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Study of occupants' perceptions and preferences of smart home system technology at The Eastern Green-LRT City Bekasi Apartment

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Study of occupants' perceptions and preferences of smart home system technology at The Eastern Green-LRT City Bekasi Apartment

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Abstract. The development of technology over the time is increasing rapidly in various fields including in the field of property that applies smart home system. During the Covid 19 Pandemic, residential with smart home system concept deserves to be an option because it can provide convenience for residents in activities and work by arranging electronic devices such as air conditioning, televisions, lights, access in and out of residence. One of them is The Eastern Green LRT City Bekasi Apartment which is a residence with the concept of smart home system. Apart from the purpose of knowing perception and preference of residents to smart home system in Eastern Green-LRT City Bekasi Apartment, there are certainly still weaknesses that are also a consideration for improvement so that smart home system is able to facilitate residents to improve the comfort of residents. This research uses quantitative method by collecting data through survey. The results showed there are several things that need to be useful evaluation materials to improve smart home system. It is expected that this article can provide feedback to realize a more comfortable residence based on smart home system in welcoming the era of society 5.0 and the new normal era.

1. Introduction

Jakarta is a city with a high population which is resulting in an increased need for housing but it is difficult to reach the vacant land that can be built for such dwellings [1]. The high number of residents has an impact on cities close to Jakarta such as Bogor, Depok, Tangerang to Bekasi so that there is planning and construction of several apartments in the city of Bekasi in order to meet the needs of housing. Vertical residential development in the form of apartments is one of the Government's solutions to overcome housing problems, one of which is the Eastern Green LRT City Bekasi Apartment [2]. Eastern Green LRT City Bekasi Apartment is designed with the concept of smart home system with the use of technology that allows its residents to control the use of electrical energy such as TVs, air conditioners and lights using gadgets or mobile phones and can be controlled practically. Smart home system is a combination of modern computer technology, control technology and information technology that has improved over time [3]. Smart home system can also be defined as a residence that uses a controller system to integrate various systems used in the home automatically [4]. Smart home system is becoming a trend nowadays because it is able to improve the comfort and quality of life of residents [5]. The emergence of technological developments makes it a basic necessity and can improve lifestyle by using smart home system with an easy and comfortable system [6]. In the era of pandemic COVID 19, people tend to limit their activities outside the home so that all activities are carried out

indoors [7]. People are encouraged to use technology in order to facilitate activities in the home, especially for learning and working from home such as high-speed internet and the feature of connection to several electronic devices in the home, namely smart home system [8]. However, smart home system technology is still not able to meet the needs of users and also requires a high enough cost to have complete features in the smart home system [9]. The demand for smart home systems is very limited in number because it has complexity rather than user friendliness and limitations on a set of features are determined by the manufacturer [10]. The study entitled Study of Occupants' Perceptions and Preferences of Smart Home System Technology at The Eastern Green LRT City Bekasi Apartment aims to analyze the perception and preference of residents as users of the concept of smart home system technology in Eastern Green LRT City Bekasi Apartment. Based on literature, direct observation surveys and interview studies with residents as users are given several questions such as how residents as users view smart home system technology at The Eastern Green LRT City Bekasi Apartment and the preference of residents as users to prepare smart home system technology in the future so that it experiences a considerable increase in the number of users, especially in welcoming the era of society 5.0 and the new normal era.

2. Methods

The research location is at Eastern Green LRT City Bekasi Apartment which is located at Jl. HM. Joyo Martono, RT.004/RW.021, Margahayu, East Bekasi District, Bekasi City, West Java (Figure 1).

Figure 1. Eastern Green LRT City Bekasi Apartment building.

Researchers conducted several of literature studies first and then collected some previous similar studies in the form of journal articles. The study is needed in order to obtain what methods were used by previous researchers. The results of the study of the literature study can be selected for use in obtaining what methods will be used in this study. The first study titled Users' Perceptions and Attitudes Towards Smart Home Technologies which aims to know the attitudes and opinions of users towards smart home systems (advantages and disadvantages) by using questionnaire dissemination methods through online surveys, data acquisition collected during January-February 2018 with some questions related to the ease of smart home system features used by residents as users in daily activities that use several variables including age classification , gender, education, knowledge about computers or Io, ease of performance for users every day, user thinking about smart home system, social involvement in supervision outside the residential unit, views on users, benefits, concerns and shortcomings about smart home system and how users perceive daily life activities in residential units and health-related data. The second study is titled Insights on Smart Home concept and occupants' interaction with building controls [11] which aims

to provide insights on the concept of smart home system that is expected to suit the needs of residents as users by using data collection methods related to technical information in a smart home system. Variables used are the concept of smart home system including services provided by smart home system features, technology used, interaction of residents as users in building supervision to how to use and its drawbacks. The third research is titled Public Perception of Smart Building Concept as Energy Saving Business [12] which uses qualitative method with data collection through the spread of online questionnaires. This research uses several variables including smart system concepts used including advanced technology, environmental friendliness, energy management, computer automation, adaptability speed, humanist, design and operational setup costs. From several previous researches conducted by researchers, researchers conducted a study entitled Study of Occupants' Perceptions and Preferences of Smart Home System Technology at The Eastern Green LRT City Bekasi Apartment using methods conducted by the first researchers focused on the spread of online questionnaires, direct interviews to some consumers or apartment buyers as users. This study uses variables from several studies in advance that can be seen in the following Table 1:

Table 1. Research variables.

No.	Variables	Sources
1.	Ease of Smart Home System Performance for Users Every Day	Singh D, Psychoula I, Kropf J, Hanke S and Holzinger A [9]
2.	Technology used	Fabi V, Spigliantini G and Corgnati S P [11]
3.	Disadvantages of Smart Home System	
4.	Design and cost of operational setup	Putra B A [12]

The researchers also collected literature studies obtained from books and journals as well as internet media, analyzing the data. Survey / observation of the location of the site and other objects to obtain data related to the object design and document the source of the data so that the results and discussion of research obtained.

3. Results and discussions
Eastern Green LRT City Bekasi Apartment was built in 2018 with a height of 24 floors and built as many as 15 towers gradually. This year there are 3 (three) towers that have been built and carried out the handover of keys in August 2020. This apartment has only been occupied since September 2020. This apartment has 3 types of residences, namely studio type, type 1 bedroom and type 2 bedroom [8].

Figure 2. Studio type.   **Figure 3.** Type 1 bedroom.   **Figure 4.** Type 2 bedroom.

The total apartment units in these 3 towers are 918 units, but at the time researchers conducted research not many people inhabited the apartment. So the researchers conducted the dissemination of online questionnaires to residents as users who had done handovers and occupied the apartment.

3.1. Ease of smart home system performance for users every day
This apartment uses smart lock system and smart home system that is connected with gadgets or smartphones by using internet access in order to regulate the use of lamp settings, air conditioning, TV.

Figure 5. Smart lock system access.
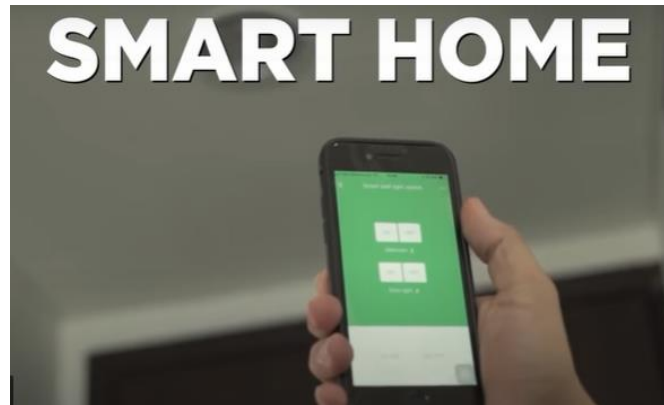
Figure 6. Smart home system.

The results show that smart home system is quite easy to use by most residents but it needs to be upgraded in order to make the smart home system more sophisticated, perhaps for the kitchen area if using an electric stove and bathroom in order to turn the water on and off automatically and others.

3.2. Technology used
The technology used in Eastern Green LRT City Bekasi Apartment is a smart lock system which is a technology used for home security such as locking the entrance through password, access card and manual. But most residents feel the technology system needs to be improved in order to improve occupancy security such as locking all doors so that the bias is synchronized with the smartphone so that it can lock the door through the smartphone and there is no problem when the access card is lost, forget the password or may forget to lock when it is outside the residential unit. Other technologies are smartphones connected with electronic devices such as air conditioning, lights and TVs. Some users hope that the technology can be improved so that it can be connected to all electronic devices such as refrigerators, electric stoves to sanitary devices in the bathroom / WC.
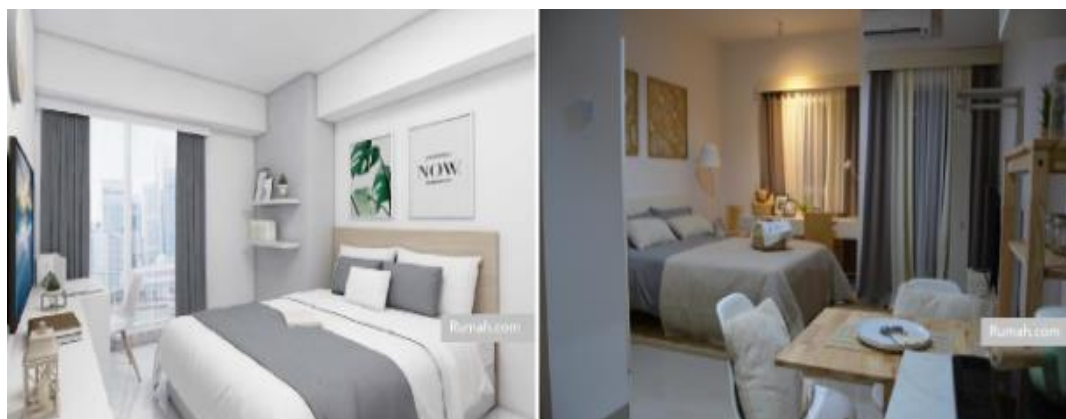

Figure 7. Interior atmosphere of Eastern Green LRT City Bekasi Apartment residential unit.

3.3. Disadvantages of smart home system
According to residents as smart home system users in Eastern Green LRT City Bekasi Apartment, smart home system can provide comfort, security and can increase the selling price of the residential unit but has some disadvantages including dependence on internet connection that is expected internet has a high speed and not disconnected, requires a high enough electricity because it has a work system every time non stop.

3.4. Operational setup design and cost
Design and cost of purchasing smart home system devices was not included from the cost of purchasing apartment units with the sense that residents must prepare a budget to buy a series of smart home system equipment in order to use it and provide internet services as a liaison by paying per month so that the cost of operational setup is quite high.

4. Conclusion
The majority of respondents perceive the concept of smart home system in Eastern Green LRT City Bekasi Apartment is good enough, and easy to use so that respondents feel smart home system is enough to help respondents if negligent in the use of electronic devices so as to increase comfort in inhabiting. But it takes a strategy to improve the design of the smart home system by connecting to all electronic devices, the use of smart lock system connected to the smartphone so as not to have problems when the access card is lost, forget the password or forget to lock manually when it is outside the residential unit, add an interior CCTV camera for security, upgrade other technologies to be more sophisticated than the initial concept used today but can reduce operational setup costs so as to further improve the quality of comfort , security for residents as users and make daily conditions more practical.

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