

## HOUSING FOR ELDERLY IN CROSS CULTURE CONTEXT

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### ABSTRACT

*This paper concerns different contexts of elderly housing and its provision basing on the premise that, similar to other socially-disadvantaged, the elderly needs such social support as subsidy and direct aid due to their declining decision-making power and physical ability. Elderly housing is by and large a social support scheme jointly supplied by various sectors. This paper raises the question whether market arrangement is capable of supplementing social services of elderly housing in absence of efficient institutions? It adopts a comparative case approach to confronting the important concern that cities are distinctive by their institutional conditions for elderly housing provision. We select three international cities and compare their elderly housing policies and provision. We found that elderly housing in different cities exhibits its unique structural features. Given continuous aging population, the market-driven segment may be a valid substitute of the state-driven services. And this creates stratification of the life-style retirement village sub-market and the government intervened and regulated aged care facilities sector.*

Keywords: elderly housing, ageing in place, self-control, capital-control, policy.

### INTRODUCTION

Population ageing is a global phenomenon. Its impacts on public spending, social redistribution, and new opportunity of emerging asset markets for value creation are apparent (DBS, 2017; EY, 2017). Recent policy for elderly housing in Hong Kong shows significant planned inputs in preparation for ‘the ageing society’ (HKHS, 2018). China’s development boom in its elderly housing sector is consistent with the ageing and fertility dual effects. In 2010, 168 million people in China (12.4% of the whole population) were over 60; and by 2040, this number is estimated to reach 402 million (UN DESA, 2013). A majority of the elderly population (aged 60 or above) live in rural area, over 10% live in mega cities such as Beijing, Shanghai, Guangzhou, Shenzhen, Tianjin, Chengdu and Wuhan. (Woetzel et al., 2009). According to WHO (2016), by 2030, 14.8% of China’s elderly persons (aged 60 or above) will live in urban area.

One counter-intuitive fact is that China’s elderly housing in is likely to experience oversupply in the near future (DBS, 2017). This is contrary to the belief that there is a shortage of elderly housing supply in China. It is reported that Chinese developers, especially those with a residential development business focus, have started to invest in elderly housing projects (largely lifestyle retirement home type). Given the hybrid nature of this housing type, elderly housing development is being challenged for it to be an effective market response to the social demand for elderly housing. It also makes an interesting exercise to look into the market’s reaction: (1) the types of elderly housing e.g. retirement homes vs. aged care facilities, (2) the perception and demand of alternative housing types at different stages of the ageing process, (3) their variation in different cities would expect to reveal different social and policy structures. For example, we have seen direct involvements by both private and public organisations in the elderly housing sector where private sector builds and manages lifestyle retirement village while public agency engages in provision of aged care facilities and low-cost housing.

What is the link between elderly person’s mental conditions, housing policy for elderly and the ageing society at large? Within specific regulatory policy framework, the demand side needs clarity and specificity of the social and behavioural reality of elderly’s housing needs while the supply side effective provision for the right

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type, quantity and quality housing. Moreover, cities would exhibit distinctive elderly housing supply and demand situations; it is expected that regulatory constraints are imposed on elderly housing which implies a hybrid mechanism of market allocation and government distribution. The Australian elderly housing serves as an example of a mixed social services and private interests elderly housing system for investment and policy innovation opportunities. It is arguable that given declining mental capability of elderly people, they may become socially-disadvantaged demand social services. Elderly housing is a public good provided and supervised by governments. China's elderly housing has unique structural characters. The elderly housing sectors in Australia, Hong Kong and Guangzhou are distinguished by their policy and governance. Given continuous age structure of population, the elderly housing market segment may be a valid option. This paper raises the question: is market force capable of generating social services for the elderly in the absence of (or weak) efficient public institutions (e.g. social security) for elderly housing? To explore, it adopts a comparative approach to the demonstration.

This paper is structured as follows. We first discuss the relations of ageing phenomena and social housing from the housing provision and elderly housing sub-market perspective. We then look into elderly healthcare and associated mental conditions and behaviour which help an inquiry of state policy in different housing contexts e.g. urban and regional to identify research gap and data sources. It then conducts an analysis of elderly housing context in Hong Kong, Guangzhou (China) and Melbourne (Australia) focusing on their respective culture. Further discussions lead to general global issues which are followed by some conclusive remarks.

## AGEING, BEHAVIOUR AND HOUSING NEEDS

The ageing society is becoming global phenomenon (van Hoof et al., 2018). It is both a fact and a consequence of the societal-wide collective choice to improve social well-being. What an *ageing society* stands for are three key aspects of the elderly's life-style choice (concern) as there is an increasing segment in the society who no longer directly engages in production activities: (1) it becomes a consumer choice for leisure activities, (2) it creates a separation of ownership, asset held by elderly, and control, asset managed by others, in society, (3) it raises the demand for healthcare services and facilities as well as their distributions. The dynamic of elderly people and their group preferences drive the development of social welfare concerns such as housing markets and policy. Elderly housing requires that special facilities and hospitality services should go beyond typical residential concern. Given elderly housing contains a mixture of tradeable residential and commercial property services, it creates an important role for facilities management services, such as the retirement village and the aged care sub-sectors (EY, 2017).

Human lifecycle (as well as the 'ageing society') is a tendency or direction within a cyclical process towards a greater need for 'external' assistance. In other words, higher level demand for public health services is aligned with an increasing level 'external' decisions. This brings the practical question of who and how should these decisions be made? This question raises fundamental challenge to economics and decision science because it challenges the basic idea of human autonomy of decision making as a stable process in human life-cycle. It raises the moral concern of individual's capability, including their ability to write self-interest based enforceable private contracts – Smith's actor's regressively losing self-control to external environment such as losing their ability to judge based on reasoning is equally concerning in the contemporary society.

The scientific concept of ageing is biologically, neurologically and psychologically derived (Bogin and Smith, 1996). Being one of the basic needs through the human life-cycle, real estate and its proper operation is a focal aspect of our ageing psychology and aged care facilities and public health provision inquiries. It is intended to raise social awareness of the '*rational future decision*' of ageing related response and choice as a possibility to off-set (or to insure) the eventual decision and care made by others. There is its inherent 'cost' such as the agency problem, known as policy failure or 'corruption', often occurs in social services provision. The self-insurance and social-insurance behaviours are key to the ageing process. It also leads to the 'ageing in place' debate in various cultural contexts.

This paper concerns the role of property management for housing for elder people. Facilities and infrastructure adaptation for retirement village are about contract management and contract design, and those for aged care facilities are about administrative and regulatory contract management. Population replacement (e.g. family reproduction) is a valid process. And the great beauty of the market mechanism is for individuals to serve others i.e. making external decisions. But why does the market mechanism serve less effectively the socially disadvantaged such as elderly, illness or homeless people is a 'myth'? Some concern the missing incentives

problem in this process, known as ‘market failure’, which justifies government redistribution being relatively efficient (and fairer) in providing such services. For example, government survival in democratic society depends on citizen collective consensus which includes those of the socially disadvantaged. However, elderly people experience exactly that diminishing voting capability that comes with ageing and their declining health, not their power of civil voting right is diminishing. This further motivates the research.

Megbolugbe et al. (1991) review the economic theory of housing demands. It is interesting to see that some decision theory and behavioural economics are not effectively connected towards housing markets and housing provision (Armitage and Conner, 2001). The behavioural life-cycle and the supply side theories have further advanced the housing economics theory. It is important to ask why, which brings us understanding of various elderly housing types and forms where retirement village is market driven, and aged care facilities (e.g. nursing homes) being state redistribution of social services. State intervention in the aged care sector is mostly due to the significant decline in autonomy and personal mastery the environment (Stimson and McCrea, 2004).

## **ELDERLY HEALTHCARE AND HOUSING DEMAND**

Several aspects are useful for understanding age-dependent behaviour perception change and the factors affect home buyer choice and effective demand. First, it brings the focus to the aged (elderly) social group. Second, consistent with most consumer behaviour, except healthcare and leisure, people’s housing and other demands tend to decline as they age. Third, agents such as family member may substitute elderly people’s decision of their housing choices. This ‘inter-generational continuity’ is of key research interest because people may suffer a great deal by voluntarily taking on this ‘duty’ due to cultural and social norms, but this often is at the cost of her own welfare. One may consider it a form of *inter-generational inequity*. Fourth, the social and institutional context affects the choice set and the relative weights of these choices. So the logic of the ageing process is a process of change from the private (self and kinship) to the public (carer) control and decision making. It fits in the public good literature of state action and distribution policy. One hypothesis is that ageing society leads to higher public spending and external control, such as the ‘public power’ such as government and NGO influences to growth. For that, institution and social structure both matter for understanding elderly housing. Will this rising the ‘state power’ while reduces the relative position of individual freedom?

Public health policy as public good and a developmental issue for the socially disadvantaged in developed and developing countries is a critical issue with global reach. There is an emerging strong public health literature links health economics and human wellbeing (Deaton, 2010; Robinson, 2001). This paper briefly discusses these two streams of literature in order to combine the ideas of individual, e.g., elderly people, preference and the social aggregate as a developmental concern. Specifically, we use the theory of planned behaviour (TPB) where specific review has been conducted (e.g. Armitage and Conner, 2001), given its relevance to the study of elderly housing and aggregate effects on the property development industry and the capital markets. It is to relate individual perception and behaviour of elderly people, and the conditions of elderly housing, as well as their development and trade (consumption).

## **ELDERLY HOUSING POLICY ACROSS CITIES**

Formal comparative studies are rarely conducted from a cross cultural context. This study intends to fill this knowledge gap. Earlier on, Deng et al. (2011) generally discussed China’s emerging public housing framework. It is useful to have prior study in developed nations e.g. traditional welfare state. Evans et al. (2002) is an US study examined the independently living elderly’s living conditions and their psychological well-being. Levy and Lee (2004) investigate purchase of elderly housing as ‘*family decision*’. They examine family members’ influence on elderly home purchase choice in the New Zealand context. Costa-Font et al. (2009) investigate the elderly housing preferences in Spain – an advanced economy and an ageing society. A number of Australian studies (Stein and Morse, 1994; Stimson and McCrea, 2004; Hu et al., 2014a, 2014b, 2014c; Zuo et al., 2014; Rogers, 2014) reviewed and analysed retirement village and elderly homes in one of the more mature ageing society’s elderly housing markets.

Chinese policy often focus on public housing provision (public rental housing and economical housing) and less on elderly home and aged care facilities. They are considered traditional government functions. Elderly accommodation is also considered a *family domestic decision* with cultural consent. In a similar context, for example, Kim et al. (2003) examined elderly lifestyle and their housing preference in Korea. Yi et al. (2018) examine China elderly living with relatives – a phenomenon of co-residence. They found the rapidly rising house price in China a major influence for intergenerational co-residence decision. Hui et al. (2012) studied Hong Kong’s elderly housing system. They provide details of local conditions and comparative aspects with

cities overseas. Comparison with mainland cities remain an untouched territory, although Yang et al. (2017) examined the ‘wealth effect’ of elderly people in China on their mobilising home capital for their retirement consumption and insurance. They found weak correlations which support the life-cycle consumption and saving behaviour of people in the Chinese community.

Tellatin (2009) explains different perspectives feature value of senior (nursing) home facilities as going concern for asset valuation. Stimson and McCrea (2004) examine elderly relocation patterns in Australia to specialised housing. They examine national survey data for elderly preference. Petersen et al. (2017) account for distinctive legal and financial obligations such as contractual and detailed constraints compared to typical housing in housing for retiree lifestyle in Queensland, Australia. They evaluate retirement village professional knowledge from legal, financial regulatory and other stakeholders (developer, investor and land owner) perspectives. EY (2017) concerns practical perspectives of the specialised financial and legal obligations affecting the value of retirement village and aged care facilities. All stress the specialised knowledge imbedded in this housing form. Seifert and Schelling (2018) is a Zurich study on the before-after effect of elderly attitudes toward elderly home experience. They found negative effect on self and positive on the asset. Overall, literature and recent knowledge advancement suggest a lack of study comparing social-policy context for social service provision, and market and culture as the private provision to facilitate elderly home supply and transaction.

This study spends specific interest in the Chinese elderly home markets as is apparently due to the ageing tendency and the scale of its emerging social impact to call for market and policy responses. One initial step is to develop an understanding of the ‘market context’ of aged care services. Given the public nature of majority of aged care facilities in China, it is useful to firstly compare closely associated cities for their socio-political distribution systems. It is also important to bring about mature aged care markets into the inquiry.

## **APPROACH/METHODOLOGY**

To propose a theoretical framework of ageing and elderly home, the human life-cycle model needs to merge into a private equity (self) and social (external) insurance system. Societies and individuals continuously change their strategies within this framework basing on the trade-off of internal and external resources basing on their relative costs and benefits.

Maybe one first step of empirical study is to identify and ascertain that people are by-stages losing command power to her ‘built environment’. This is especially so in aged care facilities, less so in retirement villages – it brings about its two sub-sectors. It is much less so for typical residential dwelling types not differentiating ageing as a main factor, which is driven by income and rent as productivity and wealth measures. Any passive income that is held the elderly is essentially a capital income (rent) serving as private insurance that funds individual productivity decline. It also needs to investigate how relatives and government agency or NGOs assist or replacing the decision in each of these areas. One further example is social housing provision where clearly choice is made by third party e.g. government agency to cope with socially disadvantaged people by taking part of their decision rights. Another early step is to look at the governance structure for the provision of elderly home and the market institutions to support and regulate elderly home products and services in different jurisdictions. To identify research gap, it worth consideration of the ‘grey area’ of market and state failures.

One interesting angle relates to the notion of ‘affordability’ as it focuses on the wealth as normative condition of relative incomes of specific social actors (a Smithian view). The affordability concern is changing to ‘adaptability’ in ageing population context (a Malthusian life-cycle and evolution view), which means age structure in society will affect consumer choice and welfare distribution. This actual effect will also depend on the relative political and economic power distribution in society, concerning “whose preference matters”? The problem of relativity or arbitrariness decision of explicit proportion for age or wealth makes the concern of social division such as low vs. high income, young vs. old, or wealthy vs. poor suffers from major conceptual and practical difficulties.

A framework is needed for existing governance structure and identifying costs of production-consumption of elderly homes across urban markets. It focuses on two structural components of elderly housing markets: (1) housing provision, (2) market transaction. It also considers key players involved in the process in the selected cities. Elderly home market is considered as a sub-set of the general urban housing market. So it allows the fundamental similarity identified in housing yet allows the space to search for sector or city specific characteristics that are distinctive in the two cities in their current development stages.

One recent attempt to develop structural framework for policy implementation focuses on policy path and incentives to trace and examine the central-local government interplay. Using four major social housing redistribution programs in China, Fan and Yang (2018) argue for effectiveness of policy outcomes via local implementation by identifying policy improvement paths and incentives. They argue policy implementation Such attempt could be useful for the current purpose of understanding the structural conditions regarding elderly housing market, provision, distribution, and consumption. This relates to the elderly home conditions in Guangzhou. Antagonistically, Hong Kong's social housing provision system is more in line with a market-driven capitalist system. Its elderly home provision and distribution (consumption) function is likely a relatively more mature (established) and smoothly operative one. Its higher transparency supports a direct understanding of its structure and major obstacles regarding elderly homes.

## **ELDERLY HOME POLICY FRAMEWORK IN HONG KONG, CHINA AND AUSTRALIA**

### **Elderly care and urban policies in Hong Kong**

Market and government provision of different types of elderly housing is well studied in recent years. Kong et al. (2015) provide an overview of the Hong Kong health care system which is the basis of elderly home system. Government institution (HKHS, 2012) and professional organisation (HKIS, 2012) provide an overview of the "retirement housing initiatives" relevant to the real estate services sector, as well as financial instruments for elderly housing provision and distribution. A comprehensive market-led system operates in Hong Kong. What follow are several additional observations regarding the governing context of elderly home.

What are the industry and product mix? How projects are delivered? What are the relevant regulations and policy agenda (e.g. HKIS, 2012; HKHS, 2012; Sun et al., 2018). Sun et al's (2018) study is consistent with the proposition that ageing is a process of increasing external association or dependency therefore rising external support such as family support and government aid. Government provision of elderly housing – options and types of elderly housing. Hui and Yu (2009) examine the relocation tendency of elderly by satisfaction in different stages of their life-cycle. The concern of population control policy such as the "one child policy" in China and the low fertility and declining population in developed nations both relate to the society ageing problem. Hui et al. (2012) investigate inter-relations of ageing, fertility, and house prices in Hong Kong. Hui et al. (2014) adopt the prospect theory framework to analysing elderly housing in Hong Kong. Like in Australia, they confirm strong preference for 'ageing in place'. This implies preferred approach to renovate (redevelopment) existing homes (location) into elderly friendly facilities. What is valued here by elderly and society is 'ageing and familiar place with dignity'. Market practice includes overseas household services related labour supply and markets e.g. home services by Philippines. They usually have received training on aged care which is also certified overseas basing on international professional standards. Financial markets – the aged care insurance products e.g. the Prudential Insurance. Also noted is the reverse mortgage program in Hong Kong (HKIS, 2012).

Locally based, e.g., district apartment redeveloped blocks, integrated elderly home facilities are also operational. Hui et al. (2014) studied Hong Kong housing markets. Theirs support the 'ageing in place' preference. Jayantha et al. (2018) identify 'ageing in place' is preferred by elderly in Hong Kong which is one of the unique elderly housing features of high-density living Hong Kong. Redevelopment of existing housing stock is directly applicable option for public and private housing supply.

### **Elderly care and urban policies in Guangzhou**

The market-oriented socialist regime allows emergence and co-existence of market and government provision combination for different types of elderly housing (Li and Hu, 2009). What are the industry and product mix? Senior housing projects may be delivered through state direct provision, NGO provision of state owned asset, private production on privately control tangible and intangible assets on urban leasehold land. The economic transition has not only led to opportunities but also loopholes to ensure the balance of distributive justice and allocative efficiency. This leads to various institutional obstacles in the emerging elderly home sector. Further concerns are outlined:

What are the relevant regulations and policy strategies for comprehensive treatment of ageing population housing problem in Chinese cities? Recent attempts have started to identify and examine the concerns of mal-operating or missing that are unique to the Chinese context (Yang et al., 2017; Hui et al., 2016; Liu et al., 2012; Yin, 2010; Li and Hu, 2009). Among them, cultural norms and inter-generational choices appears strong factor elements to explain observed evidence. Regarding options and types (typology), government provision of

elderly homes and alternative options are investigated (Li and Hu, 2009; Yang et al., 2017). However, the NGO and private supply mechanisms are yet to be clearly outlined. Although of lower performance, state-provision and operation of aged care housing remains dominant. The emerging private, including commercial, providers of elderly homes are of varying quality. There is a vacuum of governance structure on what regulations are present in this emerging sector, how do they work, and how the quality of aged care labour and services facilities on their effective consumption?

Li and Hu (2009) provide backgrounds and insights of the aged care system in Guangzhou. The site visit in a privately run elderly home estate in Guangzhou, the Tai-kang Family, was conducted in July 2019. The estate is well serviced with government policy support. Demographic change alongside with emotion and preference changes. Hui et al. (2016) concern the inter-generational wealth transfer in Chinese society and develop empirical model to investigate impact fertility rate of different generations on housing price. China's (urban) one child policy continued for 35 years (since 1978). It was fully (officially) lifted in 2015 in all urban regions. Its significant impact on ageing and resource redistribution in Chinese society is profound. It brings up an interesting over-lapping generations 'life-cycle' perspective of housing preference and consumption decisions. Under the expectation of low fertility (policy-induced and socially experienced) and consequential aged care crisis, inter-generational wealth accumulation and transfer become preferred strategic option for the older and younger generations, despite the debate of altruistic behaviour (Hui et al., 2016) or selfish life-cycle choice (Yin, 2010).

### **Elderly care and urban policies in Australia**

Like the highly marketized in the US, the Australian elderly home sector is relatively mature for its private asset and its state provision arms. Aged care sector investment returns have been competitive in recent years (EY, 2017). There is room for financial innovation e.g. reverse mortgage and product differentiation e.g. retirement village or service differentiation e.g. home care service. The emergence and growth of home care also impacts on the healthcare sector. There are economic reasons for government spending and redistributive efficiency of welfare in the healthcare sector. All suggest highly specialised knowledge is involved. It is proposed that the healthcare sector has at least two sub-sectors and two models. These two sub-sectors are driven by different combinations of market and non-market mechanisms, which echo different stages of human health over the life cycle. General categories include: (1) retirement village; (2) residential (aged) care; (3) hospital, intensive care.

The Australian population is facing the two broader options namely, age in place or relocation to down-size or independent living unit (ILU) in a retirement village as individual choice. Study shows that relative to the US, the Australian elderly desires to maintain their existing lifestyle (Stimson and McCrea, 2004). Though the retirement village sector has grown strongly in more recent years (Willison, 2019). The mobility of Australian elderly is high. There is also a concern that the ILU option implies artificially made or institutionalised environment from an existing community context (Liu et al., 2012). Several featuring characteristics are listed:

Health care involves both private and collective insurance. Developed market economies are advanced in their private insurance system. Housing diversity features the elderly market due to its diverse political, welfare and geographic landscape. Government elderly supporting programs (e.g. the live longer and healthier program) are in place to support capability building. communities support e.g. the 'ageing in place' program as to relocation or down-size option (Jayantha et al., 2018; Stimson and McCrea, 2004). As an open economy of large land resource availability, labour availability and labour markets have significant impact on its elderly home sector (e.g. barrier of the labour union). This also partially shape the combination of elderly housing provision.

Relative to the aged care sub-sector, state intervention in the retirement village sub-sector is lighter, yet it effects strongly. NGO operators or turning private business. Specialisation level is high – more exclusive or integrated than pure trade business. Retirement village relates to 'community building' as a form of housing, services, and public leasehold housing provision, regulated by the associated government authority. The retirement village sector has market characteristics, while aged care facilities involve provision of social services and regulations i.e. government intervention and redistribution policies (EY, 2017). The healthcare industry is also considered contested markets even though some challenges are mentioned (EY, 2017).

## DISCUSSION AND CONCLUDING REMARKS

Further discussions revolve around the following questions. First, are elderly housing and senior living across social spaces different by socio-economic conditions? Second, what are the unique and changing mental features in the 'ageing process'? Third, what are the provision models, their quality and how are they received in their societies? Fourth, what are the potential modes as innovative possibilities under specific institutional contexts? One may further add: what are the choices of aged care distribution vs market allocation? Friedman (1962) shows a liberal argument on income distribution and old age insurance. And, the question what features an advanced healthcare social system by their 'institutions' i.e. what is 'missing' or mal-functioning in the Chinese elderly social services provision and what resources are expected?

This paper investigates what features the advanced health care system in societies and what is private market means to supplement state social services provision to elderly as one of the disadvantaged social groups? This concern is based on specific social, cultural and contextual in places such as Guangzhou and more mature aged care markets such as Australia. Without arguing causality, it conducts a comparative institution perspective. General structure is less of a concern. More specific are some 'market solutions' that are private yet not family-labour-based. Though not necessarily of high quality, China is arguably more experienced in public healthcare provision. Aware of the downside of public provision (Friedman, 1962) and China's condition of going through a social transition. The Guangzhou's emerging private healthcare sector is then looked into with critical evaluation against advanced markets such as Hong Kong and Australia.

Elderly is socially 'disadvantaged' both in terms of financial and decision making capabilities. Elderly home is usually treated as social services that is in line with other social housing provision. One would suspect that distribution may be sub-optimal. Realistic arrangement and solution may only be 2nd or 3rd best. This is certainly the case for social service provision. It should be applicable to elderly housing and elderly care service provision. China's recent rise of its elderly home market and private investment may be logically going against its public good nature and the government provision function. Is it more a distribution question than an allocation problem in China?

It is important to recognise that there are alternative options of private development as to public provision of elderly homes. In reality, cities may have different 'combination' ratio of these two housing stock and development/financing activities and models. It is recognised that elderly housing policy of each city should be inclusive of these segments of activities. The analytic framework hopes to incorporate these elements in an international cross-section urban contexts to consider consumers (i.e. elderly people or influencer of their choices) preference of these product alternatives. It is interesting and essential to jointly consider and contrast China's 'socialist transition', Hong Kong's post-colonial transition, and Australia's market-state hybrid healthcare for ageing population, policy and behaviour. Ageing as a universal theme appears to lead to diverse housing provision and markets across international contexts and jurisdictions.

Urban based elderly housing study enables international comparisons mainly within an urban context (HKIS, 2012; HKHS, 2012). The Australian retirement village development markets are active and mature, providing interesting comparative basis as one further study. A literature stream has emerged in this area. Cities in Chinese regions, with different scale, deserve further analysis. This also leads to the important question of rural healthcare as in rural regions traditional farm work seems not having a clear retirement age as urban lives do. The case of elderly housing is a major part of future residential real estate sector.

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