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Preservation of Cultural Heritage Buildings with the Adaptive Re-Use Method: A Content Analysis of Past Research

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Abstract

Buildings that make adaptive reuse, in general, are buildings that were previously buildings that emphasized their historical values, then changed and disadvantaged changes. In this study, the adaptive reuse building used is a change of function into a building that has value. The purpose of this study is to provide insight and dissect research that discusses adaptive reuse buildings on several continents in the world. Evaluation techniques are carried out by analyzing using tables and grouping each case study from previous research. The methods used in the study are comparative qualitative methods and data analysis using literature studies related to adaptive reuse theory relating to tourism and economic theory. The results of the study, it is expected to provide input and suggestions, which can later be used and used as proof that buildings that have experienced adaptive reuse also have valuable benefits for the building itself and the surrounding environment.

Keywords: *adaptive re-use; case study; environment; historical value; the continent in the world*

Introduction

Indonesia is a nation that has a lot of wealth in history and culture. The wealth can be in the form of tangible and intangible and is still widely stored throughout Indonesia, one of which is historical heritage buildings. The historic building is also one of the icons and identities for every region in Indonesia. Budihardjo (1985) said the architecture of historical buildings in Indonesia current in currently suffers from shortness of breath. The historic building was squeezed by new buildings or even destroyed to be new buildings so that the values in the ancient buildings were lost without a former. The loss of values that exist in historical buildings can eliminate a reflection to be able to recognize the origin of history or tradition of history. (Irwansyah, 2017)

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In the Big Indonesian Dictionary, the word abandoned is something that is stopped before completing or displaced. A building is something built like a house, building, or tower. The building is abandoned is a building that is no longer functioning and is not taken care of at all so the building is no longer feasible to use and the shape of the building has begun to be destroyed. (Pinandito, 2019)

Preservation of old buildings is a strategic approach in city development because preservation guarantees the continuity of life values in the development process carried out by humans. One way to support old building preservation activities is by implementing incentives and disincentives for building preservation. In Indonesia alone, there are several forms of incentives and disincentives that have been included in the regulations on building preservation. (Sofiana, Purwantiasning, & Anisa, 2014)

In this case, the study was conducted by gathering many case studies and conducting a comparison using theory, the case study was a building that had experienced adaptive reuse and then changed its function into tourism and economic building, after conducting a comparison then conduct an assessment using a Likert scale to find out how far The building did not leave the existing value.

Research Limits
Research has limitations where it cannot make direct observations of existing cases, and of course, the data generated is in the form of secondary data which can later be developed as a basis for research on future Adaptive Reuse buildings.

Formulation of the problem
Benefits can be obtained after studying and dissecting 18 journals consisting of 4 continents and several countries.

Research purposes
This research is to compare research that has been done previously regarding the adaptive re-use, comparative research that has been carried out from various countries and see whether it still functions to its was as before or changes with new functions, then see whether the building is currently able to finance himself or not.

Literature Review

Adaptive Reuse is one way of building conservation efforts. In general, adaptive reuse is used as an alternative to protect and maintain historic buildings with steps to change old functions into new functions that are beneficial to the surrounding community and the area. (Sofiana et al., 2014)

Adaptive reuse or reuse in historical buildings is usually often juxtaposed with a conservation concept. (Sari & Purwantiasning, 2018)

The reuse of buildings adaptively is the main strategy of sustainable development. This provides a profitable economic and social way to provide new buildings that were previously not used for new life rent. This minimizes the need, which is almost unusual. (Kincaid, 2003)

The application of the concept of adaptive reuse to an area and an old historic building, namely:
1. Making the area or building a source of history and culture while maintaining the historical values implied in it.
2. Improve the economy of the local community with a new function of the area or building. (Sofiana et al., 2014)

In the theory of adaptive reuse, many things need to be considered also in carrying out old building referrals, several questions must be considered in doing this.

The following is a consideration for repairing existing buildings will face six key questions:
1. What is the potential value of use and financial value of buildings under the current class of use, given the current and current market conditions?
2. In the current circumstances, is the improvement in the class of use that is reasonable and safe, or should it be a possibility of adaptive reuse that is considered?
3. If the building is empty, it is less utilized significantly, or not suitable for the current use, what is the basic capacity of the property to accommodate change, especially the 'potential ability to adapt?
4. How are the various options that are potentially worthy of changes in the use of use adaptation can be identified?
5. What characteristics series makes the building 'more' or 'less' adapted, and how should 'the potential ability of adaptation' be assessed?
6. What is the strategic and technical feasibility of the proposed option for adaptation to new uses practically examined, and what decision support systems can be used to assist in evaluating? (Glendinning, 2014)

Theory Tracing

Buildings that experience adaptive reuse include certain criteria, including buildings that are used as residential buildings, non-residential buildings, mixed use buildings, and public buildings. (Glendinning, 2014)

The explanation of these criteria is:

a. **Residential Buildings (Residential):** Conversion to housing use is the most

popular type of change in use. This is mainly due to the increasing level of demand for good-quality dwellings in popular environments. Given the restrictions on building in the Green Belt area and the lack of urban land that can be built for housing, this kind of conversion may occur to remain useful for years. The building was converted as a place to live in general a barracks and factories.

b. **Non-residential (Commercial) Buildings:** Many commercial conversions today involve changes in use in the same building category. For example, excessive bank in the city center proves the ideal place to be converted into cafes and restaurants. Changes in such use require a relatively low level of adaptation. As a result, disturbing operations such as structural changes and external changes are maintained to remain minimum.

c. **Mixed Use Building:** In this case the formation of two or more different uses in the same building. An example is to change the building office building into a separate building on the ground floor and a flat building on the top floor is one example of a mixture change. This type of conversion, however, is the most complicated of all, because of the tighter technical requirements such as increasing fire protection and sound isolation.

d. **Public Buildings:** In general, the building can be in the form of educational and social facilities. The most suitable adaptive use will depend on the original use and the purpose of using the building. The following five parts are dealing with the reuse of the adaptive church, agricultural buildings, factories, offices, and public buildings. This is the main type of property that can maintain adaptive reuse. (Kincaid, 2003)

Methodology

Research Design

The methods used in the study are comparative qualitative methods and data analysis using literature studies related to adaptive reuse theory relating to tourism and economic theory.

Comparative qualitative methods are objective research because they interact with the facts under study and provide a picture of a precedent study as a comparison of research objects. (Bernard M Feilden, 2019)

Data Collection Technique

The research was conducted with the following steps:

1. Conduct a literature study through many previous studies.
2. Selecting several studies that result in functional changes in cultural heritage buildings.
3. Looking for several criteria that can be used as parameters and research assessments of the selected paper.
4. Analyzed using tables and compared from several related aspects in adaptive reuse theory

Get results and recommendations in the form of formulas that can later be used as an assessment of buildings that experience similar aspects.

Results and Discussion

Analysis of the results and discussion were carried out using tables based on the assessment criteria obtained based on the theory of Adaptive Reuse. The analysis is carried out in the following way:

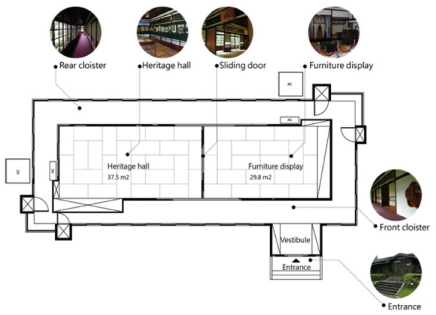
Table 1. Comparison of Asian Continent Country

Asian Continent				
Country, Author, Year, Title				
Malaysia , Elma Dewiyana, Najib Ibrahim, Nur Hidayah Hajar, 2015, The Green Aspects of Adaptive Reuse of Hotel Penaga. (Dewiyana, Ibrahim, and Hajar 2016)				
Previous function	**Function After**			**Information**
Hotel	Hotel			The building is reused and self-sustaining, preserving the former, and from a commercial and residential perspective.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
		v	v	

Figure 1. Penaga Hotel before and after adaptive-reuse
Source: (Dewiyana, Ibrahim, & Hajar, 2016)

Country, Author, Year, Title
China , Chia-Sheng Chen, Yin-Hao Chiu, Litchi Tsai, 2018, Evaluating the adaptive reuse of historic buildings through multicriteria decision-making. (Chen, Chiu, and Tsai 2018)

Figure 2. Floor plan of the Sun Yat-Sen historical museum (Umeyashiki Tabitha)
Source: (Chen, Chiu, & Tsai, 2018)



Previous function	Function After			Information
-	Museum			In this case, the building can be used as a means of education, social tourism, and commerce. Because these facilities can provide insight for people who visit and can also finance the maintenance of the building itself.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
v		v		

Country, Author, Year, Title
Hongkong, Esther HK Yung, Craig Langston, Edwin HW Chan, 2014, Adaptive reuse of traditional Chinese shophouses in government-led urban renewal projects in Hong Kong. (Yung, Langston, and Chan 2014)

Figure 3. Adaptive Reuse of Burrow street Wanchai and Adaptive Reuse of Johnston Road Wanchai
Source: (Yung, Langston, & Chan, 2014)


Before Revitalization


After Revitalization


Before Revitalization


After Revitalization

Previous function	Function After			Information
shop	shop			Preserving buildings that were previously abandoned, apart from being able to maintain the building itself, can also be used as a place to improve the community's economy.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
		v	v	

Country, Author, Year, Title
Hong Kong and Macau, Ivan WH Fung, aY.T. Tsang, Vivian WY Tam, YT Xu, Edmund CK Mok, 2016, A review on historic building conservation: A comparison between Hong Kong and Macau systems. (Fung et al. 2017)

Figure 4. Adaptive Reuse of Lui Seng Chun project and New Lui Seng Chun project.
Source: (Fung, Tsang, Tam, Xu, & Mok, 2017)


Before Lui Seng Chun


After Lui Seng Chun

Previous function	Function After			Information
-	Various buildings in Macau and Hong Kong			The buildings around the place were then preserved as more useful places.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
	v	v		

Country, Author, Year, Title
Yemen, Laila Haidar, Anuar Talib, 2014, Adaptive Reuse Practice in Tower Houses of Old City Sana'a Yemen. (Haidar and Talib 2015)

Figure 5. (a) East facade indicating floor levels and decorative wall elements; (b) The connection of the new extension on the west side
Source: (Haidar & Talib, 2015)

Previous function	Function After			Information
	Tower House/apartment			Buildings are reused for commercial purposes in addition to being able to maintain the building itself as well as develop the local economy.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
		v	v	

Country, Author, Year, Title
Medan, Indonesia, Irwansyah, 2017, Conservation of Historic Buildings: "The Palace of Five Laras Batu Intentions. (Building et al. nd) Bara".

Figure 6. The Palace of Five Laras
Source: (Irwansyah, 2017)

Previous function	Function After			Information
Five-Barreled Intention Palace	Five Laras Intention Palace Conservation			The building is in the form of a museum which is then preserved and maintained like a building that has value for the region and the local community.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
v	v	v		

Country, Author, Year, Title
Surabaya, Indonesia , Yosafat Satrio Pinandito, Diana Thamrin, Linggajaya Suryanata, 2019, Revitalizing *Heritage Buildings* into Galleries and Restaurants in Surabaya With the *Oud. Concept voor Millennials.* (Pinandito et al. 2019)

Figure 7. Prespektif Main entrance
Source: (Pinandito, 2019)

Previous function	Function After			Information
Hospital, Restaurant	Restaurant and Gallery			The building has undergone several significant changes, the most significant being from a hospital to a restaurant it is well maintained and can accommodate the interests of the building itself and the environment.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
v	v	v	v	

Country, Author, Year, Title
Jakarta, Indonesia, Yeptadian Sari, Ari Widyati Purwantiasning, 2018, Return Building Analysis Old City Red Shop Culture Jakarta. . (Sari et al. 2018)

Figure 8. Red Shop Culture Jakarta
Source: https://kumparan.com/selidik/keangkeran-toko-merah-kota-tua-jkarta

Previous function	Function After			Information
Old Town Red Shop	Rental building and Meeting Hall			The building is used to increase the economy of related parties and also to preserve and maintain the value of the building itself.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
	v	v		

Country, Author, Year, Title
Jakarta, Indonesia, Retdia Sofiana, Ari Widyati Purwantiasning, Anisa, 2014, Strategies For Implementing The Concept of Adaptive Reuse in The Old Building Case Study: PT PPI Building (Ex. Pt Tjipta Niaga Office) in The Old City Area of Jakarta (Sofiana et al. 2014)

Figure 9. Exterior Existing Condition
Source: (Sofiana, Purwantiasning, Muhammadiyah, et al., 2014)

Previous function	Function After			Information
PT PPI/ ex. Tjipta Niaga Office (*ROTTERDAM INTERNATIO*)	PT PPI Building Preservation/ ex. Tjipta Niaga Office (*ROTTERDAM INTERNATIO*)			The building is preserved as a tourism medium that has its history and value and needs to be preserved, to give identity to the area.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
	v	v		

Country, Author, Year, Title
hong kong, Evian WY Tam, Ivan WH Fung, Michael CP Sing, 2016, Adaptive reuse in sustainable development: An empirical study of a Lui Seng Chun building in Hong Kong. (Tam, Fung, and Sing 2016)

Figure 10. (a) Lui Seng Chun 1949 (b) Lui Seng Chun Before Renovation
Source: (Tam, Fung, & Sing, 2016)

Previous function	Function After			Information
shop	Chinese medicine and health care center building			Buildings can provide added value to culture and sustainability related to health, but they can also provide value that can be preserved for generations.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
		v		

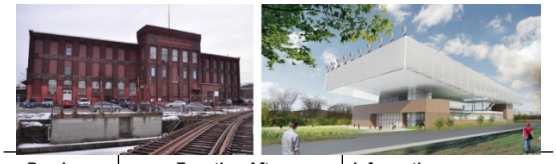
Conclusion: Of the 10 studies conducted on the Asian continent, the average was met in terms of commercial, and the building can support itself, the aspect of independence in

this building has implications for many things in this case 4 buildings are used as residential, 5 mixed-use buildings and 1 public building.

Table 2. Comparison of American Continent Country

America Continent				
Country, Author, Year, Title				
America, Ajla Aksamija (Ph.D. LEED AP BD+C CDT), 2016, Regenerative design and adaptive reuse of existing commercial buildings for net-zero energy use. (Aksamija, Ap, and Cdt 2016)				

Figure 11. (a) The existing building (pre-retrofit); (b) Post-retrofit view of the building.
Source: (Aksamija, 2016)



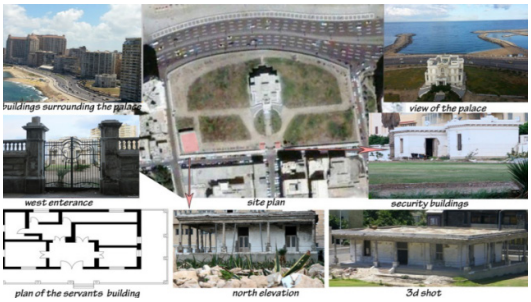
Previous function	**Function After**			**Information**
Existing Commercial	Existing Commercial			The building preserves itself, besides that it is also used as an independent building itself.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
		v		

Conclusion: like on other continents, buildings can support themselves and are preserved as cultural values.

Table 3. Comparison of African Continent Country

African Continent Country				
Country, Author, Year, Title				
Egypt, Hebatu-Allah, Abdul Fattah, Haroun Ali Fouad, Bakr Asmaa El-Sayed Hasan, 2019, Multi-criteria decision making for adaptive reuse of heritage buildings: Aziza Fahmy Palace, Alexandria, Egypt. (Haroun, Bakr, and Hasan 2019)				

Figure 12. The site of the palace (Source: the researcher,2018)
Source: (Haroun, Bakr, & Hasan, 2019)(AHP



Previous function	**Function After**			**Information**
Aziza Fahmi. Palace	Mix Use Building: Hotel, Museum, Office			The building which was originally the center of the royal government was then preserved as an educational, social, and cultural medium that is rich in values. The building has its independence and provides a positive value to the environment.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
	v	v	v	

Country, Author, Year, Title
Egypt, Dalia Abdelaziz Elsorady, 2014, Assessment of the compatibility of new uses for heritage buildings: An example of Alexandria National Museum, Alexandria, Egypt. (Elsorady 2014)

Figure 13. Above: site map. Below: main entrance and Northern facades
Source: (Elsorady, 2014)

Previous function	**Function After**			**Information**
Villa	Museum			A definite housing, where the previous building was a residential house in the form of a villa which was later converted into a museum, means that the building can be used as a means of education, and social for the environment.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
	v	v		

Conclusion: from the African continent there are 2 studies both of which are of course of commercial value and the building can independently finance itself as a valuable building. The two buildings have a related function, namely as a museum.

Table 4. Comparison Of European Continent Country

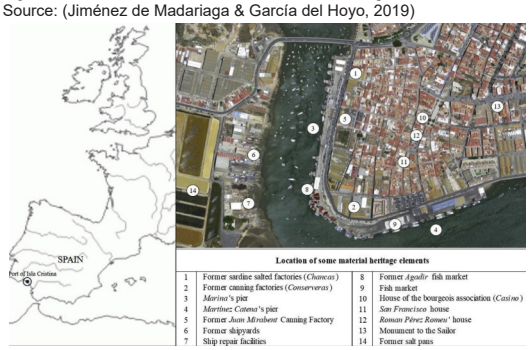
European Continent				
Country, Author, Year, Title				
Portugal, Carla Rodrigues, Fausto Freire, 2017, Adaptive reuse of buildings: Eco-efficiency assessment of retrofit strategies for alternative uses of a historic building. (Rodrigues and Freire 2017)				

Figure 14. Southeast, southwest and northeast façades
Source: (Rodrigues & Freire, 2017)

Previous function	**Function After**			**Information**
Residential home	Office			The building is reused as an office, which of course has a significant change in function because it is of value to the owner of the interest.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
	v		v	

European Continent
Country, Author, Year, Title
Spain, Celeste Jiménez de Madariaga, Juan José García del Hoyo, 2018, Enhancing of the cultural fishing heritage and the development of tourism: A case study in Isla Cristina (Spain) (Jiménez de Madariaga and García del Hoyo 2019)

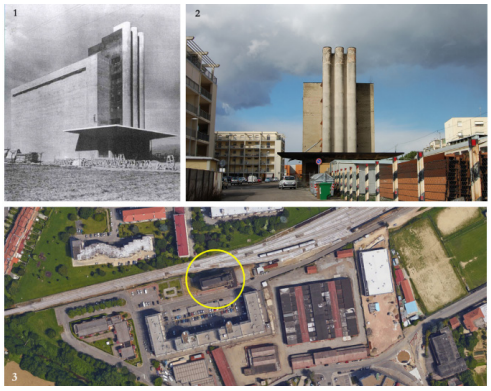
Figure 15. Location of Isla Cristina and some of its heritage sites
Source: (Jiménez de Madariaga & García del Hoyo, 2019)



Previous function	Function After			Information
-	Intangible cultural heritage			The only research that is in the form of intangible heritage is because it preserves the fishing area which is a special ritual for the area.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	

European Continent
Country, Author, Year, Title
Italy, Francesca Giuliani, Anna De Falco, Stefania Landi, Marco Giorgio Bevilacqua, Luisa Santini, Serena Pecori, 2017, Reusing grain silos from the 1930s in Italy. Multi-criteria decision analysis for the case of Arezzo. (Giuliani et al. 2018)

Figure 16. The grain silo of Arezzo (Italy). Historical (1) and current (2) pictures of the building. Location and site plan (3).
Source: (Giuliani et al., 2018)



Previous function	Function After			Information
	Silo Wheat, cultural heritage building			Buildings-related to agricultural land also have values that need to be preserved because they are a particular culture of the region.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
		v		

European Continent
Country, Author, Year, Title
Russia and Serbia, overlayNataša Petković-Grozdanović, Branislava Stoiljković, Aleksandar Keković, Avera Murgul, 2016, The possibilities for conversion and adaptive reuse of industrial facilities into residential dwellings. (Petkovi, Stoiljkovi, and Kekovi 2016)

Figure 17. The introduction of additional open housing space in a form of the roof terrace. The Abbotsford Warehouse conversion into the family home
Source: (Petković-Grozdanovića, Stoiljković, Keković, & Murgul, 2016)

Previous function	Function After			Information
Industrial Facilities	Housing area			A significant change in function is seen in this study, the building is then converted into a building that can generate benefits for stakeholders and of course can preserve the building itself.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
		v	v	

America Continent
Country, Author, Year, Title
Turkey, Damla Mısırlısoy, Ka ganbGünc, 2016, Adaptive reuse strategies for heritage buildings: A holistic approach. (Mısırlısoy 2016)

Figure 18. Royal Place of Milan
Source: (MIslrIlsoy & Günçe, 2016)

Previous function	Function After			Information
Cultural Heritage Building	Cultural Heritage Building			Preservation as a cultural heritage building also has an important value for the development of the area, as well as an irreplaceable identity and value.
Criteria				
General	**Mixed-Use**	**Commercial**	**Residential**	
	v	v		

Conclusion: for the European continent, there are several variants of building function changes, from 5 studies, 3 studies have a dominant commercial value, and 2 focus on mixed-use. Which of course, apart from being a preservation medium as well as the identity of each country on the European continent itself.

Adaptive Reuse is one of the efforts that can be done to preserve and maintain the cultural and historical values that exist in certain buildings. Reuse can be in the form of functional changes that can at least pay for the building itself.

From 18 studies collected from four continents consisting of Asia, America, Africa, and Europe, 13 studies have proven that they can be used commercially and are mainly independent to finance themselves. Furthermore, 5 studies have different focuses such as Mixed-Use, Residential, and General buildings. This is relevant to one theory which states that in general adaptive reuse is used as an alternative to protect and maintain historic buildings by replacing old functions with new functions that are beneficial to the surrounding community and the area. (Sofiana et al., 2014)

Conclusion

Based on the research that has been done on several continents, it was found that most of the studies have met the criteria as an Adaptive Re-Use building where the definition of the building according to Sofiana (2014) is the building that can support itself even though the building has changed its function is not the same as its original function, but still, maintain and protect the historic building beside that it can also benefit the environment and the surrounding area.

Therefore, buildings that experience Adaptive Reuse should be able to have sustainability and sustainability that must be maintained so that they are not lost and experience extinction in the future.

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