

## DISTILLING 'URBAN KERNEL' FROM THE REVIVAL PROCESSES FROM WAR DAMAGE IN JAPANESE LOCAL CITIES

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**Tsuyoshi Kigawa**

Fukui University of Technology  
e-mail: anything@gmail.com

**Masao Furuyama**

Kyoto Institute of Technology  
e-mail: furuyama\_ma@jim.kit.ac.jp

**Kyung Wook Seo**

Kyonggi University  
e-mail: kseo@kgu.ac.kr

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### Abstract

*In 2011, Tohoku Region Pacific Coast Earthquake attacked Japan and the Tsunami destroyed a number of cities completely. After 2 years, the way of revival are discussed right now. In the process, how the community can be reproduced becomes hot issue. The city vanished instantly, therefore, they need to reproduce not only buildings but also lifestyles. However, this is not first experience for Japanese. The war damage revivals were carried out after WWII. The purpose of this study is to investigate the revival processes from war damage in Japanese local cities and reveal the "Urban Kernel" from them. Urban Kernel is an implicit norm to reproduce urban fabric. By using this concept, an alternative viewpoint in city planning would be shown.*

**Keywords:** *City Planning, Modernization, Japanese City, Air Raid, Urban Kernel,*

**Theme:** *Historical Evolution of Built Form*

## 1. Introduction

In 11th March 2011, the worst Tsunami in Japanese modern history destroyed many local towns in the Tohoku region of Japan completely. This is a very big issue for Japanese who think a shared territorial bond as important. Especially in local cities, land is regarded as property to be inherited from ancestor and residing there permanently is natural for local dwellers. If ten years pass, many of the Asian cities would change the urban layouts. Tokyo could be one of the cities, however, a number of local cities in Japan would be exception. Probably, the difficulty of an eminent domain would be severer than other Asian countries. What happened in the stricken district is that a large-scale eminent domain and collective relocating to high place for disaster prevention by means of exchanging the land. Therefore, how a community could be reproduced on blank city is hot issue in Japan <sup>11)</sup>.

Actually, Japanese cities had experienced such demolitions long ago. In 1945, last stage of World War II, Air raids burned most of Japanese urban areas. Analyzing what had happened during the process would be useful to understand the mechanism to form urban layout and become effective also for community reproduction in the Tohoku region.



Figure 1: Scene of Fukui just after the earthquake in 1948<sup>10)</sup>

The most of Japanese local cities had traced a single pattern of development until the World War II. They had been built up the foundation in the EDO periods (1603AD - 1868AD), inserted modernistic devices in the MEIJI Era (1868AD - 1912AD), and experienced urban expansion during TAISHO (1912AD-1926AD) and early in SHOUWA (1926AD-1989AD). And, during WWII, many of the major cities were destroyed by the air raid. Even if the cities were totally devastated, in many cases, the fundamental layouts were not redesigned in the process of revival. The reason could be that the residential demand of rebuilding the same scene as the before, the desires of landowner's; besides the hasty request to revival. As a result, these desires in daily life and the ritual demands left the central part of city untouched, and brought the urban problems today. Therefore, even if cities were devastated by the air raid and back to blank, it was not perfect rupture but something had been inherited.

In order to understand this phenomenon and try to find alternative viewpoint in urban planning, we suggest a concept of "Urban Kernel". The destruction like an air raid has so far happened in Japanese, for example earthquakes and Tsunami. Although it seems apparently that such renewal of a city remakes all urban aspects, many things are succeeded in fact. For example, some cities have conventional area of commerce without any rational reason in spatial analysis. They exist there owing to historical or cultural reason. It is explained just as a custom. However, this custom has important factors for understanding the city. By means of analyzing this ritual "custom", it extracts as an implicit norm in urban forming, and defines it as "Urban Kernel".

The purpose of this study is to investigate how the concept of "Urban Kernel" would reveal the organic process of Japanese local cities' generation, expansion, destruction and revival, and find an alternative way of looking the urban evolutionary process.

## 2. Background of This study

### 2.1. Distilling urban “hidden” aspect

The most significant point of Space Syntax methodology is that we can distill spatial layouts from maps. The layouts are not easy to be found from map at a glance, and furthermore we can visualize the function.

In this paper, we use indexes of Space Syntax, Global, Local, SLOPE and UEC. For calculating of them, we use the software: Depth Map, and set Radius 2 for Local (which means Radius =3, in Axman Software). The reason why we use Radius = 2 is that the results of Global and Local are exactly same under the condition of a perfect grid, which is a grid layout without any interaction (see Figure.2.). Therefore, we can calculate how much the grid was deformed and how much the city becomes asymmetry.

“Center”: we defined it as an axial line that has higher integration value than any other lines connected directly to it. Consequently, only a single center exists in Global; in contrast, plural centers exist in Local. The index of Local extracts the position of subdivided clusters, and Global shows the center, which is composed by local clusters.

### 2.2. UEC (Urban Entropy Coefficient)

As for Global and Local, Hillier suggests, “...poor correlation between the local and the global integration...suggesting an area which ‘freezes’ the natural movement.”<sup>4)</sup> He defines the correlation between Global and Local as Synergy, a coefficient of determination, namely  $R^2$ . Stegen interpreted Synergy as one of the concepts that shows the capacity of an urban system and wrote, “The overall external image of the virtual community, mainly composed by both the majorities of the local and the global communities, is then confused. This must be confusing for all the social groups and urban functions (especially shops), which synchronize on the overall virtual majority.”<sup>9)</sup>

Focusing on the unique state of an urban system that can be expressed by “freeze” in Hillier’s text and “confusing” in Stegen’s text, we have developed a concept, Urban Entropy Coefficient.<sup>8)</sup>

The estrangement between Global and Local has conventionally been acquired by  $R^2$  in Space Syntax methodology. However,  $R^2$  has a limitation in showing the negative correlation, although such a correlation hardly appears. Therefore, we adopt another way of showing correlation coefficient by defining Urban Entropy Coefficient (: UEC) as in equation (2).<sup>8)</sup> Since each Axial Line (: AL) has its own Global and Local values, we can describe a spatial system as  $AL_1 (x_1, y_1)$ ,  $AL_2 (x_2, y_2) \dots AL_n (x_n, y_n)$  in which  $x_n$  shows the Global value and  $y_n$  the Local value of  $AL_n$ . The numerical value of UEC ranges from 0 to 2.

$$r_{xy} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{[\sum_{i=1}^n (x_i - \bar{x})^2][\sum_{i=1}^n (y_i - \bar{y})^2]}} \quad \text{--- Equation (1)}$$

$$UEC = 1 - r_{xy} \quad \text{--- Equation (2)}$$

where  $AL_1 = (x_1, y_1), AL_2 = (x_2, y_2) \dots AL_n = (x_n, y_n)$

$x = (x_1, x_2, x_3 \dots x_n) \quad y = (y_1, y_2, y_3 \dots y_n)$

$x = \text{Global} \quad y = \text{Local}$

UEC is a value of the estrangement between the Global and the Local. If UEC value is high, the estrangement between the Global and the Local system is relatively wide, and it is likely that the urban structure would experience the state of “freeze” or “confusing” in Hillier’s and Stegen’s terms. We regard the city experiencing this kind of state as having approached a point where transformation could happen for adaptation. This means high UEC, we call this condition “dynamic.”<sup>7)</sup>

From our findings in previous paper dealing with UEC, the sustainability can be understood as maintaining the pressure of evolution the city. In modern era, the evolution meant expansion, or merging several cities into one, and these evolution gave the city prolong the pressure. During the population was increasing, these evolutionary process could work. However, once the decline in the population started, the modern way of evolution made the city dysfunctional and unsustainable.<sup>6)</sup> On the other hand, a city under static condition (low UEC) can be already formed as the optimal shape by mean of historical distilling. For such a city, it is very difficult to be transformed.

In this paper, we assume that a city has clearer center and boundary, the city would be more intelligible. And, the city has lower UEC and it would be more compact and sustainable. A perfect grid city has high permeability but the layout is very flat and not clear in the location of the center. Then, the index of SLOPE would be important. If SLOPE becomes high, it means that clear centeredness appears in Global and Local, and a city will become intelligible. The clear centeredness brings definite hierarchy in the layouts. Therefore, when the number of SLOPE is high and UEC is low, the city can be understood as an intelligible compact city.

Fig.2. shows examples of axial analyses on urban fabrics. With these examples, our assumption on city shape would be explained. Since the values of Global and Local is equal, the SLOPE = 1 and UEC = 0, in the perfect grid. Based on the value, we can express the difference in the spatial layouts. For Hikone 1836, high value in SLOPE would be understood as that it has clear centeredness, the UEC shows high, and it means it has sprawl distribution. However, in pre-modern city, the urban sprawl could be interpreted as particular condition of subdivision in the hierarchy of the status of residents, like merchant or SAMURAI.

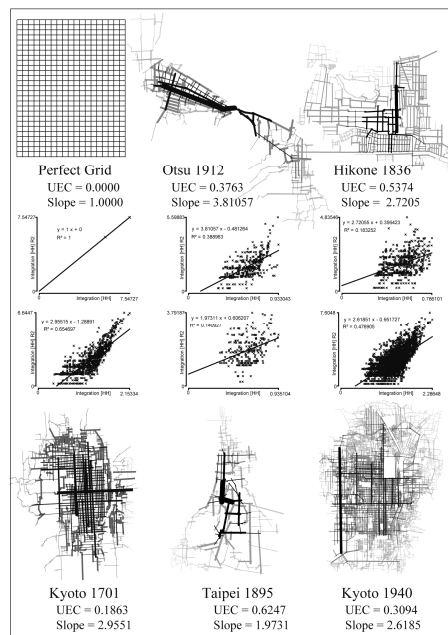


Figure 2: Sample of indexes application

If compared with Kyoto 1701 and 1940, result of 1940 shows higher UEC even though both of them have high value in SLOPE. This could be interpreted as the influence by urban sprawl.

Otsu and Taipei are examples of city merging. During the modernization, towns did emerge into one city. In the process, we can see the tendency that they have high SLOPE and UEC. However, if they have high SLOPE and low UEC, then, the emerge was not equal emerge but takeover.

In this paper, we use these indexes and assumption.

### 2.3. OMOIDECHIZU (map of recollection)

The habitants have a kind of feeling to the land, which cannot read from official history books or normal historical maps. For example, they have attachment to their villages where they were born. Such Sense of Place can be understood as one of the most important elements forming a community. Because a community can be regarded as a collective unit shared the sense of place. In order to understand the feeling, it is necessary to carry out interview to residents or look narrative document written by the experienced persons. By means of analyzing the information carefully, we can see alternative viewpoints for urban planning.

For studying the viewpoint, we adopt city of Fukui as an example. Fukui is the city, which had experienced two destructions an air raid in 1945 and a dire earthquake in 1948. The citizen of Fukui experienced tough revival; therefore, the city of Fukui uses Phoenix for its emblem. We use concept of Urban Kernel for studying the turbulent history of destruction and reproduction.

The map of JUNKA elementary school district (Figure 3.) would be interesting example to understand the phenomenon, how the habitats saw the city. JUNKA is name of elementary school and the district of JUNKA is known as conventional commercial area from Edo periods. K. Muramatsu drew the map in 1984. He was a resident of JUNKA, survived from the war and earthquake, recollected the memory of the city before demolition and added his commentaries to the map. From the commentaries, we can read how the inhabitants of the day recognized the place.

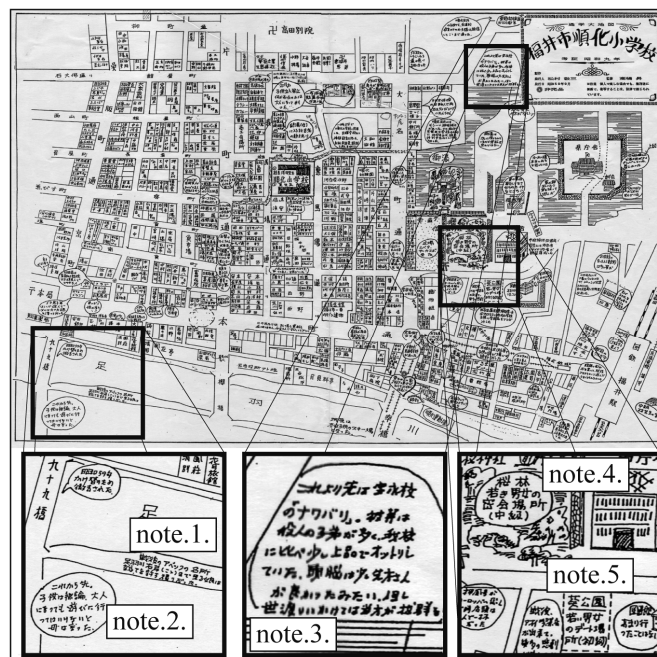


Figure 3: OMOIDECHIZU<sup>12)</sup>

The scale of the elementary school district has a significant meaning in Japan, especially in the historical urban center. Because the range of an elementary school is not only the range of a school but a range of an aggregate of communities such as a town association, a festival, etc.

We would like to introduce several commentaries on the map.

note.1: "Famous place for young couple date. If the girl came with you together, it means that she would give you everything"

note.2.: "my mother said to me "don't go across the bridge, even when you are grown up"".

note.3.: "After this point, it was territory of HOUEI (another elementary school)".

note.4. "The meeting place for young men and women (intermediate level)".

note.5.: "A Park for dating (beginner level)".

Note 1, 4 and 5 describe the sense of place where the young people did date in those days. This sense could be common among the habitats of those days. The place described in note.1. seems to be special among the date place. Why it was special can be read from note.2. After the bridge, prostitution zone was formed and the atmosphere around the bridge could be different from general life. Such an atmosphere in pre-war days is difficult to find from normal historical maps. However, which should be an important meaning for forming a city.

#### **2.4. The urban kernel**

By here, we would show Japanese contemporary issues on sustainability or compact cities. For these issue, I'd like to propose an alternative viewpoint, which is urban kernel. "Kernel" is originally a word used in computer science. Kernel is used for the name of the main component of computer, which bridges between applications and data processing at the hardware level. We use this word to explain hidden aspects of city; the phenomena inhabitants know, but do not recognize the importance. The Urban Kernel explains the ritual custom of human's sense of place.

The local town had symbolic center like as the castle, shrines and temples. For Residents lived within this area, and the boundary between the inside of the city and the outside was very clear. In the process of the modernization, the railway station was located outside of the city owing to several reasons; residents dislike the smoke of a train, there is no room in dense downtown. Naturally, new commercial area had been matured near station. And, as the motorized era comes, other commercial areas had been built up in suburbs. In these commercial areas, people would not live in, only car can access to them. Then, the conventional commercial area declined and became hollow. "The urban life" in Japan had been grown during the early stage of modernization. Therefore, still residents have good feeling in the time, and reminisce the days. The discussion on compact city contains the feeling.

We can call this a kind of kernel. Then, we can understand that the kernel penetrates the city and difficult to be removed.

### **3. Case study: City of FUKUI**

#### **3.1. History of Fukui**

City of Fukui is the capital of Fukui prefecture, and typical local town developed from a castle town. The basic layout was built up during EDO periods (1603AD - 1868AD). The castle, historical downtown, Fukui has typical aspects. After station was constructed, another commercial area was formed around the station. Besides these two conventional commercial area, several shopping malls have been constructed in suburban area, and, today, the discussion, conventional downtown vs. commercial in suburb, has occurred; this issue is very common in almost all of local towns, in this sense, Fukui can represent typical Japanese local cities' urban problem. However, Fukui had experienced severe disasters, in this point, it has unique history. In 1945, Fukui suffered air raid and 84.8% of downtown was burned. In 1948, a big earthquake attacked and destroyed again. 3,769 people died by the earthquake. This damage was the third worst earthquake after WWII, (the worst was Tohoku Region Pacific Coast Earthquake occurred in 2011).

#### **3.2. Analysis in Fukui's whole structure**

Before we study the downtown area (JUNKA-area) and discuss Urban Kernel, it will be useful to analyze the evolutionary process of whole structure of Fukui. The detail analysis can be seen in our previous paper.<sup>7)</sup>

##### **3.2.1. Fukui (pre-modern)**

From the results of the space syntax analysis on the layout in the pre-modern era (See. figure.4.), we observe the characteristics of a typical castle town. The distribution of Global illustrates the position of the commerce in those days. And, the historical highway passing the commerce area is also integrated. From the high value in SLOPE, 3.5955, can be interpreted as clearness in the spatial layouts. On the other hand, the UEC shows high value, 0.4861. This could be affected by the subdivision by defensive moats. They divide the town into quarters of Merchant and SAMURAI.

##### **3.2.2. Fukui (1894)**

By 1894, the railway and station was built up, and, the station started the commercial activity in 1896. At the beginning, the area near to the station was not developed much. From the analysis of Fukui 1894, it can be read. The layout of the central area of Fukui had not changed much, but there were several minor renovations. From comparison between Fukui (pre-modern) and Fukui (1894), the most integrated local area was moved a bit to the north. The reason for this shift could be that the northern area and the south of the river were developed. In addition, the drying up of the moat could have influenced the shift. Compared with the pre-modern, permeability becomes higher and UEC is lower.

##### **3.2.3. Fukui (1937)**

What is the significant in analysis on Fukui in 1937 is that the station becomes integrated by urban expansion.

From the results of Fukui in 1937, it is clear that the expansion to the suburbs brought about a great change. Centre which is resistant to a part of the suburbs, lies scattered so that it may be seen abundantly with a result of Local in the city expansion by the second term modern city planning, and priority on the efficiency in the central part of the city is spoilt as that result relatively. When it is mentioned from the characteristics of Local of the space syntax, this is to exceed the range that a city scale can be already covered by a walk, and it can be said as the

form as well which adapted itself to the automatic car-oriented society.

Further, the Center was moved from KATAMACHI to in front of the Fukui station, and has stayed a central part since modern times, and the space of Hokuriku road from the result of Global from the result by the influence of the thing that city expansion is taken into consideration around the station, too.

The most important point of the Fukui analysis is the permeability of the Global and Local values, which kept increasing concurrently, and the high UEC. However, the SLOPE was getting lower year-by-year, it means the city became obscure layouts.

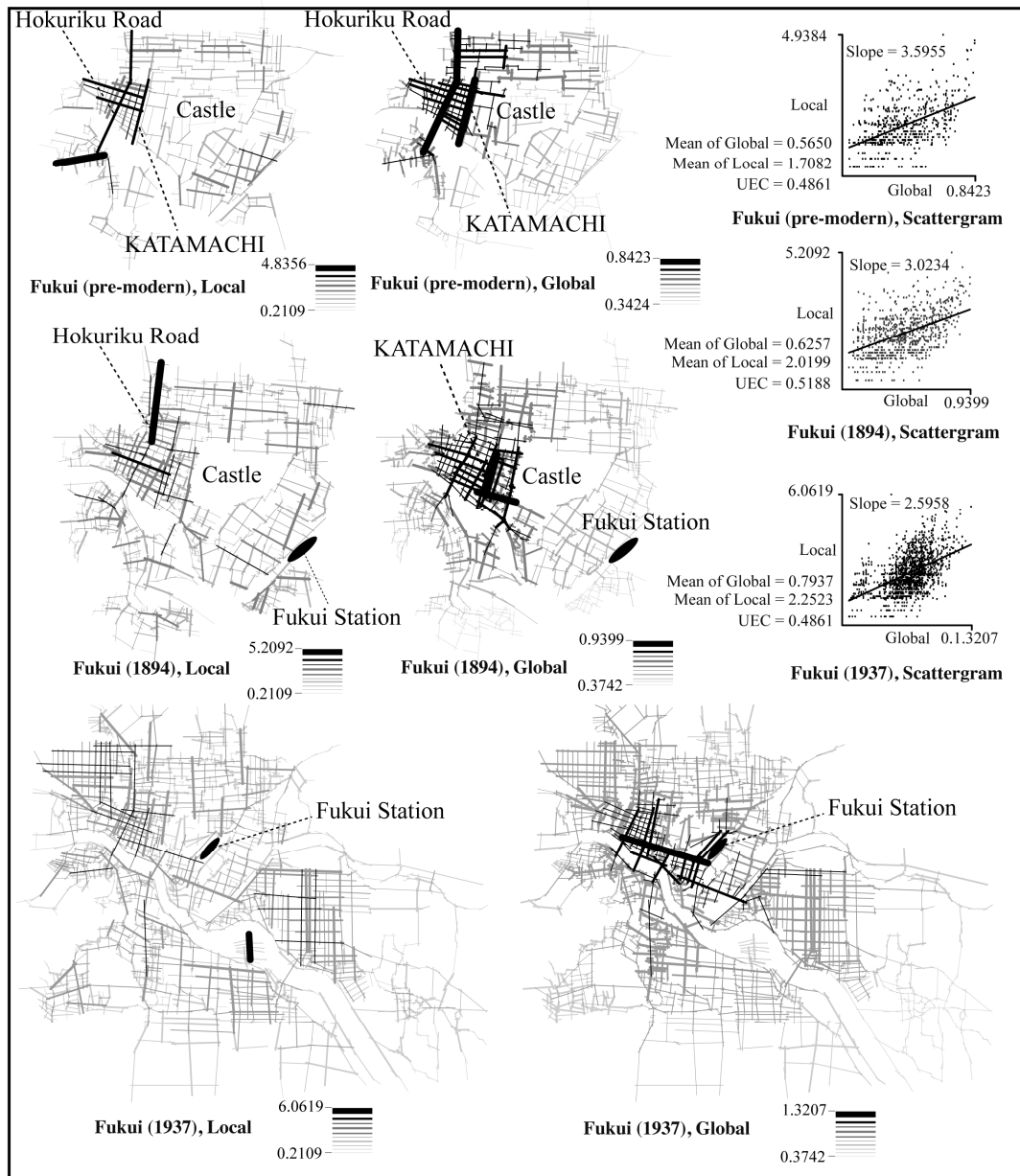


Figure 4: Analyses on evolutionary process of whole structure of FUKUI



### 3.3. Analyses in JUNKA school district

Figure.5. is the result of the analyses on only JUNKA district, where the main of commercial had located since the EDO period. Since the dweller's consciousness of the boundary is very strong in the area, it is useful to see the spatial layouts limited in the district.

The result in analyzing pre-modern layouts, we can see a big difference from shapes of later eras. The distributions in Global and Local are quite different. In Global, the Zone of SAMURAI is integrated, and in Local, the Zone of Merchant is integrated. The value of SLOPE is very low, 0.40229. From the results, there is no centeredness. One of the reasons could be the difference in the patterns of configuration of Zone of Merchant and one of SAMURAI. And, the division by the moat between the zones would cut the efficiency in the traffic and affect the result much. However, since the castle was the bold symbolic center, the configuration with the castle would be stable. Therefore, we can interpret efficiency in traffic was not important factor to form the city. Moreover, it can be said that this form could have been maintained over 200years, because there was a stable hierarchy in status in pre modern era.

Analyses on OMOIDECHIZU and the actual map of the days show similar result. Since street running east and west canceled the division by moats, the value of SLOPE increased greatly. Moreover, since UEC became lower, we can interpret the layout turned into compact urban fabric with clear centeredness.

After destruction by air raid, the revival layout today has more traffic efficiency and high value in SLOPE. On the other hand, the zone of merchant becomes less integrated relatively, and the network streets connecting district and district becomes integrated.

If compared the evolutionary process in JUNKA with whole structure of Fukui, we can see that JUNKA becomes higher permeability and stronger centeredness, on the contrary to the whole structure.

### 3.4. Urban Kernel in FUKUI

In pre-modern time, KATAMACHI was only area for official commerce. From the analysis (Figure.4), we can see the area has high integration. After generation of new shopping area near station, modern city planning installed a widen road to connect KATAMACHI and Station. Then, the efficiency of traffic was shifted from the areas of commerce to the network. The network became wider and spread to whole structure of the city; it brought other new center of commerce. Which could be shopping malls in suburb. It is quite natural customers go to suburb after automotive society comes. Because the conventional area of commerce maintained the structure of the pre-modern and the land of castle prevent the permeability.

On the other hand, the boundary of dwellers in JUNKA is stable. Within the boundary, the urban layout would be still efficient and it has clear centeredness. If we take off the boundary, the center of the district would disappear. The word to express the boundary could be Urban Kernel.

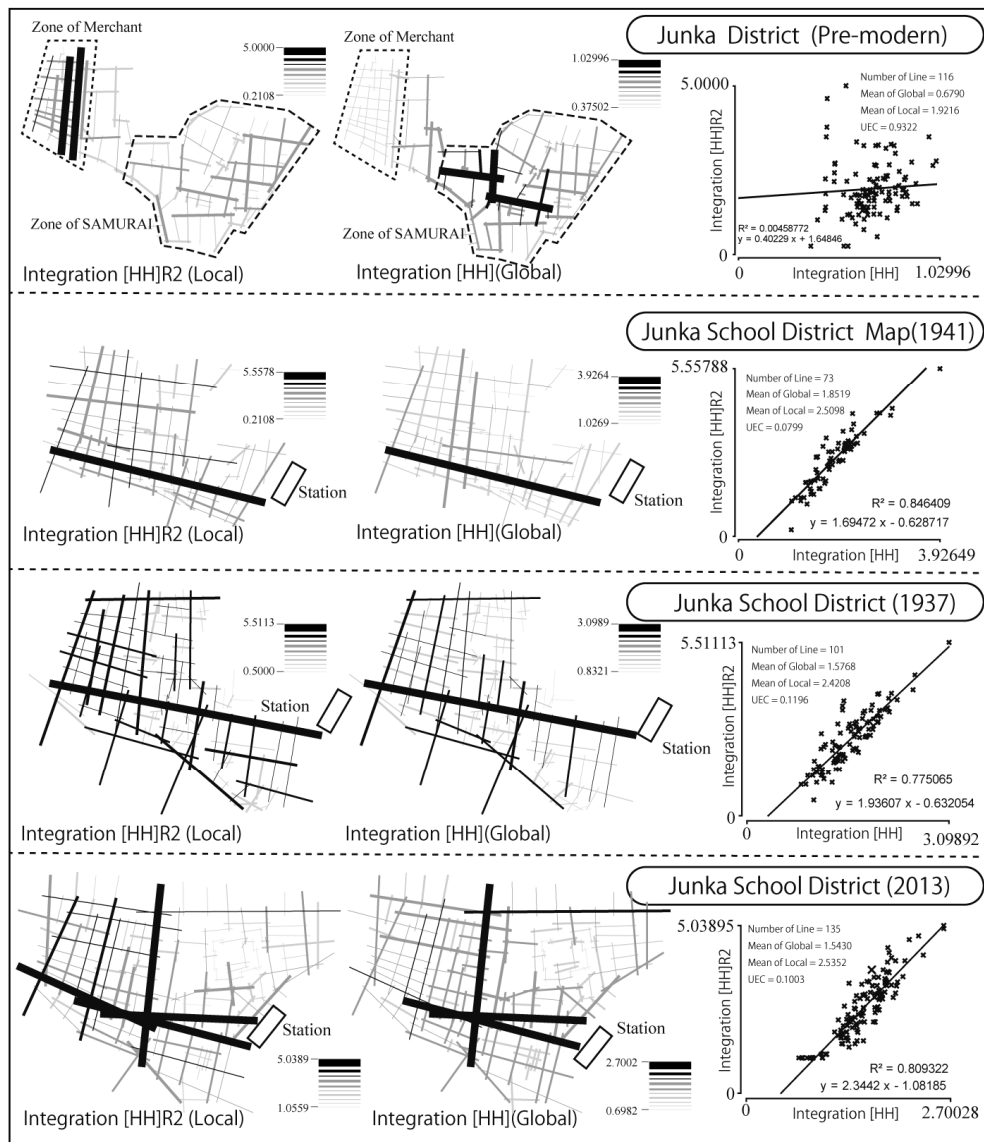


Figure 5: Analyses on JUNKA District

## 4. Tsuruga

### 4.1. History OF Tsuruga

Tsuruga is a small-scale local city in southern part of Fukui prefecture. The population is just 68,300 (2013.3.29.). Owing to the size and location, the city has a fate that it has to adopt the contemporary situation year by year. From 10th to 13th century, Tsuruga was one of the most important ports for Japan-China trading. By early stage of Edo periods, the importance as the dump was increased owing to that Tsuruga locates close to Kyoto. The goods, sent to Kyoto from East part of Japan, gathered in the port, and from here, they were sent to Kyoto and Osaka by historical highways. During modernization, the marine route from Japan to Vladivostok was developed and Tsuruga became the main gate to continental. The direct train from Tokyo to Tsuruga was also running. During World War II, as a naval port, general people was forbidden to enter the town by security reason, and the air raids destroyed the city over 3 times, and 85% or more of downtown was burned. As the international route was lost after the war, the city decreased. Nowadays, Tsuruga is known as a town of nuclear power plants. The plants were

invited in order to conquer the decline in economy. Therefore, Tsuruga can be said that a symbolical city had been affected by the Japanese political condition.

## **4.2. Analysis of Tsuruga**

In Tsuruga, the symbolic center has been on Kehi Shrine continuously since the foundation before 8th century. On the other hand, the practical center was replaced year by year; sometimes it was on shopping area along highway, the port or station. The position of the centers and the relationship between one of symbolic and one of practical would be important to trace the history of urban evolution in Tsuruga and distill the Urban Kernel.

We analyzed three different eras, which are one of pre-modern, before the air raid, and today.

### **4.2.1. Tsuruga (around 1688-1704)**

Tsuruga in pre modern era was commerce-oriented town based on the practical importance as a port. There was no ditches for defense like as Fukui. Commerce has more priority, therefore, and the function of landing and layouts of warehouses could take precedence than such a defense. Figure. 6 illustrates that grid-oriented layouts along the seashore. However, several rivers connected with the sea divide these blocks, and they affected the analysis result. Highway passes the center of the block; the highway is connected to Fukui for east, and Kyoto for south.

What the important point could be read from the analysis that KEHI shrine locates in segregated position even though the distance is not far. From this, we can see an intention to set the shrine away from traffic center; even the town had been matured spontaneously.

We can judge this urban layout has clear centeredness and static form from the indexes, SLOPE=2.5836 and UEC=0.2374.

### **4.2.2. Tsuruga (1941)**

From the importance of the harbor, the railroad came to Tsuruga in 1882. It was just 10 years later since 1872 when the first railway had passed from Tokyo to Yokohama. The original station was constructed just beside of KEHI shrine. It was transferred to the position shown in figure 6 in 1909. According to historical document<sup>2)</sup>, the development in circumference of the station started after WWII, until then, only several hotels had been built up in the area. On the other hand, the road of the conventional center of commerce had been improved. From map of the day, we can check the road in the block was widened and built up rational urban network. Therefore, the value of UEC maintained low, 0.2284 and SLOPE shows very high value, 3.1435. Based on these indexes, we can say that Tsuruga of the day had rational stable shape with clear centeredness.

What is the most important change is that the new road connected KEHI shrine and station directly, instead of historical highway. Therefore, the integration of KEHI shrine increased dramatically. So, KEHI shrine became practical center in addition to symbolical center.

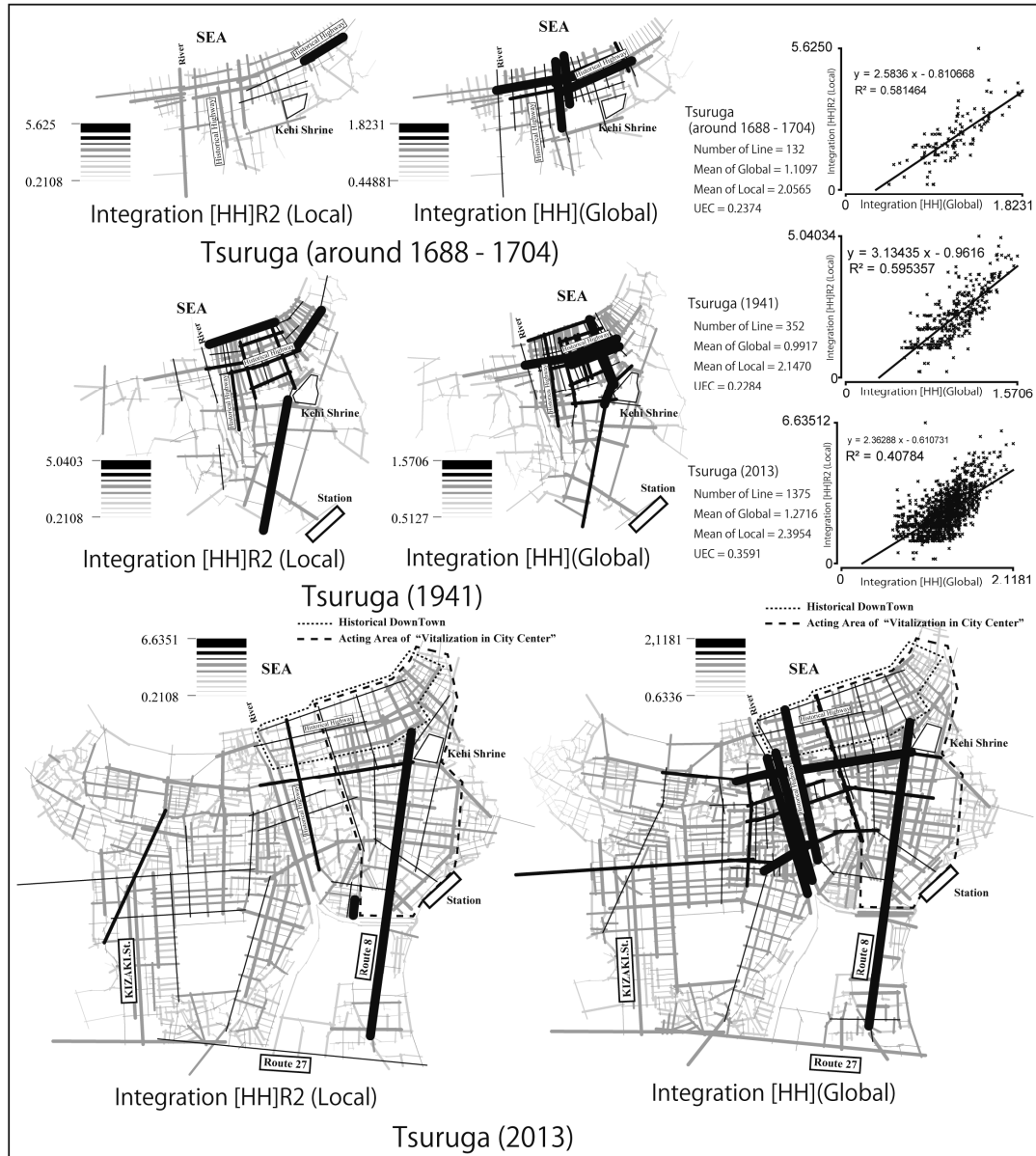


Figure 6: Analyses on Tsuruga

#### 4.2.3. Tsuruga (2013)

Although the downtown of commerce before the war was compact, the severe devastation by air raid shifted the commerce to adjacent spaces temporary. For restoration, "war damage revival plan" of government was applied to the central area. In the plan, they needed to set a range; the area in the range became the new center of commerce after WWII. About this revival, Daido conducted various analyses. He wrote, "the merchants who lived in the burnt block needed to move to another place. This led distribution in business district. Within the range of new commerce area, the center was set to close to station instead of the conventional center."<sup>3)</sup>

The burnt block had developed commercially by the plan, however, the way of commerce changed even the location was same. This area specialized in commerce and its residents decreased. According to such a situation, division in commerce and habitation will spread the urban area rapidly and urban sprawl occurred. By arrival of an automotive society, the most

severe decline in commerce could be seen in the central area. Large-scale shopping stores formed along the KIZAKI St. and people would not come to the center.

For activation of the central urban area, city of Tsuruga adopts “act on vitalization in city center”, and the enterprise started in 2009, and it continues till 2015.<sup>2)</sup> For the act, city need to set a range where to be activated, actually the range is almost same as the range of war damage revival plan. The boundary of the city today is quite different from the one just after the war, even though, the city set the same range of planning. This is not only happened in Tsuruga. Actually, it is common in almost local cities, which adopt “the act on vitalization in city center”.

From the analysis on Tsuruga in 2013, the value of SLOPE decreased from the peak in 1941, and the urban sprawl had made UEC high.

### **4.3. Urban Kernel in Tsuruga**

For distilling Urban Kernel from Tsuruga, the most effective way would be tracing the position of KEHI shrine. In pre-modern era, KEHI shrine was a mere symbolic center, not a practical. In other words, the shrine should be segregated. However, the shrine became a practical center after modernization. The shrine became a landmark of Tsuruga, and the station was built next to the shrine at the beginning. Even after the station was transferred, a direct street was installed from station to the shrine. During the modernization, the area including KEHI shrine became a predominant commercial area.

By means of that the destruction of the air raid and spreading the urban area to outer, the conventional area of commerce had lost its predominance in the spatial layout. However, the urban planning of the day tended to make the area not only revived and developed more than before. Today, the size of the city became much wider than before. In the process for urban activation, why did the city planners set the planning area the same as the war damage revival plan again?

The conventional area was burned and revived like a scab, and then it seemed as brand-new town. And, Tsuruga kept recognizing the area a predominant commerce place. This could be Urban Kernel, which cannot be erased easily. The present city is still running by Urban Kernel matured in the process of modernization. That it, Tsuruga persist the Urban Kernel just after the air raid in spite of that the today's urban condition is quite different from those days.

## **5. Conclusion**

By means of studying case studies in this paper, we can see something adhere to the cities. One of them would be an urban fabric, which cannot change easily. The fabric gives function to the city as we can see from Space Syntax analyses. Although the function has lost the necessity; the fabric keep supplying the function. And the function gives sense of place. The antiquated function, and outdated sense of place brought by the function; we call them Urban Kernel. Urban Kernel sticks on the city even after the renovation.

The modern city planning could not remove all form of inefficient matured in pre-modern era. For the case of Fukui, the city carried out the modernization by linking shopping areas as clusters without getting rid of the castle. For the case of Tsuruga, new commercial field was formed by means of shifting the symbolic center to the practical and including the station area. Thus, the dramatic paradigm shifts were acted during the modernization. However, now, the era of urban sprawl, even the philosophy of modernization continues stubbornly.

A city was modernized in order to fill the demand for efficiency, however the city persists in the old way, which could not secure the efficiency. It is necessary to see such an Urban Kernel. Now, Japan entered the age of population decreasing. The modern city planning was born to the age of population increasing. It is necessary to build a new urban developing model. Our suggestion is that we should distill the urban kernel first. Then, we can understand the organic evolutionary process of the cities. It is not necessary to remove all urban kernels, and it is impossible. However, we should figure out another rational form with consideration both of function and the kernels. This could be a new re-construct model.

With the new re-construct model, we can seek a new methodology to reproduce urban fabric, which can work for Tohoku region in Japan.

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