

# The study of urban form in Japan

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**Abstract.** *Five aspects of urban morphology in Japan are reviewed. First, the study of castle towns is considered in terms of both the compositional principles and generative processes of these towns. Secondly, research on historical Machinami and Machiya is examined with a view to establishing a set of guidelines and theories for urban conservation. Thirdly, a revision of perspectives on the modernization of urban form and spaces between the late-nineteenth century and the middle of the twentieth century is proposed. Fourthly, investigations are described of over-populated urban areas, including those on the periphery of large cities, in relation to the potential of the Machizukuri movement as a method of upgrading such areas. Finally, the particularities of Japanese methods in designing and planning are examined with a view to overcoming the sterile view that to modernize is necessarily to Westernize.*

*Keywords: Japan, morphology, castle town, overpopulated district, Machizukuri, modernization*

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The Japanese translation of the English expression ‘the study of urban form’ connotes an emphasis on the *surface* structure of the built environment. It lacks the deeper and wider meaning of the term ‘urban form’ as it is commonly understood in the English-speaking world. In our review of this field of study in Japan we shall widen our perspective to conform to the usage of this term in this journal when referring to the object of study in urban morphology.

Broadly, urban morphology in Japan can be divided into two categories. One is mainly related to issues pertaining to architecture and urban design, and is much concerned with such matters as the improvement of urban

landscapes. The other is more historical – aimed at shedding light on the physical character of old cities. If these two concerns are combined it can be argued that both theory and practice are represented, though there is actually a shortage of contributions to theory.

In this paper a number of themes in urban morphology are discussed. Most of the publications referred to are in Japanese, and in only a few cases have these been translated into English. Some have appeared in English-language journals, but obtaining an understanding of most of the research on urban morphology in Japan is not feasible without an ability to read Japanese.

Urban morphology, as a branch of study in

Japan, is concerned with the changing forms of the built environment. It straddles four principal fields of knowledge: architectural history; historical geography; history; and urban design and planning. In this respect there is a close similarity with disciplines in the West that are concerned with urban morphology. The authors of this paper have architectural backgrounds, and particular interests in urban design and planning. What is discussed here reflects that orientation, but it is also arguably not seriously unrepresentative of the field of urban morphology as a whole in Japan.

### **Disciplinary perspectives on urban morphology**

Japanese architectural history is increasingly shifting from the study of single physical structures to a concern with urban spaces. The process of urban transformation is being explored not only in architectural terms but also in relation to a variety of interrelated aspects, including social issues and land ownership. Architectural history does of course include studies of change over time in both architectural structural designs and architectural plans (Noguchi, 1988, 1992). In the case of castle towns in particular, the analysis of historical drawings is providing one of the bases for the design of urban space.

Historians of a geographical inclination are uncovering the characteristics of different historical periods, and contributing to a methodology whereby the distinct 'theme' of each period can inform urban design.

Within historical geography, Yamori (1970) in particular has investigated castle towns from the Age of Civil Wars to modern times, focusing on the comparative analysis of their plans. This work has been complemented by the findings of archaeological excavations.

Research on the early stages of urban development is serving both to uncover the configurations of ancient cities and to stimulate arguments about their restoration. There is also a link between fundamental research and practice in that historical studies

are providing bases for urban planning and design.

### **Historical background to the development of research**

After the opening up of Japan to outside influences in 1868 there was widespread assimilation of knowledge from the West. The theme of 'civilization and enlightenment' became central. In the course of the last 3 decades of the nineteenth century Japanese traditions and historical heritage were relegated to minor status. During the first half of the twentieth century, however, there was increasing concern to reclaim what was genuinely Japanese. Historical architecture needed to be 'deciphered', Bruno Taut suggested, by pursuing research into architectural history (Taut, 1962).

In 1919, Japan implemented City Planning Law nationwide. Only in Tokyo City was planning law implemented before 1918. In later years the government made significant changes to the urban planning system, changing a feudalistic urban structure into a modern one. 'Modernization' started before the end of the Second World War in 48 cities that had grown out of castle towns: the street patterns of the old cities were replaced by the so-called functional 'super-grid', namely the straightening and widening of streets. After the Second World War cities seriously damaged by bombing commonly underwent such modernization. Meanwhile, there was no discussion of the value of traditional urban forms, nor was there research on the preservation of historical cities. Such indifference continued into the period of rapid economic growth in the 1970s. Innumerable historical *Machinami* (historical townscapes) and *Machiya* (historical mixed-use trademen's houses) were disfigured or demolished. Gradually, even scholars of architecture considered this to be threatening to traditional heritage and joined the preservation campaign.

At the same time, the so-called *Machizukuri*, the town-making methodology (Satoh, 2003, 2004), was introduced. It entailed disag-

gregation of a city's entire living environment into numerous micro-environments and involved a series of step-by-step environmental improvements in pursuit of traditional urban planning – the so-called Master Plan by which the then government technically controlled planning by seeking to integrate entire cities' urban issues. *Machizukuri* was first launched in the 1960s as an alternative to the 'top-down model' of governmental urban planning. Those concerned with Master Plans for new industrial cities that contributed to high economic growth, slowly but surely switched their focus to city-wide planning grounded in design at the level of individual communities. They became interested in the micro-environment of an urban area, because they concerned themselves with the mechanism by which the whole urban area was shaped by multiple local processes, in particular how it generated the urban area's high population density. To reveal the mechanism involved they needed to understand the micro-environment that underpinned urban planning at the lower, district level. In short, urban morphology needed to consider areas of high population density as a major research topic, in addition to the improvement of living environments and the general upgrading of urban areas (Jinnai, 1981, 1995). It was recognized that the high-density area was a central issue in urban design and planning.

A key point arising out of these developments was that urban landscaping, as a major concern of urban planning, needed to change. The composition principles and the generative processes that shape the forms of entire urban spaces needed to be studied and inform planning. In fact, urban-landscaping-oriented methodology, as Takahashi puts it (in his widely-inclusive research and illustrated maps relating to historical cities), has served innumerable cases of research into the urban morphology of historical cities with satisfactory results (Takahashi, 1993). However, it is also clear that urban morphology must take into consideration the acknowledged importance of the ecology of living environments.

Against this background five aspects of the

study of urban form in Japan are discussed. First, the study of castle towns is considered in terms of both the compositional principles and generative processes of these towns. Secondly, research on conservation is considered, especially on the preservation of *Machinami* and *Machiya*, and the search for a theory and a set of guidelines for conservation. This leads naturally to consideration of the *Machizukuri* movement. Thirdly, a revision of perspectives on the modernization of urban forms and spaces between the late-nineteenth century and the middle of the twentieth century is reviewed. Fourthly, investigations are described of over-populated urban areas, including those on the fringes of large cities, in relation to the potential of the *Machizukuri* movement as a method of upgrading such areas. Fifthly, the particularities of Japanese methods of design are explored with a view to overcoming the sterile notion that modernization necessarily entails Westernization.

### **Research on the form of castle towns as they developed from the Civil War Period to the Early Modern Age**

The principal type of urban settlement in Japan is the castle town. It has been the subject of considerable research, much of it undertaken and stimulated by Satoh (2008).

Since 2008 the new law of historical *Machizukuri*, or the law of maintaining and improving urban historical culture and landscape, has been executed. Its aim is to conserve, improve, restore and manage historical cultural landscapes. It is concerned with city-wide historical urban structures and culture, with interest increasingly in urban design and planning, especially in historical cities and castle towns. In addition, as urban tourism became increasingly popular, it has had an important role in reviving old urban centres that are in decline.

Miyamoto (2005) has edited his entire body of work on the layout of castle towns. He also went some way to demonstrating the methods of creating vista lines that explained the significance of *Daimyo* (feudal domain)

(Miyamoto, 1986).

Takami demonstrated the importance for the layout of castle towns of the location of surrounding important religious facilities (Takami, 2008). He emphasized how castle towns adapted to conform to astronomical observations.

Satoh and his group developed their research (Satoh, 1999) by obtaining objective quantitative data about historical street patterns and their relationship to surrounding mountains and other aspects of topography using GIS. They did this for over 60 castle towns (Satoh *et al.*, 2014). Precise survey technology was used to shed light on such aspects as religious meaning and sense of beauty (Satoh, 2015). The same research method was adapted for use in newly-settled towns and cities in Hokkaido in the first decade of the Meiji era by Kubo and his associates, and its similarity with the methodology of castle-town planning is evident (Kubo *et al.*, 2014).

This research on castle-town design emphasized the spiritual insight and Japanese ways of philosophical thinking that have combined with the local beliefs of particular territories. These insights are widely accepted by Japanese researchers.

According to the research of Sugano on the lengthy transforming process of Kanazawa, this historical city, composed of eight small castle towns built by the *Daimyo* of Maeda Warrior Clan, inherited aspects of the complex character of each castle town, giving rise to the rich diversity of present-day Kanazawa (Sugano, 2014).

### **Historical urban landscapes, *Machinami* and conservation**

Asano has reviewed research on the historical urban environment, especially in relation to conservation (Asano, 1999). Conservation of *Machinami* has been an important movement since the 1960s. It has involved citizens, architects, architectural historians and local authorities, especially in small towns. In this way, research methods and techniques of

conservation for historical wooden *Machiya* buildings have been established. The first significant work of historical townscape *Machinami* conservation was undertaken in Tsumago-juku of Shukuba-machi in Nakasendo highway. It was led by Ota and his colleagues in the 1960s (Ota, 1981). He started to undertake preservation projects, including the investigation of the local *Machiya*.

Ota has sought to develop *Machinami* townscape research using the methodology of folk housing set up for the purpose of cultural property preservation. He endeavoured to discover the composition principles of *Machiya* folk houses, and undertook the first attempt to investigate the *Machinami* townscape.

Ota researched the widespread traits and cultural historical values of the *Machinami* townscape and *Machiya* buildings. *Kyomachiya*, which was the model tradesman's house in Japan, and its *Machinami*, were the first objects of study in the historical centre of Kyoto. Such studies were based on comparative work by Shimamura (1971). After its beginnings in Kyoto, the research on *Machiya*, published in *Studies of traditional townhouses* by Ueda and Tsuchiya (1975), expanded to cover the *Machinami* across Japan.

The *Machiya*, including shops, storehouses and rooms used for handicraft manufacturing, have existed as historical compound residential buildings since the sixteenth century. The mechanism by which the traditional tradesmen's houses and street stores undergo transformation is a topic that seems likely to be pursued.

Such research needs to be re-examined in relation to the early-modern economic system that prevailed during the Edo period. It aims to discover how the civil society of Edo could grow from the foundations of a free market economy run by merchants and artisans, and how this type of management of local communities could prosper in this liberal urban culture. Its methods are based on reading historical texts and studying the traces of urban transformational processes. An architectural historian usually makes analyses

of the researched objects by using the relevant historical texts and drawings, investigating the morphological transformations of sites and dimensions, and studying their structures or compositions in relation to, for example, the social context of any specific town in Kyoto (Noguchi, 1988). Following this, several research projects relating to traditional architectural complexes were completed under the supervision of Inagaki.

Such research was further developed to include the adjacent communities of traditional townhouses and published as *Researches on traditional townhouses and communities* (Ueda, 1976). This served as a theoretical foundation for the *Machinami* preservation movement in subsequent years.

### **The modernization process in urban planning and design**

Within architectural urban history, the concept of the ‘modern period’ or ‘modernity’ is a major research object. The Meiji Restoration in the late-nineteenth century, when Japan became a centralized nation, embraced modernity, being eager to absorb new techniques from the West and improve the Meiji’s urban spaces. Such thinking went hand in hand with the idea of demolishing the old. The historical cities and traditional districts were seen as ‘the early modern urban things of yesterday’, though they might show the way back to a brave new world. In particular, the city with its castle town at its centre was treated without respect, its castle wall was flattened, its moat filled and the Edo sentiment disappeared. The urban spaces of the historical city were planned for modernization.

In the meantime, the thinking on modern urban design and planning was introduced: architects and engineers from the West were playing major roles in designing and planning civic centres. Research attitudes towards the history of modern urban space, urban design and morphology were encouraged throughout the Meiji era. To what extent should this modernization process be seen as European-

ization? It is more realistic to view the process as an interaction. The latter view is closer to that of Ishida (2004), Fujimori (2004) and Asano (2008), who approach this issue from the standpoint of design and planning.

For their kind of research a question that is central is how will urban space undergo change? To find the answer one must undertake both practical analyses of actual urban structure and examine historical texts. Based on historical texts, old maps and ancient drawings, Matsuura has made detailed analyses of governmental building blocks that took the castle town as an architectural foundation, seeking to visualize in detail the process of castle-town formation since the Meiji era (Matsuura, 2002, 2004, 2005, 2006a, 2006b, 2006c, 2007, 2009a, 2009b).

The citizens themselves can preserve the landscape of the historical city by resisting the governmental process of modernization – its flattening of castle walls, filling up of moats and widening of historical streets. Citizens must understand, as Nonaka (2013, 2014a, 2014b) argues, that by working hand in hand with influential persons, such as lawyers and religious leaders, they can guard traditional urban forms against hostile change.

Based on Hatsuda’s research in the downtown area of Tokyo, the formation of the *Machinami* build-up and grouping of forms becomes clear – for example, in the brick-making street ‘Reng-gai’ (Ginza District), in shopping streets, processing factories, department stores and the business quarter (Hatsuda, 2001, 2004). Hatsuda endeavoured to uncover the period of urban transformation from the late-1940s to the 1960s starting with three topics – post-war rehabilitation after destruction, the fireproofing movement, and urban redevelopment. He has revealed the formation of urban spaces not merely from the standpoint of urban infrastructure but in relation to the interaction of multiple themes (Hatsuda, 2011).

Starting from research on how urban spaces are controlled and planned by official authority, urban planning projects must seek to establish how urban spaces should be formed. This should be done in accordance with public

opinion, taking into account the views of landowners.

### Research on the mechanism of autonomous transformation

Modern Japanese cities, it has been suggested, share one characteristic: they all seem to appear in a chaotic state. Nevertheless, a hidden mechanism seems to be affecting each city in a process of autonomous transformation. From the 1960s onward research revealed a number of aspects of this process.

First, there have been surveys to find out the meaning of modern urban space that has been formed through autonomous transformation. In 1966, a research team from Oregon University completed a design survey of *Kanazawa-sachi-machi*. A research group led by Kamishiro and Miyawaki completed a similar survey of the settlements and villages built in the 1960s and 1970s in the Japanese islands (Meiji University Kamishiro Laboratory and Hosei University Miyawaki Seminar, 2012).

Secondly, Jinnai undertook a design survey of practical aspects of urbanism and interpreted the results with reference to historical texts. His methodology of 'reading' modern urbanism was based on his analyses of urban morphological transformations at the block level (Jinnai, 1981, 1995). Satoh has searched for the mechanism of autonomous transformation – by analysing various districts in inner city Tokyo also at the block level (Satoh, 2003). And K. Satoh (2005) has carried out detailed urban morphological analyses of the plans of the problematic buildings and those adjacent to them, clarifying the history of environmental services in Japan, and suggesting bases for improved environmental conditions.

A further aspect has included the bringing together of a number of approaches, for example in seeking to integrate new developments within historical landscapes. High rise mansions have been frequently constructed and conflict with the forms of the low townhouses: they are disturbingly eye-

catching. To solve such problems, both commercial and residential functions were combined in compound building complexes. And, considering the need to settle all the problems arising out of such compound living environments, an archetype – the new type of *Machiya* town house – was proposed by Tatsumi (1999) (see also Satoh and Gaikukannkyou Kenkyuukai, 1990; Ueda and Tsuchiya, 1975). The Satoh group has painstakingly formulated the problems of urban transformation, investigating them not from the viewpoint of modern urban planning, as in the case of street planning, but from within the city blocks themselves – aiming to discover a mechanism of autonomous transformation. Thus the archetype of modern urban architecture may offer solutions for those crowded, condensed wooden blocks, castle towns, or even the *Machizukuri* designed to restore earthquake-ruined areas.

### Landscape design and spatial order as Japanese solutions

Urban morphological research on historical cities has been particularly concerned with the historical and cultural evaluation of *Machinami* settlement forms. Extending from the study of the district to the national scale, it also includes the modern castle town as an object of study. With an especial concern for topographical character, Higuchi (1983) analysed objects with regard to such dimensions as distance and depth, and angles of declination and elevation. He also analysed the structure of characteristic Japanese typological spaces.

In reaction against the uniformity of contemporary functional planning, there has been a concern for the design culture of traditional Japanese spaces (Toshi design kenkyuutai, 1968, 1973). Among the forms studied have been shrines, aiming to explore how the planned spaces may be most effectively incorporated in the landscape. Another concern has been with how the main street in historical Japanese towns may become a public space that is ideal for ceremonial occasions.

The 'disappearing yet visible cities', as architect Maki describes them, do still exist, including in many ordinary Japanese urban areas (Maki, 1979). Maki distils the essence of space that is genuinely Japanese in character, and shows that such character makes Japanese urban space different from that of historical cities in general (Maki *et al.*, 1980).

The concept of 'town and village making from within' can be traced back to the beginning of the twentieth century. It has its conceptual root within Japanese folklore tradition and has become fashionable today in Japanese town-making. Its major concern is to uncover the realities of those villages and settlements left behind by 'Japanese modernization'. Wajirō has dealt with the architectural aspects of this concept and coined the term *Kōgengaku* or *Kōgenology* as opposed to 'archaeology' (Kon, 1971-3). The former means 'the study of contemporary people's life and space'. Kon has published a series of books about the form of urban and rural areas. Yoshisaka, Kon's successor, an outstanding architectural philosopher, established the well-known Yoshisaka Research Laboratory, which was at the forefront in promoting *Machizukuri*.

Benefiting from his apprenticeship under Le Corbusier, Yoshisaka absorbed the fundamentals of European humanity and topography. The School of Architecture in Waseda University published, under his guidance, a comprehensive coverage of research and applications: *The methodology of the findings on forum and place* (Yoshisaka, 1975). In it he issued the challenge 'what should the Japanese city or community be?'. His answer was 'discontinuous continuity'.

In 1975, the Yoshisaka Laboratory, focusing on the meaning of traditional cities and urban spaces in the region of Sendai and Nago, presented their methods of urban morphology in spatial design and urban planning with specific visions and recommendations. These methods were founded on a deciphering of local aspects of geography, history and ecology. They aimed to counter the type of urban and regional planning that results in standardized functions and routine life styles. Applying the Fish-Eye Map as the

method of representation, it was claimed that a world view could be better grasped and visualized (Yoshisaka, 1976).

Shelton (2012) has sought to contrast the characteristics of spatial order peculiar to Japan with those peculiar to the West, aiming to discover the points in common between Japan and the West in modern urban design thinking. But what Shelton presented is fragmented. His theory is much the same as *Machizukuri* methods of 'town and village making from within', without grasping the complexity of such methods, particularly as contributed by Yoshisaka and his successors.

## Conclusion

Several research themes or fields of interest can be recognized within Japanese urban morphology and an attempt has been made here to review what are arguably the more important of these. There is an absence in Japan of anything approaching comprehensive, all-inclusive thinking in urban morphology. Yoshisaka (1980) has proposed his innovative, interdisciplinary approach called *Yukeology*: by this he means the study of the physical environment in terms of *ke* (form) and *sugata* (appearance). We offer here by way of conclusion our attempt at translation of a very small sample of his observations on this approach.

All the various specialities scattered among different studies and professions are, once again, synthesized in a binding together of research on how to make the human dwelling condition and environment full of energetic happiness. In this way it is necessary to learn how the things in daily life appear, in various forms and shapes: how they exist through their daily life intertwined with the multiple appearances of life... People who are educated in the principles of *Yukeology* would all wish to live in a friendly environment and live together in peace (Yoshisaka, 1980, pp.12-14).

By extension of this Japanese perspective, we

end with the thought that within urban morphology there is scope for integrating many scientific and academic fruits. The search continues for appropriate methods of so doing.

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## Fifth PNUM Conference

The Fifth Conference of the Portuguese-language Network of Urban Morphology (PNUM) will take place in the *Centro Cultural Vila Flor* in Guimarães, Portugal, from 15 to 16 July 2016. The theme of the conference is 'The spaces of urban morphology' and it will promote debate on the study of the physical form of cities in three fundamental dimensions: university teaching, scientific research and professional practice.

The call for abstracts will be launched in November 2015 and abstracts of proposed papers should be submitted by 17 January 2016. Authors will be notified whether their paper has been

accepted by 29 February. Full papers (optional) should be submitted by 30 April 2016. The PNUM 2016 website, containing further information on the conference will be launched shortly.

The Conference Organizing Committee comprises Jorge Correia and Miguel Bandeira (Coordinators), Cidália Silva, Ivo Oliveira, Maria José Caldeira and Maria Manuel Oliveira. The Conference Scientific Committee comprises: Teresa Marat-Mendes (President), Frederico de Holanda, Jorge Correia, Miguel Bandeira, Nuno Pinto, Stael de Alvarenga Pereira Costa and Vitor Oliveira.



**Buildings in the historic core of Guimarães. Photograph by Jorge Correia.**

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