

A Study of Building Change Pattern in Traditional Japanese Town, Gujo Hachiman

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This research attempts to clarify the pattern of building change in traditional Japanese town, Gujo Hachiman. The total of 729 units building from 18 main streets in the town centre is included in research scope. The objective of this research is to determine the pattern of the building changes and illustrate the changes with the perception of the owner on streetscape in Gujo Hachiman. As the result, the tendency of building change regarding to location, building use, building type and building condition, user perception and social condition has been determined. Building changes condition at town centre of Gujo Hachiman has shown the positive way compare with fringe area. Most of building use as commercial purpose having the renovation work by maintaining the building condition is more significant compare with residential building. Other than that, case studies have been identified for each building change, land use change and various perceptions on streetscape.

Keywords : *Gujo Hachiman, streetscape, building, land use, changes pattern, perception*

1. INTRODUCTION

1.1 Research Background

The significance of the old building to the urban heritage can be attributed to two factors which are contribution to the urban form and its aesthetic aspects or streetscape. To preserve the attractiveness of streetscape due to society change gradually, revitalisation of lively neighbourhood is regarded as the main key in planning effort. The daily lifestyle of the local people is playing the important role in shaping the urban streetscape. However, the problems generated by the growth of urban areas raise significant issues to the planning process.

The modern structure has been gradually set up around Japanese traditional town, Gujo Hachiman for supporting the daily need of local people. In 1970's, motorisation had brought impacts on social change in study area. The waterways along the street have been covered and some of the traditional building design was replaced by modern architecture. To cope with the changes, Local Government and communities collaborated to preserve the traditional townscape in 1980's and the regulations on building design have been developed until 1990's. As a result, it has succeeded in certain part especially in visual and physical aspect. However, the town is still facing the lost of fascination problem gradually, such as increasing number of vacant houses.

Does the function and building condition in historical area have a constitutive influenced by social context? Thus, one useful way to cast light on this issue is to document change in land use and physical change of building and investigate the perception of building user. The changes would be the hint of reflecting the current social lifestyle in the area because the pattern of building change influenced by various motive as when the land use or the purpose of use has changed, the building function also have to be changed for compatible with the current situation and need.

1.2 Research Objective

The objectives of this research are determining the pattern of the building changes and illustrate the changes with the perception of the owner on streetscape in Gujo Hachiman.

2. LITERATURE REVIEW

2.1 Previous Research

There are some previous researches which are related to this research such as:

a. Study on the factors and the actual situation of the urban transition in the local town

With the comparative analysis of building façade from the current condition with photo of the past, the changes of building façade were being investigated. Type and pattern of building change has been typified and the transitions were being discussed¹⁾²⁾.

b. Study on the mechanism of streetscape formation

There are the studies from Arai³⁾ where the research is to clarify the evolution and formation of streets, roofs of local history and current situation of the street.

c. Study on the changes of residence space and inheritance method of historical code design

For the purpose of understanding the factors and town transformation, the study on clarifying the inheritance of the design code historic houses, and its factors has been done⁴⁾⁵⁾. The study has revealed the transformation process of dwelling unit.

d. Study on Gujo Hachiman's Machizukuri

Takahashi⁶⁾ Tsuruta⁷⁾, has verified the "location history" in the study of Gujo Hachiman's Machizukuri. Community Planning Organization playing a role of adapting the planning regulation importantly by the involvement of local community.

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2.2 Research Position

Undergo with the change in social circumstances such as reformation of industry, commercial and motorization waves, suburb town has facing the alteration due to the development. With the phenomena of building change in Gujo Hachiman, the perception of resident determine the process of changes because resident will make a decision based on their thoughts and personal values during this process. This research is to determine the building changes pattern with its function and clarify the residents' perception on their desire and will on their living environment which contributes to the overall streetscape formulation.

3. RESEARCH METHODOLOGY

3.1 Analytical Frame Work of Research

The analytical framework is based on the two objectives of this study. The whole process of achieving the objectives can be visualized in an analytical framework as shown in *Figure 1*.

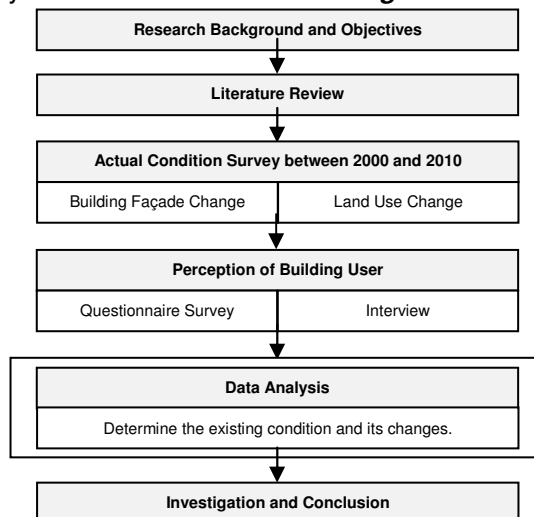


Figure 1: Analytical Framework of Research

3.2 Research Method

For this research, both quantitative and qualitative data are collected, namely, land use and building changes record, residents' perception on streetscape conservation and changes consciousness, and the feedback from the residents on the changes. To collect these data, different data collection has been adopted and mutimethods were employed such as Site Survey, Questionnaire Survey and Interviews.

4. STUDY AREA

4.1 Background of study area

Gujo Hachiman, located in the middle of Gifu prefecture, Japan, is an ancient town and was founded as Castle Town during 15-18th century. In year 1889, it was established as a town. The population concentrated in the central town area

which is located in both the shores of Yoshida River (*Figure 2*).

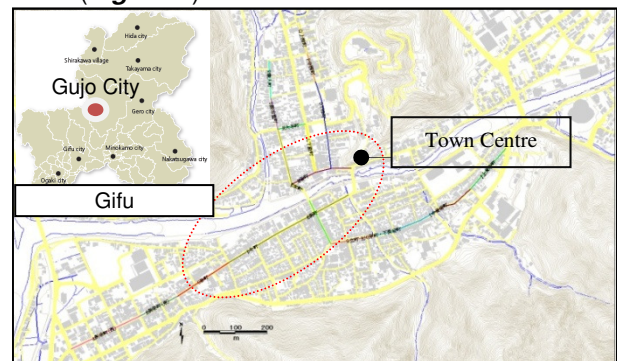


Figure 2: Gujo Hachiman Location Map

4.2 Gujo Hachiman Streetscape Characteristic

Overall, the street pattern has maintained well and it has an ingenious ancient network of waterways that is supplied by the mountain springs and rivers. There are many small platforms built and used by locals throughout the year for washing vegetables and household items. Some streets are flanked by a canal. The Pocket Park shaped by natural water system has made up the unique landscape for Gujo Hachiman. The streets, bridges and traditional houses add to the picturesque streetscape of this ancient town. The significant characteristic of wooden building are narrow frontage and long depth, shops facing to street while living space situated at the rear side of



building and containing double story space, constructed with traditional design (*Figure 3*).

Figure 3: Gujo Hachiman Streetscape (Syokunin Machi)

4.3 Town Planning Formulation of Gujo Hachiman

Streetscape Formation Regulation

The high consciousness of resident on the water network in Gujo Hachiman has smoothly pushed forward the preservation effort of heritage building between local government and resident. In 1984, the building survey has been carried out by local government. The building was built since Taisho Period and Showa Period remaining the most in Yanagi Machi. Streetscape Preservation Organization has been set up in Yanagi Machi by local community. In 1986, the investigation of building design regulation which compatible with waterway maintenance and management have been carried out. By the influenced of Yanagi Machi, this kind of activities has been adapted in Syokunin Machi and Kajiya Machi for conserving the historical atmosphere around that area. In 1991, the conservation subject area has been

expanded to surrounding of Gujo Hachiman where the streetscape foundation plan has been formulated and Streetscape Regulation has been started enactment (**Figure 4**).

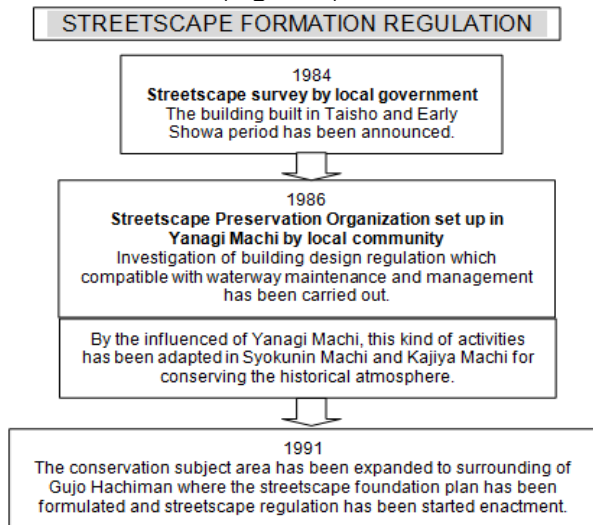


Figure 4: The Streetscape Formation Regulation Flow in Gujo Hachiman

Formulation of Urban Planning Master Plan

In early 1990, comprehensive Machizukuri plan has been launched systematically by local government. There were the efforts of local government to collaborate with local people in urban planning scheme. Government has started implement the planning effort by encouraging the local people participate in planning process in 1998. In 2003, the building coverage ratios in 21 areas which are concluded with [Machizukuri Regulation] were eased. The consciousness of disaster prevention has been emphasized and the fully-utilization of vacant house, operation of community bus has started at the same time. (**Figure 5**).

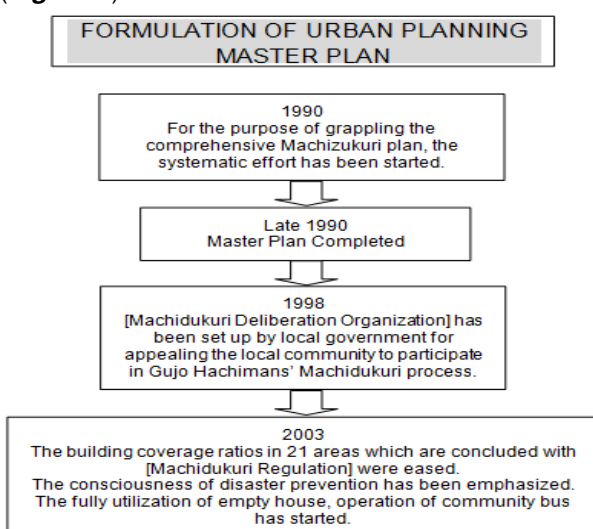


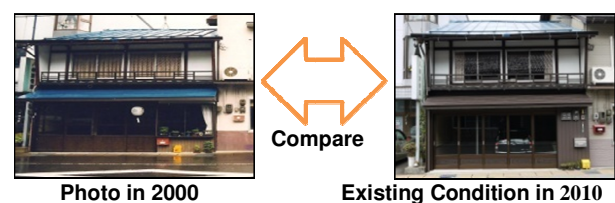
Figure 5: Formation of Urban Planning Master Plan in study area.

In 2012, About 14.1 ha of the area around Kita-Machi (Yanagi Machi, Syokunin Machi and Kachiya Machi and a part of the area) nearby Hachiman Castle is designated as Traditional Architectures Preservation District.

5. DATA ANALYSIS

5.1 Site Survey

The survey method for building and land use are comparing the building façade changes and land use changes of 729 units building within 18 streets between 2000 (photo) and 2010 (existing condition). By observation, the building changes pattern and land use changes of 729 units building within 18 streets between 2000 and 2010 have been recorded.



The changes in typology were clarified into 2 categories which are physical and functional analysis (**Table 1**).

Table1: Classification of Data Analysis

Method	1.0 Physical analysis by building changes:	2.0 Functional analysis by land use changes:
Description	This is the study of the form of building changes and the purpose of changes. This involved the analysis of physical structures. The method of analysis is to categorize the 6 aspects changes from A to F as below based on observation of comparing the photo in 2000 with the current condition.	The analysis of the relationship between people and land is essential because when the users of land decide to employ its resources towards different purposes, land use change occurs producing both desirable and undesirable impacts.
Feature	Building Changes Pattern: A. Demolished B. New Constructed C. Reconstruction D. Renovation/Deterioration E. Under Construction F. No Changes	Land use Changes Pattern: A. Residential to Commercial B. Commercial to Residential C. Changes of Commercial Type D. Became Vacant E. Vacant Filled In F. Remain Vacant G. Others H. No Changes

5.1.1 Functional Analysis: Land use

To identify the physical changes on building and its purpose, land use data has been collected. From the data below (**Figure 6**), it can be seen that Category A (Commercial) has achieved the biggest land use changes followed by Category C (Vacant Lot) and Category B (Residential) within 2000 to 2010. The distinct changes on main land use activities in study area indicated the tendencies of changes are more inclined to residential and vacant lot.

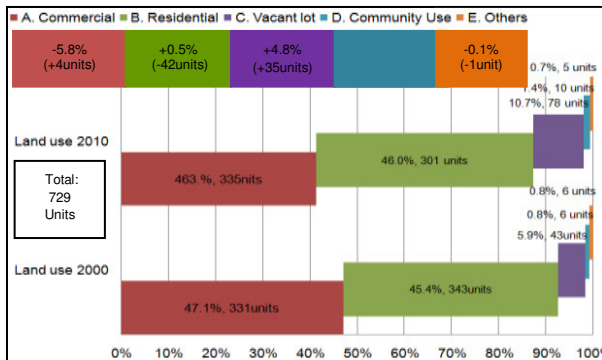


Figure 6: Land use of 2000 and 2010

The distribution of land use has shown in **Figure 7**. The land use changes can be found significantly at the Southern part of the study area where the commercial sector is playing the important role of supporting the economic sector of Gujo Hachiman.

Further analysis was done to find out the location factor for the land use changes together with the consideration in the land use division in Master Plan, which are categorized as Residential, Neighborhood Commercial and Main Commercial Area. The most significant changes have been found in Neighborhood Commercial Area which recorded the 18.8% of changes percentage and followed by Residential Area (15.6%) and Main Commercial Area (13.5%). The percentage indicates that Neighborhood Commercial Area is facing the contradiction in between Residential Area and Main Commercial Area. Among of the changes percentage, the building became vacant is found as highest percentage among 3 areas. The building and land which are still remaining in the vacant condition is the critical issues of Gujo Hachiman.

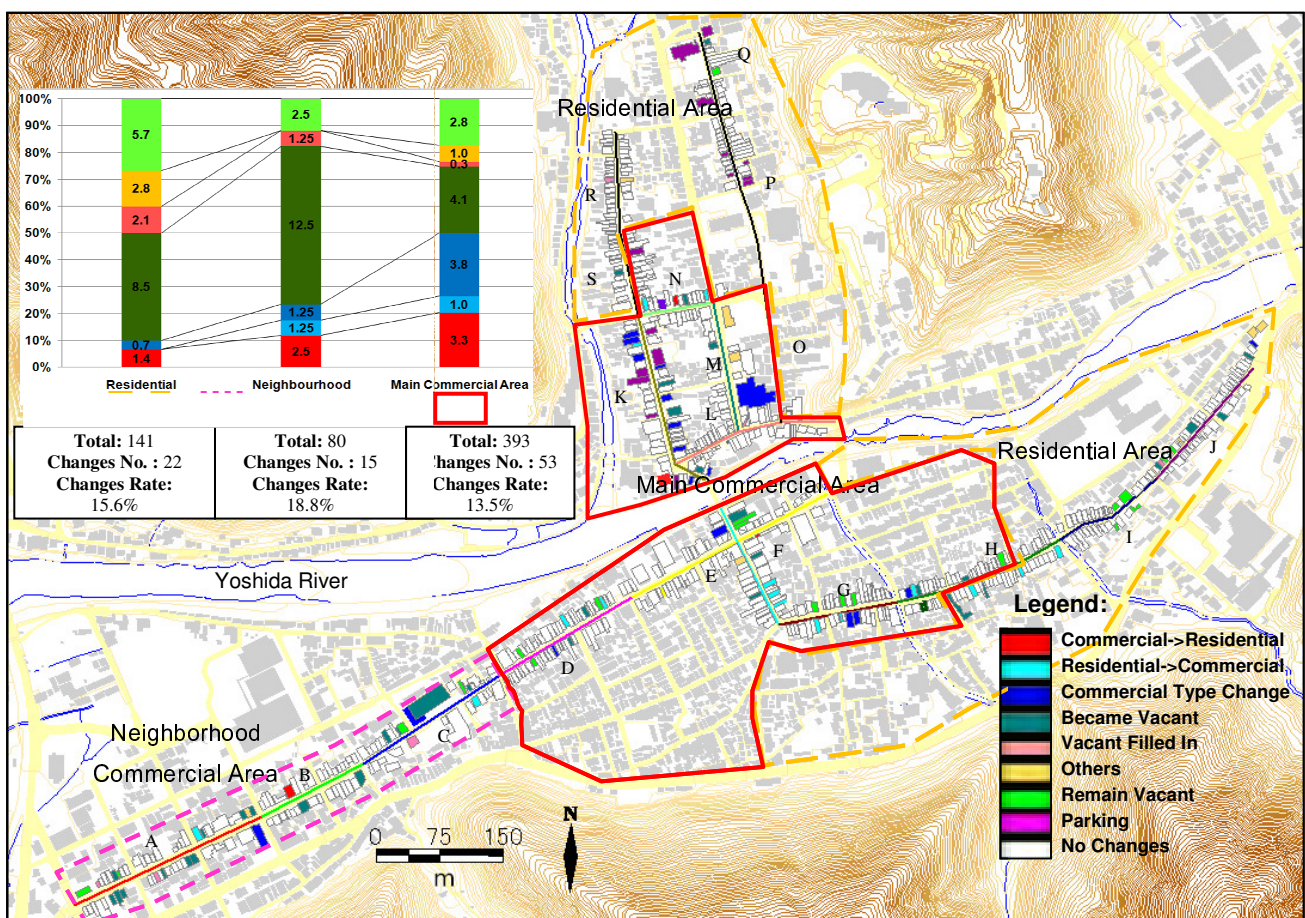


Figure 7: Land use Change Distribution Map

5.1.2 Building Change and Land use change

In order to understand the purpose of building change, the land use changes pattern is taken into account during making analysis (**Table 2**).

Table 2: Land use change and Building Change

Land use Changes Pattern	Building Changes Pattern						Total by Land use Changes Pattern
	Demolished	New Constructed	Reconstruction	Renovation / Deterioration	Under Construction	No Changes	
Commercial to Residential			3	12		2	17
Residential to Commercial			4	1			5
*Commercial Type Change			3	11		3	17
Became Vacant	21			**10		9	40
Vacant Filled In		1	2	3			6
*Remain Vacant				**3		9	224
Others	3	3	2	3			22
*No Changes			30	166	12	390	598
Total by building changes pattern	24	4	44	209	12	436	729

It can be seen that there is the significant changes of the lot which has become vacant by demolishing the building. The plot of building change as shown in **Figure 8**.

There are many reasons why and when individual sites change the land use. In Gujo Hachiman, some of the traditional retail shop has changed to residential house due to the business not being handed down to younger generation because of the gradual loss of inherited skill and lack of interest in a managing traditional business (**Figure 9**). It also causes the overall pattern changes commercial in the area.



Figure 9: The shop house which is situated at Main Commercial Area was running the business by selling the traditional item (ceramic) in 2000 has been discontinued and converted as residential house.

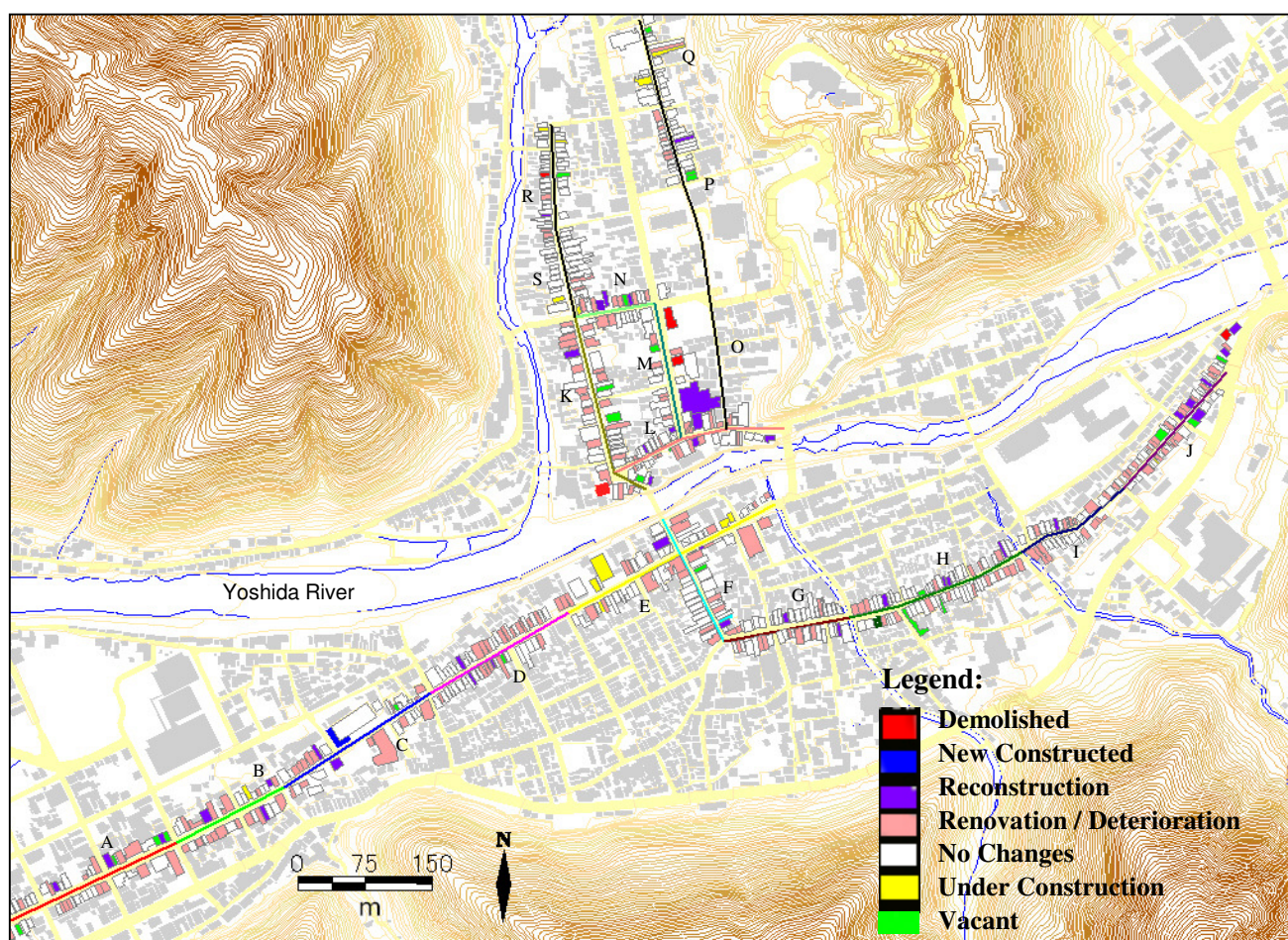


Figure 8: Building Change Distribution Map

5.2 Questionnaire Analysis

The questionnaire is set to detect the perception of the resident about the changes tendency of their living environment. The questionnaire survey has been carried out by distribute the questionnaire to 651 houses at study area where 244 sets (37.5%) has responded to it.

5.2.1 Cross tab Analysis

The simple cross tab analysis has been carried out before the categorizations of questionnaires are being made. The result has shown as below (**Figure 10**). From 244 sets of responses questionnaire, there are 143 sets have gone through the renovation and 26 are new constructed.

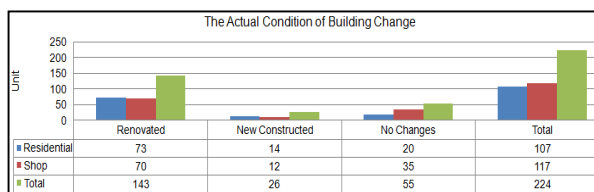


Figure 10: Building Type and Building Change Pattern

Building Changes Condition by Building Type

From **Figure 11**, it could be seen that for the new constructed condition of change, non-machiya wooden house has the highest percentage among the other compared with machiya and non-wooden house. For renovation, machiya has the highest percentage among the other building types. The aging problem and deterioration of building might be the factor of resident to take the effort in maintenance.

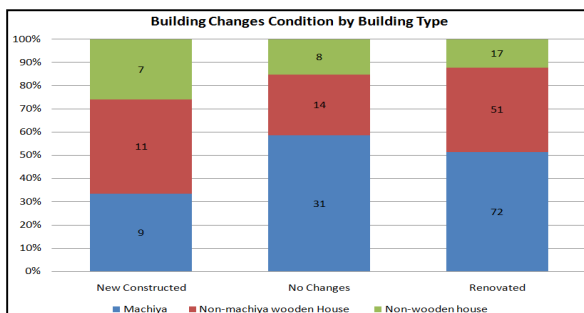


Figure 11: Changes Condition of Building by Building Type

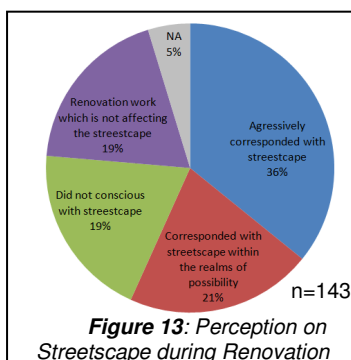


Figure 13: Perception on Streetscape during Renovation

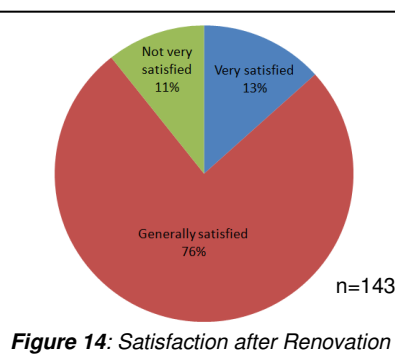


Figure 14: Satisfaction after Renovation Work

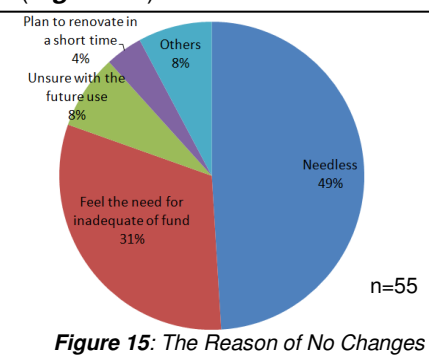


Figure 15: The Reason of No Changes

A. Renovation

Renovation Purpose

The purpose of renovation due to the deterioration of building condition has the highest percentage compare to the other purposes for 3 types of building use (shop/office, residential and shop/office, and residential). The second highest percentage of the renovation purpose is sewerage maintenance as most of the building in study area were built in Taisyo period and Pre-war Showa Period were having the aging problem (**Figure 12**).

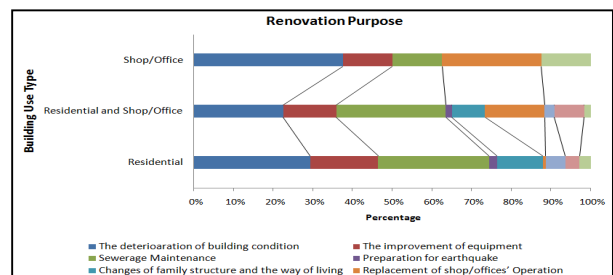


Figure 12: Renovation Purpose

Perception on Streetscape during Renovation

Aggressively corresponded with streetscape during renovation has the highest percentage, 36% while the second highest percentage is the answer which has corresponded with streetscape within the realms of possibility (21%). Only 19% indicated that did not conscious with streetscape during renovation. The result has shown that majority of the respondent reflected the positive perception to streetscape during renovation (**Figure 13**).

Satisfaction after Renovation Work

It is found that 76% of respondents are generally satisfied with the renovation work and 13% of respondent are very satisfied with the renovation work. The rest of respondents (11%) did not very satisfy with the renovation work (**Figure 14**).

B. No Changes

There is more than half of the respondent given the answer with needless in making the changes on the building. Anyhow, there is the 31% of respondents has felt the need of renovation but having the problem of inadequate fund. 8% of respondents are unsure with future use of the building while 4% of them are planning to renovate in a short time (**Figure 15**).

C. Future Perception on Living Environment

Further analysis was done for collecting the perception of residents on living environment in study area. It is found 38% of respondents have the will of staying down or staying with having some renovation work on their house (37%). Other than that, there are some respondent is preferred to staying down by reconstructing the building (10%). On the other hand, there are 8% of respondents are unsure with staying or moving away and 7% are deciding to move away from current place. The will of staying down shows that majority of resident preferring staying down either with some renovation, reconstruction work or without making any changes on building (**Figure 16**).

D. Opinion on Machizukuri

Perception of resident on Streetscape Regulation has shown in **Figure 17**. Overall, it is showing the positive view to the regulation with high percentages. The concerns to the streetscape is important during the changes are making on the building such as renovate or reconstruct the building.

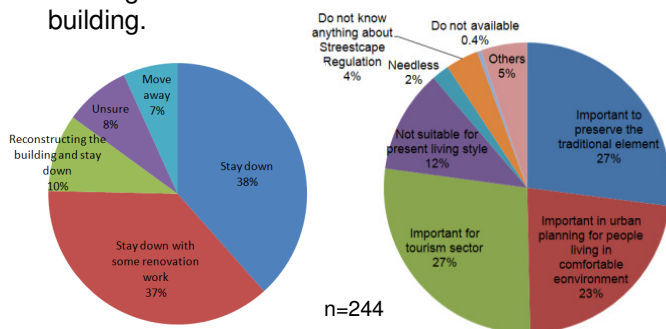


Figure 16: Staying down or move away

Figure 17: Perception on Streetscape Regulation

5.3 Location Analysis

As main tourism spot in Gujo Hachiman, land use types at town centre mainly are commercial activities such as retailing, restaurant, hotel and accommodation services and etc. The condition of building change and perception of resident to streetscape are different from the fringe area.

5.3.1 Building Changes Condition by Every Street

Looking to the building changes condition by every street in Figure 4.15, it is found that the building change of renovation has the highest percentage among the streets. For the town centre of Gujo Hachiman which is consisted street D, E, F, K, L, M, N, and O, the percentage of change apparently are higher than the other street which are located at the fringe area (**Figure 18**).

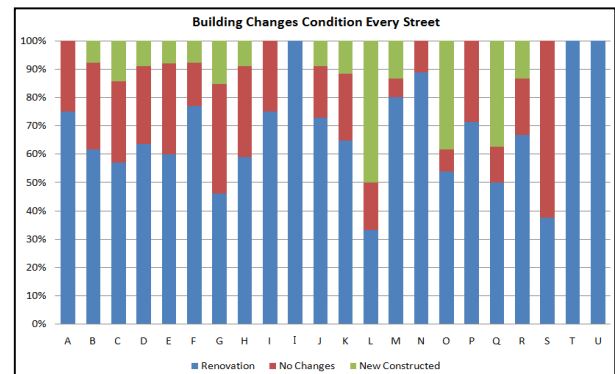


Figure 18: Building Changes Condition by Every Street

5.3.2 Perception of staying down or move away by every street

The perception of staying down or move away by every street has shown in **Figure 19**. The percentage of either staying down or staying down with some renovation work / reconstructing the building and staying down has the higher rate for street D, E, F, K, L, M, N, and O than the other streets which are located at the fringe area of Gujo Hachiman.

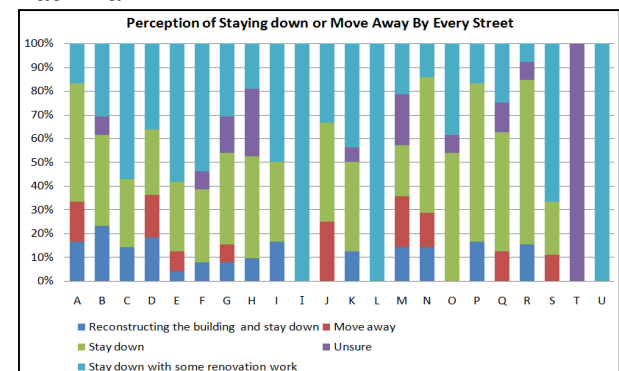


Figure 19: Perception of staying down or move away by every street

6. CHANGES PATTERN DESCRIPTION

6.1 Sample Grouping

Among 244 set of questionnaires, there are 69 sets which the identity and the building location are able to be identified. For that 69 sets questionnaire, the building changes pattern and owner perception would be traced by overlay the data of building changes pattern, land use changes pattern, and the perception of owner by questionnaire and interview (**Figure 20 & Table 3**).

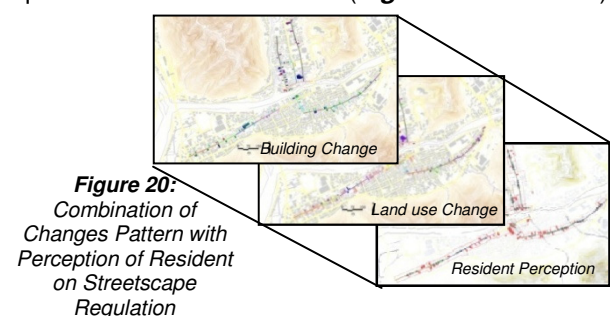
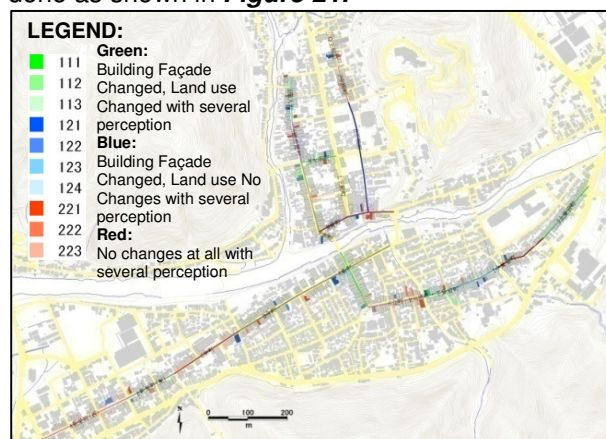


Table 3: Coding For the Changes Pattern

Layer of Building Change			Layer of Land use Change			Layer of Perception on Streetscape Regulation		
Changes Detail	*	#	Changes Detail	*	#	Detail	*	#
Demolished	a-o	A	Commercial-Residential	C-R	a	Positive	+	1
New Constructed	o-a	B	Residential-Commercial	R-C	b	Moderate	=	2
Reconstruction	a-b	C	Commercial Type Changed	C-C'	c	Negative	-	3
Renovation	a-a'	D	Became Vacant	A-O	d	Not Related	O	4
Under Construction	a-a"	E	Vacant Filled In	O-A	e			
No Changes	a-a	F	Remain Vacant	O-O	f			
			No Changes	A-A	g			

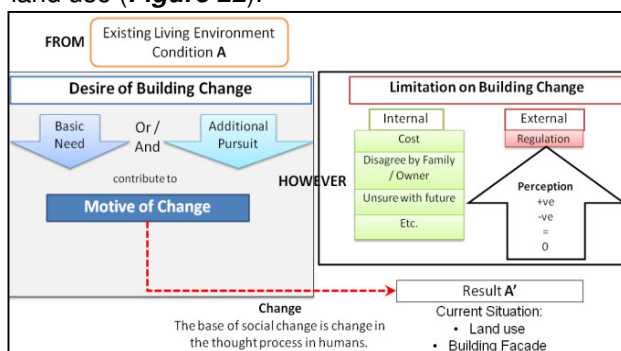
*Changes Detail Code #1=Changed, 2=No changes

The result of tracing the perception of building user from questionnaire together with the building and land use changes of 2000 and 2010 has been done as shown in **Figure 21**.

**Figure 21: Sample Group Distribution Map**

6.2 Case Study

From the existing living environment condition A, there are the desires of user on building change due to basic need or/and additional pursuit in their daily life. Those requirements would contribute to the motive of change on their living environment to fulfill the need of themselves. The base of social change is change in the thought process in humans. The change of building condition and land use itself will definitely relate to some other factor either toward positive way or negative way. The limitation of the change, which are included internal factor (personal, social matter) and external factor (such as regulation matter) may contribute to the change of building façade and land use (**Figure 22**).

**Figure 22: Changes Mechanism of Building Façade and Land use Changes Pattern with Perception of Streetscape**

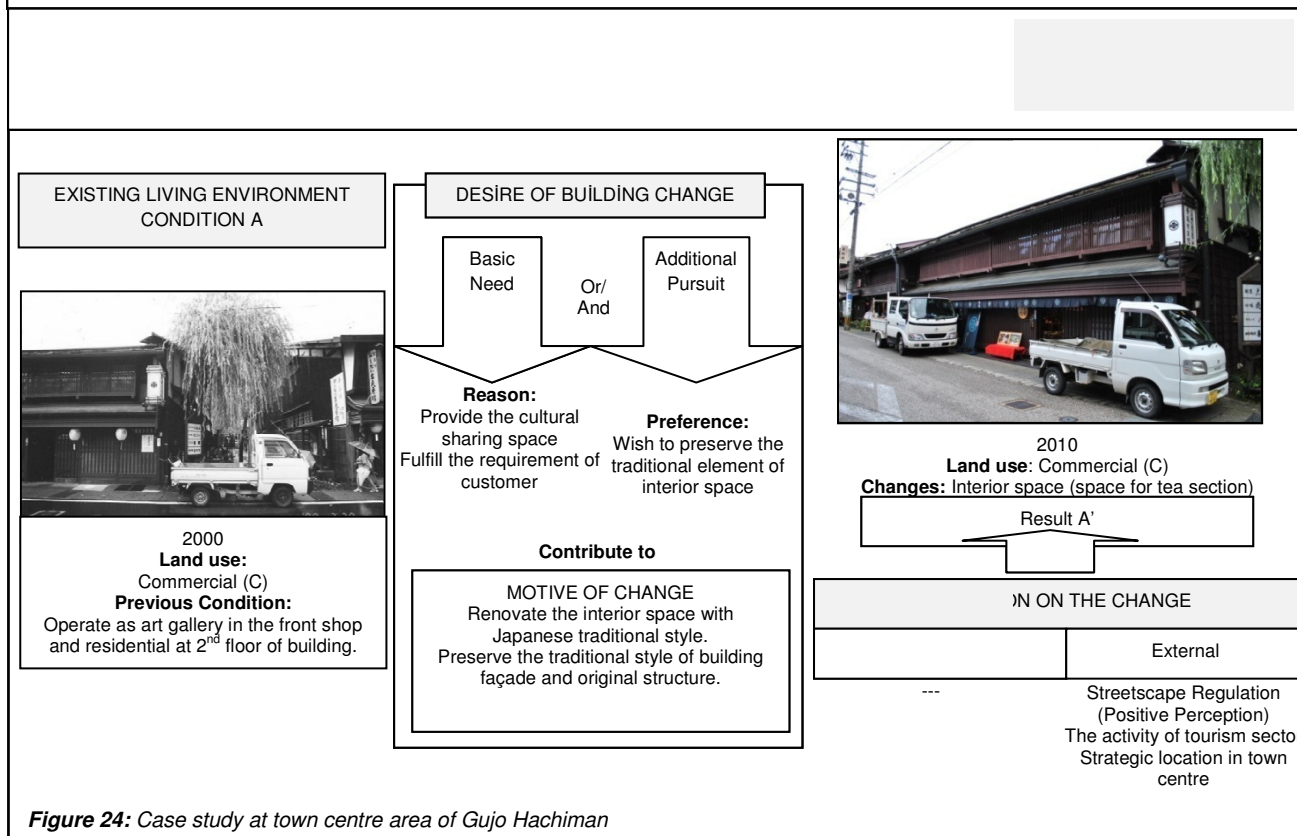
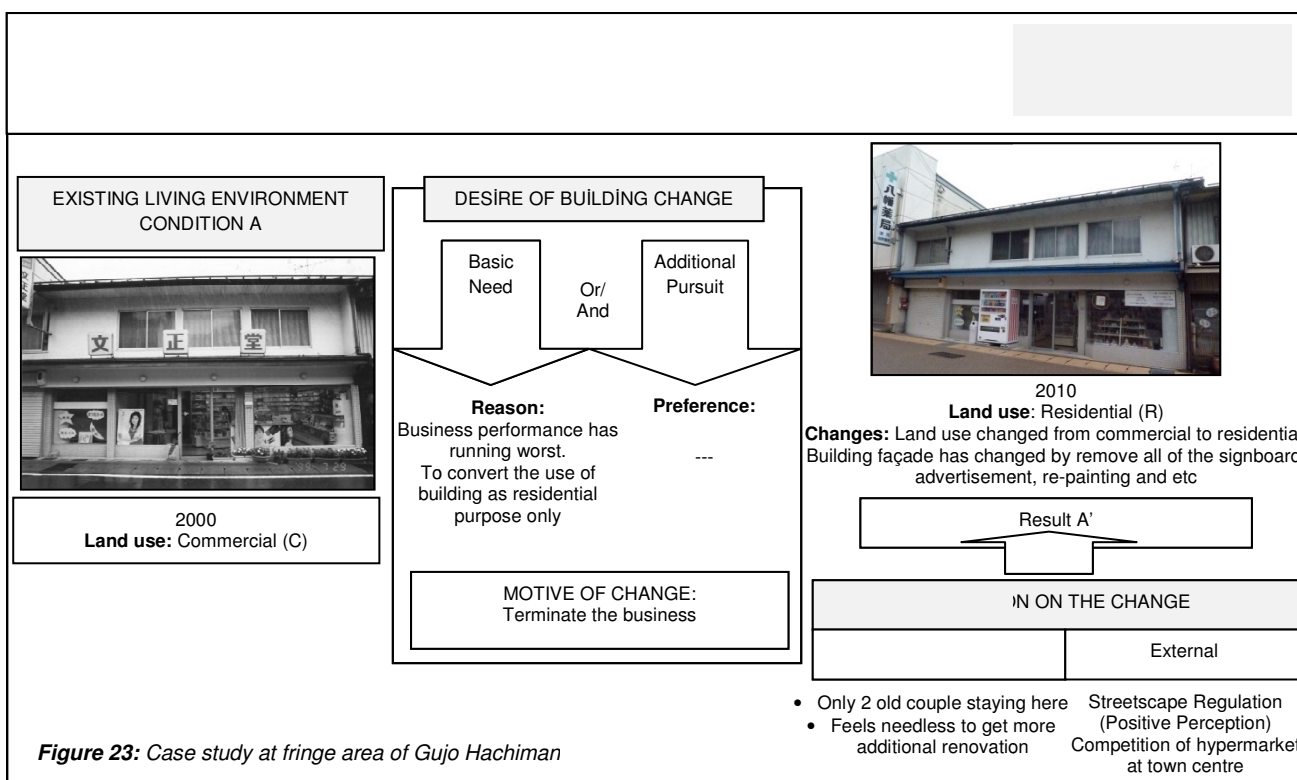
The land use change has given the impact on the building change. Below are summarizing the way of land use change effecting the building by personal matter of resident themselves and external impact by example in Gujo Hachiman.

CASE STUDY at FRINGE AREA of Gujo Hachiman

The example of **Figure 23** is located at fringe area of Gujo Hachiman Town. It has been 2nd generation for this family staying here since 3rd Showa Period (1928). The shop previously operated as stationary shop since 10th Showa period (1935). After World War II, the business type was converted to cosmetic shop. Due to the business performance has running worst, the business was terminated. The establishment of hypermarket and chain shop in town centre of Gujo Hachiman has become a threat for small business such as the shop selling the daily good for local people and tourist. By terminating the business by converting the commercial use of building to residential purpose, there are some changes has been done on building façade which directly contribute to the formation of Gujo Hachiman. The changes of building facade were removing of commercial sign such as signboard and advertisement decoration. Anyhow, the simple renovation work has been carried out which the wall painting has been renewed in 2002. The perception of the owner to Streetscape Regulation has shown the positive concerning ever since staying here.

CASE STUDY at TOWN CENTRE AREA of Gujo Hachiman

The example of **Figure 24** is located at town centre are of Gujo Hachiman Town. The building was built before 180 years ago in Edo Period. The owner is the 11st generation of the family who residence in this building together with art gallery operated by owner himself. The art gallery started operates in 1983 while Japanese Tea section was established since 2008. The motive of launching the art gallery is to contribute to Gujo Hachiman's tourism sector by providing the art viewing facility for tourist who visiting to Gujo Hachiman. Another concept is to provide the place for people to enjoy the Japanese Tea culture. With the preference of owner by running this art gallery as his personal interest, there are the demand and request from visitor which have been reflected to owner of having the Japanese conception resting place in town centre of Gujo Hachiman. For this purpose, the shop's interior has been renovated in 2005. During renovation work, the owner has tried to make sure it is compatible with the streetscape. This building is recognized as Tangible Traditional Asset of country.



7. DISCUSSION

Streetscape of Gujo Hachiman is shaped by many factors internally and externally. This circulation has shaped the value of residents on living condition and has formulated the current streetscape in Gujo Hachiman by the physical change of building. Below is the discussion by considering few aspects based on the study have been carried out.

Location

Location is one of the factors which have reflected the differences of building change and building use in Gujo Hachiman. Town centre which is also Main Commercial Area of Gujo Hachiman has been concentrated in preserving the streetscape for tourism attraction from last time. For the purpose of sustaining the liveliness of tourism

activity in whole year, other than Main Commercial Area, Residential Area was latter launching the activities in streetscape preservation to retain the original identity of streetscape. Thus, from the study, it is found that town centre has shown the significant change of building in positive way compared to fringe area. Building user has tended to make the changes by renovate it and trying to preserve the traditional style of building without removing much the original elements on the façade and inner structure.

Building type and building condition

In Gujo Hachiman, after the conversion of land use from commercial to residential, the front side of shop houses is being used as living space as well. Somehow, due to the size of residential land in Gujo Hachiman is limited and the residential houses were compacted in high density area, the optimum use of building to support daily life is considered as priority motive by user. The study has shown that the changes is significant happened on the building type of machiya and non machiya wooden building if compared with non wooden house which built with contemporary design for modern daily use. The longer period built, the changes are more frequent and significant with the renovation work such as re-constructing the whole building façade of machiya by replacing the door frame, wall material, window, eave and other element and equipment of building.

Building use (Land use)

As potential tourist spot, Gujo Hachiman is playing the role as the old town which enriched with old temples, the castle, and other notable attractions. For supporting tourism activities, the other use of building such as art galleries, restaurant, hotel, accommodation service, handicraft shop and etc are functioned as the catalyst of Gujo Hachiman's tourism sector. Most of those building which having the renovation work by maintaining the building condition are more significant compare with residential building. The renovation works mostly are improving the building condition for the purpose of operating the business and fulfil the demand of visitor. For residential use building, the renovation work mostly limited by some personal condition such as maintenance fee, the future use of building, family structure change and etc.

Building User Perception

In Gujo Hachiman, the internal factors of resident themselves where personal need and preferences on living condition have altered along with the daily lifestyle. It has influenced the value of residents on their living environment. To keep update with time and development, various effort and construction works have been applied into their houses such as getting the consultation from contractor in Gujo Hachiman for renovation service for preserving Gujo style building. Positive perception on Gujo Hachiman's Streetscape Regulation of residents has shown the effort in corresponding with streetscape aggressively during the renovation work compare with the resident which is having moderate or negative perception to streetscape.

Social Condition

Issues of urban growing from surrounding area have also led to the aging population and depopulation in Gujo Hachiman which are considered as the obstacles in sustaining the livingness of neighbourhood. Aging population and depopulation issues have directly brought the impact to the building changes condition in Gujo Hachiman. Although there are high percentage of family structure which consisted husband and wife and nuclear household (parent and children composition family) in study area but there was the increasing tendency of single household (1 person) recently especially elderly person. It has affecting the will of building owner in maintaining their living environment by considering the limitation for renovation work. The outflow of resident to other places for working or living has left their property without any maintenance work also bring the impact of building change especially deterioration of building or vacant building increasing in study area.

8. CONCLUSION

1. The tendency of building change regarding to location, building function (land use), building type and building condition, user perception and social condition has been determined. Building changes condition at town centre of Gujo Hachiman has shown the positive way compare with fringe area. Building user has tended to make the changes by renovate it and trying to preserve the traditional style of building without removing much the original elements on the façade and inner structure. Most of building use as commercial purpose having the renovation work by maintaining the building condition is more significant compare with residential building.
2. The case studies have been identified for each building change, land use change and various perceptions on streetscape. Positive perception on Gujo Hachiman's Streetscape Regulation of residents has shown the effort in corresponding with streetscape aggressively during the renovation work compare with the resident which is having modest or negative perception to streetscape. In the same time, aging population and depopulation issues have directly brought the impact to the building changes condition in Gujo Hachiman.

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