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Assessing the Environmental Health and Hygiene Performance between Green Building Apartments and Conventional apartments in Indonesia

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ABSTRACT

In the development of residential property development nowadays, is growing rapidly. This is also influenced by the increasing need of the population for housing on increasingly limited land, so the government is trying to develop vertical housing. Amid increasingly poor air quality, many people are considering healthy and clean housing. The current condition of apartments as multi-story residences is often faced with crucial energy performance problems. One of the most common examples is hygiene factors and indoor thermal discomfort caused by daily activities of temperature changes and vertical temperature stratification. In response to the two problems above, developers are trying to get buildings with green building certification from GBCI as one way to create green housing. This study aims to create parameters for assessing the performance of conventional apartments and Green Building-certified apartments in tropical areas in several aspects, especially in Indonesia. as a consideration in reviewing the cleanliness and health of an apartment. The data collection method used is a literature study from several related sources.

Introduction

Amid a pandemic storm and poor air quality like this, health is also a difficult thing to maintain. Many property developments (residential, office), especially in the capital city of Jakarta today, have implemented the concept of green architecture well (Permata & Sari, 2019). Amid the current poor air quality, many people are interested in choosing healthy housing as one of the factors. Apartments such as high-rise residences are often faced with crucial energy performance issues (FATHURRAHMAN, 2019). One of the most common causes is indoor thermal discomfort, which is caused by daily activity of temperature changes and vertical temperature stratification. Thermal discomfort results in high energy requirements for air conditioning and implies a higher dependence on mechanical systems to be acceptable living conditions (Park et al., 2021) Implementing green architecture in buildings serves not only as an added value in the marketing of

property products but can also be a solution in implementing energy efficiency but also prioritizing the comfort of residents (Reviyandi & Mulyaningrum, 2022).

Investments in sustainable design in the commercial building sector are highly profitable because they can attract higher rental rates than conventional buildings. The reduction of building energy in apartments is considered a great opportunity for energy savings because apartments occupy most of the residential buildings in the world; Final energy consumption in residential buildings reached more than 70% of the global total in 2018 (Park et al., 2021).

The world's property developers voice development that does not increase carbon emissions or applies environmentally friendly, sustainable concepts, which are often referred to as green properties (Permata & Sari, 2019). According to research conducted (Thatcher & Milner, 2016) in measuring the property value of green architecture buildings, it is proven that the quality of the environment and occupant rooms in green architecture buildings is also better than in conventional buildings (measured from the perception of the comfort of its occupants), especially in terms of aesthetics, tranquillity, lighting, acoustics, ventilation, temperature, humidity (Thatcher & Milner, 2016). This has also been proven by many studies around the world that have conducted studies on property prices in the office and housing sectors and their correlation with green building certification (Hui & Yu, 2021).

The application of the green building concept can also indirectly increase worker productivity, an opportunity for the Company's branding as a solution in responding to environmental issues, and as an attraction for building (Muslim, 2022). Where the emphasis on reducing greenhouse gas emissions also has a great impact on the construction industry, because of the huge environmental impact both in building construction and in daily operations (Hui & Yu, 2021). Cooling system methods are also closely related to greenhouse gas emissions both directly and indirectly (Ferreira, Pinheiro, de Brito, & Mateus, 2023). In the application of green architectural buildings, in addition to reducing energy use, it also has an improvement cycle to increase the production of waste and materials (Ferreira et al., 2023).

Problem Formulation

Apartment residential developers today have implemented environmentally friendly buildings as evidenced by GBCI certification. Apart from being a form of effort against climate change and environmental damage, it is expected to be a value or attraction for people who want to have a healthy home.

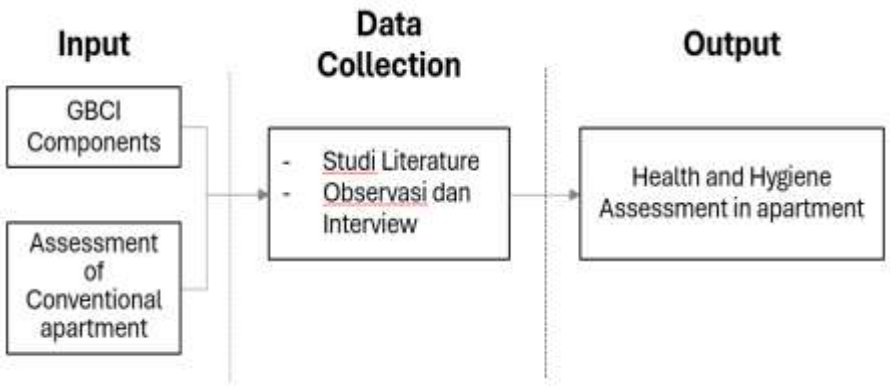
Objectives and Benefits of Research

This research has several objectives, which are expected to be beneficial to complement the study of certified apartment properties in assessing cleanliness and health in apartments, compared to conventional apartments so that they can be used as consideration for prospective residents in choosing healthy property products in the future.

Research Methods

In answering the research question, the first step is for the researcher to conduct a theoretical study related to the problem to be studied, the method used in this study is the Comparison method.

The object to be used as research is apartment residential property. This is done to find out whether it is proven that the type of apartment residential property has more value than conventional apartments. The research conducted is to compare apartment buildings that apply the concept of green architecture with conventional office buildings. The researcher uses a mixed method that uses a combination of qualitative methods (analysis text) and quantitative (numeric data) (Creswell & Creswell, 2017).



Results and Discussion

In the source from GBCI included in the thesis (Adiandari & Winata, 2017), it is explained that the green building assessment system in Indonesia is issued by an institution known as the Green Building Council Indonesia (GBCI). In the article Rating Tools by the Green Building Council Indonesia, it is explained that the rating system issued by GBCI is a tool containing items from the assessment aspect called ratings. For the assessment of green buildings in Indonesia, GBCI issued a rating system called greens. GREENSHIP was prepared by involving building sector actors who are experts in their fields such as architects, building industry, mechanical and electrical technicians, interior designers, landscape architects, and others. The GREENSHIP assessment system issued by GBCI can be divided into six categories, namely:

1. Appropriate land use
2. Energy efficiency and conservation
3. Water conservation
4. Material resources and cycle
5. Indoor air health and comfort
6. Building & and environment management.

In the GREENSHIP assessment system, which is divided into six categories, there are assessment indicators, namely:

Table 1
Assessment indicators by GBCI and processed by researchers

Assessment Indicators
Site design
Landscape Design
Community Accessibility
Public Transportation
Visual Quality
Thermal Comfort
View Access
Indoor Air Quality
Natural Lighting
Water Management
Security and Access Control
Use of Local Materials
Waste Management
Energy Efficiency

An apartment is not only a location that is the main preference in attracting the market, but the quality of life in the residence is also quite important amid the many outbreaks that have existed lately. Here are indicators from (Ho et al., 2004) about the quality of apartments in terms of measuring the safety and health of their occupants. This is closely related to the purpose of implementing green architecture. Therefore, researchers try to use this indicator to see how much impact the role of green architecture as an added value to property, especially for the comfort and safety of residents.

Table 2
Apartment Building Assessment Tool by (Ho, et al., 2016), and has been reprocessed by researchers.

No.	Assessment Indicators	Categories
1	ARCHITECTURE	Size
		Plan Shape
		Headroom
		Windows
		Noise reduction
		Open Space
2	BUILDING SERVICES	water supply

		Drainage
		Refuse Disposal
		Lift
3	EXTERNAL ENVIRONMENT	Density
		Adjacent Use
		Air Quality
		Noise Source
		Visual Quality
		Thermal Comfort
4	OPERATION & MAINTENANCE	Cleaning
		Pest Control
		Refuse Handling
		Inspection
		Maintenance
		Water Quality
5	BUILDING MANAGEMENT	Organization
		Documentation
		Emergency

Researchers try to make research instruments that can be used against research objects. Research indicators are taken based on things that can affect the value of a property. The value in question is if the object is said to be valuable if it has utility, scarcity, effective demand, and transferability (Setiyono, 2017).

Research instruments related to utility are designed by conducting previous theoretical studies related to several aspects of apartment quality and green architecture concepts. From the results of the study (Ho et al., 2004) it has been found that apartment indicators are reviewed from the performance of cleanliness quality and apartment health. In a residence, the aspect that must be considered is the quality of cleanliness and the health of its residents. By implementing green architecture, it is claimed to be able to improve the quality of life of its residents both in terms of health and hygiene. Therefore, residents try to use this indicator to see how much influence the green building concept

has in improving the quality of life of residents and also providing added value in apartment property products.

Table 3

Instrumen Assesment Nilai Apartemen sumber: penulis, diolah dari berbagai sumber

		NO	INDIKATOR PENILAIAN	KET. PENILAIAN
UTILITY *DESIGN*	*ARCHITECTURE*	1	Size	5: <20 lantai 4: 20-30 lantai 3: 30-40 lantai 2: 40-50 lantai 1: >50 lantai
		2	Plan Shape	5:rasio effective space >80% 4: Ratio effective space 70-80% 3: Ratio effective space 60-70% 2: Ratio effective space 50-60% 1: Ratio effective space <50%
		3	Headroom	5: *height* >4m 4: *height* 3-4m 3: *height* 2.75-3m 2: *Height* 2.75m 1: *height* <2.75m
		4	Windows	5: There is passive *cooling* on building 1: Indoor air quality not guarded or measured
		5	Noise reduction	5: Building Leather Materials control *noise* and use *acoustic tile* 3: Building Leather Materials control *the noise* or Using *Acoustic Tiles* 1: No noise *control* and *acoustic tile*
		6	Open Space	5: KDH >40% 4: KDH 40-30% 3: KDH 30-20% 2: KDH 20-10% 1: KDH < 10%
	BUILDING	7	water supply	5: Clean water source from PAM, there is STP

				4: Partial clean water source (PAM & well), there is an STP 3: Partial clean water source (PAM & well), no STP 2: Clean water source from the well, there is STP 1: Clean water source from the well, no STP
			8 Drainage	5: Using technological innovations in water reduction 1: Not using innovation Technology in water reduction
			9 Refuse Disposal	5: The existence of a processing system waste for recycling 1: No processing system waste for recycling
			10 Lift	5: A sufficient number of elevators Building Needs & *Waiting Time* soon 1: Insufficient number of elevators Building Needs & *Waiting Time* old
		EXTERNAL ENVIRONMENT	11 Density	5: >5 Infrastructure around the site 4: 4-5 infrastructure around the site 3:3 Infrastructure around the site 2: 1-2 infrastructure around the site 1: No infrastructure in Around the site
			12 Adjacent Use	3: the distance of the building to the road Raya 12.5m 2: Distance of the building to the road Highway 10-12.5m 1: The distance of the building to the road

				raya <10m
		13	Air Quality	5: *No pollutant* (air or sound); The existence of *fire escape* 3: *No pollutant* or no *fire escape* (countermeasures when fire) 1: There are pollutants; there is no *fire Escape*
		14	Noise Source	5: The distance of the building to the road Highway >15m 4: Distance of the building to the road Highway 12.5-15m 3: the distance of the building to the road Raya 12.5m 2: Distance of the building to the road Highway 10-12.5m 1: The distance of the building to the road Highway <10m
		15	Visual Quality	5: Light can get inside >12m long building 3: Light can get inside 12m long building 1: Light can enter inside buildings as far as <12m
		16	Thermal Comfort	5: Using materials that can maintain room temperature and temperature guarded 25-27o 3: Room temperature maintained 25-27o, no using materials that Maintain Temperature 1: Room temperature <25°C
	OPERATION & MAINTENANCE	17	Cleaning	5: The existence of *cleaning services service* throughout the building 1: No *cleaning service service* throughout the building *service* throughout the building

				1: No *cleaning service service* throughout the building 5: Having a tool (e.g. gondola) for *building maintenance* 1: do not have the tools to *Building Maintenance*
			18 Pest Control	5: Using Pest Control Services 1: Not using pest control services
			19 Refuse Handling	5: Using a *cooling system* energy-efficient 1: Not using *cooling Energy Saving* System 5: use 100% energy alternative 3: Using Alternative Energy partially or as backup 1: without alternative energy 5: The existence of utilization or renewable energy processing 1: Lack of utilization and energy processing Renewable
			20 Inspection	5: Complete security features such as *security, CCTV, access control* 3: Security Features 2 of 3 Features Fulfilled 1: Fewer security features Adequate
			21 Maintenance	5: There are regulations regarding *maintenance* 1: Absence of regulation About *maintenance*
			22 Water Quality	5: Using cost-effective technology water 1: Not using technology Water Efficient
		BUILDING	23 Organization	5: Have an electrical system and

			IT computerized systems, system Good communication 3: Have *computerized systems* or a good communication system 1: not have *computerized system*
		24 Documentation	5: Have an electrical system and IT computerized systems, system Good communication 3: Have *computerized systems* or a good communication system 1: not have *computerized system*
		25 Emergency	5: Meet *fire safety provisions* dan *fire fighting* 1: Does not meet the fire conditions *safety* and Firefighting

The indicators used refer to research (Ho et al., 2004), based on aspects of architecture, building service, external environment, operation & and maintenance, and building management. The assessment system is then used and processed in the form of scores one to five.

Conclusion

The conclusion of the results of the study is several aspects that can be used as an assessment in comparing conventional apartments and apartments that are certified as Green buildings by comparing the highest points between the apartments so that it can be used as a reference for buyers in comparing the health and cleanliness of an apartment.

Bibliography

Adiandari, Ade Maharini, & Winata, Hendra. (2017). Literasi Keuangan dan Kepemilikan Asuransi Jiwa: Observasi di Institusi Keuangan Sumatera Barat. *Forum Manajemen Indonesia (FMI 9)*.

Creswell, John W., & Creswell, J. David. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

FATHURRAHMAN, FARIZ. (2019). *Pengaruh Aspek Building Environmental Management Terhadap Biaya Konstruksi Green Building Dibandingkan Dengan Bangunan Konvensional*. Universitas Atma Jaya Yogyakarta.

Ferreira, Ana, Pinheiro, Manuel Duarte, de Brito, Jorge, & Mateus, Ricardo. (2023). A critical analysis of LEED, BREEAM and DGNB as sustainability assessment methods for retail buildings. *Journal of Building Engineering*, *66*, 105825.

Ho, Daniel C. W., Leung, H. F., Wong, S. K., Cheung, A. K. C., Lau, S. S. Y., Wong, W. S., Lung, D. P. Y., & Chau, K. W. (2004). Assessing the health and hygiene performance of apartment buildings. *Facilities*, *22*(3/4), 58–69. https://doi.org/10.1108/02632770410527789

Hui, Eddie Chi man, & Yu, Ka hung. (2021). Housing market segmentation and the price effect of certified green residential properties. *Habitat International*, *111*, 102350.

Muslim, Aziz. (2022). *Strategi komunikasi ITDC dalam membangun partisipasi masyarakat untuk pengembangan KEK Mandalika*. UIN Mataram.

Park, Ji Hun, Berardi, Umberto, Chang, Seong Jin, Wi, Seunghwan, Kang, Yujin, & Kim, Sumin. (2021). Energy retrofit of PCM-applied apartment buildings considering building orientation and height. *Energy*, *222*, 119877. https://doi.org/10.1016/j.energy.2021.119877

Permata, Mita Rahayu, & Sari, Yeptadian. (2019). Persepsi Dan Antusiasme Pengunjung Terhadap Implementasi Arsitektur Hijau Pada Bangunan Pusat Perbelanjaan. *Purwarupa Jurnal Arsitektur*, *3*(2), 137–144.

Reviyandi, Dandy, & Mulyaningrum, S. E. (2022). *Pengaruh Knowledge Sharing Dan Hardskill Terhadap Kinerja Karyawan Di Dago Suites Apartement Bandung–Pt Istana Group*. Fakultas Ekonomi dan Bisnis.

Setiyono, Wisnu Panggah. (2017). Penerapan Good Corporate Governance Dan Manajemen Laba. *Prosiding Seminar Nasional & Konferensi Forum Manajemen Indonesia (Fmi) Ke-9*.

Thatcher, Andrew, & Milner, Karen. (2016). Is a green building better for building occupants? A longitudinal evaluation. *Building and Environment*, *108*, 194–206.