial districts and have contributed to serious urban shrinkage (Kim, 2010). Consequently, buildings with obsolete structures such as wood or cement blocks that were located in blind or extremely small-scale parcels of the closed blocks have turned easily into vacant houses beyond the point where maintenance is possible.

For instance, near the Nam-gu office, there is a small, old urban block where 15 houses with an average gross floor area of 22.6 m² are left unattended. Although new construction activities took place in the surrounding area just after the Nam-gu office moved to its present location in 1991, this block maintains its previous physical condition without any development. The width of streets in the block is very narrow, within 3 m, making the passage of vehicles impossible and restricting pedestrian use. Additionally, most of the buildings consist of deteriorated block and brick structures. As the infrastructure and buildings in the block have been in poor condition for a long time, this area has been continuously occupied by a socially vulnerable group, and now there are approximately 33 households receiving national basic livelihood benefits (Jeon and Kim, 2016).

**Path 4: Unattended properties left in the process of fast aging**

Path 4 refers to a socio-demographic change that predicts the inevitable increase of vacant houses in the future, even threatening the existence of communities.

Aging populations in East Asian countries mainly stem from a drastic decrease in birth rates and an increase in life expectancies. Populations continue to age at an unprecedented rate. Although the starting point of aging varies, nearly all East Asian countries are moving from aging to aged societies quickly (World Bank, 2016). In Korea, the development of aging was relatively slower than that of Japan, which typifies a super-aged country in Asia, but the transition speed from an aging to an aged society was much faster. Korea turned into an aging society with an aging rate of 7.3% in 2000 and became an aged society by exceeding 14% in 2018. This significant increase in the elderly population has led to a long-lasting decline in inner-city areas of big cities, as well as in isolated rural towns, implying that vacant houses will continue to increase in the future after the deaths of the elderly.
Incheon’s three inner-city districts – Dong-gu, Nam-gu and Jung-gu – had a much higher percentage of aged inhabitants (older than 65 years) than Incheon’s average of 10.8%, as of 2015, accounting for 17.2%, 13.7% and 13.4%, respectively. The distribution of the elderly population, especially the low-income elderly, is considerably associated with that of poor physical environment in the inner-city areas. Elderly people do not easily improve their residential environment because of a lack of energy to maintain buildings and the tendency to settle for the present. Additionally, many old buildings owned by the elderly are often involved in complex and sensitive ownership relations. Ultimately, these houses occupied by the elderly are more likely to become vacant houses after their death. In this case, the heir to each property has to be tracked down by the local government, but the local authority is reluctant to do this task because of the high cost and complexity.

For instance, one dilapidated vacant house in Nam-gu, Incheon, which has been left without an owner for many years, was originally a house where an old couple resided. After the old couple passed away, their son and his wife came to live in the house. However, as it soon became clear that a friend of the old couple owned a part of the land, their son’s family moved to another area, leaving the house abandoned. This indicates that, after the death of an aged owner, if an appropriate heir to a building is not found or if a land and property ownership problem is revealed, the building is likely to be a long-term vacant house. Unfortunately, among the vacant houses on the building register in the inner-city areas of Incheon, approximately 41% of the owners were aged 65 years or more as of 2017. Finding the next owners for these vacant houses is expected to take a long time.

Path 5: Vicious cycle of continued stigmatisation of a neighbourhood

Path 5 describes how major facilities move away, following demand, leaving only the vulnerable parts of both urban infrastructure and communities.

In Korea, regardless of the size of the city, as the population of inner-city areas has decreased in the process of urban shrinkage, commercial districts have stagnated. As the outflow of infrastructure and services combines with rapid aging and low fertility, more severe and biased urban decline problems are being observed. For example, as the number of school-age children continued to dwindle, the Ministry of Education stated in 2015 that no new schools were to be established in new towns until small schools in rural areas or inner-city areas were integrated or closed. In inner-city areas, facilities for the young, such as kindergartens and schools, are being reduced according to skewed demand and replaced by facilities for the elderly, such as senior care centres.

In Incheon, the number of students in Dong-gu and Nam-gu decreased significantly between 2000 and 2015, with the exception of Jung-gu where Yeongjong-do belongs. In the last 15 years, the number of students in Dong-gu and Nam-gu decreased by about 32% and 42%, respectively. Incheon has discussed the consolidation and dissolution of schools in the inner-city areas since the early 2010s. However, short-sighted alternatives, including school closures, conversely have the potential to trigger the hollowing-out of the inner city as well as to cause vacant houses. On the one hand, if facilities for children and teenagers are removed from the inner city, some of the existing residents move to other places to meet their needs for a better educational environment. As a result, the influx of young adults will not occur, resulting in a limited
age range of residents in the inner city. On the other hand, the outflow of population and facilities raises the issue of the quality of life for people remaining in declining areas. The most vulnerable communities that remain in the blighted neighbourhoods are negatively influenced by policy decisions regarding the downsizing of public services and infrastructure, intensifying the downfall of the undesirable areas.

**Combination of the paths**

We have examined the five major paths affecting housing abandonment in the declining inner-city areas of Incheon. Although the paths were separated to clearly identify triggers for vacant houses, in reality they are closely inter-related and simultaneously exercise their influence. As a result, the condition of housing abandonment reveals different aspects according to the combination of the paths.

If a poorly developed area is designated as an urban redevelopment district, the project is more likely to become stagnant because of difficulty in achieving a consensus among impoverished residents. The sluggish project exacerbates the area’s already inferior physical and economic conditions, resulting in the increasing number and worsening quality of vacant houses after residents flee to other areas. For instance, in one district of Namgu, Incheon, two urban blocks with different physical conditions were designated as the same urban redevelopment district. After the cancellation of the project, in the one urban block with brick buildings in relatively good condition, the surrounding environment of vacant houses was kept somewhat clean. In the other block with decaying wooden or cement buildings, vacant houses accelerated the decline of the entire block.

In addition, if the outflow of facilities such as schools, hospitals and stores occurs in an area with rapid aging, such as the shrinking suburbs of Japan, a large number of vacant houses are generated without an additional inflow of population. Aging residents find it relatively difficult to keep their houses in good order, so buildings are more likely to turn quickly into vacant houses (Yui et al., 2017).

**Housing abandonment in other East Asian countries**

Some of the paths found in the inner-city areas of Incheon are observed not only in other Korean cities but also in Japan and China. They share similar experiences of rapid economic growth driven by state-led urban developments under the developmental state. This process has affected the pace and pattern of urban shrinkage. Additionally, the collapse of traditional Confucian values, including family integration and filial piety, has exacerbated the situation of shrinkage.

**Japan as a front-runner**

*Same type of dwellings supplied in a short time with similar household composition (Path 1).* Under the rapid urbanisation from the 1950s to the 1970s, the Japanese government promoted suburban homeownership. The Japan Housing Corporation, established in 1955 as a public developer, began to create new suburbs outside metropolitan cities such as Tokyo, Osaka and Nagoya from the 1960s to solve the housing shortage. The taxation system, including a reduction and exemption on municipal tax for property, was established with the estimation that demands for newly built houses would continue according to a traditional urban growth model (Yui et al., 2017). For example, as a great number of people in the central area of Tokyo had moved to adjacent suburbs such as Kanagawa, Saitama and Chiba since the early 1960s, the total population of these three prefectures tripled from
6.8 million in 1950 to 20.8 million in 1995 (Sorensen, 2001).

However, the large-scale suburban housing areas, which were once dream destinations for all Japanese families, have declined since the late 1990s because of the aging of the baby boomers who were major householders of these areas in the 1960s and 1970s, and the independence of their children. As the price of real estate declined in metropolitan centres after the collapse of the bubble economy and the supply of new housing increased because of urban renewal projects, re-urbanisation has emerged among young people who were reluctant to endure long commuting times to city centres. Above all, the mass supply of the same type of housing in a short period at the town planning stage has also played an important role in the decline of suburban new cities (Yui et al., 2017). In the areas where almost all the buildings and people became old at the same time, vacant houses have increased sharply, showing the hollowing-out phenomenon.

Poorly developed housing districts vulnerable to obsolescence (Path 3). In Japan, many residential areas with dense and substandard houses were developed in metropolitan industrial cities during a period of urban immigration, such as Higashiosaka in Osaka Prefecture and Amagasaki in Hyogo Prefecture (Oswalt, 2005). In the midst of the rapid reconstruction and industrialisation of severely damaged cities after the Second World War, Japanese homebuilders constructed many low-priced and low-quality wooden frame houses without thermal insulation or earthquake reinforcement. Then, in 1981, there was a major change to Japan’s earthquake-resistant construction code, so previously built buildings (kyu-taishin) had very low market value because of their poor quality compared with buildings built later (Shin-taishin). Moreover, buildings built before the 1980s had a much shorter lifespan, an average of 30 years, than those of the USA and Europe, which have led people to regard the investment and maintenance of these buildings as unproductive work.

Ultimately, obsolete buildings with very low property values have a greater risk of becoming vacant houses. According to a survey by the Ministry of Land, Infrastructure, Transport and Tourism, approximately two-thirds (68.9%) of Japan’s vacant houses are buildings built before 1980; among them, 44.5% were built before 1970 and 24.4% in 1971–1980 (The Nikkei Shimbun, 2015).

Unprecedented aging rate and difficulty finding new owners (Path 4). In Japan, the neglect and disinvestment for houses after the deaths of the rising elderly population is the main cause of housing abandonment. According to the Japan National Statistics Office, as of 2015, the proportion of people under 15 years old was the lowest and that of people aged 65 and over was the highest in the world. As the proportion of the population aged 65 and older was 7.1% in 1970, 14.5% in 1995 and 20.1% in 2005, Japan became an aged society from an aging society in 25 years and a super-aged society from an aged society in 10 years. Japan became a super-aged society in less than half the time it took to reach being an aged society.

As a result, a considerable number of houses have been left unattended since the elderly owners died, when the proper heirs to the properties could not be found. Since vacant houses resulting from the deaths of their elderly owners were mostly located away from the central parts of the major cities, their children had little desire to inherit them. Unfortunately, as the ratio of householders aged 65 and over was 31.2% in 2010 and is expected to reach 40.8% in 2035, vacant houses due to aging will continue to increase.
Outflow of infrastructure and services from the stigmatised areas (Path 5). In Japan’s vulnerable areas with rising numbers of elderly people and poor physical environment, food retail stores are being closed or relocated to other areas because of their low profitability and lack of efficiency. Citizens who have difficulty purchasing goods because of the shortage of facilities are referred to as ‘shopping refugees (kaimononanmin)’, and most of them are the elderly with movement difficulties. Furthermore, schools built in suburban new towns in the 1960s are being consolidated and closed, as the number of students has dropped rapidly because of population decrease, aging and a low birth rate.

In the end, as the older generation increases and the younger generation decreases, facilities for the young are reduced in declining neighbourhoods, which in turn draws the young out of the areas, leading to a lack of tax revenue, vulnerability to disasters and crime, and housing abandonment (Cha, 2006).

China as a latecomer

Government-led urban developments and rural spatial expansion (Paths 1 and 3). In China, new towns have been constructed on the fringe areas of metropolises by semi-public new town development corporations, which are comprised of local governments, districts’ planning authorities and state-owned developers. This construction has led to extensive suburbanisation as a new economic growth pole (Wang et al., 2010). However, some new towns have turned into ghost cities that remain largely unoccupied because of state-controlled over-supply, based not on direct demand but on speculation.

State-led urbanisation has also absorbed rural inhabitants into urban areas, resulting in the decline of rural villages. The rural population is estimated to have decreased by approximately 241 million between 1995 and 2014 (Gao et al., 2017). On the other hand, the rigid household registration system between an urban and a rural area, called hukou, has prevented most of them from fully integrating into the urban communities (Liu et al., 2010). Rural inhabitants returning from cities have constructed new houses at village fringes since the 1980s. While houses of low quality built earlier did not satisfy the upgraded housing needs of farmers, the approval for a new house could be obtained from the village head with minimum restrictions (Gao et al., 2017; Liu et al., 2010). Over time, old houses in the inner villages which were excluded from the rapid urbanisation and lateral expansion of rural dwellings have been abandoned, causing the ‘village hollowing’ phenomenon.

A high number of elderly people living alone (Path 4). China became an aging society in 2001 with an aging rate of more than 7%. China is aging rapidly because of the retirement of the baby-boomer generation born under the childbirth encouragement policy after the foundation of New China in 1949, as well as the workforce reduction resulting from the birth control policy since 1979 (Yang and Dunford, 2018). One notable feature of aging in China is not the proportion but the absolute number of elderly people. As of 2000, China had about 87.4 million people aged 65 and older, more than any other developing country, and the number is expected to reach about 331.6 million by 2050 (United Nations (UN), 2002). In addition, China entered the category of aging society before becoming a developed country. According to the World Bank, in 2000, per capita GDP in Korea was US$11,948 with an aging rate of 7.3%, while China’s was US$959 with 6.9%.

Thus, in China, the number of elderly people suffering from poverty, illness and depression, without children at home, known as ‘empty nesters’, is soaring. A great
number of empty nesters in rural areas whose children migrated to cities now live by themselves in tumbledown houses with no contact with anyone from the outside. Consequently, the number of vacant houses is predicted to increase soon because of the deaths of many solitary elderly people.

Disappearing schools in deprived areas (Path 5). In China, where rapid urbanisation and aging are taking place, small rural schools – once lively village institutions – have become gradually empty buildings as children move out to the cities with their parents (Koetse, 2017). In 2001, the Chinese government launched a campaign to close remote village schools and pool resources in centralised county or town schools in response to a decreasing number of students. As rural schools began to shut down at an alarming rate in the following years, nearly three-quarters of all rural primary schools were closed forever between 2000 and 2015. Some students had to walk for hours to reach the nearest school, and students who were unable to go on foot even had to quit school. Eventually, the government stopped the plans to shut down small village schools in 2012 after thousands of schools had already closed.

During the huge rush to cities with better physical and economic opportunities, declining rural areas have experienced a decrease in the number of students, a lack of qualified teachers and the closure of school facilities. The reduction of resources without adequate alternatives in marginalised areas is leading to serious isolation and hollowing-out.

Korea, Japan, and China show similarities in the paths of vacant houses in declining areas within the East Asian frame. However, they also reveal differences in the timing of shrinkage and the pattern of abandonment according to what laws and policies relating to urban planning were applied and when, and how urban development proceeded, based on the multidimensional nature of shrinkage.

Taking Path 1 as an example, most Korean cities large and small have experienced decline of the inner-city areas because of adjoining new built-up areas developed by government-led suburbanisation since the 1980s. In Japan, large-scale suburban new towns, constructed adjacent to metropolitan cities since the 1960s, have revealed the problem of aging and housing abandonment after the signs of re-urbanisation appeared. This is different from Korea, which is still developing new towns, absorbing many people from the surrounding areas. In China, where urbanisation is still in progress, the decline has been seen mainly in the countryside as opposed to the city and, ironically, some new towns, built on the periphery of metropolises under top-down planning since the 1990s, remain unoccupied because people have not yet moved in.

Path 2, on the other hand, can be said to be a characteristic of housing abandonment observed distinctively in the Korean context, compared with other paths. In Japan and China, urban redevelopment projects have also been carried out to regenerate old downtowns. In Korea, however, urban redevelopment projects in declining inner-city areas have been remarkably delayed or cancelled after the economic downturn of the late 2000s, resulting in massive vacant house clusters. These are largely attributed to over-designation of project districts, profitability-oriented development and conflicts among project participants.

**Conclusion**

The exploration of the five major paths indicates that the features of vacant houses may vary depending on the main causes of the occurrence. For example, the initially poorly developed vacant houses are usually located in extremely small and inaccessible parcels,
and consist of physically severely damaged wooden, cement block and brick structures. Vacant houses in the planned or cancelled districts of urban redevelopment projects have a high-density distribution pattern, negatively influencing the safety of communities. This means going beyond a simple dichotomy of whether it is a vacant house or not. Ultimately, it is important to identify the causes of housing abandonment and their interrelationship in order to select the priority management areas, to take appropriate countermeasures, and to prevent the proliferation of vacant houses.

The above results can lead to the following implications. First, since housing abandonment is directly or indirectly affected by the construction of adjacent new built-up areas, vacant house-related policies need to be considered in connection with comprehensive urban growth management policies. Projects related to the supply of apartment-based new and large-scale housing districts should be scrutinised in the urban decline phase. Second, the designation of excessive urban redevelopment districts that can produce large numbers of vacant houses in declining inner cities, especially in Korea, should be avoided. For the cancelled districts, more systematic maintenance plans for vacant houses are advised to prevent additional shrinkage. Third, it is proposed to establish a system that can keep track of buildings with a high possibility of conversion to vacant houses, such as the poorest quality housing where elderly owners live alone. Lastly, in respect of the downsizing of public facilities and services in disadvantaged areas, a long-term perspective and concrete plans are required to prevent the vicious cycle.

Although this study mainly focuses on empirically building the theoretical framework for the paths leading to housing abandonment in shrinking cities, the results would be helpful to show an undiscovered part in the complex spectrum of urban shrinkage and to provide important implications for urban design and planning related to housing abandonment. Future studies may include detailed case studies on the characteristics of vacant houses in block or parcel-level spatial units.

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Notes
1. In this study, ‘urban shrinkage’ means that the whole city or part of the city is deteriorating in economic, social and physical terms over time as a result of various causes.
2. According to the UN’s definitions, an ‘aging society’ is one in which people aged 65 or older exceed 7% of the total population; in an ‘aged society’ this figure is more than 14%, and in a ‘post-aged society’ or ‘super-aged society’ this figure is more than 20%.
3. ‘Yeongjong-do’ is an island under the jurisdiction of Jung-gu, Incheon. The population of Yeongjong-do, where Incheon international airport is located, has increased since the late 2000s as a result of the construction of Yeongjong New Town as part of the Free Economic Zone project.
4. ‘New Town Project’ is a large-scale redevelopment project featuring a broader target area.
and stronger public intervention and support than typical redevelopment projects.

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