

ลักษณะของความเป็นญี่ปุ่นที่พบในอาคารสูงของโตเกียว, ประเทศญี่ปุ่น

Japanese Characteristics in High-rise Buildings of Tokyo, Japan

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บทคัดย่อ

บทความชิ้นนี้ต้องการค้นหาว่า อาคารสูงในโตเกียว มีกระบวนการส่งผ่านความเป็นญี่ปุ่นและแสดงให้เห็นถึงลักษณะความเป็นญี่ปุ่นมากน้อยเพียงใด โดยศึกษาจากอาคารตัวอย่าง 9 หลังที่สร้างขึ้นหลัง สงครามโลกครั้งที่ 2 ตั้งแต่ ค.ศ. 1960 จนถึงปี ค.ศ. 2013 ซึ่งเป็นอาคารที่ได้รับการเผยแพร่ผ่านสื่อต่างๆ ในวงกว้าง การศึกษาเริ่มจากการทบทวนประวัติและพัฒนาการในการสร้างสรรค์งานสถาปัตยกรรมแนวตั้งของญี่ปุ่นในอดีตจนถึงปัจจุบัน จากนั้นจึงศึกษา อาคารทั้ง 9 หลัง ถึงคุณลักษณะในด้าน การเชื่อมโยงกับบริบทรอบข้าง การวางผังพื้นที่ รูปทรงภายนอก ที่วางภายใน ไปจนถึงการใช้วัสดุต่างๆ ในเชิงเปรียบเทียบระหว่าง อาคารทั้ง 9 หลังและคุณลักษณะของความเป็นญี่ปุ่นที่พบเห็นมาแต่ในอดีต พบว่าลักษณะความเป็นญี่ปุ่นยังคงปรากฏอยู่และส่งผ่านมาจนถึงปัจจุบัน ผ่านคุณลักษณะ 3 ประการ คือ 1) โลกทัศน์ที่มีต่อธรรมชาติ ถูกให้ความสำคัญมากกว่าคุณลักษณะอื่นและถูกนำเสนอในเชิงสัญลักษณ์แทน 2) ความงามในแบบประเพณี ความไม่สมบูรณ์ที่เกิดขึ้นเองตามธรรมชาติถูกจงใจสร้างให้ปรากฏขึ้น 3) องค์ประกอบประเพณี มีการใช้ในรูปแบบประยุกต์มากกว่าการใช้แบบตรงตัวเหมือนเช่นในอดีต อย่างไรก็ตามการออกแบบอาคารสูงของญี่ปุ่นยังคงให้ความสำคัญกับความ เป็นญี่ปุ่นเป็นหลักแม้ว่ารูปทรงภายนอกและบรรยากาศภายในจะมีความทันสมัยหรือสากลมากขึ้น แต่ยังคงรับรู้ได้ถึงคุณลักษณะความเป็นญี่ปุ่นสอดแทรกและแฝงอยู่ในทุกอาคาร

คำสำคัญ

ลักษณะความเป็นญี่ปุ่น

อาคารสูง

องค์ประกอบทางสถาปัตยกรรม

ความสัมพันธ์กับธรรมชาติ

สุนทรียะ

Abstract

This research aims to explain the transition of Japanese characteristics in high-rise buildings using several transferrable procedures, and to verify how much the appearance of Japanese characteristics still remain. A total of 9 selected buildings, which were built after world war II (1960 to 2013), and published in the international data source, were studied. The method included searching the history and the development of high-rise or vertical structures in each period. The data synthesis consisted of studying the 9 buildings across several aspects, such as their physical features, relationship with their surroundings, layout plan, form, interior space, materials in comparison with other buildings, and the origin of the Japanese characteristics. The representative Japanese characteristics, which have been transferred to the present were identified as follows: 1) Human beings and the landscape were considered more important than other features, and this concept was represented only in a symbolic way. 2) Aesthetic from natural processes have changed due to human contrivance. In conclusion, the form and interior space have become modernized and internationalized. 3) The elements were used in the form of adaptation rather than in direct usage in past buildings, however the high-rise buildings still emphasize important Japanese characteristics, which persist to a small extent in every building.

Keywords

Japanese Characteristics

High-rise Building

Architectural Elements

Connection with Nature

Aesthetics

1. Introduction

The origin of Japanese tradition comes from the Shinto belief that Kami (spirit) exists in nature, with native Japanese erecting shrines nearby the trees where they believe Kami dwelled (Nute, 2004). The traditional architecture places itself in relation to the natural landscape, retaining the unique characteristics of Japanese beauty and architectural planning. With the advent of Buddhism from China in the Asuka Period (538-645), Japan became influenced by Chinese Buddhist architecture. The original Chinese architecture was soon developed and adapted to suit Japanese living conditions, natural landscape, and primitive belief, eventually giving birth to the unique architecture of Japan. In Japanese traditional architecture, the relationship between human beings and nature is difficult to separate. For instance, the abundant use of natural materials and harmonious planning with the surrounding environment, are influenced by the conditions of an island country where earthquakes and volcanic eruptions often occur (Ring of Fire). Besides, Japan is located in a warm zone where four different seasons can be clearly observed, the different climate of each season producing the year-round unique beauty of the natural landscape and built environment. Due to the abundance of forests, wood was the main material for building construction in Japan (Museum, 2018; Nishi & Hozumi, 1996), possessing the ability to be flexible when hit by earthquakes, a major natural disaster in Japan. Horizontal buildings were not only constructed of wood, but also vertical structures, such as, pagodas in temples and castles, where wooden structures were built on top of a stone foundation. From the mid-19th century, Japan has opened and developed her country to meet Western standards, including technology innovation and culture. Unfortunately, Japan has always encountered powerful destruction; the Tokyo earthquake in 1923, atomic bomb in World War II, Hanshin earthquake in 1995, and Tohoku tsunami in 2011. These conditions

constitute a potential challenge for future development amidst an increasing population, limited living space, and requirement of new types of vertical structural buildings, which represent Japanese characteristics in a modern way. Presently, under these tough conditions, Japan can successfully create acclaimed contemporary architecture with advanced construction technology, while Japanese characteristics still can be represented in some levels. In that case, does the concept of Japanese characteristics still transition to vertical or high-rise buildings?

Therefore, by investigating the transitional process of Japanese characteristics from horizontal to vertical structures can help us understand the possible ways to apply some traditional characteristics to modern structures for the requirement of contemporary life.

2. Objective

The objective of this study was to investigate the transitional process of Japanese characteristics towards high-rise buildings in Tokyo, and to clarify those aspects, which can be observed in the buildings, as a result of peoples' changing way of life, culture, regulations, and Western influence.

As a hub of modern high-rise building construction and most densely populated city in Japan, Tokyo was selected to be the study site with its strict social conditions, high land-price, and embodiment of a fast-living life. Under these conditions, Japanese architects still continuously attempt to transfer Japanese characteristics towards high-rise buildings.

The samples of study are high-rise buildings constructed between 1960 to 2013. The Japanese economy has constantly expanded since after World War II, from 1960 until the early 1990s. Japan was subsequently under an almost 20-year sluggish economy expansion, but in 2013, a Creative Industries Policy, Cool Japan, was promulgated to promote the tourism and service industry, instead of the

construction and product industry, as in the previous century. The new policy motivates people to be concerned more about Japanese expression and identity in all cultural assets, including architecture.

3. Japanese Spatial Characteristics: An overview

Japanese culture has its roots in Shinto, in the belief that Kami (spirit) resides everywhere in nature, for example, there are seven gods in every grain of rice, making Japanese sensitive to the natural beauty and concerns about the existence of natural elements and phenomena. According to the review from data sources (Taut, 1936; Koren, 1994; Locher, 2015) essential or distinctive features that are the sources of Japanese architecture, can be identified in to 3 topics, as follows:

3.1 The relationship of human beings and the landscape

One of the cornerstones of Japanese culture is the way of relating to natural world, especially in deeply personal perception of things (Taut, 1936). Western man has always looked at himself as the master of his fate and nature as a supplier of materials for him, but Eastern man has seen himself as a part of nature and natural processes (Kurokawa, 1977). Although, Japan has a brutal climates, Japanese still live with these nature together by accepting the good part and terrible part. They place themselves in harmony to the natural world and adjust with the architecture together as a part of their life, and develop until it is hard to separate. As a result, Japanese traditional house always faces to the nearby nature or mocks up the garden, in order to appreciate the changing of seasons and create their own world (Isavorapant, 2000). The way of connection with the nature is not only by physical, but also by using the eye visual from framed view of the garden that creates a view to the garden and makes the garden as a part of the building and observer.

3.2 Aesthetic Perception

The viewpoints of the beauty experience in Japanese concept is unique and different from other cultures. For example, inside the Japanese room from foreign eyes, the room is empty and blunt, but in the eyes of Japanese, the room is full of beauty and humility (Priscilla, 2019). The usage of natural materials without any embellishment; appreciation of objects' beauty with humble elegance, rustic simplicity, irregularity, asymmetry; and respect of incompleteness, and the way to find a melancholic beauty and impermanence in objects produced by a handmade process, are good examples of this attribute, fundamental to the root of Japanese aesthetic called Wabi-sabi (Koren, 1994). Indeed, nothing is permanent, perfect, and forever. Everything happening, existing and ending, and just living and focusing on the present are the truth. This unavoidable life cycle or concept of time produces a strong cornerstone in Japanese aesthetic. As the evident in architecture, the buildings are mostly made by natural materials with a natural time limit, and the buildings are reconstructed with adjustment of design many times (Koutsugeorga, 2016). In addition, tranquility, silence and dimness are also the attribution in Japanese cultural nuance and beauty, influenced by Zen Buddhism. These concept and philosophy of the Japanese worldview have been represented in architectural planning, form, material, and construction process.

3.3 Intermediate Architectural Elements

Japanese respect nature, shaping their harmonious living with the existing environment with no attempt to occupy, in contrast to the Western paradigm, which tends to control and create grandeur and monumental structure over nature. The result of the relationship between human beings and the landscape, appears in the application of natural materials for architectural elements, such as Tatami, soft straw mats, with its dimension applied for a basic measurement of Japanese spatial modular design.

Shoji, a wooden lattice patterned sliding door, which allows light to pass through Washi, a traditional translucent paper. The basic traditional room of modular coordination can connect with the adjacent rooms and the outside environment by moving Shoji left or right, creating multi alterable space; closed/open, big/small/universal, private/semi-private, and bright/dim/dark, following specific requirements (Wongphyat, 2017). Furthermore, Genkan, Engawa, and roof, are three other spatial elements, bridging outside and inside. Genkan, the lower space between the front door and the interior space, where guests must pass through and take off shoes before entering to an inner space, is a transition space to welcome the guest from outside. Engawa, a raised wooden corridor functioning as a middle space between a room (inside) and garden (outside), encourages an uninterrupted transition of space and spectacle of climate changes outside (Greallegretti, 2015). Lastly, roof, the most obvious and important element in Japanese architecture, was normally built quite high and to a large scale, with an overhanging eave to protect against frequent heavy rains and snow. This makes the area under the eave an indistinct space between the inside and outside. Looking into the room, interior decorations, for example painting on hanging scroll, or sliding walls, are usually completed by the application of natural elements and tell a story too (Locher, 2015). The above-mentioned architectural spatial elements and characteristics were combined and became the unique identity of Japanese architecture, which is widely known throughout the world (Black, 2000).

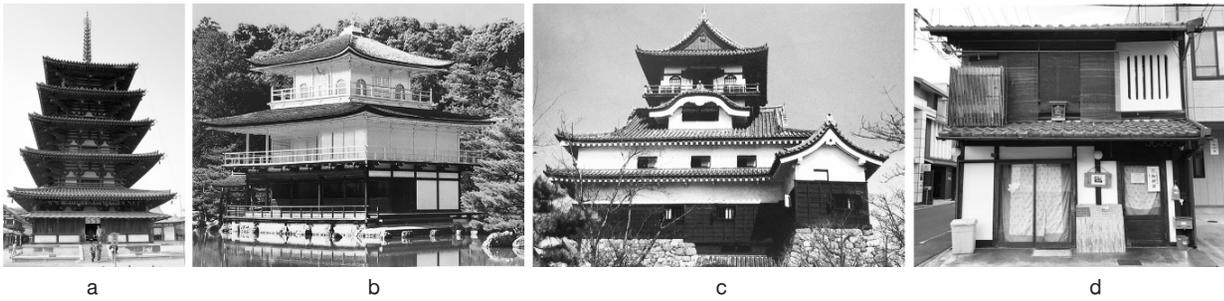
4. Toward Vertical Structure

In the Japanese architectural timeline, since the Ancient Age to the Middle Age, both horizontal buildings and vertical structures have been developed throughout its history. The most evident is the five-storied pagoda of Horyu-ji temple, built in 5th century (Figure 1a). This is the world's oldest wooden building,

a vertical structure that has withstood many earthquakes throughout its history due to its structural flexibility (Watanabe, 2001). The wooden pillar at the center of the pagoda being a balancing object to absorb the natural forces acting upon building. Kinkaku-ji (Golden temple), is another historical vertical structure in the Japanese architectural timeline. The three-story pavilion inside the temple compound was built by wood and is approximately 12.5 meters in height; it was used by shogun as a retirement villa (Figure 1b). Shiro, are other vertical structures, Japanese castles with a military and natural defense purpose. Normally, Shiro were constructed by wood on a huge stone foundation in a vertical direction, for example Inuyama Castle, the oldest castle in Japan, completed in 1440 with a height of 19 m. (Figure 1c). Another good example is a living house in Kyoto, a wooden town house named Kyo-machiya (Figure 1d), which were widely developed into 2-3 stories in the Edo period.

Since 1868, Japan changed the name of “Edo” to “Tokyo”, and opened its trade with other countries. Urban Japan has been gradually changed by the adaptation of culture and civilization from the West, due to the belief that Westernization could bring them to a modernized state. At that time, architecture in Tokyo was still centered around wooden structures built in traditional patterns and construction techniques. However, in 1890, Japan's first western style high-rise structure (12 stories), Ryoukaku tower, was completed in collaboration with a British engineer using brick over a wooden frame (Perez, 2014). The tower set the trend for the beginnings of tall buildings, and it was a showcase of new technologies, such as the first electric elevator.

Unfortunately, in 1923, Tokyo was hit by the Great Kanto Earthquake, with a magnitude of 7.9 on the Richter scale, most of the devastation caused by uncontrollable fires after the quake, which destroyed three-quarters of the wooden city over almost three days, killing over 140,000 people. It was the most destructive earthquake in Japan's history.



Source: (a) by Ron Reznick 73, (b) Introduction to Japanese Architecture (p.59), by David and Michiko (Young, 2003) (c) Ibid. (p.74), (d) by Author
Figure 1. Vertical structures in traditional architectures demonstrating each building type.



Source: (a) USGS/George A. Lang Collection, (b) US National Archives
Figure 2. (a) Tokyo after the Great Kanto Earthquake in 1923, (b) Tokyo after the bombing in 1945

In 1945, Tokyo experienced another wave of devastation during World War II when the United States Air Force conducted a devastating firebombing upon the city. It was regarded as the most destructive bombing raid in human history, 41 square kilometers of Central Tokyo were destroyed and left completely flat, about 100,000 people died and over 1 million people were made homeless (Long, 2011). After the war, Tokyo fought to rebuild the city in every sector; restructuring residences, economy systems, transportation systems, infrastructure, and even social dynamics (Shea, 2019). In 1958, Tokyo Tower was built, with a height of 332.5 meters, it became the tallest structure in Japan, and a symbol for lifting the spirits of Japanese people after the war, a starting point of the new Tokyo city (Perez, 2014).

Subsequently, the first envisioning of Tokyo as a high-rise city was started by the Metabolism group, with the vision of creating mega-structures, thus starting a trend of development of high-rise buildings in the city. Building regulations meant a 31 meters

height limit was set on the high-rise buildings due to aesthetic and engineering concerns about earthquakes. However, similar to other international buildings, many architects looked to buildings higher than 31 meters, as the height of the building had become an important matter in regards to the aspect of design. Later on, the number of high buildings in Tokyo rapidly increased, and the construction of high-rise structures was in focus again when Japan was selected to be the host of the 1964 Olympic Games. Many buildings were constructed for this international event, including some buildings with a vertical structure. A good representation was Komazawa Olympic park control tower, which was made from concrete and represented the traditional Japanese pagoda via simple form by contemporary construction. In addition, there were many high-rise building developments in the following decade. A good example was the 36 story Kasumigaseki Building, which was completed in 1968, broadly regarded as the first modern office skyscraper in Japan (Japantimes, 1998).

During the 1980s, the Japanese economy had become one of the largest and most powerful in the world. High-rise buildings kept developing alongside the strong economy, nevertheless only four buildings in Tokyo were completed with a height above 150 meters, but still below 180 meters. At the end of the decade, Japan was faced with a bubble economy, with the excess of an uncontrolled economy driven by land speculation and leveraged property valuation by banking deregulation (Seligmann, 2016). Economic recession continued for almost 20 years, while values of real estate was decreased considerably, so building regulations regarding high-rise construction were liberated, and the Japanese Government contributed capital into the economy. These factors supported the development of high-rise buildings in Central Tokyo (Perez, 2014).

Since the 2000s, Japan has reoriented her economy expansion and development from construction and technology, to cultural industry and tourism, under the campaign “Cool Japan”. Therefore, service design, cultural facilities, lodging, transportation, and other related infrastructure have greatly expanded to support the arrival of tourists from all over the world (DITP, 2016). As a result, Japanese started to rethink about their national and cultural identity. Tokyo has encountered many changes in physical appearance, from city of wood and paper that are combustible materials to city of reinforced concrete, steel, and glass which has more durable materials (Maki, 1988). Tokyo gradually change from a low-rise city, into a tower city, and it became a challenge for Japan to proclaim their advancement in urban development, architectural design and construction technology. Furthermore, the attempt to introduce a western style suggesting the use of fixed doors instead of Shoji and Fusuma (sliding doors), provides effective control of privacy and temperature (Fuji, 2017). The traditional steep gable roof was replaced by a modern flat roof. Moreover, almost of the new houses have a dining-kitchen space to save more space in the tiny areas (Pernice, 2014).

5. After the war, a study of 9 buildings from 1954

Several years later, Japan had been developing their architecture to rival many Western sectors, by supporting architects in terms of overseas education and internships. As a result, those who came back with knowledge from the West could improve Japanese architecture standards (Isozaki, 2006). Moreover, Japan encouraged the import of architects and engineers from other countries, enabling collaboration between foreign and local Japanese architects across several projects. Then, there was a brand-new design, which played an important role in Japanese architectural field, especially in the capital of Japan. Tokyo has constructed many buildings with a balance between culture and new technology, causing the architecture in Tokyo to be renowned. Nonetheless, there was a clash of cultural notions between the Western’s modern perception and the Japanese original tradition.

Tokyo is a challenging place for modern building construction, therefore 9 buildings were selected for studying. In this procedure, the high-rise building does not mean the tall building or the high-rise under the Japan’s regulation. However, the buildings were selected according to the height; more than 7 floors, and the proportion between vertical and horizontal; not less than 1:3. These buildings are the representatives of architectural materials-façade such as wood, concrete, steel, glass, and aluminum. Besides, these buildings were built during in 3 eras; rapid post-war economic growth era (1950’s-1970’s), bubble economy era (1980’s-2000’s or the lost decades), and after 2000’s with growing depression. However, during those periods, many buildings were built by focusing on the cost-effective and functionalism more than the expression of Japanese characteristics, which made those buildings usual. Therefore, the sample buildings must have some notable Japanese characteristics.

Besides, these buildings are published in the international data source, and have Japanese



Figure 3. Location of 9 buildings

Name	Architect / Nationality	Building Type	Year	Material-Façade	Texture
1. Shizuoka Press and Media Building	Kenzo Tange / Japanese	Office	1967	Concrete	Rough
2. Yasuyo Building	Nobumichi Akashi / Japanese	Commercial	1969	Aluminium Panels	Smooth
3. Nagakin Capsule Towers	Kisho Kurokawa / Japanese	Residential	1972	Galvanized Steel Panels	Rough
4. Century Tower : Ochanomizu	Norman Foster / British	Commercial	1991	Aluminium Panels	Smooth
5. Maison Hermès	Renzo Piano / Italian	Commercial	2001	Glass Blocks	Glossy
6. Prada Aoyama	Herzog & de Meuron/ Swiss	Commercial	2003	Glass Panels	Glossy
7. Tokyo Skytree	Nikken Sekkei / Japanese	Broadcastcase	2012	Aluminium Panels	Smooth
8. Asakusa Culture and Tourism Center	Kengo Kuma / Japanese	Office	2012	Woods	Rough
9. Omotesando Keyaki Building	Norihiko Dan / Japanese	Commercial	2013	Concrete	Rough

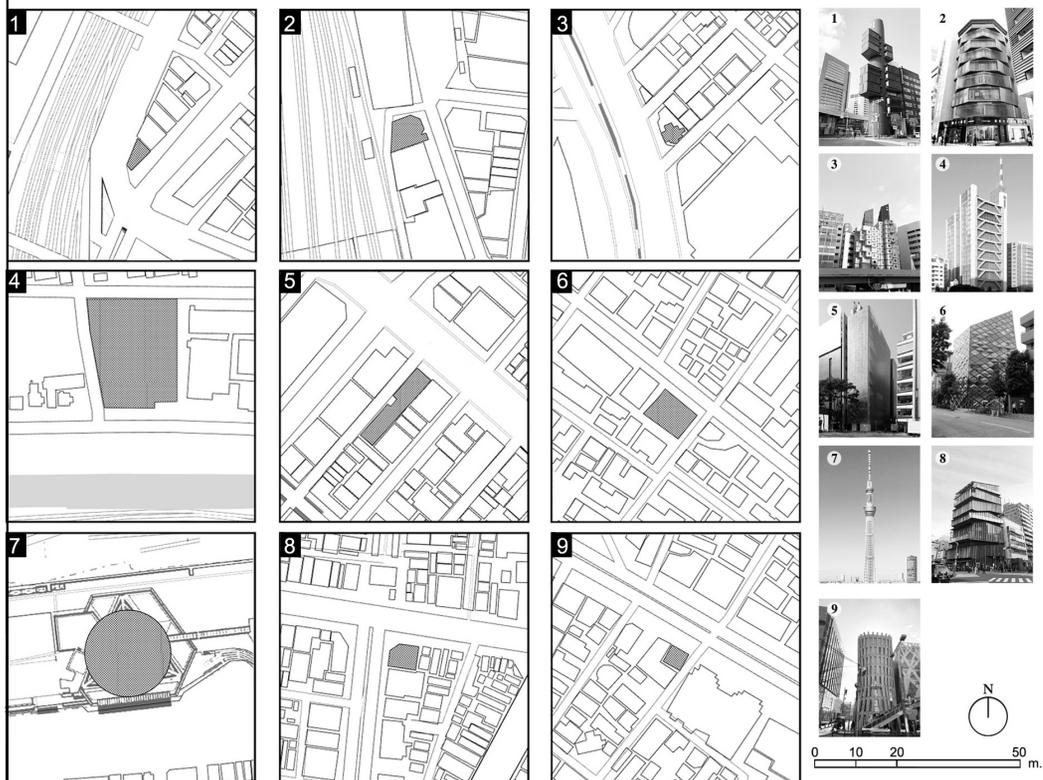


Figure 4. Criteria, Layout plan, and Pictures of 9 buildings

characteristic features according to descriptions, articles, reviews, and architect's interviews from the reliable data sources. Additionally, the buildings were designed by a world-famous company, and had a number of different building types, such as residential, store, commercial, office, and tower. These high-rise buildings are distributed on main roads, near public transportation and important places, as shown in Figure 3-4.

1) Shizuoka Press and Media Building (1967) was the first project that the Metabolism Group could realize their vision of "cities living like organic growth". Indeed, this building was an influencing urban landmark in the East-Ginza area (Bognar, 2011), because the tower comprised a structural core and infrastructure that could be plugged in with modular capsules, following the requirements of the building (Merin, 2013).

2) Yasuyo Building (1969) located at the corner of eastern exit of Shinjuku Station. According to Nobumichi Akashi, the architect, this building was anchored solely in the fast pace of Tokyo and in the present moment. This narrow commercial building looked like a stack of twisted bolts, which was quite a weird shape at that time. Even though the use of wooden-liked louvers made it acceptable in the traditional style, the top floor also had 12 and 10 Tatami size mats in two of the three rooms (arcSPACE, 2018).

3) Nagakin Capsule Towers (1972) was the outstanding 14-story building of the Metabolism Group and one of the most recognizable buildings in Japan. At the time, architects intended to build these twin cores to express a vision of a dynamic city that always changed and grew. This vision was represented through the way 144 capsules were plugged in the central core and rotated in various angles, and which can be individually replaced or removed when necessary. Each capsule is fully furnished and allows one person to live comfortably, have circular windows inspired from Kyoto's Genko-an Temple, and a built-in bed and bathroom. The interior space of each

modular could be manipulated by joining the capsule to other capsules (Sveiven, 2011), with the architect attempting to build a residence for businessman who worked in Tokyo during the week (Kisho Kurokawa). In fact, these capsules were the model for the many capsule hotels, which can be seen nowadays.

4) Century Tower Ochanomizu (1991); Norman Foster's first building in Japan, was widely recognized because of its technological modernization according to the characteristics of Tokyo and the emphasis of earthquake prevention. As a result, the building tried to bring together the East and West to give the building an obvious aesthetic sensibility, and a harmony and calmness based on the historical characteristics of the spaces. On the inside, are double spaces with mezzanines hanging between them, which provide free-column space in the office so that people can appreciate the natural light and views, also Japanese Tatami proportion was used in the museum sector (Norman Forster).

5) Maison Hermes (2001); Renzo Piano wanted to create a magic lantern that was inspired by traditional Japanese lanterns. The façade was made from more than 13,000 glass blocks, which resemble the Japanese paper screens. In the daytime, the space inside was blurred by the glass block façade and brightened with warm light at nighttime. A steel skeleton holds the glass blocks and gives the building flexibility from earthquakes. At the eyelevel of the building, clear-glass bricks were inserted to show Hermès' products, with the inside set for a calm atmosphere to contrast with the loud and noisy urban context (arcSPACE, 2018).

6) Prada Aoyama (2003) was the first project in Tokyo of the Swiss architects Herzog & de Meuron. According to the architects, this 6-story building looked like a crystal, or sculpture, by alternating the skin with a combination of convex, concave or flat glass. The interior space used lamps and furniture, which was designed especially for the building, to present Prada products. (arcSPACE, 2018).

7) Tokyo Skytree (2012) was a broadcasting and observation tower, which became the tallest structure in Japan at a height of 634 meters. The design of the building was based on the traditional elements, for instance, the curves of the building refer to a samurai sword's shape and the camber structure relates to the temple columns from the Heian and Nara period. The tower basement also has a triangular pyramid shape that turns into a rounded shape along its height. Current technology was inserted for earthquake prevention by using a flexible core pillar, which was adapted from the ancient five-storied pagoda and incorporated in the design to create a modern architecture (Koshihara Mikio).

8) Asakusa Culture and Tourism Center (2012), was designed by Kengo Kuma and located in the corner opposite Kaminari-mon Gate. The series of roofs divided this building into eight horizontal sections, similar to the stack of Machiya house. This building extended Asakusa's lively neighborhood vertically, and the stack roofs covered different activities underneath, giving a unique aspect to each space. In addition, the use of louvers separated the surface into strips, resembling a traditional pattern. Inside, the large air volume space with the facilities include tourist information, an exhibition space, conference room, a café, and an observatory terrace, which are free to enter.

9) Omotesando Keyaki Building (2013) was designed by Norihiko Dan and Associates. The eight-story commercial building is located on a corner, behind Tod's L-shaped building. This irregularly shaped building created a certain "symbiotic" synergy with the inner vertical façade of the adjacent Tod's building. In addition, intervening elements, such as the vertical scale, were made possible by its torch shaped form, which were brought into context with the aim to liven and enrich the whole atmosphere. Lastly, the structure used multiple leaf-shaped columns, which had wood-like texture on the columns, and were made from steel reinforced concrete (Gruntz, 2016).

5.1 Layout and Site Planning

The design of the layout planning is still concerned about the relationship with the surroundings, as evidence, Prada Aoyama's shape is considerably influenced by the perception of the incidental local profile. Moreover, Tokyo Skytree is designed to have three entrances according to the three axes, such as the Sumida River and Arakawa River, the south, and the railway lines that run on the eastern and western axis. Next, Machiya's roof-shape, the local residential type, are used as a form of building in the Asakusa Culture and Tourism building, and the angles of the roofs are inclined in relation to the adjacent kaminari-mon. Another, the Omotesando Keyaki building, changed its relationship with the surrounding Tod's building by being placed in a diagonal position with an irregular design (Figure 5). Indeed, the connection of the surrounding environment was represented by bringing a scenery view with intentional openings. However, the sample buildings after bubble economy era (1980) turned to create a bigger opening to get more panorama view, and still related to the concept that surrounding environment is a picture and the buildings are the visual frame in which the office view can change in each moment. Besides, this environment can be far away from the building, which is different from the traditional style, that looked attached to the surrounding environment.

The urban planning of Tokyo city has a grid pattern, normally attaching two sides of a building with a road which is good option to attract the people from both side with a flow of space. But, most buildings still have only one main entrance and another entrance as a service or a fire exit. The main entrances are placed on a different layer to the building's wall, which can create a small transition space before entering, similar to Genkan. In addition, they are also intentionally asymmetrical from the center, and not exactly in the middle, which is different from the Japanese religious buildings where the entrance is in the center (Figure 6). While this one main entrance is simple and has humility, it fits to

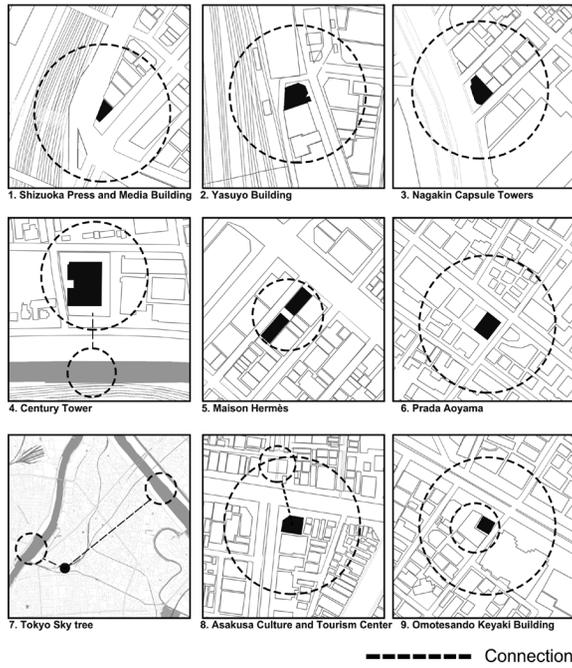


Figure 5. Boundary of the connection with the surrounding environment

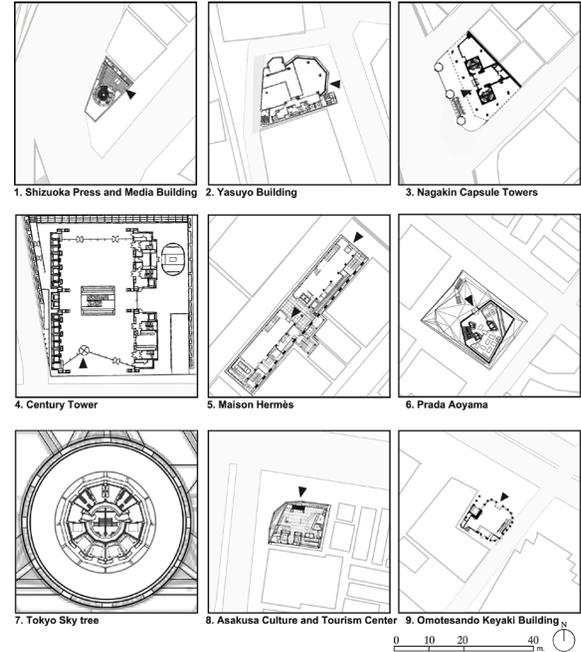


Figure 6. Plan with entrance axis

Asian people's dimensions, and the entrance's design is harmonious with the building's form, and not prominent or showy.

5.2 Form, Structure, and Plan

Since, Metabolism group visions aimed to improve the modern cultural connection to Japanese tradition and Western idea that emphasized in the form, most buildings were turned to design with a pure geometry, such as box or polygon shapes (Figure 5), and with Japanese characteristics expressed in the form of a louvers façade adopted from the traditional way and pattern. In the Yasuyo building and Asakusa Culture and Tourism Center, the buildings are adapted according to the appropriateness of each side of the building. The form and space were inspired by the social condition at that time, for example, the Metabolism Group represents the definition of Tokyo's never-ending change by the use of plug-in buildings. Similarly, the Yasuyo Building, is built to be anchored solely in the fast pace of Tokyo, and in the present moment.

Japanese characteristics are not only represented by the form of the buildings, but also by structural innovation. For instance, the inspiration from the structure of the ancient five-storied pagoda, which is expressed in the Tokyo Skytree, applies an interesting combination of old wisdom and new technology. It is based on the traditional Japanese architecture principle of Mukuri (convex) and Sori (concave) (Figure 8) and includes the Japanese traditional curve, such as the blade of the samurai sword with a camber structure, appearing in this building. The expression of the Japanese structural characteristics also appears in the Century Tower, which inspired the design of the main structure of ten of Torii (Figure 8), which appears to be piled on top of each Torii (Guides, 2018). The usage of structure appears outside the building compared to the traditional way of appearing only inside the building. Moreover, these buildings also use structures as the skin of a building, with some buildings produced without-columns to achieve maximum space, and focus on rentable area more than give some space for encouraging atmosphere or aesthetic.

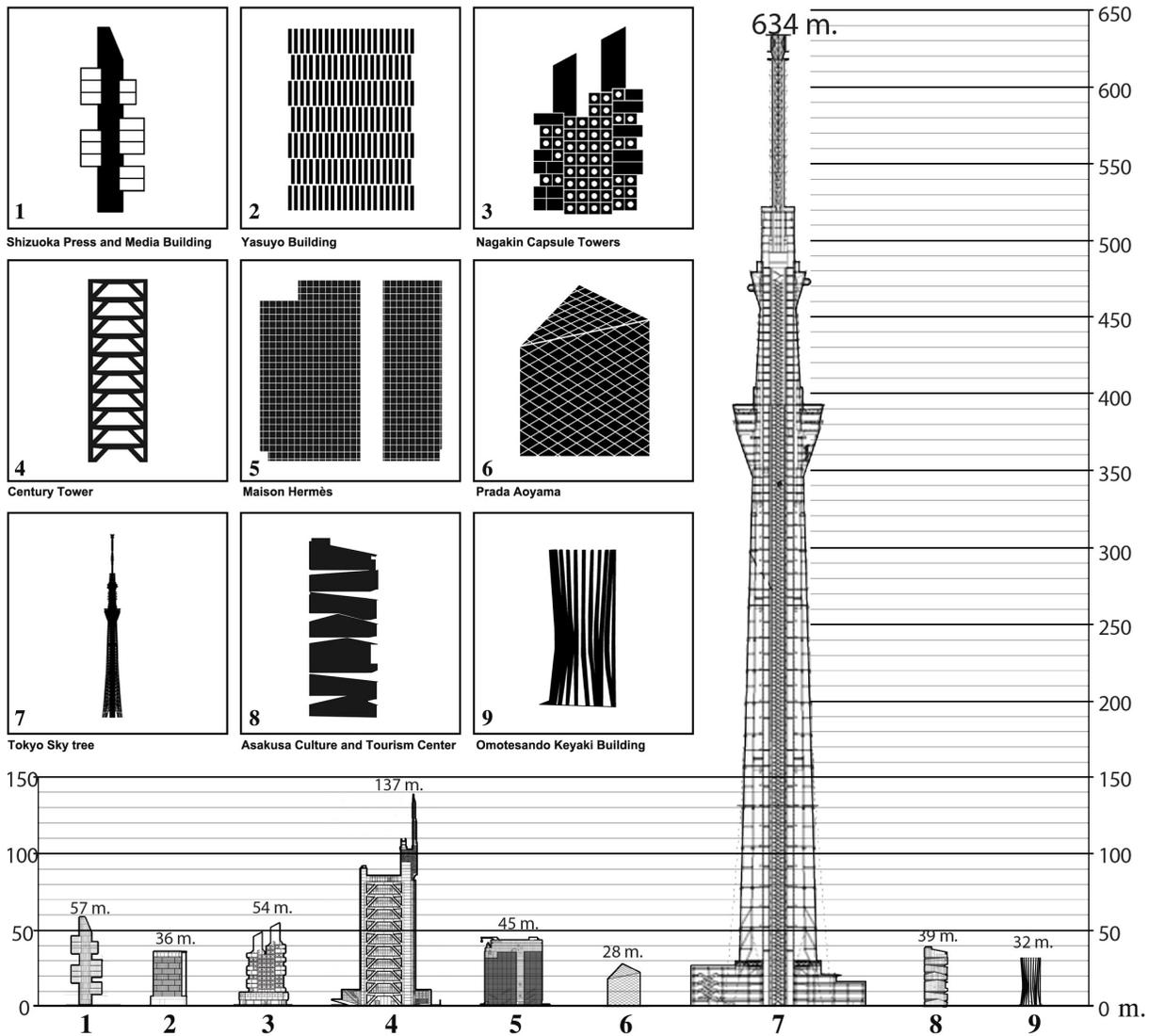


Figure 7. Elevation and iconic of each building

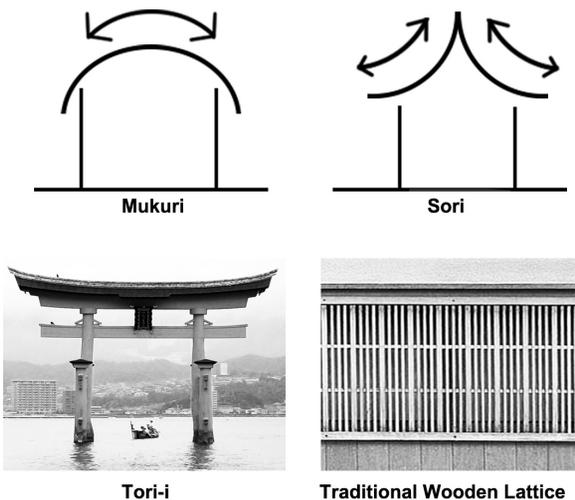


Figure 8. Sample of some traditional elements

On the ground floors, zone, size, and room-function are clearly separated. A fixed wall as an effect on the size of space that cannot expand and integrates space, similar to Shoji in the past. Likewise, Tatami mat proportions are only used in some areas in line with the spatial size. The usage of maximum site in most buildings produce the enclosed independent space from the outside. In spite of a lack of landscape in the environment, in the Shizuoka Press and Media Building, some space is still available as a pool, and in Prada Aoyama, some areas are divided by landscaping. Some case, the inside is still decorated by flowerpots, small gardens, and terrace gardens for a natural feeling.

5.3 Interior Space and Material

Most of interior space becomes international style and focuses on sustainable design more than Wabi-sabi principle. For instance, the dimness from the use of natural light through intermediate moveable natural materials (Shoji, Fusuma) changes to artificial light that can control light intensity. Besides, low-to-the-ground furniture in the past is raised up to fit in with universal standard. Inside the building, the senses of calmness and stillness in the atmosphere can be felt by using wooden furniture to decorate sparingly, white or earth tone color, and some fragrance of timber, which gives the interior a natural or jungle atmosphere. Industrial materials can be conveyed to traditional materials and potentially be used in a similar way, for example, in the Maison Hermes building there is a glossy glass block façade that is slightly similar with Shoji. The Prada Aoyama building uses convex, concave and flat panels of glass, which can be related to other natural materials, such as leather, moss or spongy planks of wood. Furthermore, the concrete skin of the Omotesando Keyaki Building appears to resemble a rough wood texture via use of setting liquid concrete into a rough wooden mold. Lastly, the color of the Tokyo Skytree comes from the technique of indigo dyers, with a mix of a blue and white color that gives a delicate pale blue glow. Indeed, these industrial materials can impose a smooth texture, and polished or rough appearance, depending on the intention of the design. Additionally, the industrial materials decay slowly and have a longer life.

6. Results: A search for Japanese Characteristics

In reviewing the 9 case studies, it was shown that the idea of design space was influenced by Western architectural concepts, contrasting with the traditional way, which commenced from using the full potential of the materials to satisfy human residential needs. However, it was largely the influence of

Western architecture, the prevention of earthquakes and the introduction of fire technology, alongside the requirements of new function and more space, that caused new building designs. The structures were developed and combined until it left only the building skin, without columns inside, causing the design of the traditional way to gradually vanish. It became the challenge of creative design to set up a new standard of Japanese architectural design.

However, Japanese characteristics still remained and were transferred into the 9 case study buildings, divided into 3 identified Japanese viewpoints, as follows:

6.1 Japanese Human beings & landscape

The modern buildings cannot be as harmonious with their surroundings compared with the past due to the changing city and diminishing nature. However, the relationship of the surrounding landscape and context of the buildings is still the cornerstone idea. It is represented by focusing on important aspects, which are adjacent and far away. For instance, the buildings are located behind temples and rivers, and whichever aspects that emphasizes the building. This relationship influences the layout plan, access, form, and openings with an intended view, with the social conditions pushing the concept towards space. In accordance to the Japanese culture, the interior space is still concerned about privacy and seclusion. This is achieved by firstly, enclosing the space and enabling the building to be protected from the chaos outside, secondly, using opaque materials and using minimal openings, and finally, by using a façade pattern to obscure vision. Therefore, the inside space is kept private and cut off from the outside world (similar to how a traditional house created their own world). Additionally, the entrance feature can follow an unassuming concept, and be designed to essentially fit in to people's proportion of not over scaling, and a traditional style may be emphasized by using a non-centered building.

Since there is a lack of natural environment in the city, the trees become the towers, however, the relationship between human being and nature still appears continuously by intently setting a mockup natural environment, such as a small pool, small garden, flower vase, and/or natural painting, which are distributed throughout the building. Even so, these natural elements are forms of symbolic representation and, not used necessarily for inhabitants as in the past.

6.2 Japanese Aesthetics

Although Metabolism movement tries to preserve the aesthetics of the Japanese traditions by promoting the concept of organic growth similarly to constant change in nature, the concept is not completely successful because of the economic conditions. The buildings still use the principle of simplicity and imperfection, emphasized in forms of the building rather than the quality of space, and the aesthetic is an evident from an effect of materials, especially in glass. The building shapes are completely different from the past, with the exterior materials manufactured to create texture using irregularity, roughness, unevenness, and imperfection without the use of the passage of time. Even though recessed lighting, reflecting light, and low small windows, can control the original dimness intensity, the dimness seems to be replaced by the brightness. According to the modernism, the buildings need brightness diffused widely to save energy and stationary light all day long. Although most buildings look international according to the concept described in the data sources claiming Wabi-sabi has been preserved in these building.

In the interior, the sliding panels are installed to a fixed wall; however, the inside can provide an idea of non-permanence by using mix-used space and opening empty space, enabling a flexible rearrangement by using a temporary partition in the traditional way. The advanced technology is a great impact-change in aesthetics of Japanese and the

effect of the timing concept. Almost buildings focus on the attention of the functionality and efficiency more than the aesthetic. Clearly, the meticulous handmade-furniture and unique style are used instead of prefabricated furniture from industrial processes, and possess a glossy characteristic, prevent corrosion, and have a long life. Although inside the buildings, there are still a natural furniture, and a dilapidation element, representative of the natural passage of time.

6.3 Japanese Elements

Japanese element which is the majority of the concepts and identity of the buildings, were represented through the form of the buildings (façade, skin), expressing an obvious modern design, with the counting of floors by roofs disregarded. The buildings were also designed to stand out and be unique, so that they could be recognized from faraway by using new materials and notable shapes. Indeed, this is different from the past, which was more centered on buildings with a harmony attachment with their surroundings. However, the proportion of the interior space still followed the Japanese style by using Tatami mats as a modular, but changing to use other materials instead of rice straw. While the original Tatami was made by rice straw, it only particularly evident in a built Tatami room, which does not affect the plan of the other rooms at all, because of their clearly-divided functions.

Nevertheless, because of limit space, the transition space, which is a long way in the past, was reduced in short, however the interior still creates the idea of a walk-through, connecting functions smoothly. In addition, wood, which used to be the main material in traditional buildings, is no longer used as it caught fire so easily during earthquakes. Therefore, steel construction and alternative materials, that resembled traditional materials, began to be used instead, with wood primarily used just for interior decoration. For example, the façade was made by pieces of aluminum, which had the same color and size as wood, or concrete, which had a wood like texture. In the same

way, translucent glass blocks and blur surfaces, similar to Shoji sliding paper doors, are now used. As a result, Japanese elements are expressed in a combination of many forms that are representatives of traditional elements to fit in the current context, such as earthquake structures based incorporated from the five-storied pagoda, curve from the samurai sword, and the color technique from indigo dyers, the adaptation of Torii, the façade from traditional patterns, or Machiya's roof shape. All of these are inspired from the different Japanese elements, but blended together to be in union.

7. Conclusion

This case study showed that the 9 Japanese buildings designed by international architects and different functions, were designed in a modern way using advanced technology with the design emphasized in the form of the building and eye-catching, rather than inhabitation of people. The density of the town caused the gap of relationship between human and nature, however, this relationship still appears in these buildings, as shown with, both Japanese and foreign architects, their integration with the surrounding environment, which could be adjacent and expanded to important aspects faraway. In addition, these surrounding environments include both natural and human-made environments. Functionality and efficiency are concerned more than the aesthetic, natural organic and handmade materials are not used

anymore and instead factory polished materials are preferred. Although, brightness become necessary more than dimness, Wabi-sabi has not been lost, but it has been appearing in terms of abstract or design concept instead. These buildings still apply the principle of Wabi-sabi in symbolic way, such as withered plants can create an awareness of time. Traditional elements still appear in the design of the buildings, which attained creative inspiration from many sources, for example, the social conditions, surroundings context, definition of the city, and even objects, which are adopted and combined with new technology.

In conclusion, the development of horizontal buildings to high-rise buildings is a result of the increasing population, congestion, requirement of new building types, economic conditions and new life-style, motivated from traditional model to the Western model with the belief that Westernization is synonymous of modernization. However, after World War II, Japanese traditional characteristics was reconsideration by Metabolism group, and influenced Japanese architects to concern about their identity. Tokyo has been a hub of modern high-rise building construction, permitting architects to use inventiveness in their designs. Service, tourism, and economic sector are seem to be new factors of architecture, which can develop Tokyo to the world's leader, and new generation of architects should concern and practice with their Japanese characteristics.

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