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City Compactness Tendencies and
Gentrification Effect in Japanese Cities Context

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Abstract

Recently, to perform sustainable communities in urban areas, compact city as an urban strategy becomes most popular. Obviously, from global discussion in the worldwide level, this strategy has started to be adopted into local strategy or implementation level, including some Japanese cities. It has also typically been argued to be able to promote urban regeneration, revitalization of city center, and other objectives. To deliver such compact development principles, many efforts by means of appropriate policy alternatives have been adopted and done by many local governments, such as urban infill and development boundaries are being used. Such these developments have actually been indicated as cause in pushing rebirth of some neighborhoods and a rise in property and land values. It also influences displacement problems among poorer residents, many of them elderly and unable to afford higher rents and taxes. These effects have been known as a gentrification where process by which higher income households displace lower income residents of a neighborhood, changing the essential character, and flavor of that neighborhood. This study firstly is aimed to present and provide actual information of Japanese cities development and tendencies, from viewpoint of city compactness, a term of measuring compact city in this study. With undertaking 63 Tohoku Region cities in Japan (northern part of Honshu Island, Japan that comprises 6 prefectures: Aomori, Iwate, Miyagi, Akita, Yamagata, and Fukushima) as a case study where it has an aim to analysis and to give an illustration existing conditions of these compactness attributes in Japanese cities particularly through city data examination (1980-2000 basis). Second, based on the preceding results, some analysis related initial effect of compactness in inner city will be conducted to predict, mainly their effects related gentrification phenomena. Through this early study, it would be useful for how Japanese cities face and accelerate these two problems: delivering compactness and harmonizing its side effect such gentrification process. Generally, the results inevitably will steer to prepare an appropriate strategy to handle both problems appropriately in the cities.

Key words:
City compactness tendencies, Inner city development, Gentrification process, Neighborhood characters, Japanese Cities

1. Introduction
1.1. Background

Needs to perform sustainable communities in urban areas bring greater effects of finding direction either new approached or new philosophy to attain the objective of sustainability, one of popular strategies is a compact city concept. Inevitably, from global discussion level mainly in Europe, the US, and Australia, this strategy has started to be adopted into worldwide local strategy or implementation level, including some cities in Japan. On the other hand, actually, either compact city strategy or level of compactness of a city is probably the most avidly followed urban issue, but there is little understanding of how it works, even deciding its level. The debate is often without empirical foundation, even the characterization of the compact city is often confused.

Without deeply understanding of its work and its effects, compact city would be just a slogan, may be dangerous, and it would cause some unpredicted negative effects. For example, to deliver such compact development principles, many efforts by means of appropriate policy alternatives have been adopted and done by many local governments. Tools such as urban infill and development boundaries are being used to optimize affordable housing within dense population in existing urban settlements. Such these developments have actually been indicated as cause in pushing rebirth of some neighborhoods and a rise in property and land values. It also influences displacement problems among poorer residents, many of them elderly and unable to afford higher rents and taxes. These effects have been known as a gentrification where process by which higher income households displace lower income residents of a neighborhood, changing the essential character and flavor of that neighborhood.
As illustrated in Fig. 1, tendencies to deliver a compactness concept in the cities, make many of them concentrate their efforts to optimize the inner cities development by means various strategies. Indeed, step-by-step the atmosphere of the city will change. It occurs when people once living comfortably in a neighborhood are involuntarily uprooted as the neighborhood changes. As property values increase in response to improvements in the area, real estate speculation, property taxes and rents increase in tandem. Economically, all stakeholders in urban development would benefit these situations. Landlords in the community often seize this financial opportunity, evicting old renters, and increasing the rent on apartments for which incoming residents are willing to pay more money. As a result, current residents, many of whom have spent their entire lives in the community, suddenly find themselves without homes and forced to move to less desirable locations.

1.2. Objectives and Method

Regarding previous overcomes in compact city studies, this study firstly is aimed to present and provide actual information of Japanese cities development and tendencies, from viewpoint of city compactness attributes in line with compact city study. It is an initial and important step to understand characters of Japanese cities in implementing efforts towards recent compact sounds development. As a representation of sustainability concept, it is also an important role of compact city strategy to be understood from the standpoint of each attribute, and furthermore should be needed in defining indicators. The study undertakes 63 Tohoku Region cities in Japan (northern part of Honshu Island, Japan that comprises 6 prefectures: Aomori, Iwate, Miyagi, Akita, Yamagata, and Fukushima) as a case study where it has an aim to analyze and to give an illustration existing conditions of these attributes in Japanese cities particularly through city data examination. In this study, we examine and compile related recent cities data and its changes for twenty years interval (1980-2000 basis). Besides it offers appropriate information as sufficient means to face compact city issues and its implementation in the future.

Second, based on the preceding results, some analysis related effect of compactness in inner city will be predicted, mainly their effects related gentrification phenomena. In conducting these effects, the study initially focuses in changing population and its social economical aspects. Though it is as a preliminary study to more focus on the wider problems on gentrification, at least it will be able to predict changes of some aspects of cities, which have potentials to affect a gentrification process. However, it is interesting enough to be analyzed, since there is common trend in Japanese city context, one of them that total population has tended to decrease, while elderly persons increase significantly. Moreover, through this study, it would be known how Japanese cities face and accelerate these two problems: delivering such compact development and harmonizing its side effect, for example gentrification. Generally, the results inevitably will steer to prepare an appropriate strategy to handle both problems appropriately in the cities.

To achieve the research objective, at first, from the previous study we present attributes of compactness, which seem very strong to establish a certain level of city compactness and derive many related indicators towards implementation compact city development. Furthermore, from these attributes some important and positive indicators are carried out. Using data of case study where the study undertakes 63 cities in Tohoku Region, the analysis is conducted. Finally, to initially obtain an implication of the result to gentrification effects, we also use some related cities data that would have strong indication to lead the process and elaborate with finding results of compactness analysis. In the end part of the study we discuss the results intensively and it will be closed by a concluding remark.

2. Toward Compact Sounds Development
2.1. City Compactness and Sustainability

Sustainable development concept in urban areas brings greater effects of finding direction either new approached or new philosophy to reach the objective of sustainability. The action to find an appropriate sustainable urban form has point out compact city as a desirable urban form. In order to the performance of sustainability, the compact city proposal as integral transformation of the concept appears to essentially consider space, time, and the objectives of sustainable development itself, encompass all
sustainability factors in urban living: environmentally, socially and economically sustainable based on the character/context of the city.

As illustrated in Fig. 2, the sustainable urban development and compact city relationship should be in coherent as a transformation unit if we need to discuss city compactness. As stated by Elkin, et al. (1991) and Alberti (1996) that sustainable urban development must aim to produce a city that is “user-friendly” and “resourceful” as a place for living, and requires the achievement of urban development aspirations, subjects to conditions concerning inter- and intra-generational equity and its regenerative capacity to be self reliant in the time being. Since the concept of sustainability covers space and time range (natural capacity and future generation factor), indeed in the implication level -through a choice of compactness strategy- should not be an instant city, its development needs a process encompassing each aspect of sustainability. Indeed as representation of sustainable development concept, compact city should inevitably consider all sustainability aspects together in a solid framework. In this study, based on compiled previous studies, the definition of the compact city is defined more less as an urban policy strategy in line with sustainable urban development efforts that a process to perform all together higher density urbanization, activity concentration development, public transport intensification, as well as increased social welfare of residents in certain area in city center, towards more benefits in all dimensions of urban life.

2.2. Framework: Compactness Attributes

From previous studies which compromise some majors focus on compact city issues through several systematic literature reviews, proposes several attributes (see Tab. 1) that each of them has same role and interdependencies among others as a profound means in conducting level of compactness, respectively: population density, activity concentration, public transport intensification, city size consideration, social - economic welfare target, and there exists a process to realize compactness as described through a diagram in Fig. 3. Since compactness needs performing time and space in its process, this study indeed acknowledges the dynamic side of compactness in wide range characters of cities.

| Population densification | High densities are seen to be fundamental attribute to urban vitality and the way to achieve sustainability by many authors (for example McLaren, 1993; Newman and Kenworthy, 1999). In the many countries where the compact city development start to implement, higher density is believed to be an essential component of walkable city where many activities can easily do without dependencies on vehicles, mainly on private car usage. In urban areas, higher density development usually implies sufficient infrastructure provision. Other arguments related to transport specifically, the development of higher density along the transport nodes or corridors sufficiently encourage public transport provision (Nijkamp and Rienstra, 1996). Similarly, the arrangement of density levels across the city may be more significant for energy consumption requirements. |
| Activity Concentration | It compromises the idea of living, working, and traveling activities in a area. consequently, also encourages the direction of growth to appropriate local areas, and the sitting of facilities and housing close to urban public transport nodes. It is argued that unity of activity in a same location by means mixed use development will lead greater opportunities to a successful sustainable concept in the area, with a balance of residential and non residential land uses. In this case, the centrality location of residential land use becomes a key factor to attract this concentration to be a living environment for many other activities, since the other activities is semi permanent activities or not along time done in the such concentration area. Burton (2002) has pointed this case that the mixing different activities within an area should serve to strengthen social integration and civic life. |
### Public transport intensification
Transportation in the compact city issues is arguably the single biggest issue for environment arguments relating to urban form, as reflected by the large number of reviews devoted to this topic. Barret (1996) principally, has identified that the public transport intensification or stronger to serve the urban activities with a competitive public transportation systems may become an initial key action to overcome the other crucial problems in transportation, in spite of though that it may produce long journey lengths. Moreover, intensifying urban transportation may lead to reduce private car dependencies and may change the travel behavior of the residents, this effort which comprehensively implemented in greater concerns also results reducing emission and energy consumption in urban areas, as well as overcoming parking difficulties. In addition, the urban transport intensification should be related in areas where they are developed as mixed-use areas with attractive housing, business facilities. One of this advantage, it will open new possibilities to develop urban nuclei in the nodes where the system connects to the existing lines. It means that the new public transport system may promote idea of making higher density to activities and population.

### City size consideration
Prud’homme and Lee (1999) has identified that the relative location of jobs and homes (compactness of jobs and homes) will influence the effective size of a labor, market, and size of city itself. From viewpoint of localization economies, distance between jobs and homes should influence the degree of agglomeration economies. Explicitly, Cervero (2001) has also pointed out that employment densities and urban primacy size are positively associated with worker productivity, suggesting the presence of agglomeration economies. In concept practice, Thomas and Cousins (1996) have suggested some notes to compromise with its certain scale, aimed to provide as many daily needs as possible within minutes of most inhabitants homes. Ultimately, the necessary to consider the certain city attributes is to determine an easier manageable city when certain number of population, activities, and physical pattern of the city can provide a harmonized interaction.

### Social welfare target
One of the claim benefits of compact city is that compact city promotes increasing quality of life of the residents, or greater urban compactness is associated with benefits for the conditions or life chances of the disadvantages, so reducing the gap between the advantaged and the disadvantaged (Crookston, et al., 1996). Those are claimed as positive results of higher density, ease to do activities, affordable city size, higher availability of transportation mode, mainly public transport mode. As an integral part of sustainable development strategy, city’s compactness should be closely verified through social equity with focus on quality of life represented by not only equitable access to urban facilities but also social and economic welfare including space allocation. It is essentially important to examine feasibility of the urban renewal in consideration of limited available resources and population trend in the future. However, this attribute has received the least attention in the study of the compact city (Burton, 2000).

### Process to be compact
The other important understanding is the status of compactness, compactness is dynamic; and the measures advocated by many authors are static. It is affected there is gap or misunderstanding to capture the compact city study. For this case, it especially needs to model any compactness in a dynamic and interactive fashion. It means that city compactness development needs a process, which can be transformed into some efforts namely intensification, infill, consolidation, or whatever the name of guiding the development of the city towards a higher density with mixed use activities in the central area (Burton, 2000). However, implementation of process to be compact needs to be sensitive not just to the ecological imperative, but also social and economic needs (Jenks, et al., 1996).

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3. Japanese Urban Context from the View Point of Compactness

3.1. Observation from Case Study: Tohoku Region Cities

Tohoku Region comprises 6 prefectures (Aomori, Iwate, Miyagi, Akita, Yamagata, and Fukushima) is a specific region in northern Japan, located in Honshu Island, dominated by agricultural related development, where the differences among cities in this area are smooth (Fig. 4). Beside of that, Tohoku Region cities are chosen as case study to reduce different range in the geographical factors and social-economic gap reasons among the cities, although perhaps the side effect of inner city development is still rare. To ease calculation and analysis, all cities in this area (63 cities) are categorized into 3 small, medium, and big cities categories as shown in Table 2. It also has an initial purpose in the future to provide these identified results based on cities rank with an appropriate compactness policy measures. Concerning the data, since the study to explore all related indicators to perform almost complete compactness attributes number reliable data for each item/component of attribute, each measured indicator here is suggested as a key element to conduct reliable attribute of compactness. It assumes that all indicators are equal importance. It also monitors performance of attribute in particular, and information to set the objectives compact city concept.
Tab. 2 Classification of the cities based on population rank

<table>
<thead>
<tr>
<th>City Rank</th>
<th>Name of City (Prefecture)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big cities</td>
<td>Fukushima, Aizuwakamatsu, Koriyama, Iwaki (Fukushima Pref.), Sendai, Ishinomaki (Miyagi Pref.), Yamagata, Tsuruoka, Sakata (Yamagata Pref.), Morioka (Morioka Pref.), Akita (Akita Pref.), Aomori, Hino, Taka (Hachinohe (Aomori Pref.))</td>
</tr>
<tr>
<td>Medium cities</td>
<td>Sakagawa, Shinkawa, Haramachi (Fukushima Pref.), Shiohama, Furukawa, Kesennuma, Natori, Tagajo (Miyagi Pref.), Yonezawa, Tendo (Yamagata Pref.), Miyako, Mutsu, Hanamaki, Kita, Ichinoseki (Morioka Pref.), Noshiro, Odake (Akita Pref.), Gouga, Towada, Mutsu (Aomori Pref.)</td>
</tr>
<tr>
<td>Small cities</td>
<td>Kita, Sakata, Nishimatsusakawa, Shinjuku, Kamaishi, Inawashiro, Shinjo, Saiseikai, Kamiina, Murayama, Gajari, Higashine, Nanyo, Obanazawa (Yamagata Pref.), Oshika, Tohno, Kurozenkata, Kamaishi, Ichinoseki, Nizune, Kuzi (Morioka Pref.), Yokote, Honjo, Oga, Yuzawa, Omagari, Kazuno (Akita Pref.), Kuroishi, Misawa (Aomori Pref.)</td>
</tr>
</tbody>
</table>

Tab. 3 Indicators of each attribute

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Variable</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Densification</td>
<td>popden01</td>
<td>Person/nha in DDD area</td>
</tr>
<tr>
<td>popden02</td>
<td>Person/nha in built area</td>
<td></td>
</tr>
<tr>
<td>popden03</td>
<td>Person/nha in residential area</td>
<td></td>
</tr>
<tr>
<td>popden04</td>
<td>Person/flower space area of dwelling</td>
<td></td>
</tr>
<tr>
<td>popden05</td>
<td>Rate of occupied dwelling / total dw.</td>
<td></td>
</tr>
<tr>
<td>popden06</td>
<td>Rate of non single house / total dwelling</td>
<td></td>
</tr>
<tr>
<td>Activity Concentration</td>
<td>actcons01</td>
<td>Rate of work place/total area of city</td>
</tr>
<tr>
<td>actcons02</td>
<td>Rate of person engaged/total area of city</td>
<td></td>
</tr>
<tr>
<td>actcons03</td>
<td>Rate of working home/total emp/ed pr.</td>
<td></td>
</tr>
<tr>
<td>actcons04</td>
<td>Rate of working in the same city/total emp/ed pr.</td>
<td></td>
</tr>
<tr>
<td>Public Transport</td>
<td>transpres01</td>
<td>Rate of public transport trip/total trip</td>
</tr>
<tr>
<td>transpres02</td>
<td>Rate of transport without private car / total trip</td>
<td></td>
</tr>
<tr>
<td>transpres03</td>
<td>Rate of walking and bicycling person / total trip</td>
<td></td>
</tr>
<tr>
<td>transpres04</td>
<td>Rate of person per car</td>
<td></td>
</tr>
<tr>
<td>City Size and Access</td>
<td>citize01</td>
<td>Average distance of city (negative)</td>
</tr>
<tr>
<td>Access Consideration</td>
<td>citize02</td>
<td>Average distance of DD (negative)</td>
</tr>
<tr>
<td>citize03</td>
<td>Average commuting time (negative)</td>
<td></td>
</tr>
<tr>
<td>citize04</td>
<td>Rate of W5 trip, 30 min. per total trip</td>
<td></td>
</tr>
<tr>
<td>Social Economic Welfare</td>
<td>socsecw01</td>
<td>Rate of annual revenue per person</td>
</tr>
<tr>
<td>socsecw02</td>
<td>Rate of income per person</td>
<td></td>
</tr>
<tr>
<td>socsecw03</td>
<td>Rate of 65 years age or more / total pop.</td>
<td></td>
</tr>
<tr>
<td>socsecw04</td>
<td>Rate of number of daily facilities in total pop.</td>
<td></td>
</tr>
<tr>
<td>socsecw05</td>
<td>Rate of non housing area / built area</td>
<td></td>
</tr>
</tbody>
</table>

Findings related to compactness attributes conditions in Tohoku Region cities. Furthermore, based on results, the analysis system of these attributes represents a degree of compactness as shown in Fig. 5. There are two factors of analysis, first is in x axis which named socio-economic performance and y axis which named environmental performance. Since each indicator has equal value for compactness, a degree of compactness should be reached by a balance value from both factors.

Generally, existing condition of compactness attributes in Tohoku Region cities is difficult to explain whether both compactness strategy and development ready to implement in these areas, even in general Japanese city condition. Koidoe (2001) said that in Japan, strategy such compact development is transformed into policy has just begun. The right moment to adopt its spirit started initially when there was 2000th year amendment of City Planning Act in Japanese City Planning where Japanese cities are faced to find future strategy of city planning. Afterwards, Sendai City in Tohoku area and Fuku City in Hokuriku area have tried to adopt the concept and take it into account in their new planning strategy. However, it is still far away to further developments, since many problems related planning system, local characters and others should be integrated into a rigid approach to deliver the concept.

Initially, based on the analysis results, it is obvious that compactness attributes would really exist, although there just have a visible movement in process due a compactness condition for a certain time (in this case from 1980-2000). Moreover, during these times, as evaluation, direction of Tohoku Regions cities (2000) in delivering compactness seems less than the previous years (1980, 1990). Both factors analysis, Tohoku Region cities have a serious decrease. It may provoke positive analysis to find the causes and guide the future development. Moreover, although the tendencies of compactness degree show significant decrease, from Tab. 4 based on the city rank categorization, we can observe that during 30 years data examination, big cities (14 cities) in 2000 still has highest score (0.35) of factor accumulation.
or cycle of community change, and development and conservation policy. It has been an interesting discussion in almost worldwide urban discourse. Generally, this process occurs in the inner city, located a lot of deteriorated urban properties with poor neighborhoods, when old buildings attracted by rich people. Physical conservation is undeniably an advantage from the role of gentrification since building and neighborhood environment are improved, but the effect on social conservation is the other side of its role. Actually, from that we get the term to "gentrify" meaning to change a run-down area of a city into an improved state by repairing and remodeling the houses and environments.

As stated by Smith (2002) that the process of gentrification, which initially emerged as a sporadic, quaint, and local anomaly in housing markets of some cities, is now thoroughly generalized as an urban strategy that takes over from liberal urban policy. The impulse behind gentrification is now generalized. Its incidence is global, and it is densely connected into the circuits of global capital and cultural circulation. In reality, of course, this evolution of gentrification has occurred in markedly different ways in different cities or neighborhoods and according to different temporal rhythms. The important point, however, gentrification is a sharp two-edged sword. In one hand, it is a frontier of urban space optimization, and the other hand, it may trigger a chaos, imbalance condition in physical, social, and economical of the city.

Regards to the compact city development, by means of inner city development efforts, it re-emerges continuously for two basic reasons. First, rapid economic growth and its agglomeration create great demand for labor and housing at the regional level, and in some cases this makes the housing in inner cities -particularly the CBD area- newly attractive to higher income newcomers (see for example Kennedy, at al., 2001). Second, the local government, cities and non-profit organizations increasingly have motivation, resources and specific policy strategies to direct revitalization efforts in targeted parts of central cities (see Kennedy, et al., 2001). Under some circumstances, such these compact development efforts can lead to gentrification. These new conditions of urban settlements in a compact city development that have specific conditions which all represent transformation and change of urban
settlement conditions: displacement of original and unable residents; physical upgrading of the neighborhoods, particularly of housing stock; and change in neighborhood characters. Inevitably, these would influence both urban structure and urban characters in which it needs to put emphasis on understanding transformation mechanism and then finding the appropriate solutions for different scales and locations of development.

4.2. Japanese Gentrification Type

In Japanese urban context, gentrification just gets a very little attention and researches in gentrification are very rare. However, as identified by Fujitsuka (2002) Japanese gentrification process has specific development and may be different with the other countries. During the 1980s, in Japan, land prices skyrocketed in metropolitan areas of Japan. Land prices peaked in the beginning of the 1990s. After that, it fell year by year, though in some areas, for example in Tohoku Region, land price still stable to increase (Fig. 6). Generally during the first half of the 1990s, real estate transactions stagnated. After the bubble economy burst that influenced Japan economics stronger, disinvestment was prominent in the inner city areas of Japanese cities. Gentrification re-emerged after the mid-1990s in Japanese cities, at the same time as Western countries’ cities, as Smith (1996) mentioned. The existence of unoccupied sites and the depreciation of land prices caused gentrification in the inner city areas.

Takahashi, et al. (1996) identified already that there has been a leading to the disintegration of some communities and neighborhood, particularly in some areas in big cities. Intensification development where office buildings have been enthusiastically constructed, there have been a gentrification process where the old traditional urban communities tends to vanish. The older housing stock, with older residents or other disadvantages have gone to elsewhere, while only very little low-income housing has been provided in the new development. As an example in Tokyo area taken from White Paper of Ministry of Construction, 1990, Fig. 7 shows that areas with close distance to urban center are dominated by high income residents.

The other problem that may lead specific gentrification in Japan is character of the population, where it has been recent discourse. It is interesting enough to be analyzed, since there is common trend in Japanese city context, one of them that total population has tended to decrease, while elderly persons increase significantly. For over four decades now, the Japanese people have been having too few children to replace themselves and many explanations stated that it becomes a serious cause of Japan’s failure to live up to its earlier promise. According to United Nations estimates, by the year 2050 Japan will have 35 million fewer people than it does now. The 92 million Japanese who remain will have a median age of 54. This depopulation crisis has already forced Japan and now become a hot topic to be solved.

On the other hand, Japanese urban development also shows increasing activities, mainly with many projects labeled urban redevelopment, main of them are to focused in inner city development, concretely
encourage optimization area development in UPA (urbanization promoted area, mostly in existing city center). As illustrated in Fig. 8, using case of Tohoku Region cities we can see some tendencies of UPA development. Although, there is a decrease of density in UPA between 1980 to 1990, but from 1990 to 2000 trend of density in UPA show significant indicator of cities efforts to pull population to live in the central cities. From the data, only Iwate and Yamagata cities show decrease case, since between 1990 and 2000, the UPA in both areas were enlarged significantly. It causes effort to draw population going back to the city center would need more time. Nevertheless, in common sense, it is obviously going in line with main of compactness developments idea, back to live in the inner city.

4.3. Future Directions: Displacement and Change of Community

In Japan, although urban social condition and system of urban planning have different character with the other places where observation of gentrification development process is acknowledged, these phenomena would also be inevitable, though has lack of attention yet. Recent days, such "gentrification process" may be visible by the construction of new high-rise residential buildings such as condominiums and apartments in inner city Japan. Despite some of them use undeveloped areas, many others may relocate the local inhabitants and the attractive town space of historical areas. There is a danger that the peculiarity of this district cannot be maintained. From Kyoto case study, as founded by Fujitsuka (2002) that some traditional townhouses have been rehabilitated and used for commercial uses such as restaurants, cafes, boutiques, and others. Since the case of gentrification spreads globally and reflects a capital force in inner city (Smith, 2002), inevitably it is may ready extents to over Japan.

Moreover, since there is the sustainable development agenda, with its emphasis on the revitalization of cities linked to meeting the growing pressure of new housing development. Indeed, developments of city centers in a number of Japanese cities are undergoing a process of rapid change affecting their physical form and the uses of their land and buildings. Once the exclusive preserve of commercial (office) and retail users, city center have seen significant diversification, with the growth of activities, including various forms of new cultural provision, an explosion of uses of bars, cafes, restaurants and clubs, as well as most recently of new housing development. In the background to these changes has been a more diffuse set of influences affecting the economy, class formation and identity, and associated patterns of consumption. Japan Real Estate Institute survey in 2002 also strengthens this opinion that in some major cities, gentrification has reduced demand for rental units in the suburbs (JREI, 2002).

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Back to the case study, the result of measurement of compactness level using Tohoku Regions cities macro data as case study is not clearly show the tendencies of compact city development in the area, in contrast even it shows decreasing value of compactness than the preceding times. However, despite it would be difficult to assume gentrification process using these data, to observe compact city development implementation in relation with its effects in gentrification, the study undertakes and analyzes some related factors represented by specific indicators for gentrification as written by Polen, et al. (1984). They concluded that extension revitalization of inner city, followed by demographic change, economic change, as well as lifestyle change is fundamental indicators in direction of gentrification process. These changes in this study are represented in Fig. 9 by relation between compactness level and chosen indicators such as 65 years old and more population, rate of monthly rent, average income, and person per floor area space. The obtained results show that level of compactness of the city would brings effects of lower number of elderly people in the city, higher rents of dwelling, higher average income of city population, and less person per floor space area respectively. Nevertheless, these mature findings need further detail analysis.

More detail illustration of local development may use Sendai City condition as an example (see Fig. 10). Sendai is the center of Tohoku Region area located in Miyagi Prefecture, where in the beginning 2000 was stated to initiate compact city strategy in its urban planning program. JREI (2002) stated that Sendai is one of surveyed city with strong demand result for newly built class-A apartment buildings with state-of-the-art facilities in prime location. Furthermore, from 1980 to 2000, data in Fig. 11 taken from Furuta Planning (2001) illustrates that there is an increase unit of room mansion development in greater Sendai area. Moreover, the data shows significantly that mansions were developed in the area near CBD also increasing. Hamnett (1991) has already described these characteristics of location would be chosen by major "gentrifier" to own such improving lifestyle and cultural differences of the home itself and the surrounding neighborhood, and the access to specific forms of consumption (cultural and leisure facilities) provided by particular locations It has been a key feature in shaping the process of future gentrification. For major cities in Japan, it is may be as a fact that gentrification process is running on.

![Fig. 10 Development of Sendai City: more apartments are developed in the central city](image)

![Fig. 11 Comparison of new built mansion in Sendai greater area and in CBD](image)

5. Concluding Remarks

This study embraces the city compactness attributes into population densification, activity concentration, urban transport intensification, certain city size consideration, target to gain social economic welfare in the city areas, and finally a development process to deliver compactness condition as representation of sustainability objective for the compactness strategy. These attributes represent a new performance of a-rigid attributes as direct derivative of sustainable concept, than the previous studies have, for a comprehensive analysis of the compact city. The study has also verified the existence of compactness attributes in Tohoku Region Cities. The results inevitably will steer to prepare an appropriate strategy to deliver more compactness in the cities.

Furthermore, regard to the compactness effects, the study preliminarily examined the effects of gentrification to the cities, which induced by compact city viewpoint. Although, in common, gentrification is not well known yet, the process would be in progress. The gentrification is also natural process that also consist both positive and negative influences. Since the significance of gentrification is also demonstrated by its permanence as an urban process, it will be inscribing a distinctive and changing pattern on the urban context. Furthermore, the study argues that gentrification should be considered by a
significant socio-spatial process in relation to its magnitude and examined carefully the initial negative effects in the inner-city areas. The continuation studies to make clear interpretations from the preceding results will be fruitful and should clarify more relevant findings related attributes in detail with a thorough discussion and incisive analysis.

6. References

12) Furuta Planning, 2001, Sendai Greater Area: Information of Land and Housing for Sale (Sendaiken: bunjouchi to jiwaku no annai), Furuta Planning, Sendai