

# Furniture Design, Arrangement, Relationship to Tiny House and Remote Working Activity.

## Abstract

Urbanization in most countries leads to limited space and tiny houses. The trend of remote work is also growing rapidly. However, residential properties are not typically designed as spaces for working activities, such as remote work. Furniture design for workspaces is also usually not designed for residential spaces. This study examines the perspectives of 15 professional designers, as captured through Key Informant Interviews (KIIs), on designing workspaces and potential furniture types for remote work across the 30 selected tiny-house floor plans. Discussions with KII's show that with a suitable spatial configuration and appropriate furniture, a tiny house's limited space can accommodate a work area. As a result, most KII's agree on the semi-open arrangement with several values as the furniture configuration for tiny houses. Even though 27.83% of modified floor plans show an increment in the percentage of multi-purpose space to maximize the area. The discussion also shows that the workspace area for a specific area has increased by 12.64% compared to the original floor plan. The suitable furniture for the multi-purpose space identified in this study was built-in or custom. This configuration study could help designers design and explore suitable furniture according to the spaces in tiny houses.

Keywords: furniture arrangement, furniture design, tiny house, working activity

## Introduction

Working remotely is already the norm. People could work from various places, such as cafés, co-working spaces, hotels, and houses. About 14% of employees in the United States, approximately 22 million adults, work from home (Kim Parker, 2023). Remote jobs have grown by 1100% since the middle of 2021, and 67% of remote workers report being more productive when working from home (Tobi Agbede, 2024).

The demand for tiny houses is increasing across various contexts, including the affordable housing crisis (Shearer, H., & Burton, P., 2018). The size of the tiny house varies by region. There are studies at Norwich University that range in size from tiny houses of 120 sq ft to 400 sq ft (M. Lutz, 2019). While compact houses in Asia range from 50 sq ft in Japan (Rachel Presser, 2020) to 750 sq ft in Malaysia (Rachel Chew, 2019). Rachel Chew also mentioned that the sizes of Malaysian houses have been shrinking throughout the years (2019). This study integrates remote work and the tiny house movement to provide a deeper understanding of the context of furniture design, as shown in Diagram 1 below.

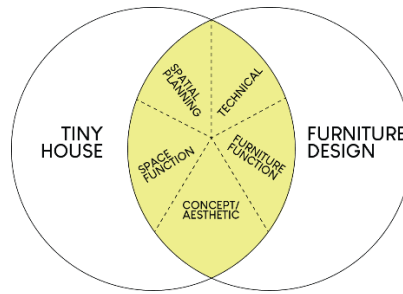


Diagram 1: Idea of study (Source: Author)

A previous study by Zainol I.S. et al. (2025) highlights differences between designer and user perspectives on furniture design evaluation criteria, noting that the most important aspect for the user is the furniture's function, whereas the designer is more concerned with its technical aspects. Other than that, studies indicate that optimizing space allocation is required to use limited space efficiently (Laksono P.W., 2016). Studies have shown that the division and layout optimization in the house play a crucial role in enhancing residents' needs and living experience (Strave E., 2019). According to Alvaro Arancibia, space standards should be flexible for unpredictable alterations and set the conditions for usual daily activities (2024)

The type of furniture arrangement can be defined in several ways. However, in this study, the author focuses on furniture arrangements based on floor plans, which are classified as open, closed, or hybrid. The open arrangement is a style that integrates several areas into one ample space, allowing users to move freely and maintain continuity and mobility (Fuchs D. et al., 2022). A closed arrangement is more specific, providing clear boundaries and functions for the area, ensuring privacy and an allocated environment for specific activities such as resting (Keshavarzi, M., 2021). A study discusses how a flexible, modular furniture design enables the combination of the two to support work activities (Cruz, R. et al., 2023). There is no specific definition or term for hybrid furniture arrangements, as found in this study, there are two other types of arrangements for hybrid furniture arrangements, which are semi-open and semi-close arrangements.

### Conceptual Framework

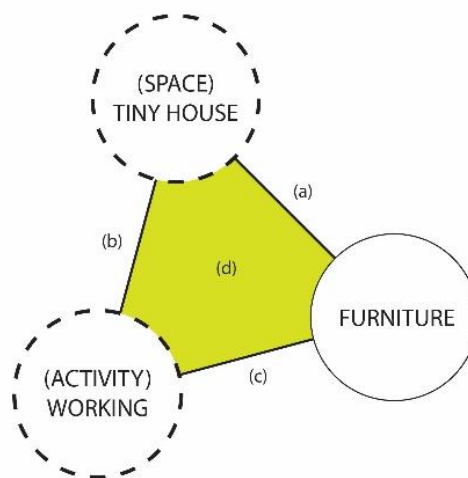


Diagram 2: Conceptual Framework (Source: Author)

Based on the literature review, the author shows the focus of this study in Diagram 2: Conceptual frameworks. In response to the study's idea in Diagram 1, Diagram 2 shows the author's attention to a more specific relationship among Furniture Design, Tiny House, and Working Activity.

On that basis, three hypothesis statements are below:

- a. The furniture design for a tiny house should accommodate the space provided. The furniture selection was based on the size of the space, with the commonly suggested designs being custom and built-in furniture.
- b. The space will be fully utilized when the user engages in the activity well in the space. In this study, work activities will be facilitated in a tiny house, typically measured by user productivity. Therefore, several linking criteria will affect the user's productivity, such as the workspace's position in the house.
- c. The furniture design supported the activity of the user. The type of furniture design also defines the space's function. To support the user's activities in a tiny house, specific types of furniture are needed to meet the user's needs.

### **Methodology**

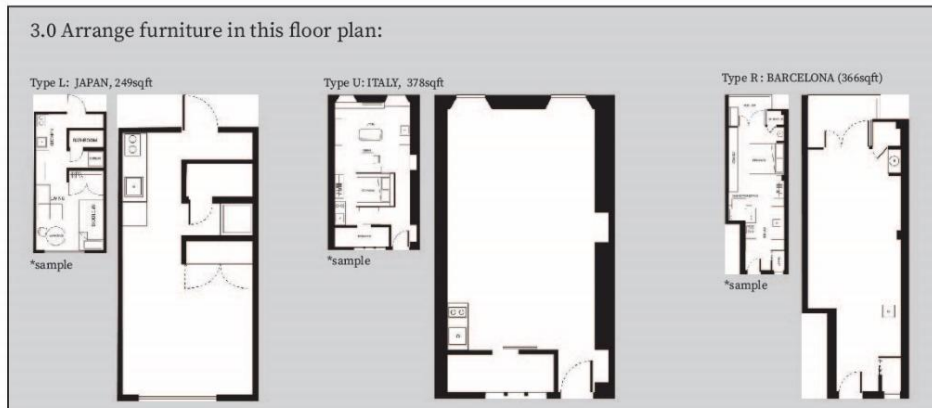
This study selected 30 tiny-house floor plans from various projects. The selection of tiny houses is randomly chosen from internet sources, from developers' websites, books, etc. According to Kilman, C. (2010) The Tiny Life Blog mentions that the size of tiny houses ranges from 100 square feet (sqft) to 400 sqft. However, the developed-country perspective differs from the non-developed-country perspective. While other studies from Indonesia do mention that a tiny house could fall under 60 square meters ( $m^2$ ) to 80  $m^2$ , equivalent to 600sqft to 800sqft (Analisa, F.C.K, 2023). Therefore, for the purposes of this study, the author set the range from 240 sqft to 600 sq ft. The random floorplan selected in this study had the smallest house is a 247 sqft type 1R from Chiba, Japan. The largest house in Melbourne, Australia, is 592 sqft.

The 15 Malaysian professional designers from Architecture, Interior Design, and Industrial Design backgrounds, later referred to as the Key Informant Interview (KII), conducted an online discussion with the author via Google Meet and the Miro Platform. The KII comprises experts from various fields, including interior design, house planning, and furniture design. The discussion comprises 3 parts (2.0, 3.0, 4.0- refer to Diagram 3 below). The first part is to rank the suitable workspace areas. In the second part, the author prepared 30 original floor plans of tiny houses, selected by the KII, and modified them and their furniture layouts to accommodate a workspace. The third part is an additional discussion of how the KII determines the configuration from part 2.

2.0 Rate the possibility of the space and the furniture to be working space:

2.1 Kitchen : Dining Table and Dining Chair ☆☆☆☆☆☆☆☆☆☆	2.2 Living : Sofa and Coffee Table ☆☆☆☆☆☆☆☆☆☆	2.3 Bedroom: Bench/ Chair and Build-in desk in Wardrobe ☆☆☆☆☆☆☆☆☆☆	2.4 Balcony: Leisure table and chair ☆☆☆☆☆☆☆☆☆☆
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3.0 Arrange furniture in this floor plan:



4.0 What is other aspect to consider in providing a workspace to a space; color, modularity, material, functionality.

Diagram 3: Format of the discussion - reillustration (Source: Author)

The author then analyses the floor plan into several sections, including the workspace area, the configuration type, and the recommended furniture type from KIIs. All the floor plans were segmented into color-coded sections to ease the calculation as shown in the Diagram 4 below. The floor plan is later converted to a .png file and uploaded to an online tool (<https://www.tools366.com/tool/image-color-ratio>) to calculate the area of each floor plan. As a result, the percentage value is calculated. A comparison of the original and modified floor plans was conducted to assess the feasibility of incorporating a workspace into the tiny house.

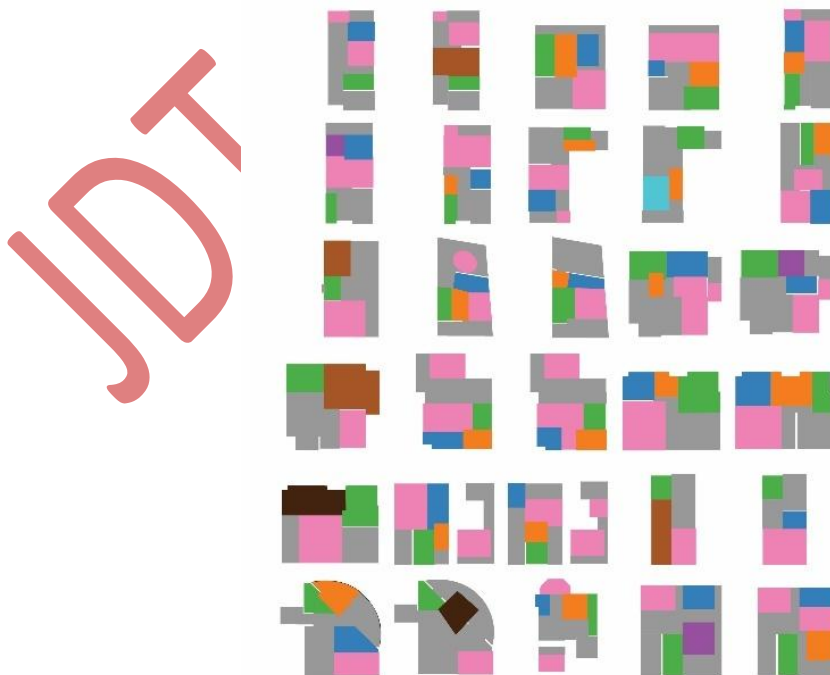


Diagram 4: Example of a segmented area of the floor plan (Source: Author)

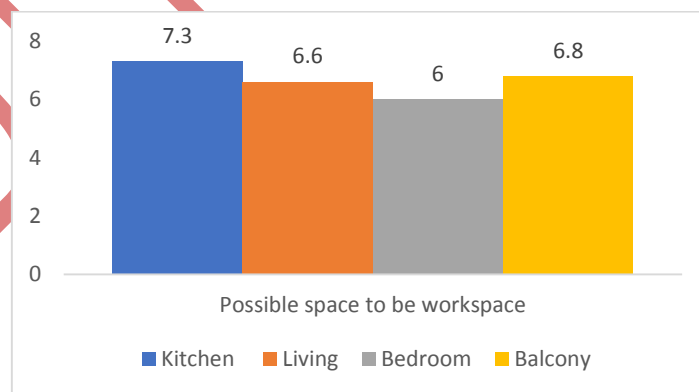
Table 1: Segmentation colour code indicator.

<i>Colour</i>	<i>Colour code (RGB)</i>	<i>Label</i>
<i>Gray</i>	153,153,153	Common areas: bathroom, air conditioner, wardrobe, storage.
<i>Pink</i>	240,131,181	Resting area: bedroom, living room
<i>Green</i>	74,176,73	Kitchen
<i>Blue</i>	51,127,186	Workspace
<i>Orange</i>	246,127,33	Dining area
<i>Light brown</i>	166,86,40	Living, dining, workspace
<i>Dark brown</i>	66,36,14	Dining and workspace
<i>Purple</i>	152,79,159	Dining and living room
<i>Red</i>	228,30,38	Workspace and living room

The color segmentation method for areas in floor plans is the same as that used to train machine learning models in the architecture field, as studied by Zhongguo X. et al. (2025). All the floor plans are assigned a solid color code, as shown in Table 1. In this study, all the floor plans were converted to RGBA format in .png files to clarify the base colour (foreground colour or black) of the walls, doors, and windows.

Thematic analysis is used in this study. The online discussions with the KII's are recorded, and important keywords and notes on statements are captured on the Miro platform. The keywords and statements are categorized into 2 topics with subdivisions. The first topic is the zonal definition, and the second topic is the attributes for the conceptual frameworks. Under the second topic, the keywords and statements are subdivided into the relationships among tiny houses, work activities, and furniture design.

### Finding and Analysis

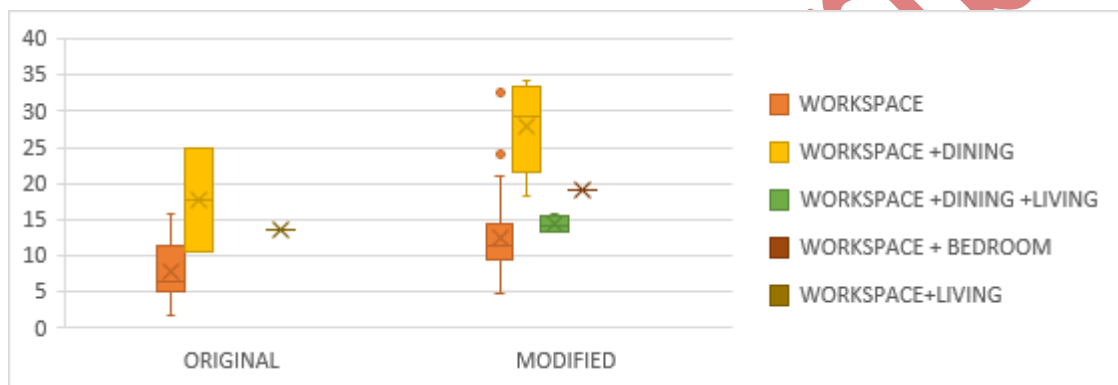


Graph 1: Possible space in the house to be a workspace without a dedicated area.

The KIIs rate the available space and the type of furniture in-house, and Graph 1 above shows that the highest-rated space is a kitchen with a dining table and a dining chair. The least suggested space to be a workspace in the bedroom. The most common rationale for KIIs is that the bedroom is a resting area designated for restful activities. However, among all the in-house

spaces, the rates were not as different. In this discussion, some KIIs believe that if there is a comfortable workspace, users can work anywhere in the house. In this context, work-from-home practices require changes in certain behaviors, such as using the Pomodoro technique. Some studies identified three tactics for creating a workspace at home: positioning the workspace in the house, creating a workspace with objects, and choreographing the workspace into their bodies (Bernal, D. M., 2026). By considering similar ideas, the influence of furniture design indeed supports the second hypothesis of the studies.

Of the 30 original floor plans, 26.66% lacked a workspace. 16.66% of the original floor plan is multi-functional space, which includes working activity, and 53.33% of it specifies workspace area. After the discussion with KIIs, all the floor plans include a workspace, either as a multi-function space or a dedicated area. The modification shows that the number of floor plans with workspaces in multi-purpose areas has increased to 22.5%. The rest of the floor plan indicates specific workspace areas.



Graph 2: Space Percentage of Workspace in the floorplan.

Graph 2 shows that the original plan has the highest percentage of space area, a multi-functional space combining workspace and dining, and the same is true for the modified floor plan by KIIs. However, an added variety of multifunctional spaces in the modified space compared to the original floor plan. Compared to the early thoughts, KII did provide an optional combination of multifunctional spaces; the largest in the first section is the kitchen area, which is equivalent to the dining area.

Both the original and modified floor plans are segmented by space function, and only the area for working activity is calculated as a percentage for each floor plan. The original floor plan has the largest workspace area of 71.466 sq ft. It is a multifunctional space for dining and work. The smallest workspace is the dedicated area, which is 6.506 sq ft. Meanwhile, after the discussion and implementation of the workspace, the largest workspace among all the floor plans is 88.358 sq ft, and the smallest is 17.942 sq ft. Overall, the workspace area after the discussion has increased by 6.38%.

On average, in both the original and modified floor plans, most workspace areas are dedicated rather than multifunctional. This is because the KIIs insist that a dedicated workspace is better. The average percentage size after the modification for the specific space is 12.64%; meanwhile, the multi-functional spaces of workspace, dining, and living account for 27.83% of

the floor plans. In terms of sqft, the average dedicated working area after the discussion area is 41.61 sqft, while the multi-functional space averages 86.54 sqft. Though it is more than double the size of the dedicated space, it is a combination of several spaces. In this case, the more function of the space is used, the larger the space needed or provided.

Table 2: Zonal Type

Type	Description	Floorplan descriptive
Close	Separation by a concrete wall	 <p>The floorplan shows a rectangular room layout. At the top is a balcony with a toilet and an A/C unit. Below the balcony is a bedroom with a bed and a window. To the left of the bedroom is a staircase. Below the bedroom is a living/workspace area with a table and chairs. Below the living/workspace is a dining area with two chairs. Below the dining area is a kitchen with a sink and stove. At the bottom is a bathroom with a toilet and sink. Solid walls separate all these areas.</p>
Semi-close	Half separation by a concrete wall/which can be adjusted to open and close. This type of zone is usually applicable to multifunctional spaces. Therefore, the type of furniture in here is more flexible to fulfill the activity. For example, the Murphy bed that can hide the mattress and change into a working desk.	 <p>The floorplan shows a similar layout to the 'Close' type. It includes a balcony, bedroom, living/workspace, dining, kitchen, and bathroom. However, the wall between the bedroom and the dining/living/workspace area is shown as a dashed line, indicating it is a half-separation that can be adjusted to open or close. The furniture in the dining/living/workspace area is more flexible, including a Murphy bed.</p>

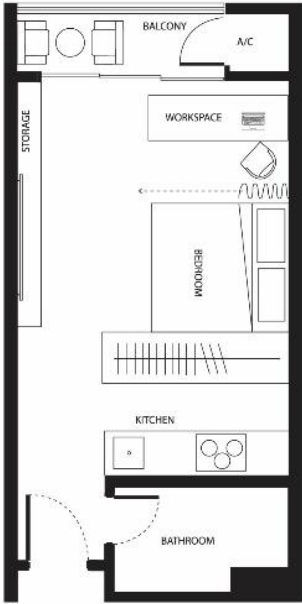

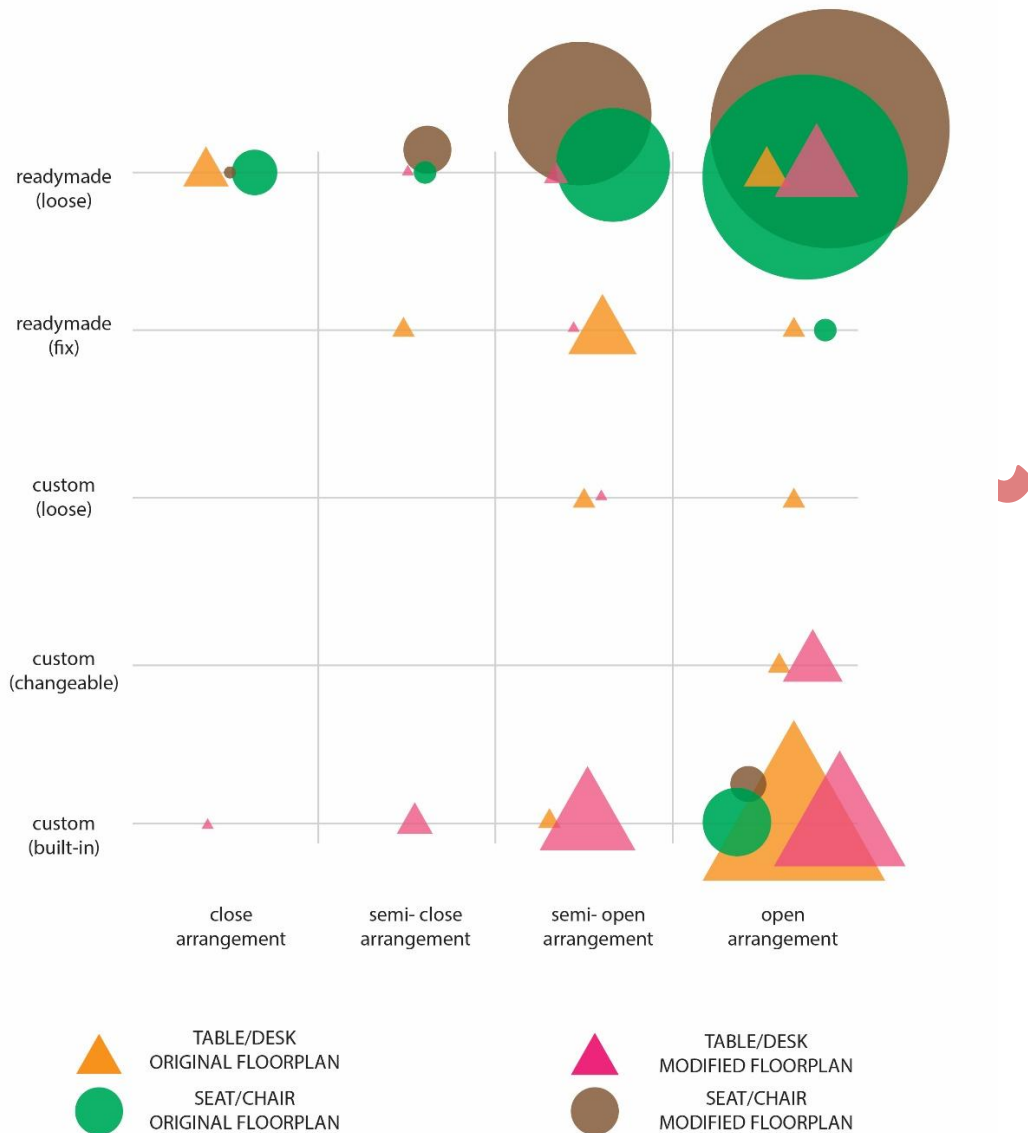
Type	Description	Floorplan descriptive
<b>Semi-open</b>	No separation by any wall; - using the 3 <sup>rd</sup> material or product to create the separation, such as vertical shelving, screen divider, or curtain that can be adjusted. This method is useful to create temporary privacy for the user.	 <p>The floorplan shows a rectangular room layout. At the top is a balcony with an A/C unit. Below the balcony is a workspace area with a desk and chair, separated from the rest of the room by a screen divider. To the right of the workspace is a woodier area. Below the woodier is a kitchen area with a sink and stove. At the bottom is a bathroom. A storage area is located on the left side of the room.</p>
<b>Open</b>	No separation: the furniture arrangement and its function define the zone. In this arrangement, the type of furniture typically determines the zone. For example, the bedroom area is limited to surrounding the bedframe. This type of zone also has high potential to create multifunctional spaces.	 <p>The floorplan shows a rectangular room layout. At the top is a balcony with an A/C unit. Below the balcony is a bedroom area with a bed. To the left of the bedroom is a dining/workspace area with a table and chairs. Below the dining/workspace is a kitchen area with a sink and stove. At the bottom is a bathroom. There are no physical walls separating the zones.</p>

Table 2 above shows the zonal type determined by the author, which in turn affects the KII's recommendation for the furniture type. Therefore, this addresses the third hypothesis, which depends on the furniture arrangement and the positioning of the workspace in the house, which will affect the selection of the furniture design. For example, in an integrated multifunctional space like a dining room and workspace, a set of desks and chairs may remain for eating activities; however, the user may use the furniture as a temporary workspace. Therefore, supporting furniture, such as storage to put all the working materials, is essential for switching between activities.



Graph 3: Open-closed arrangement relationship with the type of furniture (Source: Author).

Graph 3 shows that the larger the shape, the more types of furniture were selected by KIIs for the arrangement. In the relationship graph above, comparing the original and modified floorplan discussed with KIIs, there are slight changes in KII's percentage recommendations.

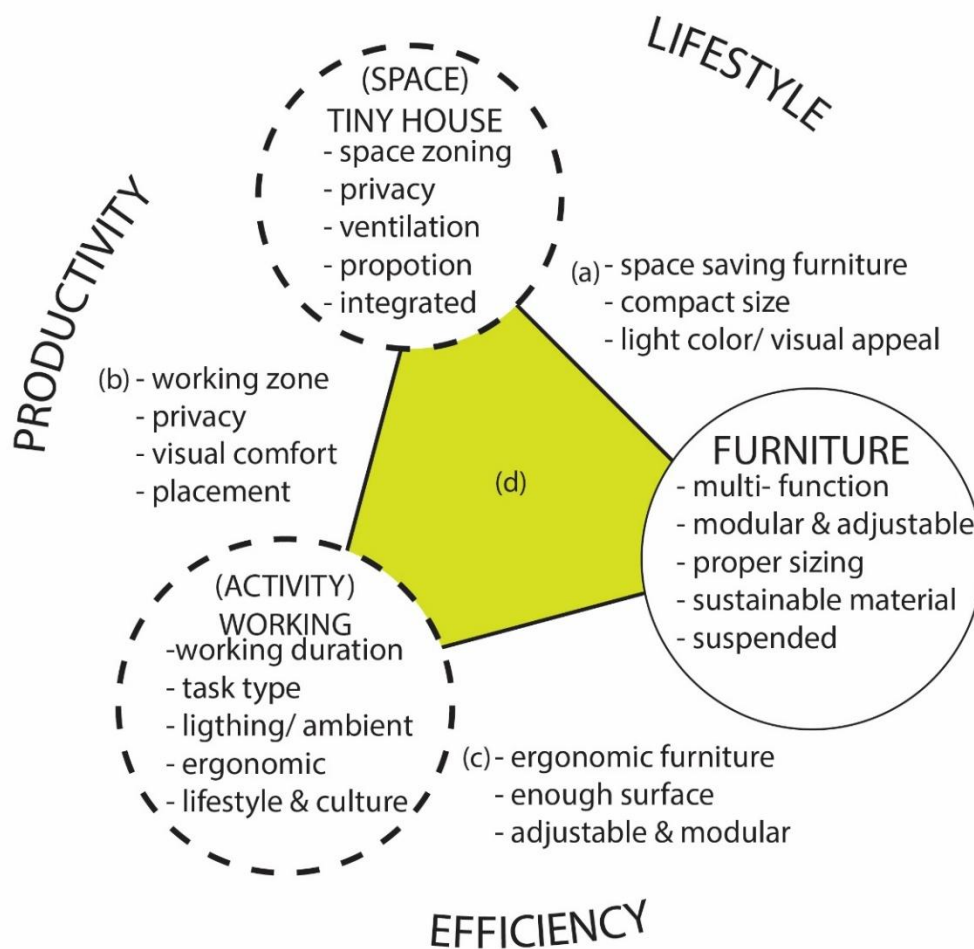
- a. To give the best solution for the tiny house issue, most of the tables or desks are custom-made to utilize every single space.
- b. After the discussion, most KIIs use semi-open space as the standard arrangement. Therefore, more practical materials and products are needed to construct the zonal separation and achieve this arrangement. (Table 2: Zonal type)
- c. Another significant change after the discussion, table or desk for open arrangement, KIIs are suggesting a custom-made design that is changeable or multi-purpose, with these, it is easy to see that the space is also a multi-purpose space.
- d. Evaluating the pattern, the KIIs also show that the chosen type for seating is the loose type. Most of the KIIs mentioned that a specific type of chair is required for work

activities, but this still depends on the user's preferences. However, some KIIs also believe custom-made seats can potentially optimize the tiny space.

- e. According to one of the KII, somehow, it is very unusual to have custom-made furniture but loose unless it is for a rental unit.

In conclusion, the type of furniture is technically important for accommodating the space in the house. Even though the stronger part of the results is mostly observed near the surface for the working activity, there is potential to customize seating furniture as well. This was eventually appointed to the first hypothesis.

On the other hand, the last section of the discussion presented in diagram 5 illustrates the relationship among space, activity, and furniture design, as shown below.



(d) WELLBEING while working in tiny house achieved when each of activity, furniture design and space create a flexible lifestyle, efficient ergonomic and productive environment that served the purpose.

Diagram 5: Categorized keywords into the Conceptual Framework. (Source: Author)

Diagram 5 above is the attributes keyword and statement that undergo thematic analysis from the last section of the discussion. All the keywords are categorized by conceptual frameworks and used to build relationships among them. Overall, the keywords conclude that

to build well-being while working from home, users need a proper working zone that is visually comfortable and well-placed, for example, by a window for a bigger view. This is supported by the study's hypothesis.

Between furniture design and tiny houses (space), the attributes are space-saving solutions, such as compact furniture, and visual appeal. As supported by studies, saving space in spatial design is crucial for optimizing energy use, thermal comfort, and visual comfort (Du, T., 2020). Visual appeal for comfort and to create a sense of comfort through light-coloured furnishings are among the suggestions by KIIs. A study that recreates an interior for a small, limited space, such as a camper van, also suggested light colour furnishing as comfort and coziness (Stoykov, D., 2024). Other studies suggest that using natural colour temperature can improve working efficiency and comfort (Lu, M. et al, 2020).

Between furniture design and work activities, creating an efficient workspace requires ergonomic furniture, adequate space, and an adjustable or modular system. KIIs suggested furniture design that conveys users' needs and behaviour. Meanwhile, furniture in a house reflects the user's lifestyle; as stated by Hareri, R. (2015), furniture serves as a medium for reflecting a building and its owner's identity in a domestic space. However, many studies address the hazards of working from home due to a lack of ergonomic factors, as noted by Cruz-Ausejo, L. (2022). Hence, furniture that fulfils the ergonomic factors, such as a dining table that has an adequate surface and appropriate height, is workable for remote working as discussed in a study (Du, T., 2022).

### **Conclusion**

In this study, the tiny house poses a challenge for the KIIs, who always look forward to suggesting the best configuration for installing a workspace for remote-working users. After discussions with the KIIs, the most common and easy solution to address the limited space is a semi-open arrangement. While a multi-functional space is the solution, it includes a simple detail to address the temporary work zone. A multi-functional space needs multi-functional furniture to support the activity. Therefore, KIIs usual suggestions for the table or working surface should be customized to the available space in the house to fully utilize the limited space. While the seating type remains loose, it gives users the option to shape their living concept. This study shows that the relationship between space (tiny house), activity (work), and furniture design yields 4 attributes: productivity, lifestyle, efficiency, and well-being. For a future furniture designer, answering these 4 questions while designing furniture for a tiny house is a worthwhile process. The author also constructs the framework around the design process of furniture design, not limited to a tiny house as a space and working activity, as the activity column. The same framework could be useful for other case studies. A limitation of this study is that the design-process perspective focuses too heavily on the small number of the KII's ideas. Other than that, the experimental approach is limited since it was conducted online. Hence, it is open to conducting the study from the user's perspective and creating a better environment during the study.

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