Adaptive reuse approaches of Shophouses at Cannon Street in George Town, Penang.

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Abstract. George Town has many heritage buildings as a UNESCO World Heritage Site that need to be preserved due to their status. Adaptive reuse of heritage buildings is a common method of building conservation and should be done in maximum retention with minimal intervention by applying the right materials with the appropriate approach. This paper focuses on the four approaches of adaptive reuse that were applied to Shophouses at Cannon Street in George Town, Penang. The data was collected from a survey on ten Shophouses in Cannon Street, Penang. The findings of this research point to the common approach of adaptive reuse in Shophouses that has been used as the Preservation approach.

1. Introduction

Adaptive reuse of historic buildings is not a new process, however, it has been used since the French Revolution in 1790, and it was necessary to confiscate all the church’s properties, buildings, lands, and works of art (Plevoets & Van Cleempoel, 2014) Adaptive reuse is a method of conservation that allows a building to be altered for a new or different use. With the world population doubling in recent decades and the enormous increase in environmental threats to our heritage buildings, our society’s concern about their survival, conservation and reintegration and how to pass them on to future generations is more acute than ever (P. Bullen & Love, 2011).

The critical reflection of the use of cultural heritage buildings and sites, however, is a completely new date (P. A. Bullen & Love, 2009; Plevoets & Van Cleempoel, 2011). Adaptive Reuse provides specific opportunities for the public to perceive and attract newborn spaces to the value of historic buildings. Most experts regard adaptive reuse as the most appropriate and the only solution to preserve the legacy of the past (Pimonsathean, 2002). Heritage buildings, according to Australia's Department of Environment and Heritage, provide valuable insights into the past and characterizes communities (Reuse, 2004), hence, it should be preserved for future generations.

Conservation of heritage buildings helps to explain the past and contributes to future generations and gives a sense of continuity and belonging to the place where people live. In Malaysia, buildings designated as heritage buildings are believed to be over 50 years of age and should be preserved, protected, and upgraded in order to prevent them from being lost forever (Mustafa & Abdullah, 2013). After being listed as a World Heritage Site by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2008, George Town is required to preserve all its heritage buildings. It is usually recommended and inspired to use adaptive reuse methods for heritage buildings to bring new life to such buildings in order to maintain the idea of the Living Heritage City. For that reason, it’s prohibitive to do any physical changes to the structure of the buildings if there’s any conceivable means of protecting it in its original or current condition. This is conjointly stressed in ICOMOS Burra Charter article two that explicitly states that the essence of heritage conservation in Penang is mostly retention with minimum intervention (Icomos, 1999). One of the famous Streets known for shop house in George Town is Cannon Street, which got its name from the cannons fired during the 1867 Penang Riots.
2. Literature review

2.1. Adaptive Reuse
According to Encarta English (U.K.) Dictionary, adaptation means something modified to suit different conditions or purposes. Adaptive reuse in architecture refers to the process or state of change that fits a new environment or condition, or the resulting change. Adaptive reuse refers to suitable functional conversions of heritage buildings to suit newly proposed uses and coexist in a different environment from the original. It is the act or process of preserving something in order to keep something alive through either modernization (rehabilitation to the original function), or complete conversion to a new function or even a mixture between the two (Yildirim, 2012). Adaptive reuse is defined as a "successful marriage" between cultural heritage facilities and modern architectural design (Reuse, 2004). Also, it is described as the transformation of buildings or sites in order to adapt to modern tendencies of sustainable development (Brooker & Stone, 2008). Moreover, buildings have often changed their purposes from ancient times to fit into contemporary social needs.

2.2. Adaptive Reuse Approaches
In some cases, the adaptive reuse process may exceed the existing structure's boundaries or may even require the construction of an annexe building depending on the project's peculiarities (Eyüce & Eyüce, 2010). In other words, adaptive reuse involves any intervention to adapt, upgrade, introduce new services, and uses, while protecting the location in order to meet the desired functional requirements. The process itself should be applied to the building, while retaining its structure, character, original identity, and general authentic meaning for future generations (ElKerdany, 2002). There are several design strategies that are ambiguous whether they are projects that are reused or just new buildings that refer to historical elements. Otherwise, in adaptive reuse buildings, there are many common identifiable interventions. In addition to taking a historic structure and renovating it for future use, some approaches for reuse involve only specific elements of the original structure. For example, when the original structure would be too expensive to renovate, the incorporation of only certain building parts into a mostly new structure can be used. A facade is maintained to retain the exterior appearance, but the entire interior structure is replaced. That means the building maintains the contextual character of the environment it is in, but it is given a completely new function on the interior (Kim, 2018). This is popular among developers as a practical solution, but not among those who seek to preserve a city's history. For a building that is too poorly repaired or a site with little historical value, a façade can be a compromise. Although there are aesthetic and cultural-historical reasons for preserving the architectural value of the building, the practice of "Facadism" is often seen as a compromise between the investor, who needs to satisfy the needs and standards in construction, and the competent protection services, which want to preserve buildings and its cultural and historical significance. "Facadism" can also be seen as a compromise between the preservation of the architectural heritage and its demolition, and therefore, is equally both praised and contested (Kim, 2018).

The renovation is the most common refurbishments approach in adaptive reuse projects. It is mainly used to replace deteriorated parts of the building. In many cases, the basic structure and external appearance of the original building are maintained, but the inside is completely different (Ozik, 2006). Reuse projects that fit into this category are often either pedestrian outcomes resulting from a need for more space or physical manifestations of the polemic of a designer. On the other hand, the polemical projects can be charged quite emotionally and are not usually the result of spatial or economic necessity; rather, they are the result of social, cultural, and historical commentary. As such, the interventions they propose are concise, often affecting much more than their actual fabric in reading an old space.
Integration means the addition, and it is positioned next to the original building and does not interrupt the older structure in Bollack’s notion, which is obviously legible; “no blurring of boundaries, no transfer of architectural elements” (Bollack, 2013). The most successful adaptive reuse projects fall under the category of integrated infill, in which much of the skin and structure of the original building is kept unchanged, while the internal space configuration is changed, sometimes significantly.

Preservation is how to reuse a historic building with the aim of preserving or restoring its original state. In addition, it is about using the existing old structure to protect original buildings, while inserting new spaces into the older volume (Bollack, 2013). According to Bollack, who describes this approach as maintaining the old building facade as a skin to preserve memories and emotion, the actual preservation defines the new space. In addition, it is emotionally attractive to the public to see and perceive such old structures and forms, as this helps preserve the existing atmosphere of the historic districts.

3. Research methodology
This research focuses on the quantitative method of using survey, which is a questionnaire that is a reliable and quick method to collect data from multiple users in an efficient and timely manner. The Personal interview was used to get data about the approaches of adaptive reuse. This survey had been done in ten-heritage Shophouses in order to identify the different approaches to the Shophouses at Cannon Street in George Town.

The survey covers a general question about the buildings as well as the approach that applied. The research sampling method used in this study was 10 users whether they were owner or renter of Shophouses In George Town. Canon Street in George Town was chosen as the location of those Shophouses due to the importance to be one of the oldest streets in George Town. Cannon Street is among the popular tourist destinations in Penang and has emerged as a commercial area since 1867.

Table 1. The 10 buildings in the study have changed their intended use after the adaptation process.

| Building No | Types of ownership | Year build                  | Previous function                | Current function     |
|------------|--------------------|-----------------------------|----------------------------------|----------------------|
| B1         | Rental             | 1920’s (by Khoo Kongsi)     | House, Townhouse, Royal house    | Commercial building  |
| B2         | Rental             | 1920’s (Owned by Khoo Kongsi)| Townhouse                        | Commercial building  |
| B3         | Rental             | Around (the 1890s-)        | Shophouse                        | Souvenir shop        |

Figure 1. Cannon Street, George Town, Penang.
B4 Rental 1920’s Townhouse Shophouse and townhouse

B5 Rental More than 100 years old and owned by Khoo Kongsi Art (teaching) dance physical Refreshment shop (sells Ice cream, etc.)

B6 Rental Around (1890s to 1910s) House (residential) -Retail shop - Refreshment shop

B7 Rental Built around 40 to 50 years ago Unknown Commercial building

B8 Owned Maybe exist before the 2nd world war. Unknown Commercial building

B9 Owned Happen to pass down till now- 4th generation Unknown Unknown

B10 Owned 4th generation Unknown Unknown

4. Data analysis
Four approaches have been studied, which were ‘Preservation, Renovation, Facades and Integration’. As shown in table 2, 7 out of 10 Shophouses had used the preservation approach in a significant rate by reusing a historic building to preserve or restore its original condition. While 9 out of 10 Shophouses have used the renovation approach with low rate due to replacement of much of the building that could be in poor repair. In many cases, the original building's basic structure and external appearance are maintained, but the inside is entirely different. Lastly, 3 out of 10 of Shop Houses used integration approach with the lowest rate, and it was by building around the original structure in such a way that it remain almost the same, but a new building is included.

Table2. Approaches rate on each Shophouses

| Building No | Methods /Types of Adaptive Reuse |
|-------------|----------------------------------|
|             | Preservation | Renovation | Facades | Integration |
| B1          | 90%          | 10%        | 0%      | 0%          |
| B2          | 0%           | 10%        | 0%      | 90%         |
| B3          | 20%          | 80%        | 0%      | 0%          |
| B4          | 50%          | 10%        | 0%      | 50%         |
| B5          | 80%          | 20%        | 0%      | 0%          |
| B6          | 90%          | 10%        | 0%      | 0%          |
| B7          | 0%           | 20%        | 0%      | 80%         |
| B8          | 0%           | 100%       | 0%      | 0%          |
| B9          | 80%          | 20%        | 0%      | 0%          |
| B10         | 100%         | 0%         | 0%      | 0%          |
| Total       | 51%          | 28%        | 0%      | 22%         |
5. Main findings
The main findings show that the most common approach of adaptive reuse applied is the preservation as appears in figure 2. Overall, about 51% used the preservation approach; on the other hand, 28% used the Renovation approach, whereas only 22% used Integration approach.

However, these interventions should be evaluated in order not to conflict or falsify the heritage building's uniqueness. This criterion evaluates any changes, additions, and extensions made to heritage buildings as part of their reuse adaptation in terms of respecting their authentic style, character, and identity. The main indicator is to avoid the conflict between the additions and the heritage building in architectural style.

In the end, this research paper sought to simplify a different kinds of adaptive reuse approaches that are used to Shophouses in George Town. Ultimately, the data obtained can guide and assist the heritage sector as well as the designers in developing new adaptive reuse approaches.

6. Conclusion
Eventually, Preservation approaches become the most popular approach in adaptive reuse due to its successes in distinguishing between original and contemporary. Rather than blurring old with new, and causing confusion between historic and contemporary, these elements accentuate each other. Furthermore, this method is emotionally attractive for seeing and perceiving such old structures and forms because it helps preserve the existing atmosphere of the historic districts.

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References
[1] Bollack, F. A. (2013). Old buildings, new forms: new directions in architectural transformations. United States: Monacelli Press.
[2] Brooker, G., & Stone, S. (2008). Basics interior architecture 02: Context & environment (Vol. 2): Ava Publishing.
[3] Bullen, P., & Love, P. (2011). A new future for the past: a model for adaptive reuse decision-making. Built Environment Project and Asset Management, 1(1), 32-44.
[4] Bullen, P. A., & Love, P. E. (2009). Residential regeneration and adaptive reuse: learning from the experiences of Los Angeles. Structural Survey, 27(5), 351-360.
[5] ElKerdany, D. (2002). Innovation and conservation: case studies in intervening with valuable buildings. Paper presented at the Proc. UIA Int. Conf. WPAHR on Architecture and Heritage as a Paradigm for Knowledge and Development Bibliotheca Alexandrina, Egypt.
[6] Eyüce, O., & Eyüce, A. (2010). Design education for adaptive reuse. International Journal of Architectural Research: ArchNet-IJAR, 4(2/3), 419-428.
[7] Kim, D., M. of Architecture. (2018). Adaptive Reuse of Industrial Buildings for Sustainability: Analysis of Sustainability and Social Values of Industrial Facades. (Thisis), Retrieved from http://hdl.handle.net/2152/67980
[8] Mustafa, N. A., & Abdullah, N. C. (2013). Preservation of cultural heritage in Malaysia: An insight of the National Heritage Act 2005. Paper presented at the Proceeding of International conference on tourism development: Building the future of tourism.
[9] Ozik, D. (2006). *Reinvention through reuse: strategies for the adaptive reuse of large-scale buildings*. Massachusetts Institute of Technology., Massachusetts Institute of Technology. Retrieved from [http://hdl.handle.net/1721.1/37578](http://hdl.handle.net/1721.1/37578)

[10] Pimonsathean, Y. (2002). Current issues concerning adaptive re-use in the conservation of urban cultural heritage. *RC: Revista de Cultura= Review of Culture*, 4, 45-51.

[11] Plevoets, B., & Van Cleempoel, K. (2011). Adaptive reuse as a strategy towards conservation of cultural heritage: a literature review. *Structural Studies, Repairs and Maintenance of Heritage Architecture XII*, 118(12), 155-163.

[12] Plevoets, B., & Van Cleempoel, K. (2014). Aemulatio and the interior approach of adaptive reuse. *Interiors*, 5(1), 71-88.

[13] Reuse, D. A. (2004). Preserving our Past, Building our Future. *DEPARTMENT OF ENVIRONMENT AND HERITAGE. ACT: Department of Environment and Heritage, Commonwealth of Australia*, 17.

[14] Yildirim, M. (2012). Assessment of the decision-making process for re-use of a historical asset: The example of Diyarbakir Hasan Pasha Khan, Turkey. *Journal of cultural heritage*, 13(4), 379-388.