

## A STUDY OF SPATIAL AND OCCUPANTS' BEHAVIORAL CHANGES DURING COVID-19 (CASE STUDY: LANDED HOUSE TYPE 70M<sup>2</sup> IN SOUTH BEKASI, INDONESIA)

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### ABSTRACT

*In March 2020, Corona Virus Disease 2019 (COVID-19) managed to surprise the people of Indonesia with its appearance, impacting human activities and behavior. This pandemic has resulted in humans being required to change their habits to reduce the transmission of the COVID-19 virus, one of which is carrying out daily activities at home or what is often called Work from Home (WFH). In August 2021, the government still restricts community activities, including teaching and learning activities that still use the online system and some offices that are still working from home. It is not predictable how long this habit should be applied in human life. This is a consideration to improve the quality of the landed house into an ideal place to carry out activities. This study aims to determine changes in spatial patterns that occur due to behavioral adaptation during COVID-19. The research method used is descriptive analysis with a case study approach. The results of this study indicate that there are changes that occurred in the landed house type 70 m<sup>2</sup>, including changes in room function, the addition of health protocol facilities, changes in human circulation, the addition of new facilities support facilities, changes in the frequency of use, changes in the circulation of goods, and provision of isolation rooms.*

**Keywords:** Changes in spatial patterns, COVID-19, interior space, behavioural adaptation, landed house

### 1. PREFACE

The occupants' behavior during COVID-19 has caused some changes in the spatial arrangement in the landed house to support the necessary needs. To break the chain of transmission of the virus, we are forced to adapt to some new habits that have been made. Before the pandemic happened, the function of a house was a support family identity, support opportunities, and give a secure feeling to the residents [1]. However, during the pandemic, Work from Home is applied for both the workers and students. With the possibility of working and studying in the future to be blended between office and home, the function of the space in the landed house might change due to the occupants' needs [2].

Health protocols are also required to be applied inside the house or outdoor. One of them is to raise awareness to pay attention to personal hygiene before entering the house, changing clothes, and cleaning items with disinfectant regularly. Some of the usual activities, such as exercise, must be done at home because most of the fitness centers are still closed. A proper spatial arrangement in the household has an important role in supplying the occupants' needs.

Therefore, this problem can be considered to rearrange the spatial arrangement in a landed house so it can support the activities that are being held at home. This study aims to determine the changes in spatial patterns that occur to support the occupants' behavior during and after COVID-19.

## Related Previous Works

Several previous studies have become a reference in this study to collect theory and data so that it can adequately study research.

**Table 1**

### *Previous Research*

No	Research Title	Researcher	Result and Conclusion	Source
1.	Perubahan Tata Ruang Tipe Kecil dan Pengaruhnya Terhadap Aspek Kesehatan Penghuni	Ashadi, Anisa, and Nelfiyanti [3]	Small houses often don't get natural lighting, so shading devices such as windows and roosters are made so. If the natural lighting and circulation aren't good, the room inside will become dark and humid, and that can have some bad impacts on health.	NALARS: Jurnal Arsitektur. Volume 15, No 2.
2.	Penyesuaian Setting Ruang Untuk Bekerja dari Rumah pada Masa Pandemi COVID-19	I. Ariyani [4]	The results of this study is that many workers run Work from Home by creating multiple rooms that combine various functions in one room, because many people don't have a personal room for them to work.	Lintas Ruang: Jurnal Pengetahuan & Perancangan Desain Interior. Volume 8, No 1.
3.	<i>How is COVID-19 Experience Transforming Sustainability Requirements of Residential Buildings?</i>	G. Tokazhanov, A. Tleuken, M. Guney, A. Turkyilmaz, and F. Karaca [5]	The researchers stated that COVID-19 and the lockdown revealed that residential buildings still have some shortcomings in terms of health and comfortness.	Sustainability. Volume 12, 8732.
4.	<i>Future of Sustainable Architecture: Rethinking COVID-19 a Pandemic or Turning Point?</i>	G. Ateek [6]	The result of the study states that COVID-19 has an impact on several aspects, and sustainable living can help to make a city becomes green and healthier, so it can help to prevent infectious diseases.	Bahçeşehir University

Based on the table of previous research on the COVID-19 phenomenon and its changes in architecture and interior space, there has been no research that focuses on discussing changes that occur due to changes in behavior during the COVID-19 pandemic in a landed house with a specific type, which is type 70m<sup>2</sup>.

## 2. RESEARCH METHOD

### Space and Space Pattern

Space is a place that is being used to carry out activities that have elements as boundaries between two or more spaces based on the function [7]. A space has elements, which are floor, wall, ceiling, door, and window opening [8]. In addition, furniture is also an essential element inside a space. Furnitures are objects that are being used by the occupants for an activity or for storing things [9]. The furniture must be able to support the occupants' activities that are being held in the room.

Circulation, which has a function as a link between spaces, should be a clear space and ability to be known by the occupants, so it does not cause any confusion. Circulation between spaces has

several types [10], namely: (a) *Pass by Spaces*; (b) *Pass through Spaces*; and (c) *Terminate in a space*.

### **Functionalism Theory**

Talcott Parsons and Robert Merton first put forward the functional theory from a sociological perspective. In architecture, functionalism theory focuses on the function where an architecture or space can support human psychological activities and aspects. In this theory, it's explained that space is divided into several groups based on the activities carried [7], which are: (1) Public space, is an area used for more general activities and can be used by many people; (2) semi-public space, is an area that can only be accessed by certain groups; (3) Private space, is an area that can only be accessed by the owner of the space and has special regulations; (4) Service room, is a room used as a place to provide needs or as a complimentary room at home.

### **Behaviour Architecture**

Behavior Architecture is the application of architecture that considers human behavior in a design. Weinstein and David explain that there are three principles of behavioral architecture [11], namely: (a) A design must be able to communicate with humans and their environment; (b) Provide facilities for occupants to support aspects of physical and psychological comfort; (c) The design must follow the condition and occupants' behavior.

### **Changes in Activity and Behaviour caused by COVID-19**

The COVID-19 pandemic, which has been running for two years in Indonesia, has had many impacts on the country. The impact can be seen in several aspects, namely political, economic, social, cultural, defense, and security [12]. Working and learning activities that were previously carried out at office and school have become activities that being carried out at home by using an online system. People who are still forced to carry out activities at home such as those who still have to trade, buy food, and others also have new habits caused by the COVID-19 pandemic. The Indonesian Ministry of Health in the Decree of the Minister of Health of the Republic of Indonesia concerning Health Protocols mentions several things that must be considered [13]:

- a) Use a mask that can protect from nose to chin when do activity outside the house
- b) Routinely wash hands with soap or using a disinfectant
- c) Keep a distance of at least 1 meter from the others
- d) When arrived at home, take a shower and change clothes immediately
- e) Clean items from outside with disinfectant liquid
- f) Always optimize air circulation and sunlight to increase the body's immune system

There are also protocols that must be applied if exposed to COVID-19, [14], which are:

- a) A person with suspicious symptoms or who has been exposed should stay in separate, well-ventilated rooms
- b) A person with symptoms should limit shared spaces.

### **State of the Art**

This study was conducted to determine changes in spatial patterns that occurred due to changes in behavior during the COVID-19 pandemic in landed houses of type 70m<sup>2</sup>. Type 70m<sup>2</sup> is a type that tends to be large and luxurious, so the reason why the authors chose this type is to see if there are still changes in spatial patterns to support behavioral adaptation during the COVID-19 pandemic, even though the house area is quite large and what makes the occupants make any changes. After knowing that there are some changes in the spatial pattern that occurs, it will produce a guideline that can be used as a reference.

## Research Method

The change in spatial patterns occurred due to the COVID-19 pandemic. COVID-19 cases are soaring in almost all cities in Indonesia. To find out more clearly about the changes in spatial patterns that occur, a qualitative descriptive analysis research method with a case study approach is being used. Qualitative research methods, known as naturalistic research methods, mean that research is carried out on natural objects and conditions, which develop as they are, with no manipulation. Meanwhile, the case study approach is a method to examine in detail a particular event or case. [15]. The researchers will do observations and interviews to see the spatial and occupants' behavioral changes during COVID-19. The case study in this research is landed houses type 70m<sup>2</sup> in South Bekasi.

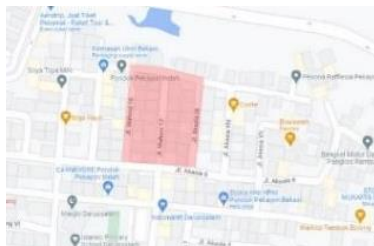
To analyze the data, the writer will use the thematic analysis method. In qualitative research, the thematic analysis aims to analyze and obtain patterns and codes from the data collected, such as the results of interviews [16]. The stages of the thematic analysis method carried out are: (1) Understanding the data; (2) Compile code; (3) Search for themes; (4) Analyzing the data.

## 3. RESULT AND DISCUSSION

The research location is in RW 011 Pondok Pekayon Indah, South Bekasi. The total houses that become the object of the study are five houses. Initially, the houses were the type 70 m<sup>2</sup>, but the residents made some renovations so that most of the landed houses here become 70m<sup>2</sup>.

### Figure 1

*Research Location*



Source: googlemaps.com

### House 1 Informant 1 (R1IF1)

Informant 1 (R1IF1) is a resident of a landed house with a house area of 165 m<sup>2</sup>. The house consists of 2 floors consisting of several rooms, namely terrace, garage, living room, kitchen, dining room, bedroom, workspace, warehouse, drying area, and bathroom.

### Figure 2

*House 1*



Source: googlemaps.com

When being asked if any changes were implemented during the pandemic, R1IF1 explained that footwear is removed on the terrace to be sprayed with disinfectant (Figure 3), thereby killing

viruses. In addition, R1IF1 also explained that during the pandemic all new family members are allowed to do activities after cleaning themselves, such as bathing or changing clothes. Visiting activities have also changed since the beginning of the pandemic. Before the pandemic, when there's a guest, they would gather in the living room but during this pandemic that activity happens in the terrace. To support this activity, chairs are provided to sit on the terrace (Figure 3).

**Figure 3**

*Footwear Disinfection Area and Chairs in the Terrace*



Source: Authors, 2022

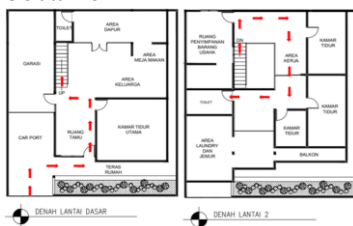
Work from Home activity that has been implemented by the government also happens in this house. Home members who used to work in the office every day, now spend 5 days working at home. But before the pandemic, a desk that was already provided, so there are no additional facilities but an increase in the frequency of using the facilities. From the results of the interview, for R1IF1 obtained 5 themes, namely the addition of health protocol facilities, changes in room function, addition of new facilities supporting facilities, changes in human circulation, and changes in the frequency of furniture use.

**Figure 4**

*Circulation Changes in House 1*



became



Source: Authors, 2022

### House 2 Informant 2 (R2IF2)

Informant 2 (R2IF2) is a resident of a landed house with a house area of 154 m<sup>2</sup>. The informant's house consists of 1 floor which has several rooms, namely terrace, living room, family room, kitchen, dining room, bedroom, study room, toilet, and warehouse.

**Figure 5**  
*House 2*



Source: Authors, 2022

R2IF2 stated that there is a work from home activity that being held in the house. The mother, who is a civil servant, used to work in the office every day, but during COVID-19 she works at home. The room that being used for work is the family room because there is no special room for work before. The child also studies at home, so that the space that used to be an empty space becomes a space for learning (Figure 6).

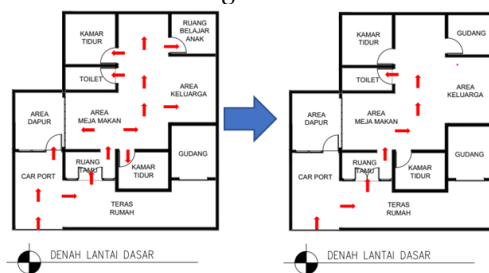
**Figure 6**  
*A family room that being used as a place to work and a warehouse that is converted into a study room.*



Source: Authors, 2022

In addition to the implementation of work from home, there is also the application of protocols, namely have to wash hands or use disinfectants and before entering the house and immediately take a shower. Goods from outside must be washed or cleaned first before being brought into the house. From the results of the interview, there were 4 themes for R2IF2, namely changes in room function, the addition of health protocol facilities, the addition of new facilities support facilities, and changes in the circulation of people and goods.

**Figure 7**  
*Circulation Change in House 2*



Source: Authors, 2022

### House 3 Informant 3 (R3IF3)

The informant's house consists of 2 floors which has several rooms, namely the living room, family room which is united with the dining room, kitchen, bedroom, toilet, terrace, drying area.

**Figure 8**

*House 3*

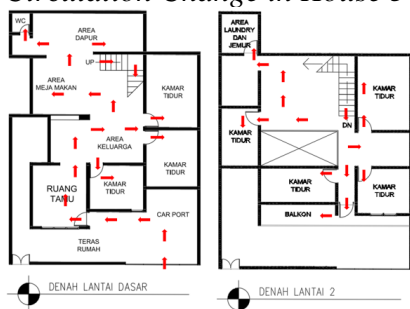


Source: Authors, 2022

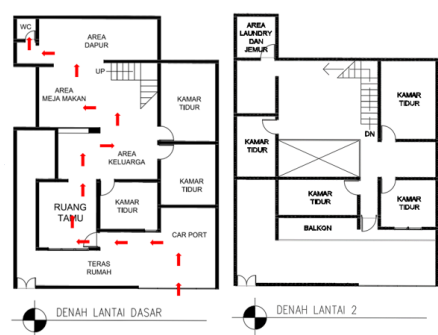
R3IF3 said that her husband has been doing work from home since this pandemic. He works in the bedroom. The main reason for choosing the bedroom as a place to work is to avoid noise. The son of R3IF3 usually uses the family room as a place to play, so a bedroom with wall as partition and door is the most appropriate room. Apart from that, there is also a change in circulation, when arrived at home after outdoor activities, they must taking a bath before doing other activity at home. Before the pandemic, householders were not required to clean themselves immediately after arriving home. The COVID-19 protocols was also implemented in this house, namely providing soap next to the water faucet on the terrace to be used after receiving goods from outside or before entering the house. From the results of the interview, four themes were obtained, namely changes in space function, changes in human circulation, changes in the frequency of use, and the addition of health protocol facilities.

**Figure 9**

*Circulation Change in House 3*



becomes



Source: Authors, 2022



#### House 4 Informant 4 (R4IF4)

Informant 4 (R4IF4) is a resident of a landed house with a house area of 165 m<sup>2</sup>. The informant's house consists of 1.5 floors which has several rooms, namely terrace, living room, family room, kitchen, dining room, bedroom, toilet, terrace, drying area, and service room.

#### Figure 10

House 4



Source: googlemaps.com

R4IF4 says that work from home is applied in this house. To support work-from-home activity, a facility which is a computer desk is needed but this facility was already here before the pandemic (Figure 11a), but the frequency of use has increased since the pandemic. Even though the husband of R4IF4 has retired, he still often participates in several online meetings in the living room. The reason for choosing the living room is that it is more spacious because there is no traffic going on in the room. Changes in the function of space are also seen in the use of the terrace as a place to visit and the space for drying clothes as a place for planting (Figure 11b). In addition, body exercise has also started to be carried out regularly since the pandemic. However, previously there was no special room for exercise, so the ironing room is being used as a place for exercise.

#### Figure 11

(a) A computer desk that being used for work from home, (b) Drying space became a place for plants.



Source: Authors, 2022

R4IF4 said that when her husband came home from work in other city, he immediately isolated himself as stated in the COVID-19 protocols. This self-isolation was carried out on the 2nd floor of the house because there are empty rooms. Any goods from outside or purchased online must be sprayed with disinfectant before being brought into the house. This indicates that there is a change in the circulation of goods and the addition of protocol supporting facilities. From the results of the interview with R4IF4, 7 themes were obtained, namely changes in room function, changes in the circulation of people and goods, the addition of health protocol facilities, the addition of new facilities support facilities, changes in the frequency of use, and provision of isolation rooms.



**Figure 12**  
*Circulation Change in House 4*



Source: Authors, 2022

### House 5 Informant 5 (R5IF5)

Informant 5 (R5IF5) is a resident of a landed house with a house area of 165 m<sup>2</sup>. The informant's house consists of 2 floors which has several rooms, namely living room, family room, kitchen, dining room, bedroom, toilet, terrace, drying area, reading room, and service room.

**Figure 13**  
*House 5*



Source: Authors, 2022

R5IF5 said that her daughter studied at home during the pandemic. There are two rooms that are being used, namely the dining room and the bedroom. The reason for choosing the dining room is she doesn't feel alone in an open room and she can still do activities with her mother (Figure 14a). Meanwhile, the bedroom is chosen when requiring a quiet atmosphere. This indicates that there is a change in the function of space. Changes in the function of the space are also seen in several other spaces, namely the garage which was previously used as a place to park vehicles into a place for exercising and doing hobbies, namely sewing (Figure 14b). The front area of the garage which is the entrance for the car is a place for goods that are the result of the community program, used cooking oil (figure 14c).

**Figure 14**  
*(a) Dining Room, (b) Garage, (c) Small Area in Front of the Farage.*



Source: Authors, 2022

**Figure 15**  
*Circulation Change in House 5*



From the 5 houses that had been observed and also the occupants who have been interviewed, it shows that the 5 houses experienced some changes during the pandemic. The changes that occurred are made to support the activities of the occupants who also changed during this pandemic.

**Table 2**  
*Changes that Happened in 5 Houses*

	R1IF1	R2IF2	R3IF3	R4IF4	R5IF5
Change in Room Function	v	v	v	v	v
Addition of New Facilities	v	v	-	v	v
Addition of Health Protocol Facilities	v	v	v	v	v
Change in Frequency of Use	v	-	v	v	-
Change in Human Circulation	v	v	v	v	v
Change in Circulation of Goods	-	v	-	v	-
Provision of Isolation Room	-	-	-	v	-

Based on the results of the analysis, it can be concluded that there are changes that occurred in landed houses of type 70m<sup>2</sup> during the COVID-19 pandemic. Changes that occur include the change in room function, addition of health protocol facilities, change in human circulation, addition of new facilities, change in frequency of use, change in circulation of goods, and provision of isolation rooms. These changes occurred due to protocols issued by the government, such as the implementation of health protocols, regulations for doing work from home (WFH) and distance learning (PJJ).

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