

A study of Bangkok shophouse facades for adaptive possibilities: a case study of Klongsan District

Chamnarn Tirapas, Dr.¹

¹School of Architecture and Design, King Mongkut's University of Technology Thonburi, Bangkok, Thailand

ABSTRACT: In Thailand, especially, Bangkok, the shophouse is one of the well-known mixed-use and multi-functional buildings: residential and commercial use. With its diverse uses, the users have modified shophouses' appearances to accommodate the purposes of uses based on residents' and owners' conditions, and business opportunities. However, the designs, constructions, and materials of its appearance have never been considered to adapt for new building purposes. This causes difficulties of adaptation and reuse of the buildings. The adaptive concepts and typology study are applied to understand the building type. The former study of shophouse are also employed and reviewed to depict the pattern of building uses. The study aims to present the variety of shophouses' appearance pattern to generate a common understanding of façades' designs, constructions, and materials. In addition, a survey of the residents' attitudes and requests for adaptable facade opportunities is done. The study mainly focuses on Klongsan district area where a new development is rapidly occurring due to the new expansion of the city and its potentials of waterfront developments. The area is in an urgent need for adjusting itself for the new developments to come. A survey of 100 shophouses of 3 story in height or higher and 3.5 - 4 meters in width are explored. An expected result is to illustrate the possibilities for shophouse façade adaptive design and structure. This can improve the shophouse façade appearances, shophouse usages, an image of the community, and a future of the sustainable city development.

KEYWORDS: Bangkok, Shophouse, Facade, Adaptive, Possibility

INTRODUCTION

In the recent years, Bangkok development have been impacted by new sky train and subway lines. This causes many new high-rise condominiums and apartments evolving along the lines. This happens in Klongsan District where there are new 3 subway lines and a sky train line running through the district. With the district location, next to the Choapraya River and opposite to the CBD and historical area of Bangkok, it is a new prime location for new city developments. To strengthen its potentials, National Innovation Agency, one of government agencies, aims to develop this district to be one of the innovation districts in Bangkok. As a result, Klongsan District is now become a new city expansion area. The new developments cause concerns on local daily life and developments, especially, living lifestyle and images of the areas. Furthermore, a gentrification of the area become a major concern to the communities in the district.

However, one of the common housing types in Thailand is shophouses. The shophouses, in residents' perspectives, are very good in supporting walkable street and livelihood of the area (Tirapas and Suzuki, 2014). It is also commonly known by the local of its diverse uses; residential and commercial use. This unique character also supports the Innovation District policy. In addition, with the numbers of them, the appearance of the shophouses have created an image of the city or the area. With different purposes of use, people change the shophouse's appearances according to their preferences and conditions. However, shophouses' design, structure, materials, have never been considered to serve its adaptation. Therefore, with its increased degrees of shophouses' adaptation, the local atmosphere and developments can grow along with the new developments from the developers.

Thus, this study aims to survey the existing shophouses' facades in Klongsan District to understand their designs, constructions, material usages and patterns. Furthermore, the survey presents residents' concerns on shophouses' renovations. The results can address and suggest possibilities of shophouse facade designs, constructions and material usages in order to increase the degrees of adaptability to respond to the new urban developments.

1.0 SHOPHOUSE AND INNOVATION DISTRICT DEVELOPMENT

1.1. Shophouse and Klongsan innovation district development

One of the Thai government policies is Creative Economy which intends to drive the country from merely manufacturing industries towards innovative and creative industries (NESDB, 2016). Thus, science, technology, research, and innovation are the main tools to achieve the goals. In order to encourage innovation, especially, the urban and main regional developments are significantly focused. Therefore, National Innovation Agency

(NIA) which responds to drive this policy, funded many researches and activities to gear the policies to increase economic abilities for both urban and regional areas (NIA, 2018).

The innovation district concept is a world trend to encourage knowledgeable, innovative, and creative people to join and share their ideas in order to create innovations which lead to the economic value increasing. Katz and Wagner (2014) state that to facilitate the innovation ecosystem, there are 3 major keys involving economic, network, physical asset. The economic asset involves firms, institutes or organizations that drive and enrich innovation environment. Network asset is the relationship between those key players in innovation. There can be tied or loosen relationship; same and different professions. As they meet and exchange, ideas can be created and generated.

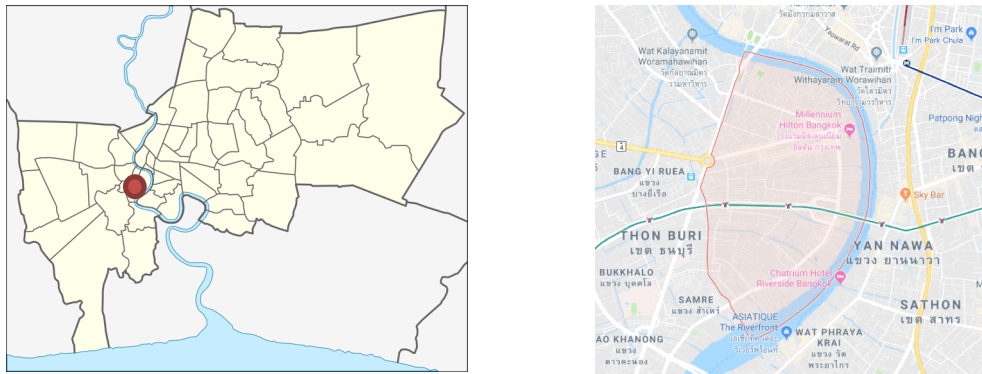


Figure 1: Bangkok map and Klongsan district area.

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The physical asset is the major concern. Especially, the urban area where high-tech companies, universities, institutes, business incubators are the keys to motivate the innovations. The area should provide facilities and environment to encourage creative people e.g. mass transit systems, network wireless and offers variety of activities, mixed-use housings and buildings, and retails (Katz, B. & Wagner, J. 2014). The idea is served very well with the nature of the shophouse which is a mixed-use type of urban housing in Thailand.

1.2. Open Building and shophouse adaptable façade

The study bases on the Open Building concept. The idea aims to increase an efficiency of building uses, business opportunities, construction procedures, and material technologies via a design of “support” and “infill” (Kendall, S. and Teicher, J. 2000). This increases degrees of building flexibility and adaptability over time.

The shophouse is a mixed-use building; however, it has not been designed for adaptation. Often time the residents or owners adapt it with common ways of renovation. The Open Building can enrich the possibilities of adaptive use of the shophouses in many levels; for examples, spatial and apparent adaptations. According a study of Tirapas and Suzuki (2015), the shophouse residents and owners view that the shophouse’s components have different degrees of change and adaptation. The results show that the structure (columns and beams) is the most difficult components to modify; while the façade is rather easier for the residents and architects to modify when they want. However, the process of modifications of the shophouses’ facades is not convenient for the residents and owners.

To understand the shophouses’ façades, the typological study by Habraken (1988) is applied. The idea is to distinguish a building type into 3 main parts; spatial, physical and stylistic characteristic. Habraken (1988) suggests that the spatial characteristic is viewed by certain configuration, positions between inside and outside, public and private classification. The physical characteristic is viewed by their physical shapes and sizes and relation between each other in the space. The stylistic characteristic is viewed by what kind of windows and doors used, how they placed, and decorative elements applied on the facade. With this approach, the results can guide shophouse façade adaptabilities.

Furthermore, Habraken (1998) addressed the hierarchy of control of the physical elements. This study states the level of dominance and the dependence of the level of control (hierarchical control). The level concept explains the controlling ability to adjust and transform physical elements based on restrictions of the higher level. At the same time, the physical elements of the lower levels are moved or changed according to the restrictions given

by the higher-level elements. This idea is applied to study the physical components of the shophouses in order to understand the impact of the facade physical components.

2.0. METHOD

The survey focuses on Klongsan District where it is aimed for the innovative district development. As the shophouses are mostly built along the streets, the survey then focuses on the shophouses, located on the main streets. The 100-shophouse samples are 3 story in height or higher and 3.5 - 4 meters in width. These are a typical shophouse. The survey of the 100 shophouse façades and the questionnaires are distributed on 8 main streets; Krung Thonburi (2 bldg.), Charoen Nakhon (northern and southern of Taksin Bridge) (36 bldg.), Somdet Chaopraya (6 bldg.), Tha Din Dang (5 bldg.), Itsaraphap (15 bldg.), Somdet Prachao Taksin (12 bldg.), Chareonrat (18 bldg.), and Lat Ya (7 bldg.) (see Fig. 2).

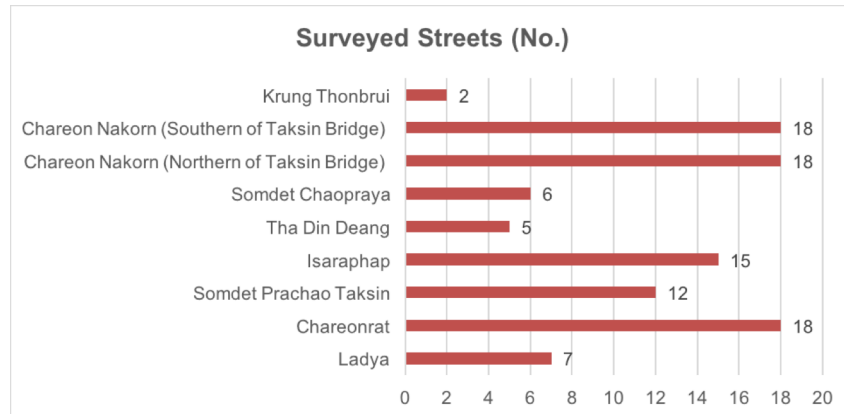


Figure 2: Numbers of surveyed shophouses in 8 streets in Klongsan District.

The questionnaire survey focuses on the residents' attitudes towards the façade modifications. The survey then inquires the participants to answer 3 main issues; the reasons why they need to improve or modify the façade; their concerns about façade renovation; the needs of assistance for renovation. Furthermore, the questions inquire them to rank the top 5 issues from the most important to the least important according to their aspects.

The results of the questionnaires and facades' photos are compared and analyzed in order to depict the patterns of the shophouses' modifications by the residents or owners. This reveals ideas of residents towards what they concern and need to support their facades' modifications.

3.0. SURVEY RESULTS

3.1. Basic information

According to the survey, as shown in Fig. 3, there are 55.7% of female and 44.3% of male. The age of participants is shown in Fig. 4, which are 3% of 20-25 years old; 8.9% of 26-30 years old; 14.9% of 31-35 years old; 18.8% of 36-40 years old; 18.8% of 41-45 years old; 10.9% of 46-50 years old; 4% of 51-55 years old; 9.9% of 56-60 years old; and 10.9% of more than 60 years old. The income of the participants is shown in Fig. 5, which are 13% of lesser than 15,000 baht; 37.7% of 15,001-30,000 baht; 17.4% of 30,001-45,000 baht; 8.7% of 45,001-60,000 baht; 8.7% of 60,001-75,000 baht; 4.3% of 75,001-90,000 baht; and 10.1% of more than 90,000 baht.

In addition, the ownership of shophouses are shown in Fig. 6. There are 27.8% of self-owner; 15.6% of parent's belonging; 26.7% of rental building; 17.8% of long-term leasing; and 12.2% of others. The type of building use is also shown in Fig. 7 which are 24.6% of commercial building; 3.1% of residential building; 72.3% of mixed-use building. Among the surveyed shophouses, Fig. 8 shows that there are 51% of participants who have experienced in adapting the shophouse facades; there is 49% of participants who have never experienced in adapting the shophouse facades.

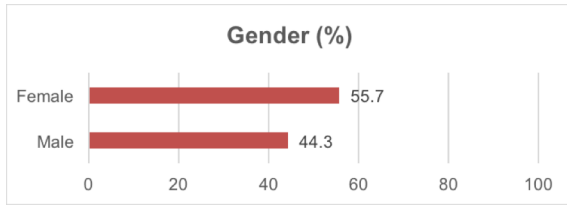


Figure 3: Gender of participants.

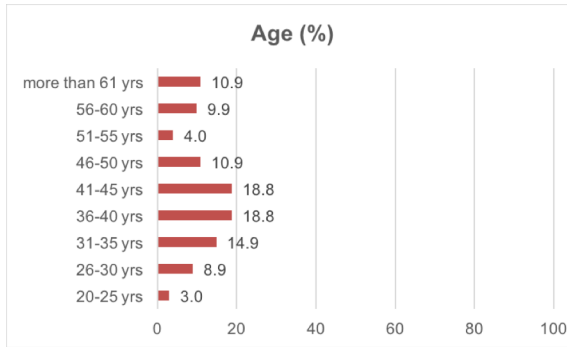


Figure 4: Age of participants.

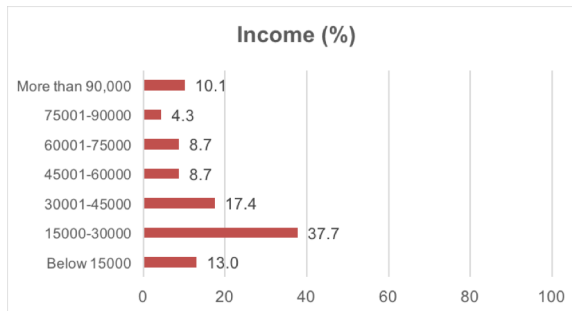


Figure 5: Income of participants.

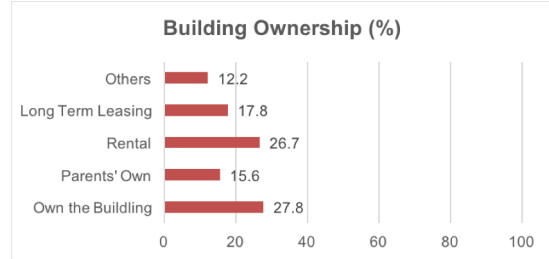


Figure 6: Building ownership of participants.

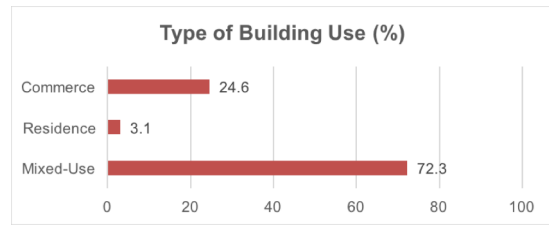


Figure 7: Percentage of type of building use.

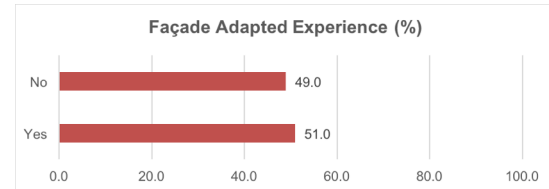


Figure 8: Percentage of façade adapted experience of participants.

3.2. Shophouse facade patterns

The study of the shophouse façade patterns is based on the typological study by Habraken (1988). The designs, structures, and materials are also explained. In term of the spatial characteristics, the façade can be seen as two portions; ground and upper level. The space on the ground level is defined by the terrace or concrete shading of the mezzanine or second floor above (see Fig. 9 (a)). In addition, in order to protect the sun heat, a canopy is extra installed which extends the front space of the shophouse (see Fig. 9 (b)). This spatial definition is ubiquitously problematic. It is unclear of public or private space. The residents normally occupy this area by displaying goods, renting to vendors, planting pottery, etc. (see Fig. 9 (c)). However, the Bangkok government has recently taken over the space for pedestrians.

On the upper floors, there are terraces, balconies, or shading devices. It is 0.80 – 1.00 m. in width with the same length of the front façade. For the terraces, the space is used for hanging clothes, placing the air-con, planting pottery, etc. (see Fig. 9 (c)). The roof deck is the most variation in use as the residents often extended the space. The extension can be a roof for the rain and sun protection; a steel case to cover to burglary protection; or a room (see Fig. 9 (d) and (e)). Some units extend the room over the terrace (Fig. 9 (f)).

Physically characteristic of shophouse is quite simple. The shophouse structure is simply reinforced with concrete column and beam with 4x4 m. the dimension of span. The floor is the precast concrete plank floor system. For the façade, the ground level is widely open for many wall materials; aluminum frame, steel fold door, rolling door, etc. On the upper level, the brick wall with cement plaster is commonly used.

The design of shophouse façade is a given by the designers. The analysis of the physical study, based on the “control of hierarchy” by Habraken (1998), shows that the shophouse façade is one of the upper level which control and impact on the lower physical element in the shophouse (Tirapas and Suzuki, 2013). As mentioned above, the façade is considered as easily modifiable (Tirapas and Suzuki, 2015). This addresses a chance for detaching the structure and façade from each other to enhance the façade adaptability.

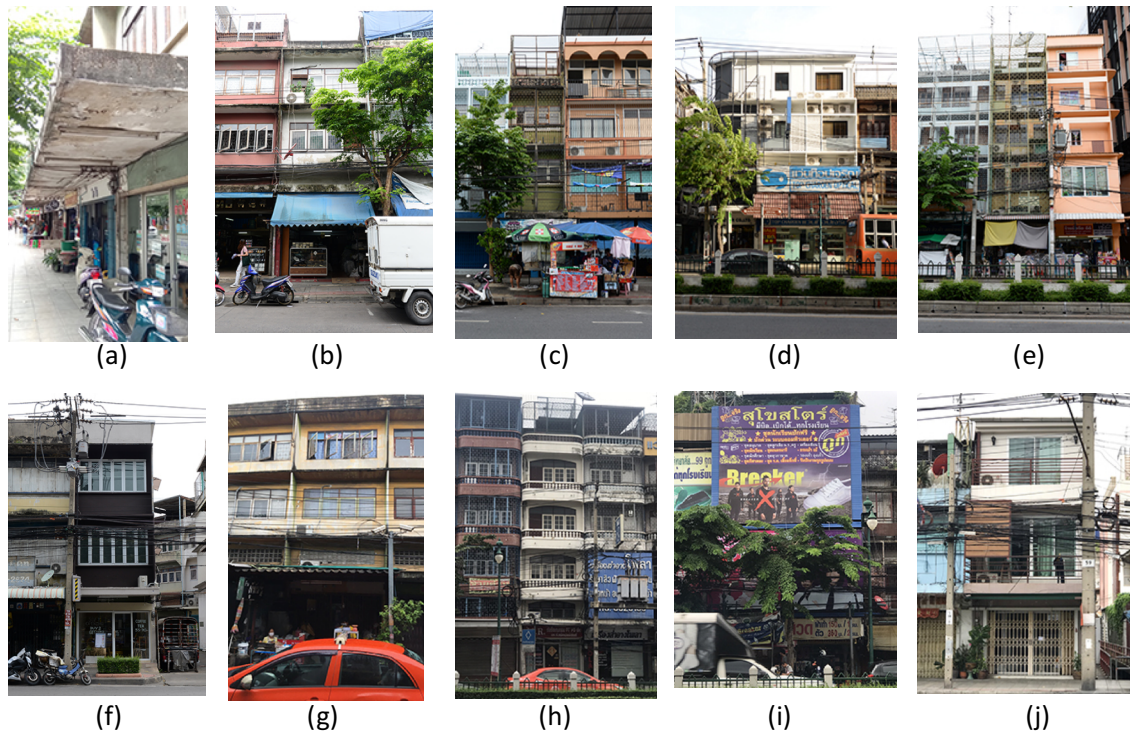


Figure 9 : A front façade of shophouses. (a) the space in front of the shophouse with the shop signage hanging on the concrete ceiling or put on the beam on Chareon Nakorn; (b) the fabric canopy installed to protect the heat on Chareonrat; (c) a vendor rents the front space of shophouse on Tha Din Dang; (d) The room extension of shophouse on top of the roof deck on Ladya; (e) the steel case covers the whole front façade and roof deck on Ladya; (f) Balconies have been covered to a full room on Somdet Chao Praya; (g) the small windows are placed over the front door to allow daylight to get inside on Isaraphap; (h) The balcony hand rail is brick wall and precast concrete ornament on Somdet Prachoa Taksin; (i) a huge fabric advertising board covers the whole façade on Somdet Prachao Taksin. (j) a residential house with a modern design on Chareon Nakorn.

For stylistic characteristic of shophouse, the shop signage, made of aluminum, plastic, or plastic light box, is hung from the concrete ceiling or attached to the concrete beam or brick wall at the front door (see Fig. 9 (a)). The door on the ground level has different designs. Mostly the door will be widely opened for business purpose such as welcoming customers or displaying goods (see Fig. 9 (f) and (j)). The door types and materials are steel folding door, aluminum-rolling door, glass aluminum frame, and wooden folding door. Above the front door or canopy, there is a window for ventilation or daylight purpose (see Fig. 9 (g) and (h)). For the upper levels, there is very common to have a door on each level to access to the terrace or balcony; however, without a door, a window can also be used as well. The common door materials are color or oil painted wooden, color painted steel, or normal or black-color aluminum (see Fig. 9 (f) and (j)).

The window materials are also similar to the door. However, one to four sets of window on each floor are common. The windows are designed with a very simple pattern to suit the common shophouses (see Fig. 9 (f) and (g)). There are also different types of opening; awning, fixed, casement, or sliding window type. In addition, the handrail is also often as part of the balcony. There are many materials of handrail; cement blocks, steel, precast concrete, brick parapet (see Fig. 9 (c), (e), (h) and (j)).

The advertisement boards or signage are often seen on the shophouse façades. The different scales and positions of the façade are varied. The shop signage, on the ground level, appears over the front door or a graphic sticker on the glass of the aluminum frames (see Fig. 9 (a), (d), and (h)). On the upper level, the billboards are put as banners on the mezzanine level to the upper floors or cover over the whole façade

(see Fig. 9 (i)). The signage is made of many materials; fabric, plastic, or aluminum.

3.3. Shophouse façade adaptation opportunities

3.3.1. Intentions of shophouse façade improvement

The results of the top 5 important reasons for the façade improvement or renovation are shown in Fig. 10: Decadent Building (4.20), Structural Safety (3.54), Noise (3.31), Attractive Building (3.19), Business Promotion (Signage/Bill Board) (3.05). From the first two reasons; Decadent Building and Structural Safety, these can be seen that the safety and strength of shophouses structure is a very important for the participants. The surveyed shophouses in Klongsan District are rather old; thus, the physical conditions are needed to be repaired. In addition, most of the surveyed shophouses are on the streets, therefore, the noise from cars is one of their major problems.

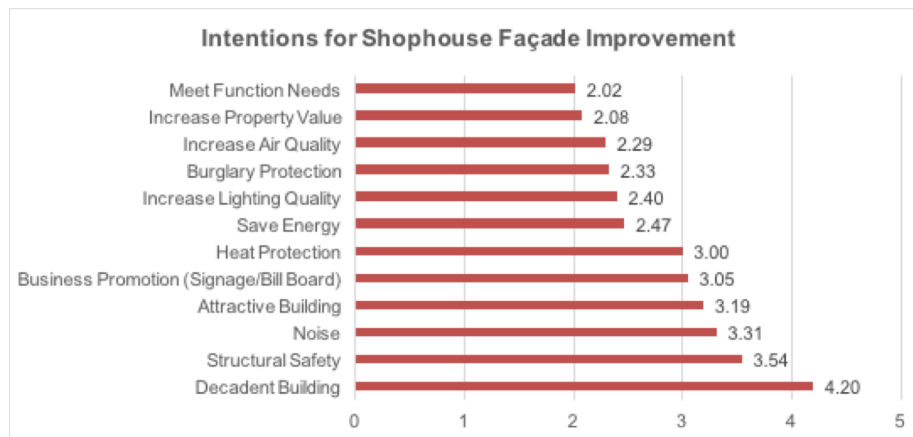


Figure 10 : Participants' reasons for improving and renovating the shophouse

Attractive Building and Business Promotion (Signage/Bill Board) are ranked 4th and 5th. There is a possibility for the shophouse facade to adapt in order to serve the business purposes. The participants improve and adapt the façade mostly for business advertisement and to attract customers; therefore, a beautiful, clean, new painted, modern façade are needed.

In addition, Heat Protection (3.00) is also ranked as high as Business Promotion. This is because of a comfortable living concern resulting from the hot-humid climate. However, when the advertising board has been built, it effects on the poor living quality in the shophouses; daylighting, energy usage, ventilation, and air quality. This could be dissolved without an inclusive façade design. On the other hand, Increase Property Value for Leasing or Sale (2.08) is ranked quite low. This results from the lack of budget and the ownership. The participants who rent, do not want to invest or not allow to do so. The lowest rank is Meet Function Needs (2.02) which presents that the façade is less concern to them for the functional changes.

3.3.2. Concerns of shophouse façade renovation

The concerns of the participants when they renovate the shophouses' façade are shown in Fig 11. The list can be categorized into 3 major groups; pre-renovation, renovation process, and impacts during the renovation. The first group shows the top 5 concerns which are: Structural Strength (4.03), Budget (3.82), Impacts on New/Old Systems (3.81), Renovation Period (3.24), Professional Level of Designer (3.00), and Professional Level of Contractor (2.78). These are similar to the reasons when participants want to do the facade renovation. They highly concern on the safety and strength of the structure since the buildings are old. Most of these concerns are related to the pre-renovation of the façade. Therefore, a clear and well-plan method and process of renovation can encourage the residents and owners to be certain of their renovations.

The second group is Unknowledgeable of Material Usages (2.72) and Permission Process (2.60). These seem to be concerns during the process of renovation. These concerns relate to the renovation process. The third group of concerns are Unsatisfied Function (2.47), Maintenance Cost (2.39), Difficult Process of Permission (2.27), Safety of Residents During Renovation (2.20), Impacts on Nearby Units (2.00), Business Interference (1.83), Daily Life Interference (1.81). The third group concerns about the impacts of the renovation. However, the building renovation permission somehow can be illegally done; therefore, the minor changes of the façade will be less concerned.

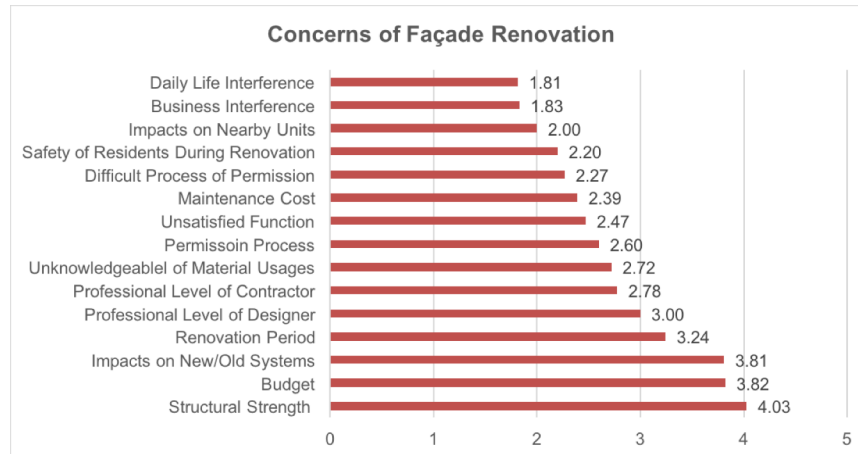


Figure 1 1 : Participants' concerns on renovating the shophouse facades.

Many major concerns can be solved by introducing and applying the Open Building. When a detachment of the shophouse structure and façade components are done; the idea of “support” and “infills” can be applied to assist the residents or owners to advance their design and renovation plan. By applying “support” and “infills”; as a result, it finally saves the renovation time consume and budget. However, the concept has been rarely known and widely practiced in Thailand.

3.3.3. Needs of shophouse façade renovation assistances

The results show the most wanted assistances are; Design Consultant (3.54), Construction Consultant (3.37), Contractor Provider Firm/Org. (2.83), Material Consultant (2.70), One Stop Service Firm/Org. (2.60) (see Fig. 12). The results are synchronized with the concerns of professional designer and contractor. The participants need design and construction consultant to advice on the designs the most. This shows that the participants might lack of knowledge of design and construction. Therefore, this can be an opportunity to contribute professional services to the shophouse residents and owners.

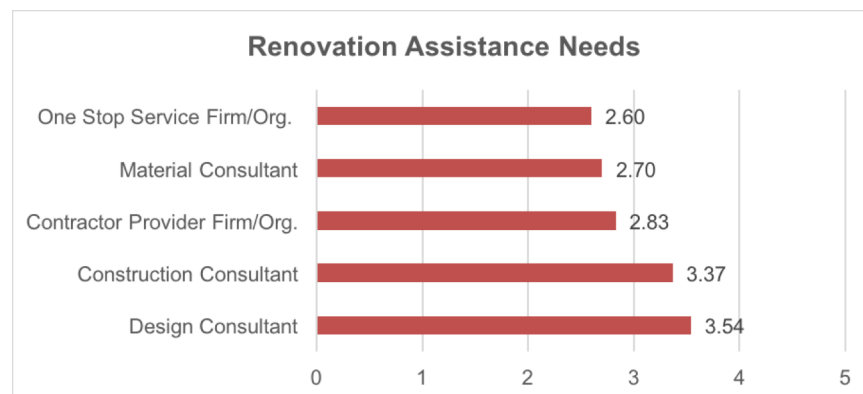


Figure 1 2 : Participants' needs on the shophouse facade renovation assistances.

CONCLUSION

In general, the façades of the shophouses can be seen as a variety of variation. The ground level is more variety of design. However, it is mostly aimed to encourage business opportunity. While the upper level facade is more rigid in changing. Observing the ground level, the front door is more widely open to adapt

and change; light weight and dry process. This offers quick an installation, budget saving, less maintenance. These benefit the commercial aspects. On the other hand, the material use of the upper level, brick wall with cement plaster, seems to be a typical construction. This construction rarely supports façade's adaptability. Therefore, a substitution of the facade materials, with easily adapted materials responding to functional and business changes, can be an approach. In addition, detaching the concrete frame (column and beam) from the façade components can greatly assist in adaptability. This is an opportunity to enhance the dry wall system to encourage more adaptable shophouse façade.

The questionnaires have shown an opportunity to approach the adaptable façade. The intentions of adapting the façade address that the concern of commercial use is more important than the residential use. Therefore, the high results are focused on the façade attraction rather than the quality of living. The concerns of adapting can be dissolved by the pre-conceptual design of adaptable façade. It is also a common skeptical for the construction process for those who are not the experts or involved in the professions. Hence, a professional consultant for design and construction is obviously needed.

Finally, to encourage the adaptable shophouses' facades, the Open Building should be implemented. Thus, the Open Building can be approached in two ways; soft and hard approach. The soft approach is to create a professional consultant service for design and construction which respond to the concerns and requirements of the participants. This service includes the adaptable façade design to respond the functional needs (residential and commercial use) and maintenance; and to encourage living quality of shophouse; daylighting and ventilation. The hard approach focuses on the "support" and "infill" idea. By detaching the structure from the façade components, an application of dry wall system and light-weight materials must be tested and researched for future applications.

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