Guidelines for Designing Recreational Vehicles Functionality and Interior for Selected Culture

by

Zhengxian Li

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Approved by

Tin-Man Lau, Chair, Professor of Industrial Design
Richard Edward Britnell, Professor of Industrial Design
Rusty R Lay, Associate Professor of Industrial Design

Abstract

The thesis is about creating a guideline to help design recreational vehicles for one specific culture or subculture. It covers a brief history of the birth and development of recreational vehicles, including the predecessor of recreational vehicles, the development of RV camping, significant contributors, and global influence. Moreover, there is discussion about the necessity of culturally oriented design and the cultural influence within the recreational vehicle industry. Recreational vehicle development has primarily occurred in North American and Western regions, but the trend of RV camping is rising outside of these areas. Therefore, a design tool is created to assist recreational vehicle designers in understanding a culture objectively and extracting useful cultural elements that can benefit the design process. Following the tool from three perspectives, cultural, regulatory, and market, designers could have a clear overview of the recreational vehicle industry and market in selected cultures. In order to make the design guideline more reliable, a case study on designing a recreational vehicle considering Japanese cultural influence is demonstrated. Based on the results of the case study, feedback is provided for reference on the effectiveness of the design guideline.

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List of Abbreviations

FCR   Fuel Consumption Regulations

LP   Liquefied Petroleum

MPV   Multi-Purpose Vehicle

NA   North American

NYC   New York City

RV   Recreational Vehicle

RVIA   Recreational Vehicle Industry Association

SUV   Sports Utility Vehicle

US   United States

VPN   Virtual Private Network

Chapter 1

1.1 Problem Statement

North America and Europe have dominated the recreational vehicle market, but there are growing demands outside this area. North America, as the largest recreational vehicle market, significantly influences the development of recreational vehicles, but it also limits the diversity of the design. According to the research report of Yibai Doc (2016), "In 2014, the total sales volume of recreational vehicles was estimated to be 600,000, and the United States had the largest market share of 56.3%. The second was Europe with 31.7%, and the third was Canada with 4.4%." Most companies that design recreational vehicles are from the United States, and almost all motorhome products are targeted toward the North American market. Although North America has the most significant market share, the global market is experiencing steady growth. It is not only people in North America who are interested in camping or traveling with a motorhome. However, a design factor may have retarded the growth of the global market. Most of the motorhomes were designed to fulfill the demands of North American consumers. Many motorhome owners prefer to modify their vehicles through the dealer or aftermarket, especially in Asia. In the study of recreational vehicle modification by Fang (2017), he mentioned that:

> The interior of the motor caravan still has room for improvement to adapt to the
> Chinese lifestyle. For example, the fridge's volume is too large, plenty of stock
> appliances are not used often, and the living space for passengers is too
> small. Also, many of the stock appliances do not work properly due to technical
> and cost problems, which influences the comfort and operability of the motor
> caravan. (p.3)

This indicates that the current motorhome design is not the best for many regions worldwide. Ever since the pandemic, there has been significant growth in the global RV market, and outside of North America and Europe, RV camping has become a more popular choice. However, there is not much research about how to design a recreational vehicle for those cultures. There are few or no local RV manufacturers, and importing from abroad has been quite complicated. The pursuit of RV camping is being impeded by import regulations and the product itself, which is not the best fit for local consumers. All these difficulties resulted in the torpor of the RV industry outside of North America and Europe.

1.2 Need for Study

As the global recreational vehicle market grows over the years, it is worth discussing the design of the recreational vehicle for different cultures. To adapt to different markets across the world, one design of the recreational vehicle is not enough. The various cultures in different regions result in different lifestyles. For example, Asian countries have very different diets compared to European countries, which will result in a very different choice of kitchenware. Also, road conditions and local regulations vary around the world. For example,

> China has implemented fuel economy standards (i.e., fuel consumption regulations, FCR) to reduce greenhouse gas emissions and fuel consumption of on-road vehicles. For heavy-duty vehicles, namely commercial vehicles including various types of buses and trucks, the first-ever mandatory national FCRs were released in February 2014 and have been effective since July 2014. (Wu, 2017)

Therefore, when implementing the design of the recreational vehicle, one design cannot fit both the consumer from Asia and Europe without compromise. Also, cultural reference is an important element for a product to be successful, especially on recreational vehicles. During camping, the recreational vehicle can be considered as the "second home," which is closely related to one's everyday life. It is during one's everyday life that cultural influences are showcased more. There is a great potential for cultural elements to be implemented into recreational vehicle design to change the industry. The most important reason is that culturally oriented RV design is an untouched topic that should be discussed more for the growing demand of the market and for a better user experience.

1.3 Objectives

The following list explains the objectives and processes to develop the guideline.

    1) Understand the Market

With a look at the history and market evaluation of the recreational vehicle, to further understand the value of creating a tool for designing a recreational vehicle. This will include not only the recreational vehicle itself, but subjects related to recreational vehicles that are worth looking at.

    2) Understand the History

Having a complete sight of the development of recreational vehicles. Although the United States dominates the recreational vehicle market and played a significant role in its history, the spread across the world cannot be ignored. The developing history in the second largest market, Europe, and even in the less discussed area, Asia, will be covered.

    3) Research Accurately

To study the history of recreational vehicles, books and magazines will be the first medium to start with. As the contents may be coming form various different regions, they could be in different language and translated into English. Deviation of meaning can happen, but the research will try the best to capture the original meaning.

    4) Understand Recreational Vehicle

For the early study of the thesis, the basic construction of a recreational vehicle will be the second topic to discuss. Current recreational vehicle design will be included in the research and a conclusion of what are the necessities of a recreational vehicle will be drawn. A good existing example may be used as a reference to illustrate what will be a good recreational vehicle design.

    5) Understand Culture

Cultural differences will be addressed as the main focus. There will be study of cultural psychology and how it influences the research and results. Local culture, including daily routines, lifestyle, local regulations, level of urbanization, traditions, and so on, are the comparison subjects. Based on the influence the specific subject has on the use of recreational vehicles, some subjects may be studied more deeply.

6) Research Conclusion

At this point, the research finding according to the study of designing recreational vehicles and understanding the cultural influence will be determined.

7) Research Tool

With the understanding drawn from researching cultural differences, a research tool will be created to help the designer understand the local culture in the view of designing recreational vehicles accurately.

8) Design Guideline

In addition to the guideline on how to design a recreational vehicle, cultural elements will be added. A guideline for the designer to design a recreational vehicle that can fit into multiple cultures, or one specific culture will be completed.

1.4 Definition of Terms

Caravan

Caravan stands for a covered wagon or motor vehicle equipped as traveling living quarters (Merriam-Webster, 2024).

Culture

According to the research, the word culture refers to many different meanings, but most of the time in the discussion it means a group of people who shares similar backgrounds and have a similar lifestyle. The meaning of it can change under different contexts. (Kroeber, 1952; Lin, 2007)

Motorhome

Motorhome typically means a large motor vehicle equipped as living quarters (Merriam-Webster, 2024).

Recreational Vehicle

Recreational vehicle is a vehicle designed for recreational use, as in camping (Merriam-Webster, 2024).

Assumptions

Culture is different throughout the world and each region has its local culture. In different regions, the trend of lifestyle is different; the consumer demand is different. It is assumed that from the local culture, a pattern may be found and could be used as a guideline to design products for the locals. It is assumed that recreational vehicles are one product that can be influenced by cultural elements. And furthermore, diversity, such as designing for local cultures, is important to a product as it can help the product adapt to a more complex market. Therefore, having a more diverse recreational vehicle product line can help it becomes more successful and sustainable. Also, the local culture usually is assumed to be the most historically dominant characters and traditions. But as different cultures meet, some of the characters and traditions may transform and be adsorbed. It is not surprising to find characters and traditions in local culture that are similar to a different culture. Therefore, the local culture in further discussion refers to the local culture at the time of research, and whether the characters and traditions within it will be in different discussion.

Scope & Limits

The study will discuss the cultural differences and influences on recreational vehicle design. What are some differences in lifestyle among various regions, and how will these different lifestyles affect consumers' demands, habits, and choices? The study will also be about how to effectively study a culture to ensure the conclusion is accurate. Moreover, how to apply cultural elements to recreational vehicle design will be talked about. To limit the study, the thesis is more about the cultural aspect of recreational vehicles but not the engineering of the vehicle itself. It's a design guideline and the outcome will be a conceptual idea, but the manufacturing and construction detail will not be covered as much. And the emphasis of the study is on the cultural influence so the engineering part of the recreational vehicle may not be perfect and not all the structures on the vehicle will be considered. While discussing other cultures, the study may not be fully accurate due to cultural difference and observer bias but will try to be as precise and objective as possible. Overall, this is an attempt to apply culturally oriented design to recreational vehicles that may not include every detail of designing a vehicle.

Anticipated Outcomes

After the study, conclusions of cultural influence on recreational vehicle design will be determined and a design guideline will be generated. Based on a list of factors that have effects on the recreational vehicle design, a better decision can be made on the choice of the appliances, layout of the interior, or the necessity of certain functions. In addition, a guideline that designers can follow to do research more precisely and faster while designing a recreational vehicle for an unfamiliar culture will be created. By better understanding the local culture, the designer should be able to obtain a more accurate local consumer demand. At the end of the study, a design project will be conducted with the guideline generated by the study to demonstrate how to use the design guideline. A concept motorhome designed for the chosen region will be presented to support the study. With the research finding about the cultural difference and the design guideline, hopefully, the cultural element in the recreational vehicle design can be emphasized. Moreover, as the global recreational vehicle market expands, the design guideline can help with producing a better recreational vehicle product for the locals, which will help the growth of the market. For the industrial designer, more attention will be brought to the cultural aspect which should lead to a greater diversity of products.

Chapter 2: Literature Review

2.0 Introduction

Recreational vehicles, also known as caravans or motorhomes, are a modern mode not only for camping or vacation travel but also for tailgating traveling with pets and business and as a preferred mode of transportation for outdoor sports and other leisure activities. It is hard to determine where recreational vehicles originate from. However, looking at the development of recreational vehicle camping, the recreational vehicle has been carried forward and has become popular in North America. However, the trend of recreational vehicles did not just stop in North America; it seems to have become a more and more popular choice for travel and camping around the world.

2.1 History of Recreational Vehicles

2.1.1 The First Recreational Vehicle

In the early twentieth century, the concept of recreational vehicles was introduced in America. In 1905, one of the first recreational vehicles was built by Roy A. Faye and Freeman N. Young. But the model was still rough and simple in that it only had incandescent lights, a bed, an icebox, and a radio built on an automobile chassis. In 1915, the first influential recreational vehicle was built by Roland and Mary Conklin, called the Gypsy Van. They modified a bus to equip a full kitchen, an electrical generator, and incandescent lighting, a concealed bookcase, Pullman-style sleeping berths, a folding table and desk, convertible sofas with pillows, a variety of small appliances, and even a "roof garden." The Gypsy Van supported a family traveling from New York to San Francisco. According to Young (2017), "of course, the vehicle might have remained nothing

more than a local oddity, but, according to Roger B. White, it 'influenced the design of camping vehicles for decades' because the family journey in it from New York to the Panama-Pacific Exposition in California was 'widely publicized' in American newspaper and magazines" (p.211). It was not the very first approach to the concept of a motorhome, but the Gypsy Van was the most influential one at the time. Moreover, according to Young, 2017, this was the first time the public knew the concept of a motorhome, and a lot of the motorhomes later were improved based on the Gypsy Van. It is also the first time that recreational vehicles have become an option for camping and traveling (p.212).
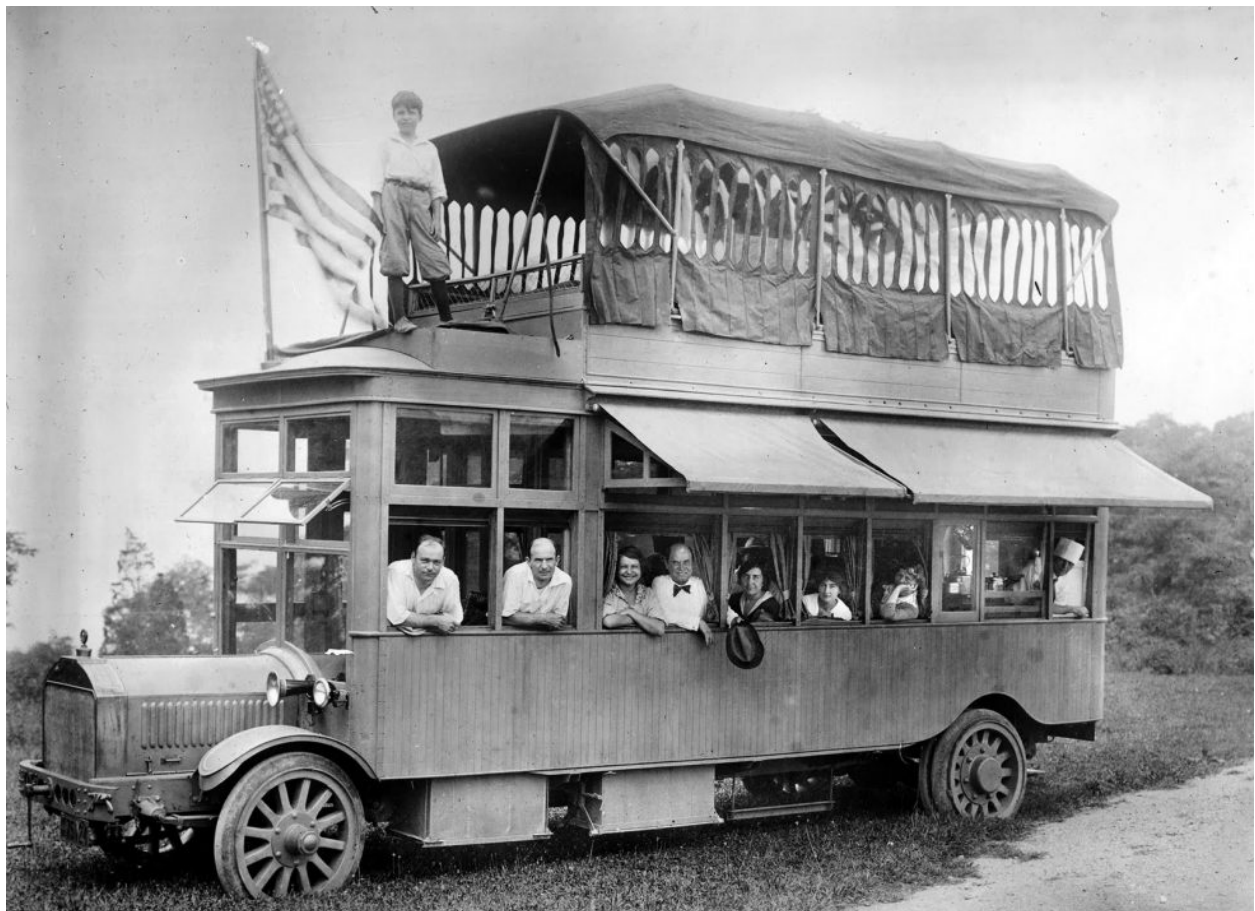
Figure 1. The Gypsy Van (Hinckley, 2020).

2.1.2 Camping with Recreational Vehicles

According to Young (2017), when the Gypsy Van caught the public's attention, different types of recreational vehicles were considered for production by companies like Curtiss Aeroplane and Motor Company of Buffalo and Hammondsport. Travel trailers were the first type of recreational vehicle that were mass-produced. Unlike the Gypsy Van, a travel trailer is a modified trailer with a bed, kitchen, and other camping appliances incorporated that can be towed by automobile. But the Gypsy Van is a motorhome, or it can be called a caravan, which itself is a fully functional automobile with appliances. Rather than purchasing a new automobile, an add-on trailer seemed more accessible for the consumer. In 1908, the first affordable automobile, the Model T manufactured by Ford Motor Company, was sent to the mass-produced assembly line. As automobiles were much more accessible than before, travel trailers found their market value.

> For any camper who sought (and could afford) to smooth the roughness of an
> adventure, the appeal of motor homes was simple and clear: the ease of camp
> establishment and an enhanced sense of freedom. An auto camper had to erect a
> tent, prepare bedding, unpack clothes, and establish a kitchen and dining area,
> which could take hours. The motorhome camper could avoid much of this effort.
> (Young, 2017, p.211)

Traditional camping is not a low-barrier activity. Climbing and backpacking require a certain level of skill, like being able to enjoy climbing, physical strength and endurance are needed. Spending nights outside can be very challenging without practice or training. However, travel trailers lower the barrier for the public, which makes camping closer and easier for almost everyone.

2.1.3 Journey of Ferguson's Family

Melville F. Ferguson, a reporter for the Philadelphia Record, was famous for his Motor Camping on Western Trails. Ferguson and his family, seven members including three college-aged daughters and a seventy-eight-year-old mother, trailer camped eighteen-thousand miles across the West and around Hawaii from June 1923 to Jun 1924. As the Ferguson family planned the journey, they realized that the other campers did not face too much inconvenience as they camped only for a week, but a solution had to be found for the Ferguson family to support their journey that lasted a year. With eight on the journey, they decided on auto camping with both of their cars and listed out all the equipment and daily necessities they needed. But then they quickly realized that it was impossible to load this much gear on the car, so according to Ferguson, 1925, "it dawned on us that we were about to assay the impossible. It was then that we determined upon trailers" (p.132).

2.1.4 "Covered Wagon"

In 1928, four years after the Ferguson family's journey, Arthur G. Sherman and his family headed out from Detroit to upper Michigan. They had purchased a tent trailer that advertised that it could be fully opened in five minutes. Unfortunately, Sherman did not test it out before the trip, and a rainstorm came with no sign. Sherman and his family spent an hour in the rain trying to set up the tent, but because of the strong wind, they never succeeded. This experience gave Sherman the inspiration for a solid body trailer. Later, in 1929, Sherman had a carpenter build his designed "Covered Wagon" for him for about $500. In the summer, Sherman and his

family went on travel with this "Covered Wagon," which attracted many campers' attention. According to Young (2017),

> In 1929 fall, Sherman built two additional Covered Wagons. One was for a friend, but the other one he kept and displayed as a model at the Detroit Auto Show in January 1930. He set the price at $400, which was expensive, and although few people came by his display, those who did were 'fanatically interested.' By the end of the show, Sherman had sold 118 units, and the Covered Wagon Company was born. (p.221)

It is the first modern travel trailer, and the Covered Wagon Company became the largest trailer producer in the market in 1936, selling approximately 6,000 units. Although a factory-built solid-body trailer was still a luxury for the average American family, the market for travel trailers still grew over the years.

Figure 2. Covered Wagon (Tin-Can-Tourists, 2023).

2.2 Cultural Influence on Recreational Vehicles

2.2.1 Camping Outside of America

In the book Fifth Avenue on Wheels written by Wally Byam (1953), the founder of Airstream

Company, trailer camping is promised "to lose yourself mentally, to slow down and to be free of

time constraints" (p.72). In the book, Byam (1953) mentions, trailer camping is not just an

outstanding way of connecting in America, but it is also the best way "to get the low down" in

foreign areas. A travel trailer allows a closer look at the local culture, "and when you have

finished your leisurely journey through that land, you know more about the real thoughts and

conditions of the people than any congressional junket that ever went on an investigating

mission" (p.75). Byam encouraged Americans to travel across the border to Canada and Mexico,

which Byam did himself. The travel trailer was discussed not only in America but also outside of

America. In June 1954, the Airstream Company launched the Caravanner, and Byam touched on

the benefit of trailer camping overseas:

> You stop by the wayside and get acquainted with the people who live there. They
>
> are always glad to meet the trailer traveler, and whether you speak their language
>
> or not, you soon become friends with them. You learn what they are thinking
>
> about, what their problems are, what their hopes are, and what makes them
>
> tick. You get close to the people and close to the soil. (p.125)

2.2.2 Recreational Vehicles in Britain

While recreational vehicles have just started to develop in one region, it is the time when cultural

elements have the biggest impact on design. In Britain, the recreational vehicle industry, usually

called caravans, was right in its early growth period. Because it was still a new concept inspired

by the Gypsy wagon, nobody knew what a caravan should be like. Caravan designers took whatever they were familiar with, dumping it into the caravan design. Mrs. Jarley's is the very earliest caravan built by Charles Dickens in 1840 in Britain. As Woodmansey (2022) noted, it was "constructed after the fashion of a berth on board ship" (p.32), and it's easy to associate with Britain's geographic location. Britain is surrounded by the ocean.

2.2.3 Mrs. Jarley's Caravan

It was not a shabby, dingy, dust cart, but a small little house upon wheels, with white dimity curtains festooning the windows and window shutters of green picked out with panels of a staring red, in which happily contrasted colors the whole concern shone brilliantly.' Dickens notes that the interior of Mrs. Jarley's caravan was 'constructed after the fashion of a berth on board ship', an early reference to the influence of ship accommodation on caravan design.

(Woodmansey, 2022, p.26)

Britain's trading heavily depended on ships, and the country used to have one of the strongest navies in the world. Therefore, the berth-like design is possible influenced by the navigation/sailing culture in Britain.

2.2.4 World War I

The design of the first motor-drawn caravans in Britain after World War I was influenced by two different forms of wartime transport. These distinguished British motor-drawn caravans from those of other countries and gave Britain an

early lead in the development of this novel form of RV. (Woodmansey, 2022,

p.43)

The Ambulance Trailer (1914) and the Eccles Caravan (1919) were the earliest British caravans.

Their design was influenced by wartime transportation (Woodmansey, 2022). That was the time

World War I just ended, and the wartime culture inherited the caravan design. This could also be

an example of culture influencing RV design.

Figure 3. Eccles Caravan 1919 (Tin-Can-Tourists, 2023).

2.2.5 Streamline

Around the beginning of the nineteenth century, there was a trend of "Streamline" design.

According to Woodmansey (2022), Streamline was frequently used in automobile design.

Designers like Dennistoun Burney, who used to be an aircraft designer, have applied streamline

to car design and created some amazing works (p.42). With the "streamline trend" influence,

having a streamline curve roof on caravan became popular. This is a great example of how

subculture affects the design of recreational vehicles. Streamline was a concept first applied on aircraft to reduce air resistance, and then slowly became an aesthetic element applied to automobile design. The use of streamline on recreational vehicles wasn't because of its functionality but simply the aesthetic. The designer did not calculate the air drag but still advertised streamline as a cool feature that has a practical function. In Figure 4, according to Woodmansey (2022), is the Nelo Pemberton Billing's Road Yacht, towed by a 38hp Lanchester and itself mounted on a Lanchester axle from 1909, the caravan had a streamlined roof and all-rounded square windows (p.43).

Figure 4. Nelo Pemberton Billing's Road Yacht (Woodmansey, 2022. p.43).

2.2.6 Romany

Romany comes from the Roma, who spread from Europe and now are residents all around the world. They were usually described as "thieves," "beggars," and "swindlers who rig the festival games." According to Smyth (2019), they have been discriminated against in Europe for centuries, and the term gypsy was generally applied to the Roma people (para. 3). The Romany people did not tend to have marriages with other ethnic groups. Maybe because of the discrimination, or their migratory culture, or maybe they don't get along well with locals; they often migrated in their caravans or wagons.

2.2.7 Romany Camping Culture

In the modern day, this history could be the main reason why so many Roma still have a traveling life. The Gypsy RV culture should be deeply related to the migratory culture. Therefore, while designing an RV for the Roma, considering them a cultural group here, the migratory culture could be an entry point. In addition to history, discrimination does not sound positive, but some other cases could be used for branding. The same thinking process could be used for another culture, too. Looking deep into the spirit of the culture, through the history, and the development of the culture group, the designer could find the elements that are related to RV culture and use these elements to rebrand the RV, like the "road trip culture" to Americans, the "migratory culture" to the Roma.

2.3 Recreational Vehicle Market

2.3.1 Why Marketing

Marketing is also an important sector to consider while discussing a product. "Nothing really happens until the product is sold.' This statement emphasizes the fundamental importance of marketing to business organizations. In fact, successful marketing is essential for survival in the American economic system" (Bennington, 2004, p.1). There is no doubt that most products are designed to be sold and sold well. The recreational vehicle is relatively "new" compared to a lot of the products that we use daily, like furniture, cameras, or even the phone. Therefore, it is necessary to understand the market value before designing a recreational vehicle. What brings the recreational vehicle to the public, and what will it lead to?

2.3.2 Prospect of the Recreational Vehicle Market

Research by ResearchAndMarkets.com (2022) indicates that the recreational vehicle market has a large potential and is having rapid growth. "The recreational vehicle market was valued at USD 48.8 billion in 2021, and it is expected to reach USD 70.7 billion by 2027, registering a CAGR of about 6% during the forecast period (2022 - 2027)" (ResearchAndMarkets.com, 2022). COVID-19, when a lot of things were in lockdown, impacted the sales of recreational vehicles. But it didn't take long for the industry to experience recovery, and consumers often prefer to stay in caravans rather than hotels. In addition, the pandemic amplified the desire for the consumer to travel to get away from home and work life. Therefore, due to the growth in consumer demand, the need for recreational vehicles has increased significantly. During post-lockdown, notable growth was witnessed across the globe, especially in North America and Europe.

2.3.3 North American Market

North America is likely to lead the market of recreational vehicles, and one of the reasons is the various recreational and camping activities. "RV is highly popular among Americans, and over 11% of households own it. More than 13,000 privately owned and 1,600 public campgrounds within the United States enable individuals to experience camping activities with their recreational vehicles" (ResearchAndMarkets.com, 2022). Americans began camping or traveling with caravans as early as 1915, and after more than a century, the amount of recreational parks and camping grounds is considerable. The camping system with caravans is complete. Problems like hard-to-find campsites or famous sites that are not supported by caravans are mostly solved. On the other hand, the market environment is not as complete as in America, but it is growing. As the popularity of recreational activities grows, the recreational vehicle market is expected to expand.

Recreational Vehicle Market - Growth Rate By Region (2022 - 2027)
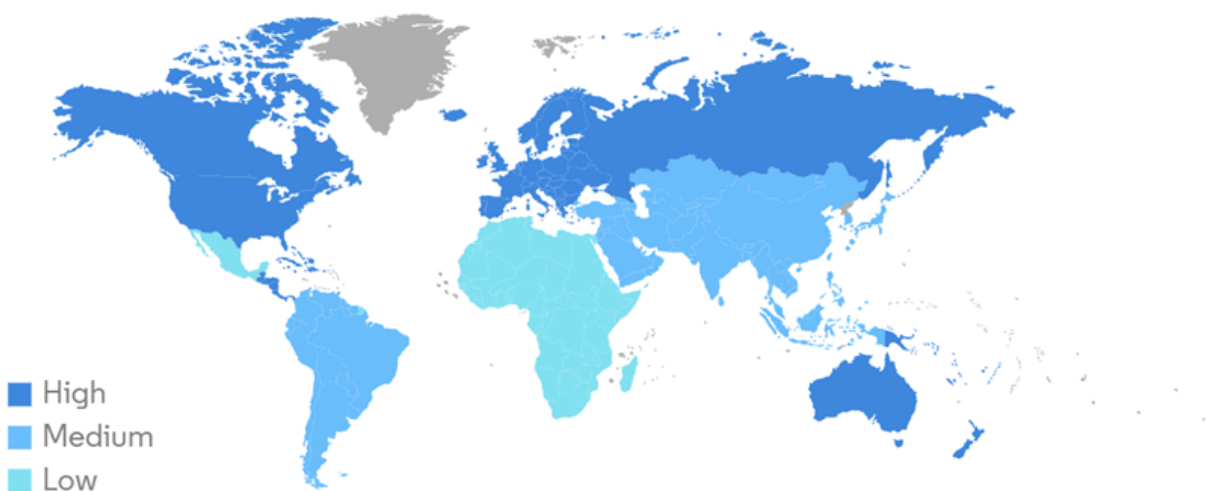
Figure 5. RV Market Growth Rate Predict 2022-2027 (ResearchAndMarkets.com, 2022).

2.3.4 Global Market

Although America is in the leading position in the recreational vehicle market, the tendency for market growth is on a global scale. According to research data from ResearchAndMarkets.com,

> For instance, in 2019, in Germany, about 55,000 units of new motorhomes were registered, which increased to more than 78,000 units in 2020. The growing number of motorhomes continued in 2021, too, as over 82,000 units were registered in the country. On the contrary, compared to 2020 and 2021, there was a 13% dip in new registrations of caravans. (ResearchAndMarkets.com, 2022)

The pandemic did not affect the choice of using caravans at all, but in fact, the pandemic has excited the growth of the recreational vehicle market. During the post-lockdown period, people wanted to go out, and camping seemed to be the choice. The regulations during lockdown limited recreation activities encouraged being stuck at home and required masks outdoors. These regulations intensified people's wishes for outdoor recreation activities. Camping, as a low-barrier but entertaining activity, has become the first choice for most. This trend has been seen most conspicuously in America due to the complete camping system. While the pandemic took over the whole world, the global market of recreational vehicles was stimulated.

2.3.5 Market Conclusion

The recreational vehicle market leans heavily on North America today, but it also means the global market still has a large potential market. ResearchAndMarkets (2022) states that the

> RV is highly popular among Americans, and over 11% of households own it. Over 1 million households in the United States live full-time in RVs. It allows traveling at 20-60% less cost, which drives the popularity of recreational vehicles

among millennials. The recreational vehicle market contributes an overall USD

114 billion to the US economy, employing over 600,000 people.

The United States contributes more than 90 percent of the market share in North America. However, Canada is expected to hold more than 10 percent in the next five years. It is reasonable to say that the United States has dominated the recreational market for the past decades and will continue to do so in the near future. Yet, this situation is hard to consider perfect for the market. Once North America represents most of the recreational vehicle market, the market will follow the demand, which seems like it is happening. In other words, recreational vehicles will be "designed for" North America. However, the culture is different across the world, and the user scenario varies. North America cannot represent the whole world. It is important to address the cultural elements while designing the recreational vehicle so that it fits the local market best. Therefore, as the recreational vehicle market quickly grows, a guideline for the designer to design a recreational vehicle that fits into multiple cultures, or one specific culture is necessary.

2.4 Cultural

2.4.1 Explanation of Culture

Over the years, the term "culture" has been defined in many ways under different academic disciplines. The meaning of culture changed with the times, with different languages and with different backgrounds. It is such a complicated concept to define. In the book Culture: A Critical Review of Concepts and Definitions by Kroeber in 1952, there are over two hundred different definitions of culture listed. It is constantly being debated, and the truth is that there may not be a right answer. There was never one definition widely accepted by everyone. "Different definitions of culture reflect different theoretical bases for understanding, or criteria for evaluating human

activity" (Lin, 2007, p. 77), a statement which may refer to the idea that one's cultural background can influence one's perspective on the understanding of culture. It seems the term "culture" is undefinable. However, the purpose of the study was never to find only one definition of culture but to try to understand how culture influences the user experience of the product. The different perspectives on the definition of culture could be helpful for understanding the differentiation of culture. In the study of recreational vehicle design, culture should be a tool to guide the design process. During the course of learning about local culture, designers should gain a deeper understanding of the true demand through cultural understanding rather than just researching demand directly.

2.4.2 Culture-Oriented Design

Cultural elements also play an important role in introducing new products to the market. "In this global market-local design era, connections between culture and design have become increasingly evident. For design, cultural value-adding creates the core of product value" (Lin, 2007). Several examples provided in Lin's article have proved the positive influence of applying cultural elements on products. In Figure 6 are products inspired by Taiwanese Tao culture by Lin (2007). Tao people are indigenous people living in Taiwan, and they have a tradition of building canoes. They live by fishing and usually bring a holy dagger with them going out to the sea. The holy dagger is also a symbol of safety in their tribe.
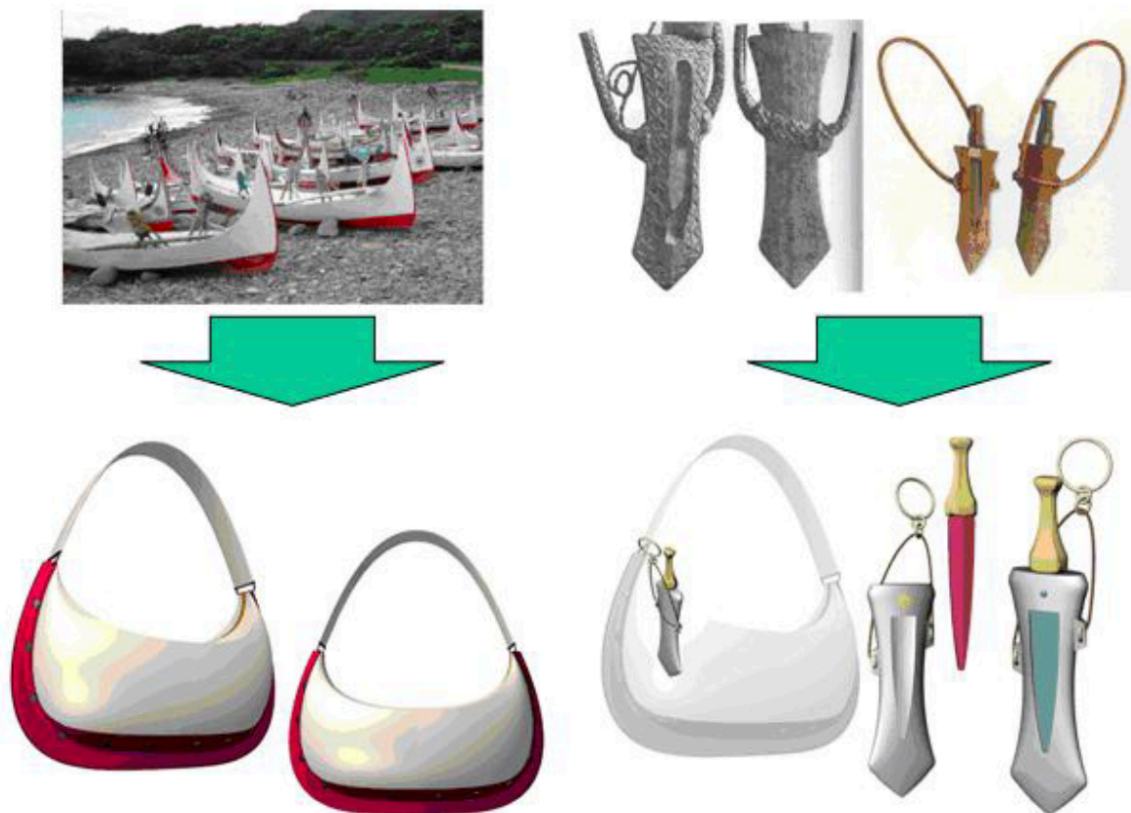
Figure 6. The Cultural Product from Pin-Ban Boat and Holy Dagger (Lin, 2007).

But then, culturally oriented design is not just limited to the local market; there is a chance for it to become successful all over the world. A great example is how Japanese design became so influential. There are a lot of elements inspired by Japanese tradition incorporated into their design. The lobby of Okura Hotel in Tokyo, designed by Taniguchi Yoshiro, is influenced by the concept of "Shibui." Shibui is an idea of "elegance and refinement, sophisticated and simplicity, tranquility, natural imperfection, and modesty." It is related to the Wabi-Sabi style of the Japanese tea ceremony of Chanoyu. (Sigur, 2008)

Figure 7. The Lobby of Okura Hotel (TheOkuraTokyo, 2024).

With the spread of Japanese culture, by arts, films, and many other entertainments content, these Japanese cultural elements started to become attractive for people around the world. As the value of Japanese culture keeps growing, the products inspired by it receive additional value. In other words, a good, culturally inspired product is timeless.

2.4.3 Cultural Fusion

Globalization is not an unfamiliar word for the twenty-first century. Different cultures meet and mix so that a lot of people think the whole world is the same. A large number of products were designed for "everyone," removing the identities from the product as much as possible so that it could be adapted to all users in the world. It is undeniable that this strategy brings great success to a lot of the products, but this is not the perfect strategy for all. Cultural fusion happens when

two different cultures collide and begin to mix together, which is ongoing everywhere under the globalizing background. In theory, all the different cultures around the world will merge into one big culture, so then there is no point in designing a product for different cultures. However, cultural collision does not end with merging all the time. In fact, according to Van Raaij (2005), with more international communication and exchange, there is a defensive attitude toward local culture and regional identities and a fear of cultural fusion (p.5). A large number of long-term exchange students, after studying in a foreign country for a long time and getting to know a brand new culture, gain more acceptance of their local traditions. There are some habits related to one's cultural background that remain common within that culture. But when living in a different culture, these habits become special, not only to the surroundings but also to oneself. These habits usually represent the characteristics of the culture. When everyone around is nearly identical to you, it's hard to realize how different and special you are. Therefore, under globalization, cultural differences are not likely to disappear but instead even increase. Getting in touch with new cultures makes one compare, and then the differences that were

not noticed become obvious.

2.4.4 Trending

Research by Shinde and Jain, which was introduced in 2016, discussed methods of how to design motorhomes for Indian families. A survey gathered two hundred respondents from different cities in India and collected various opinions about motorhomes. However, the research was largely about purchasing tendencies and preferences for functions. There was no investigation into Indian culture. Shinde and Jain (2016) have made several suggestions for Indian RV manufacturers, but the recommendations are brief and broad. In Figure 8 is a chart showing the

Indian car industry is shifting from two-wheelers to four-wheelers. The government is encouraging foreign companies to invest in the Indian car industry. The sales analysis reflects the strong growth in Indian domestic car sales. It is good to know about the local voice, what the consumer wants, and what is selling the best now. However, it's not enough if the designer really wants to incorporate culture into the design that can resonate with the consumer. While collecting consumers' feedback about a product, it does not one hundred percent represent the actual demand. Consumers can only see what's on the market now and give feedback based on existing products. The only way to test out a new product, in the extreme case, is when it is released to the market. To increase the chance of success, far-sighted research study before and during product development is necessary. Studying the local culture is a perfect way to start the research and achieve accurate results. Culture briefly summarizes the characteristics of one region, which can be used to better predict the trend and future market on a larger scale.

COMPANY		JULY	
PASSENGER VEHICLES	**2014**	**2015**	**% CHANGE**
Passenger Cars	137,922	162,022	17.47%
Utility Vehicles	45,023	45,191	0.37%
Vans	16,617	15,155	-8.80%
Total passenger vehicles	**199,562**	**222,368**	**11.43%**
COMMERCIAL VEHICLES			
M&HCVs			
Passenger carriers	2,950	4,440	50.51%
Goods carriers	14,859	18,621	25.32%
Total M&HCVs	**17,809**	**23,061**	**29.49%**
LCVS			
Passenger carriers	4,305	4,692	8.99%
Goods carriers	25,661	24,042	-6.31%
Total LCVs	**29,966**	**28,734**	**-4.11%**
Total commercial vehicles	**47,775**	**51,795**	**8.41%**

Figure 8. Indian Four Wheelers Sales Analysis (Shinde and Jain, 2016).

2.4.5 Cultural Psychology

Psychology is an important bridge between design and culture. Culture is such a broad and abstract concept. Therefore, cultural psychology is a great tool for extracting concrete and useful elements from one culture system. Take the comparison of East Asian and European North American cultures as an example, Richard E. Nisbett and his colleagues (2001) suggest that East Asia should be more holistic, looking at the entire field and assigning causality to it and having a better understanding of object-in-context. European North America is more analytic, paying attention mainly to the object and categories, using rules and formal logic to understand behavior. This discrepancy comes from the different cultural evolution paths. Recent research indicated that East Asia put more of their cultural value in a group, that being a valuable member of the group and having connections with group members generates more positive

feelings (Brown & Kobayashi, 2002). Then, during product development for East Asian culture, the individual value of a group can be a direction for further research. Yet, East Asian culture is still a large, generalized collection of cultures. For each specific and more targeted culture, the conclusion could be off or totally different. The larger scale summary is still able to help with locating the emphasis, giving a target area to dig into.

> Consistent with the finding that those from collectivistic cultures are more sensitive to the relational context than are those from individualistic cultures, group opinions, concerns for in-group benefits, and group harmony play a more important role than personal attitudes and preferences in social interactions for East Asians, and the reverse is true for European North Americans. (Lehman et al., 2004)

While designing for the concerns for in-group benefits, what most consumers want is more important than what every consumer needs. Because the review from the group is an influential factor that affects individual consumer demand, the consumers can purchase products that they don't necessarily need, but because most voices suggest having one of these great products, they feel like they need one, too. Under this circumstance, the consumers may expect every function possible but not just the function needed. In European North America, which is the reverse, personality is more in consideration. The demand for specialization and differentiation is more in the focus. Public review will not be the main driving force that consumers may be looking for the product just enough to fulfill the demand. In other words, being outstanding in one function could be the more competitive approach compared to being general at all functions in European North America.

2.4.6 Cultural Value

"Cultural values represent the implicitly or explicitly shared abstract ideas about what is good, right, and desirable in a society" (Williams, 1970, p.7). Schwartz also explained in his study of cultural values that these cultural values, like freedom, prosperity, and security, are the fundamental standards that tell people what is the most suitable in various situations. And a lot of time, "the social institution like the family, education, economy, implies the priority of cultural values" (Schwartz, 1999, p.12). The concept of cultural values is based on a whole society instead of individuals, so it often reviews the overall characteristics of the culture. While designing the RV, making sure the theme is able to adapt to the value of targeting culture can increase the acceptability of the design. The study by Schwartz summarized the variety of cultural values. "Seven types of values are identified, structured along three polar dimensions: Conservatism versus Intellectual and Affective Autonomy; Hierarchy versus Egalitarianism; and Mastery versus Harmony" (Schwartz, 1999). A detailed explanation of the characteristics of each type can be found in his works. Although cultural values are abstract and recapitulative, studying these values means reducing prejudice towards unfamiliar cultures. The value can function as a summarized portion of the culture, which can be used to better understand the culture. A theory of value by Schwartz (2012) suggests that "values are used to characterize cultural groups, societies, and individuals, to trace change over time, and to explain the motivational bases of attitudes and behavior." (p. 13) People make choices based on their cherished values, and this is rarely conscious in everyday decisions. Through a study of 82 countries, he summarized the ten common values. Self-direction, Stimulation, Hedonism, Achievement, Power, Security, Conformity, Tradition, Benevolence, Universalism. In one culture, there will be multiple values, but they are of different priorities. In Schwartz's theory, values have six features. "(1) Values are

beliefs. (2) Values refer to desirable goals. (3) Values transcend specific actions and situations. (4) Values serve as standards or criteria. (5) Values are ordered by importance. (6) The relative importance of multiple values guides action" (Schwartz, 2012, p. 3).

2.5 Related Field

2.5.1 Limited Space

Similar to a lot of the small interior designs, to make better use of the limited space, there are usually three functional zones in the RV: bedroom, kitchen, and toilet. According to Li and Wu (2021), the living room is not a popular choice in a small interior for space efficiency. Space-saving furniture is often used for practical purposes (p.4).

The furniture existence form	The image display	Advantage	Disadvantage	Relationship with micro building
stretch type		①more space for use; ②does not take up space when hidden	sliding tracks are easily damaged	
fold type		①maximize the utilization of interior space; ②maximize the role of furniture itself	furniture corners are not easy to clean	①increased use space and area; ②the utilization rate of irregular room area can be maximized
axial turn type				
hanging type		use the upper part of the room	not convenient to pick up clothes	

Figure 9. Different Types of Space Saving Furniture and Comparison (Li and Wu, 2021).

Also, according to Frontczak and Wargocki (2011), thermal comfort is the main factor that affects comfort in an indoor limited space environment (p.5). In a smaller space, the temperature heats up faster than in a larger space. This factor could be beneficial in cold weather keeping the indoor environment warmer, but it could also cause stuffiness during hot weather. Yet, thermal comfort does not only mean the right temperature. The weather and interior design could also affect comfortableness.

2.5.2 Cultural Influence in Space Orientation

In a limited space, a sense of wideness is important to make the user feel more comfortable. In fact, the RV class is mostly divided by the size of the space. However, the space inside an RV is basically set as the RV body is usually uniform. Therefore, RV manufacturers have done quite a lot of work to make space look and feel larger than it is. There are several things that may have an effect on spatial perception, like visual, sound, and temperature. Obviously, the one that influences the most is visual. Most of the attempts to enlarge space sensorially are through visuals. Then, how are cultural factors related to enlarging the space? In the book *Culture and Experience*, chapter 9, Irving A. Hallowell started a discussion of how cultural experience has an effect on one's sense of space. "To be spatially oriented in the widest sense, one needs to constantly be aware of his position in the space and the varying relation between one and the objects" (Hallowell, 2012). It is complicated diving deeper into this theory, but to explain it in a simpler way. One only knows about the space one is in, and that sense of comfort and wideness is settled. While entering an unfamiliar environment, every object is unknown, and the layout is unknown. Then what happens is the awareness of self-location is ambiguous, and the awareness of the relative distance between objects' self-location is ambiguous. Irving thinks that this awareness is important for one moving in the space. Susanna Millar also made a similar point in her book *Space and Sense*, "the spatial process are activities of the organism that integrate inputs from diverse sources to act as reference cues" (Millar, 2012, p.121). Psychologically, knowing exactly where you are and the path to where you are going makes you feel safe being in the space. Hallowell makes the point that cultural experience has a great influence on how a person proceeds to perceive space. "When integrated with individual knowledge and experience of terrain, it affords a schema of reference points for topographical"

(Hallowell, 2012, p.125). The past experience related to one's culture provides references for this

person to assess the current environment. A similar reference point helps the person process the

information faster and more accurately. It's why some people do not like being in a strange place

and meeting unfamiliar people; humans naturally repel unfamiliar situations. Therefore, bringing

cultural elements that are common in a person's cultural environment into the designed space can

help reduce the information requiring for processing. This means that the element is not limited

to physical objects that directly connect to the user's experience. But spiritual, mental, and

abstract conceptual elements should perform the same function. In the small space that has

packed in so many functions, by keeping more elements that the user is familiar with to reduce

the information for the user to deal with, the limited space can be a little more friendly and

comfortable.

2.5.3 Technology

As more advanced technologies are established, manufacturers keep thinking about how these

newer technologies can benefit recreational vehicles. Technology like solar panels is widely used

on recreational vehicles now as an option or as a modified aftermarket add-on part. Yet,

according to Rivers (2003), the solar panel systems are not so efficient and are usually used to

power the battery so then the battery can power other appliances. If with enough power, directly

powering all the appliances would reduce the loss of electric power and is better for battery

health. Based on Bani Khaled and his colleague's (2022) studies, a compact heating and cooling

system is being developed for recreational vehicles. The heating and cooling system is necessary

for some areas, but the system usually takes up too much space and is not really efficient. Also,

due to the breakthrough of battery technology, a fully electric recreational vehicle have become

possible. Winnebago company (2024), one of the major recreational manufacturers, has started the project of designing a fully electric motorhome called eRV2 (Winnebago, 2024). Smart home is also a new but potential idea for recreational vehicles. According to Furszyfer Del Rio and his colleagues (2021) research, in Japan, the United Arab Emirates, the United Kingdom, and the United States, smart home technology is able to bring more comfortable and luxurious experiences to users and help reduce carbon emissions. However, smart home technology is generally viewed as leisure and entertainment devices for the affluent. As mentioned by Becker (2022), some other newer technologies including examples like awnings equipped with solar panels, better batteries, fully electric recreational vehicles, 5G internet, NeverDump tanks, glass sunroofs, radiant floor heating, and active noise canceling technology.

2.5.4 Kitchen

Except for the smallest-sized RV, most RVs provide some space for cooking. Dining is an important daily routine, and the kitchen should be considered as the space for it. There is no doubt that every region has its unique food culture. To fulfill the demand for cooking different food, the design of the kitchen should be different, too. According to the study by Chung (2005), the way of using a kitchen varies in different cultures. Columbus, Ohio, and Ulsan, South Korea, subjects utilize microwaves and stoves the most; the involvement and use of the kitchen by spouses in Columbus and Ulsan is higher than in NYC and Seoul. In food preparation, Americans have chosen a mixer, chopper, grill, oven, and toaster, whereas Koreans only chose a rice cooker. The research results show that people may have bias for the tradition, relating tradition to compromise. Yet people have started to realize that the traditional aspect is more appropriate for their lifestyle.
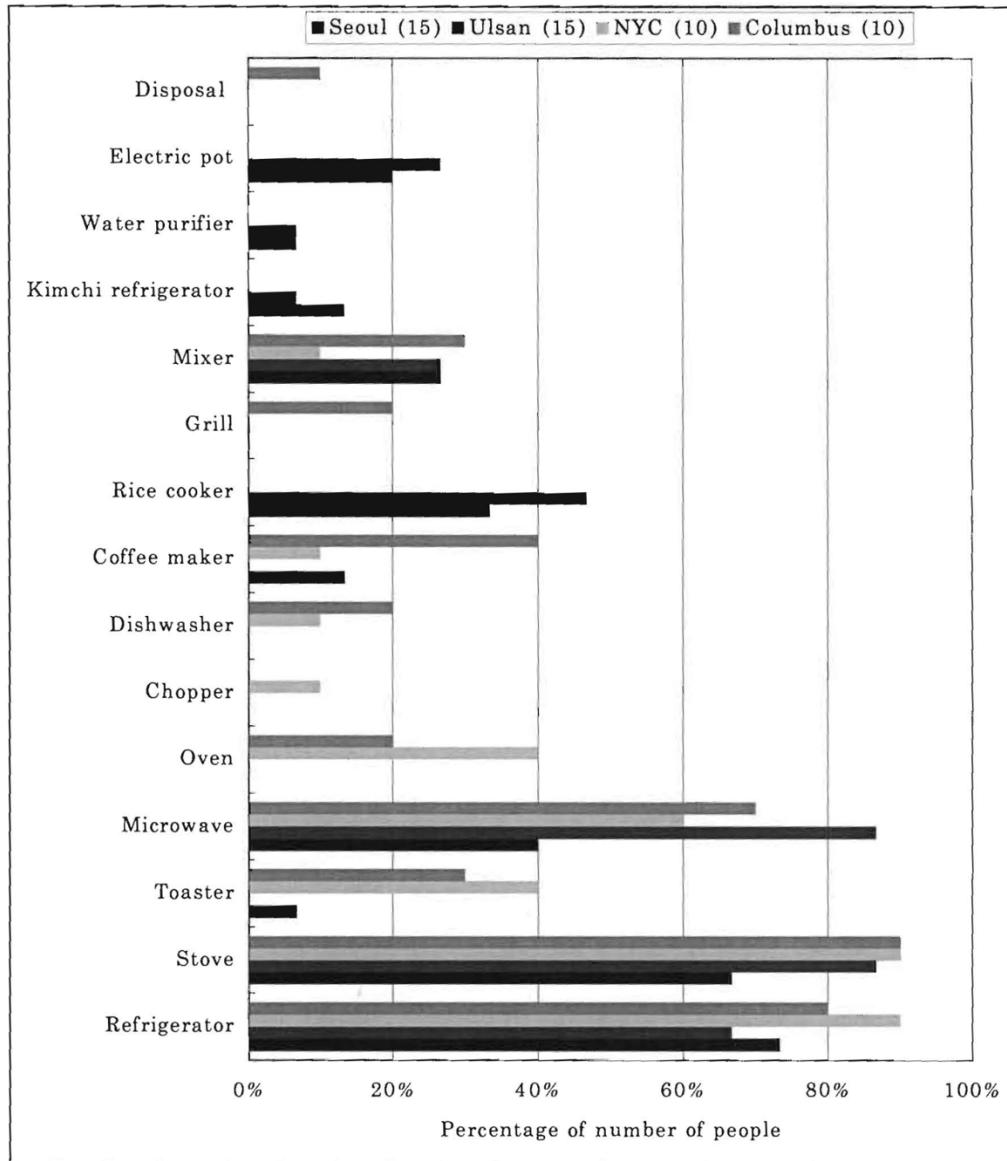
Figure 10. Preferred Kitchen Appliance in Columbus, NYC, Seoul, and Ulsan (Chung, 2005).

Also, the cooking space layout and choice of utensils are influenced by cultural background. According to research by Tao and his colleagues (2019), the Chinese prefer having various kitchen utensils to deal with different styles of cooking and like to have space for operation and storage. The research suggests having a U-shaped kitchen layout and leaving enough space

between the sink and stove for food preparation. There may be similarities in food culture in many places, but there are still differences in the preferences for how to cook, choice of utensils, and more.

2.5.5 Bedroom and Living Room

Sleeping is an everyday activity for everyone, but people's attitude toward sleeping is different. Cheung and his colleagues (2021) have done a study on the sleeping duration investigation for the Canadians and Japanese. He found that people from East Asian cultures, especially Japanese, have shorter sleep durations than people from Western cultures. Japanese people seem to prefer spending more time on other things rather than sleeping. In a study of elderly bedroom preferences in China by Li and his colleagues (2022), the research found that Chinese elderly prefer harder beds, cotton bed sheets as it is nicer to the skin, and bedroom spaces around 15-24 square meters. The elderly could feel emptiness if the bedroom is too big, but activities may be restricted if the room is too small. Cheung and his colleagues (2021) also suggest in Western industrialized society, people prefer sleeping in a dark environment with thermal control and soft bedding. Research suggests that the preference for bedrooms is different between Western and Asian cultures. In research by Ozaki (2002), he investigated the housing choice between England and Japan. The result suggests that English subjects are more concerned about privacy when looking for a new house. The number of bedrooms is an important factor influencing the choice made by English subjects. Yet the Japanese subjects' demand is more abstract. Their preference and ideal is a "comfort" and "homely" house. Japanese subjects have fewer requirements about the bedroom, and they are more willing to stay together with family. Further research suggests that the personal space at home in English is larger than in Japan, where Japan has a higher

demand for all-in-one living rooms. But this has been changing, and Japan has started to develop

more demand for private space. Yet the cultural influence on living space is complex and hard to

determine. The influence is often not only through culture but also through a lot of other factors

like the economy. As more regions started to become modernized and westernized, the cultural

remand began to fade out. According to Atabey (2013), Asians and Americans often choose to

sit at a distance and keep that distance without being in touch with each other. Arabs and

Southern Europeans prefer sitting close and having constant contact. He also mentioned that

Germans prefer to use a large space around them and are more careful when being interrupted

than Americans. The bedroom and living room are like the inverse of each other. According to

Rechavi (2009), the living room is more like a fully public space, and the bedroom is a private

section.

2.5.6 Bathroom

In terms of health and hygiene, the toilet is an important subject to talk about. Research done by

Chen (2010) suggests that the toilet might be the most influential element in an RV. Although all

the participants are from Taiwan, so the result may be different in other areas, it's still a good

reference showing the importance of toilets in RV. In research on the satisfaction of different

toilet types by Tumwebaze and his colleague (2013), the result indicated that clean sanitation and

not being smelly are the top reasons for toilet satisfaction.

Variables	No. of respondents	Percentages
Reasons for satisfaction*		
Clean sanitation facilities and not smelly	232	39.7
Toilet improved type (lined from the bottom)	216	36.9
Toilet used by few people	93	15.9
Facilities easy to clean	32	5.5
Cooperation among sharing households in cleaning the toilet	12	2
Total	585	100
Reasons for dissatisfaction*		
Toilet used by many people	378	36.7
Facilities not clean and are smelly	294	28.5
Bad toilet super structures	155	15
Unemptiable toilets that are full	122	11.8
Toilets filling fast	25	2.4
Toilets far from house	22	2.1
No cooperation among sharing households	19	1.8
Facilities expensive to empty	12	1.2
Using toilets still under construction	5	0.5
Total	1032	100

Figure 11. Reason for Satisfaction (Tumwebaze, 2013).

Squat toilets are widely used in Asian countries such as Malaysia, China, and Japan. There are

over 4 billion people in the world using the squat toilet, and this toilet system is still relatively

unknown to the West (Ling, 2015). A squat toilet is considered the healthier way for the bowel

system compared to the sitting lavatories commonly found in the West (Rad, 2002). Also, water

is considered the more hygienic way for perianal cleaning in many cultures but is barely used in

the West (Othman & Buys, 2016). Showering is also a big part of everyone's daily routine, and

showering plays an important role in culture. A lot of regions have their unique showering

culture. According to Merry (2013), "bathing culture was popularized via Buddhism, and bathing

means more than just the physical act of cleaning oneself to Japanese." And according to

Wójtowicz-Wcisło (2023), a "sweat bath" is a traditional cultural element in Central America,

Poland, and some other regions.

2.5.7 Visual Complexity

According to Kaplan and Kaplan (1982), complexity generates an environment with more information, and information attracts involvement. Involvement is essential to humans to find information that is necessary for survival. Inversely, coherence is part of the informational needs, referring to how easily the environment can be organized and structured. Dale (1982) suggests there may be a preference for different attributes in interior design. Dale's research found that most people appreciate public interior spaces with softer surfaces and plants more than hard angular surfaces with no plants. Yet, Kaplan and Dale's research did not mention the possible influence of different cultural backgrounds and familiarity with the environment. In the experiments by Ham and his colleagues (2004), they investigated how complexity and coherence influence the preferences of American participants and Chinese participants. In the experiments, multiple scenes were set up to reflect different levels of complexity and coherence. In Figure 12, the left interior environment represents a higher level of complexity by its angular form, railings, interior accessories, and lighting condition. The right interior environment represents a higher level of coherence as the spatial configuration is clear and straightforward. Furnishing, lighting conditions, and interior accessories are repetitive and in order.

Figure 12. Complex Interior vs. Coherence Interior (Ham, 2004).

The experiment results suggest that Chinese participants prefer a more coherent interior design, and American participants show more acceptance of complex interior design. Ham and his colleague also did an experiment about American and Chinese participants' preferences for different design attributions, including vertical space and darkness at the focal point. In Figure 13, the left image is one of the experiment environments for the acceptability of darkness at the focal point. The right image is one of the vertical interiors. There are 43 vertical interiors in the experiment, and 3 of them have a dark spot at the focal point.

Figure 13. Interior Environment of Darkness at The Focal Point and Vertical Space (Ham, 2004).

The two interior spaces that American participants preferred more included darkness at the focal point, and the Chinese participants mostly disliked these two interior spaces. Chinese participants show more preference towards the offices setups. The darkness at the focal point can be explained as an element that enriches the interior, adding more complexity to the space. And in the office environment, there are more repeat elements, and the layout is more predictable. Patterns can be found in the preferences of different cultures, but these preferences can change fast. Moreover, based on how the designer defines the cover range of the selected culture, the result could be different. In RV design, considering interior complexity and coherence may influence the choice of furnishing, layout, aesthetics, and more. By understanding the acceptance of complexity, designers can be aware of when to stop adding more elements to the space. In culture-oriented design, to emphasize the culture, there is potential that the designer has incorporated too many cultural elements into the space, which exceeds the acceptability of the consumer. Knowing where the limit is, designers may reduce the amount of elements or find a way to hide some elements that can be less noticeable.

2.5.8 Lighting

Lighting is a big part of interior design. Consumers with different cultural backgrounds may react differently to the same lighting conditions. Research by Park (2010) suggested the different preferences for indoor lighting between Korean and American. According to the result, most Koreans prefers warmer and brighter lighting and Americans prefers warmer but darker lighting. The research result also suggests the preference may related to the lighting conditions found in traditional Korean and American families.

Figure 14. Four Different Lighting Conditions in Hotel Rooms (Park, 2010).

In another study of lighting by Sharma (2016), the research result suggests Persians prefer simulated sunlight, Chinese and the descendants of the British prefer soft yellow and white light, and Southern Asians prefer white and cool white light but do not enjoy yellow light. More investigations have been conducted after the research, which shows the relationship between lighting condition preference and cultural background. However, the results were not always matched, and most participants preferred more contemporary lighting. In Figure 15, it is the case when the expectation of lighting condition is closely matched with the preferred lighting condition. The reason could be the expected lighting is more contemporary.
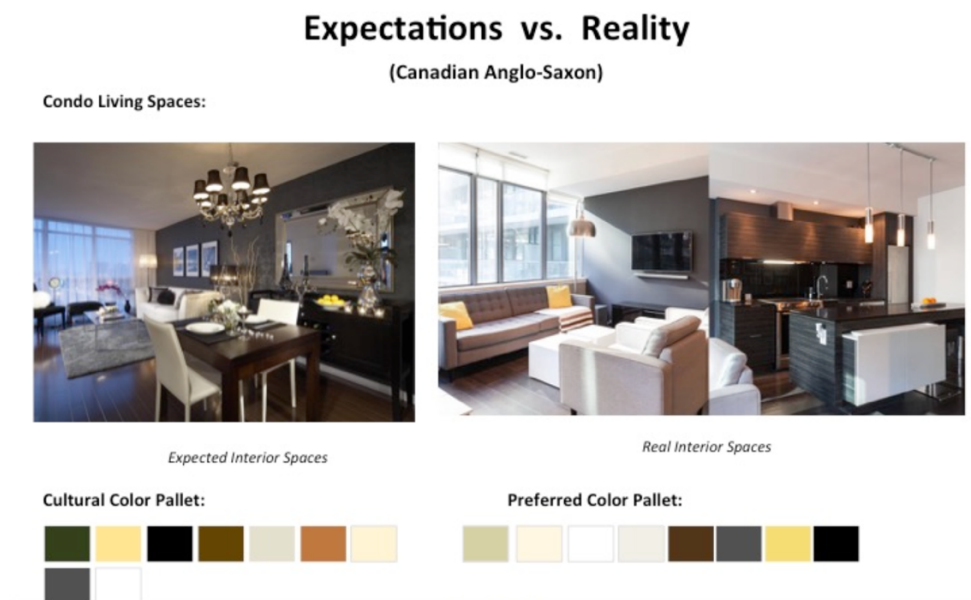
Figure 15. Canadian Anglo-Saxon Participants Expected Lighting Condition vs Preferred Lighting Condition (Sharama, 2016).

In Figure 16, it is the case when the expectation does not really match the preferred lighting condition. The reason could be the huge styling difference between traditional lighting and contemporary lighting.

Expectations vs. Reality
(Persian Culture)

Lighting:

Expected Interior Lighting Multi-colored

Preferred Interior Lighting (Off-white + White)/ Natural Integrated

Space Expectation: Well light Ambient

Space Preference: Well light Ambient (Natural)

Lighting Texture: Bright (Textured)

Preferred Lighting Texture: Bright (Non Textured)

Expected Lighting Color Pallet:

Preferred Color Pallet:

Figure 16. Persian Participant's Expected Lighting Condition vs Preferred Lighting Condition (Sharama, 2016).

With globalization, there is a better chance to know about different cultures and styles than ever before. More and more people appreciate the styling and aesthetic form of contemporary. Yet, due to different cultural backgrounds, the preferences are still various. Although a lighting set that is too different from contemporary style lighting may not be the top choice, having relevant elements to the consumer's cultural background is still effective. Research for the preferred lighting condition in the selected culture could help the design be more friendly to the local consumer. The variables that can affect the light quality can be summarized as color, brightness, intensity, direction, diffusion, and texture (Sharma, 2016). A good set of lighting should level up the user experience a lot.

2.5.9 Color

Color is an important visual element in design. Yet, color is subjective to the human eye. Within different lighting environments, especially indoors, human eyes observe color differently. Therefore, while considering color in the interior, the color shift in different lighting environments should be studied. Acking and Kuller (1968) suggest it is necessary to investigate experiment participants' comments on color within the simulated lighting environment for interior design. In an early study of the cultural influence on color by Garth (1931), he came up with the conclusion that culture, tradition, and custom have a positive influence on color preference. In a study by Saito (1994) about color preference in Asia, the subjects from Tokyo, Taipei, and Tianjin were asked to pick three colors that they liked the most and three colors that they disliked the most and provide reasons. Although all groups have different preferences, the color white is highly preferred. This may relate to the special meaning of the color white in Asian culture. Saito concludes that the associated meaning of color could be an important factor that influences people's color preferences.

2.5.10 Color Palettes

According to Park and Guerin (2002), color palettes are the combination of several colors being used in design considering hue, value, and chroma, as well as color contrast, overlapping, and adjacencies. Park and Guerin did a study about the cultural influence on color preference among English, Korean, Japanese, and American subjects. The tested color palettes are designed through hue, value, chroma, value contrast and chroma contrast. For the design of test palette, "the proportion of the two- dimensional shapes or sections represents the different components in

an interior. Large planes represent the walls, floor, and ceiling. Medium-size planes represent furnishings and window treatments. The smallest planes represent accessories" (Park and Guerin, 2002).
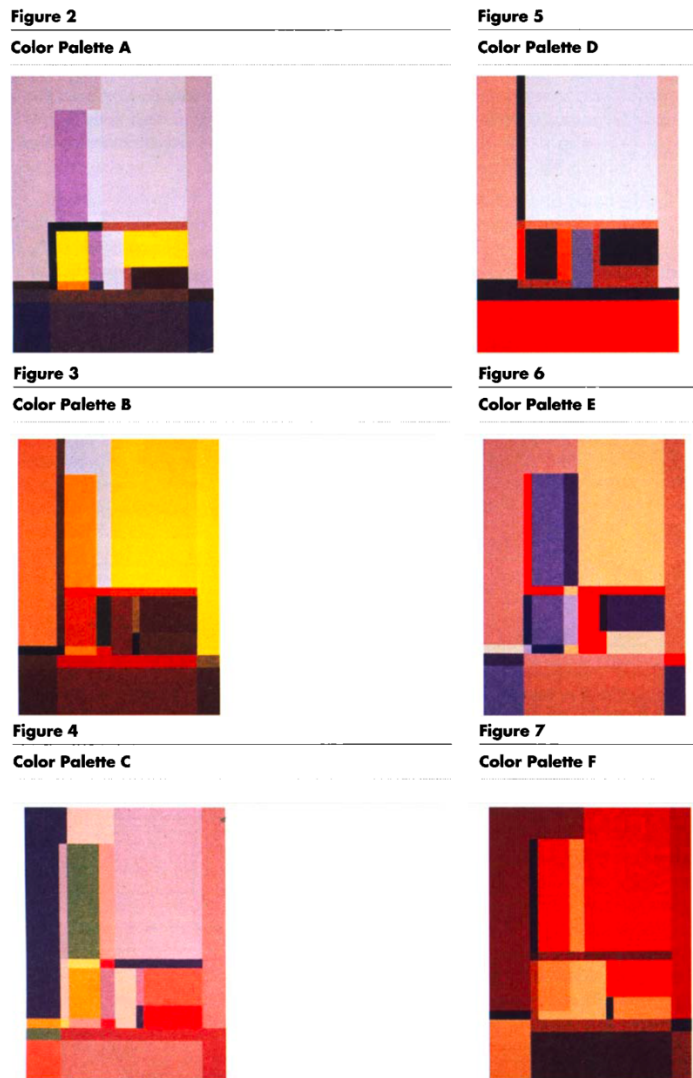
Figure 17. The Six Color Palettes (Park and Guerin, 2002).

The result shows America and England have a similar preference; Americans preferred palette C, then F, and England preferred palette F the most then C. Korean and Japanese preferences have

some similarities, too. Koreans preferred palettes E and A, and Japanese preferred palettes A, C, and E. The Korean preference for color palettes reflected the Korean Yin-Yang principle of harmony. The study also found that chroma strength affected the meaning of color more than hue, and the same result is supported by another study by Mikellides (1990). Mikellides found rather than color hue, color value, and chrome have more influence on color preference.

2.5.11 Preference of White in Asian Culture

In Saito's 1994 research, the result shows that among all the Asian cultures, the color white seems to be highly appreciated. In Saito's research in 1981, he investigated the color preference among Americans, Germans, Danes, Australians, Papua New Guineans, South Africans, Japanese Americans living in the US, non-Japanese living in Japan, and Japanese. The research result shows that the color blue is the most favorable color overall. What's interesting is that the Japanese show a distinct preference for the color white. In Saito's investigation in 1992, he conducted the same survey in Seoul and Taipei; there is a strong preference for whites, similar to the previous research. The same thing happened in Tianjin, China, and Jakarta, Indonesia. (Saito, 1994) It seems like the color white has some meaning in Asian culture. According to the research by Chou and Chen (1935), the reason why the Chinese prefer the color white may be because of the high usage rate of the literary word "white" and because of the color of the national flag. The Chinese flag was white at that time instead of red. Bur Shen (1937) suggests that white is related to pureness, fairness, and clarity. There is definitely a reason behind the strong preference for whites, but each has its argument.

2.6 Conclusion

According to market research, recreational vehicles are getting more popular and becoming one of the top choices for camping, travel, and a way to relax over holiday. Yet, recreational vehicle camping is not so popular outside of America and Europe. The rise of the RV mostly occurs within these two areas, outside of which consumers can barely find an RV. Of course, there are multiple reasons behind the lack of recreational vehicles, but it can be summarized as the unmatched of demand and supply. Most recreational vehicles target the North American and European markets, so they are not designed for other markets. As a result, when a user from another area purchases the existing RV, it usually cannot satisfy user's need and even works against it. Moreover, there is minimal discussion about how an RV can satisfy different cultures' needs. Most of the discussion is direct and plain, like how to select the best option out of the existing designs. But if none of them are designed to satisfy the market, then even the best option will not match the consumers' demand. Without a product that can fulfill the consumers' desires, there will be fewer and fewer consumers considering recreational vehicles for camping and travel. The cycle will not end until there is a design specifically targeted at them, and the key for this design to take effect is culture-oriented design. RV as a product is so connected to the user's everyday life that its designer needs to understand the user's cultural background to better meet the consumer's need and desires. By understanding the cultural background, the designer can know how users will most likely behave and make decisions and understand the reasons and driving force of why users have made the decision.

Chapter 3: Design Tool

3.0 Introduction

To design a recreational vehicle, a designer needs to know about the basic functionality, construction, and manufacturing process. The best way to learn about these is to look at current RVs and see their thoughts on the design. A basic understanding of RV will help apply cultural elements in the design and guide the research of selected cultures. Applying culture to a design is challenging because it requires the designer to comprehend the product and culture deeply. Only with vast knowledge of the product can a designer design a great product, and only with an appropriate understanding of the culture can a designer design a culturally successful product. How well the targeted culture will accept the RV will depend on how well the designer can analyze, understand, and summarize the culture. Following the guidelines should assist the designer in understanding recreational vehicles and profoundly learning about the selected culture.
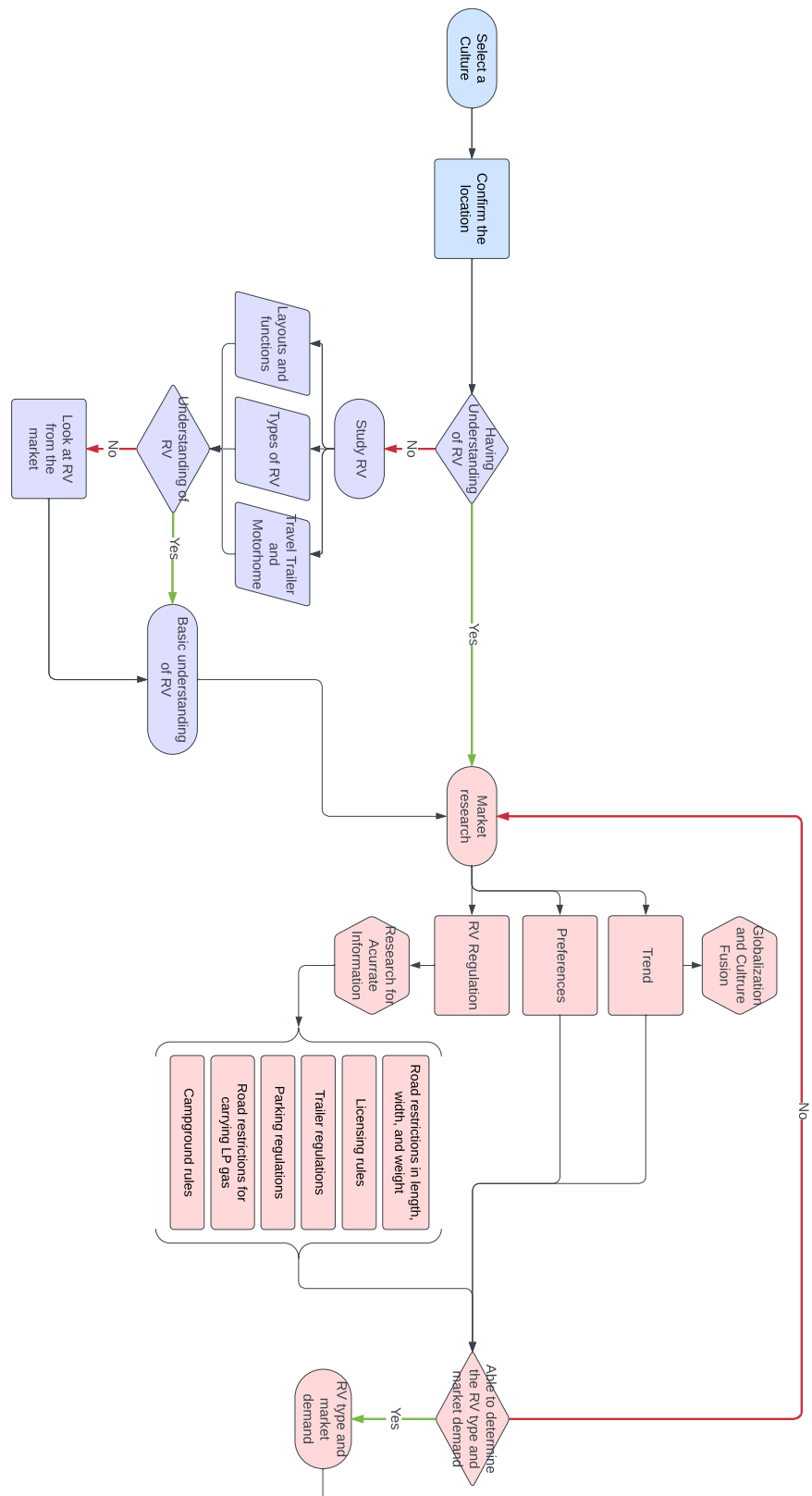
Figure 18. Flow Chart Part 1.
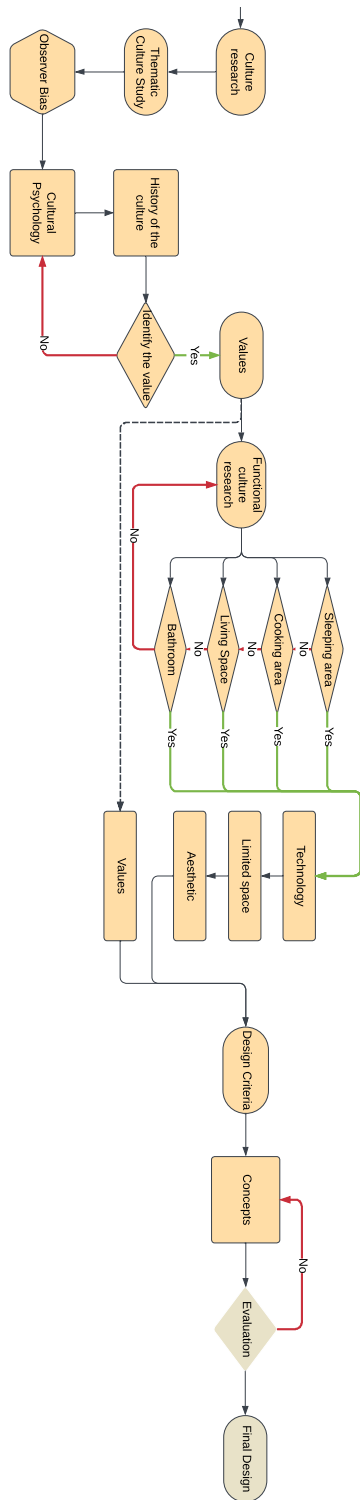
Figure 19. Flow Chart Part 2.

3.1 Identify Target Culture

Before starting to design, designers should select a culture, but the word culture may need clarification. In chapter two, there are detailed discussions about what culture is and what should be considered during design. Culture can be viewed in various aspects, and the exact definition of culture is not the most important thing for this tool. While selecting culture, in a simpler way, a country can be selected as the culture. For example, the topic could be how to design a recreational vehicle for Italians if they select a country. Yet, culture can be viewed on both a larger scale and a smaller scale. On a larger scale, a group of several countries have similar cultural characteristics, like Western, Asian, and North American. On a smaller scale, a subculture or a smaller region, like a state or certain area, can be looked at. As long as the selected culture can be proven to have its own unique character, it should be able to be used as the design tool.

Select a Culture → Confirm the location →
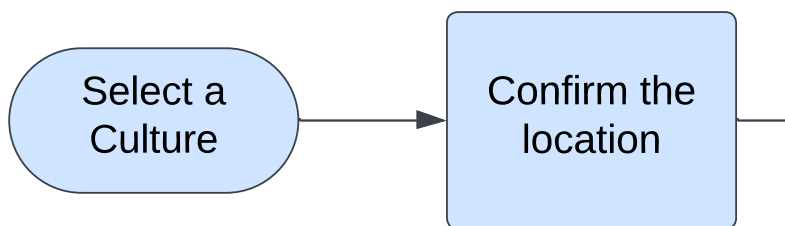
Figure 20. Section 1, Establish User Group - From Flowchart.

3.1.1 Location

Designers should confirm the location of where the culture settles because the local environment will significantly influence the design. People living in different regions could share a similar

cultural background. As there are few limitations in the selection of culture, the designer should

at least make sure most of the members within the selected culture group are living in similar

locations. The results from market research, culture studies, and research can be inaccurate if the

members of the selected culture group live in many different places. For example, according to

Chung's (2005) research about kitchen appliances, the results of Koreans living in Seoul

and Koreans living in New York are different. In Saito's (2002) research about color, the result

of Japanese living in Tokyo is similar to that of Japanese Americans living in the US but

different from that of Americans. It is hard to achieve a consistent outcome if the research range

is too wide, even if all the subjects share a similar cultural background. Also, the location has a

strong influence on many things. Due to the location, the market and regulations could all be

different. However, there will be endless discussion about how all places differ slightly. So as

long as the selected culture is specific enough then this tool should be effective.
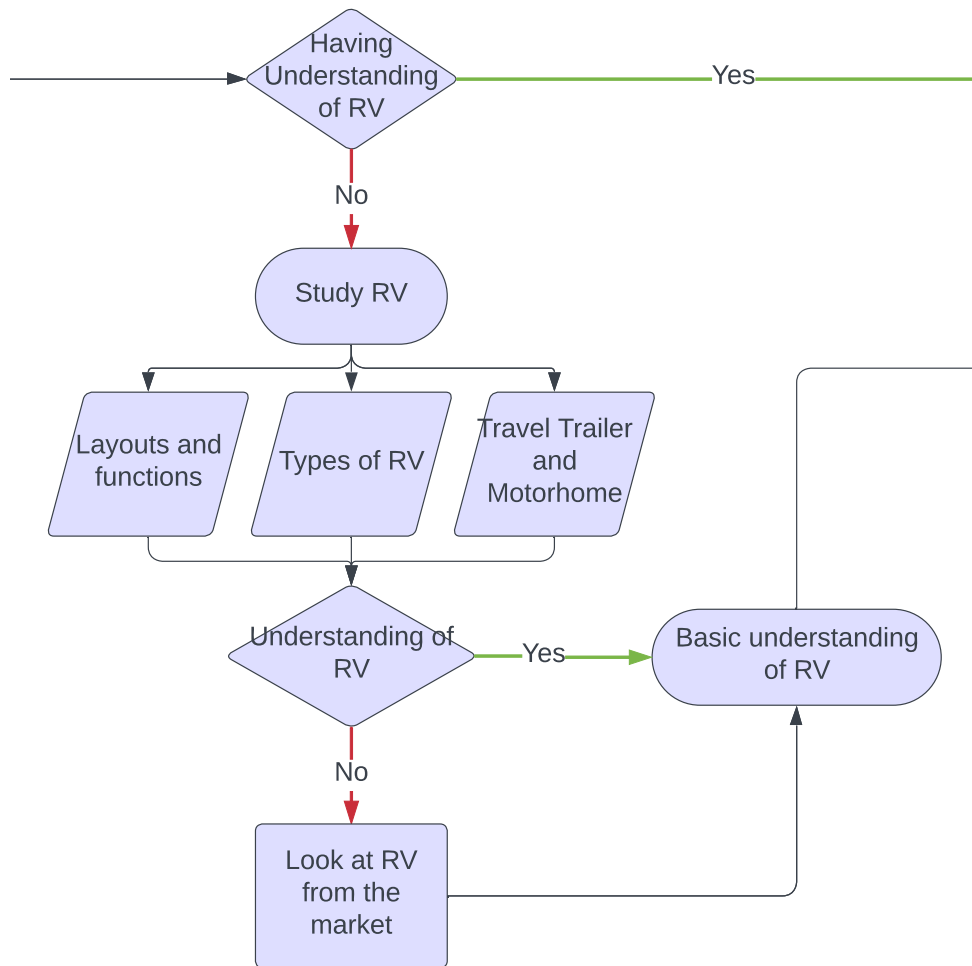
Figure 21. Section 2, Studying Recreational Vehicle – From Flow Chart.

3.2 Understand Recreational Vehicle

After the culture is selected, designers should learn about some basics of recreational vehicles.

Yet, the designer may already know about recreational vehicles very well, so the study of

recreational vehicles is optional. It depends on how confident the designer is about designing

recreational vehicles. Basic knowledge about recreational vehicles is provided, including types

of recreational vehicles and a discussion about travel trailers and motorhomes, layout, and

functions. If the designer still feels uncertain about designing a recreational vehicle, the designer can look at existing recreational vehicles on the market and learn from them.

3.2.1 Types of Recreational Vehicles

Basic functions and types of recreational vehicles can be learned by studying the existing recreational vehicles on the market. Generally, it can be divided into two categories: towable RV, also known as travel trailer, and motorhome. There are also different types classified by use purpose. All Class A, B, and C are usually referring to motorhomes but not towable RVs. Class A means the biggest and most luxurious RV you can find on the market. Class B is the mid-size option, usually with a sleeping quarter over the top of the cap. Class C is the most compact choice and is more road-friendly. Within the travel towable RV catalog, most of the largest-size trailers are known as the fifth wheel, which has space similar to that of Class A motorhomes. There is also camper truck which is straightly modified from a pickup truck. It's like a camping cabin built on the trunk of a pickup truck. In Figure 21, from the up left to bottom right the types of RV classify as Class B van size motorhome, teardrop trailer, travel trailer, camper truck, fifth wheel, mid-size Class C motorhome, small-size Class C motorhome, Class A motorhome, super Class A motorhome.

Figure 22. Types of Recreational Vehicle (Latch.it, 2024).

3.2.2 Travel Trailer and Motorhome

A travel trailer refers to a tow-away trailer that requires another vehicle, usually a truck. There are small travel trailers that even some SUVs can power, but some larger travel trailers require high-torque pickup trucks. Towing a trailer is a totally different experience than driving a car, so it takes time to practice and even train. Because a travel trailer can easily detach and set up for camping, it's a very good choice for long-term camping. Some people and places even use a travel trailer as permanent housing. Compared to motorhomes, travel trailers are significantly cheaper and are the same size. In 2024, a travel trailer is commonly listed from $20,000 to $100,000, and a motorhome is usually listed from $50,000 to $600,000. Travel trailers are the more popular choice in the US and Europe. According to the shipment report from the RV Industry Association, in the 2021 year alone, nearly 550,000 travel trailers were shipped, and

only about 56,000 motorhomes were shipped (RVIS, 2022). Although a motorhome is able to travel without towing by a truck, the additional part – the driving component, has leveled up the cost too much. There is a lot of work and difficulty in designing a totally new motorhome from scratch, so most manufacturers choose to convert an existing vehicle into a motorhome. But still, there are many technical challenges to ensuring everything is right. A smaller motorhome is usually modified from large-size vans or MPVs (Multi-Purpose-Vehicles), a medium-sized motorhome is based on pickup trucks and large-size motorhomes are based on buses or trucks. These factors cause the price of a motorhome to be significantly higher, and most consumers have a hard time affording it. Moreover, in the US, most consumers prefer having a road-friendly daily vehicle for shopping supplies during camping; then, the towing pickup truck will be available during camping and could even be the everyday vehicle. A lot of motorhome owner actually choose to tow an SUV or sedan behind the motorhome as their daily vehicle. With a higher price, a large motorhome usually means more luxury. Because the driving area is connected to the living area, the driver and passengers do not need to be separated from each other. A small-size motorhome is one of the most compact RVs you can find, and it can get on smaller roads and even offroad.

3.2.3 Layout and Functions

By studying the current RVs on the market, some similarities can be found in the interior layout. There are several necessary areas that should be considered in an RV - sleeping area, living space, cooking area, and bathroom. For the sleeping area, the most common set is one sleeping area and one living room. In the living room, there usually will be a multifunction seat and table set, which could be used as a dining table, resting, and transformed into a sofa bed. With limited

space, most storage space is designed as a shelf around the head level. However, some high-end RVs choose to use closets and floor-to-ceiling cabinets for a larger space feel. There is also a trunk that can be accessed outside on most large-size RVs. The cooking area, also known as the kitchen, usually contains two stoves, a sink, a refrigerator, and a microwave. The ventilaton mostly relies on one openable window. If using a gas stove, propane is usually the power source. There will be regulations for the placement of the propane tank. The bathroom is not going to be huge, but it will have a toilet, wash basin, and shower. Within the smallest size RV, bathroom is often the first area to be put away. To power all these appliances and lights, RV will have to carry a large battery. With newer technology, there is solar panel that can be installed on the roof that charge the battery at daytime. There is also an electric generator that runs gas or fuel. The water tank is designed on an RV with a kitchen and bathroom to store fresh water and grey water. With different use scenarios, the layout and functions can be discrepant, but the overall purpose is always similar, with one or more people spending overnight as comfortably as possible. In Figure 22 is the Airstream Class 33FB, is the largest most luxury travel trailer option.

Figure 23. Airstream Classic 33FB Floor Plan (Airstream, 2022).

3.2.4 Basic and Optional Layout and Function

Sleeping and cooking are considered the most basic functions in recreational vehicles. The original idea of the recreational vehicle was to "set up camp, prepare the bed, establish kitchen and dining area easier" (Young, 2017, p.211). The majority of recreational vehicles on the market all have sleeping areas and cooking areas even the smallest type. A fully set up kitchen, living room, and toilet are often the optional areas, especially on smaller recreational vehicles. Within the larger recreational vehicles, there is more space to design the layout. Storage space is often provided, and some larger-sized recreational vehicles even provide trunks that can be accessed outside.
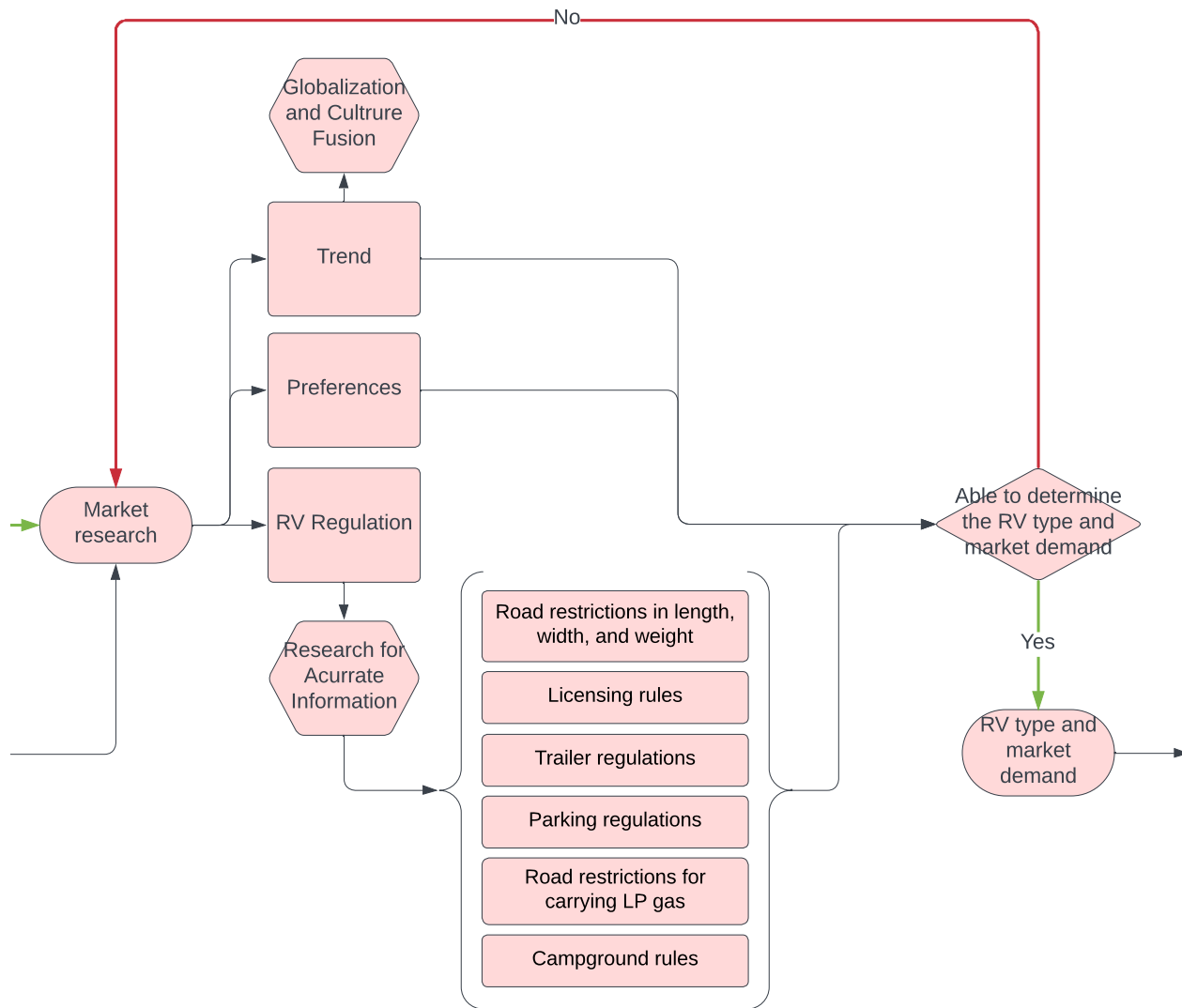
Figure 24. Section 3, Market Research - From Flow Chart.

3.3 Market Analysis

Knowing where the market value and potential of a product is the key to a successful product.

Overall, the recreational market has continued to grow since the COVID-19 lockdown. However,

in different areas, the growth rate and prior demand are diverse. If the existing recreational

vehicle market is considerable, a designer could look at the existing recreational vehicles for

reference. Market research is able to provide direct and clear information. For example, in

Shinde and Jain's (2016) research, data from market research can clearly show the demand. The

demand from the recent past is often more accurate. Research companies like the Recreational

Vehicle Industry Association (RVIA) and Mordor Intelligence Research Company usually offer

detailed market reports for sale. The report usually contains sales volume, sales analysis,

prediction, and so much more. Moreover, by analyzing the recreational vehicle and culture

studies, the overlapping area could be considered the emphasis for market research, too, for

example, if the cultural study shows that consumers pay extra attention to social contact. Ozaki's

(2002) research suggests that Japanese tend to spend more time with family, and areas like the

living room and dining space should be focused more. At the end of this section, designer should

be able to determine what type of recreational vehicle is going to be designed and what is the

market demand.

3.3.1 Globalization and Culture Fusion

Obviously, with the new advanced technologies like the internet and high-speed airliners, there is

more international communication than ever. As a result, one product could have been

introduced to various consumers who have completely different cultural backgrounds. The

design situation has changed a lot under these cross-cultural communications. Therefore, one

designer may not be able to design a product for a consumer from a different cultural background

only with intuition and personal experience. In order to come up with a more localized product, a

designer needs to have an understanding of the targeted culture and its differences from the

designer's original plans. The designer should remember that due to globalization, different

cultures, they meet and mix together quicker than ever before. Some regions may have a very

diverse and complex culture, and some regions may still remain as simple and conventional cultures. Therefore, while analyzing the culture, the designer wants to be extra careful in comprehending the selected culture.

3.3.2 Trend

Based on the market research, combined with the culture study, the designer should be able to briefly summarize the trends. The trend refers to the predicted future market. This trend should not only represent the market demand but should also show the tendency toward cultural innovation. Because culture is not a still object, its characters keep changing and transforming, research found ten years ago may not apply to the condition nowadays. It does not mean that past research was useless; the designer needs to look at the research dialectically. Then, by analyzing all the research found, the designer should be able to predict potential trends. Knowing the trend helps the product fit in the market more, instead of resonating with the selected culture perfectly, but not appealing to consumers.

3.3.3 Preferences

Proceeding to the near end of the research and analysis process, the preferences can be concluded as a more straightforward summarization for design. There might be surveys or investigations of preferences about recreational vehicles in regions where recreational vehicles are more popular. But in regions where the concept of recreational vehicles is relatively new, these kinds of surveys and investigations may be hard to find. Then, rather than research recreational vehicles directly, designers can look for research from other fields that are related to recreational vehicle design. By knowing the cultural preferences, designer can have a reference point. During ideation,

designer can choose from these preferences, testing what could fit to the design and what can improve the design.

3.3.4 RV Regulations

For a recreational vehicle to be able to get on the road, there will be regulations that have to be followed. However, regulations vary in different regions, and they can be very different. Then, to use the RV for camping, having only the RV is not enough. There has to be somewhere to park, like an RV campground or an accepted parking lot. Refilling water and gas, dumping waste and grey water, recharging batteries, replenishment, and maintenance during travel rely on specialized facilities. According to Wood (2021), the common regulations can be summarized as road restrictions in length, width, and weight, licensing rules, trailer regulations, parking regulations, road restrictions for carrying LP gas, and campground rules. For example, there are different regulations in different states in the US, so it is important to know about the local road laws for the culture. In the US, most states have a height limit of 13' 6" and a width limit of 8' 6". However, these number these regulations vary in different states. The maximum trailer length is 28' 6" in Alaska, Alabama, and Indiana, but it can be extended to 53' in Illinois and Mississippi, and some others (RV Info, 2023). In China, the maximum trailer length is restricted to 6 meters, and there is a maximum weight restriction of 4,500 kg. To license a larger size trailer, different types of driver licenses need to be applied; between 6 to 9 meters, a B1 driver's license is required, and any trailer longer than 9 meters requires a B2 driver's license (Fangchemao, 2023). Ignoring the regulations may not just cause heavy fines, but the RV and road could get damaged under certain conditions. For example, a low bridge on the road or a

narrow mountain road will all cause danger. Regulation is the limitation of recreational vehicle

design. The design is not going to be sold to the market unless it can fulfill all the regulations.

Road restrictions in length, width, and weight

Licensing rules

Trailer regulations

Parking regulations

Road restrictions for carrying LP gas

Campground rules
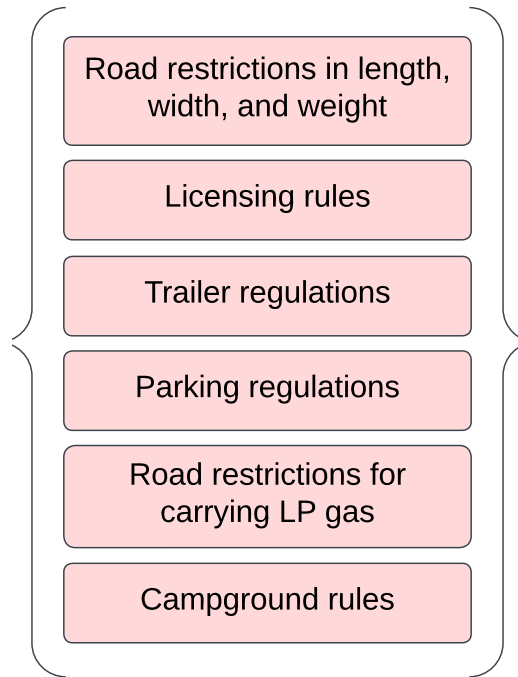
Figure 25. Regulations Category – From Flow Chart.

3.3.5 Research for Accurate Information

To know about the local regulations, the internet is the easiest and fastest way to start. Most

information can be found through articles, reviews, blogs, travel websites, and RV websites.

However, the designer may not be in the same region as the selected culture, and share the same

language, which means the firsthand information to the designer may be inaccurate. For

example, when looking up Chinese RV regulations in the US, the first couple of results may

be outdated or too brief. As the road law infomation above, most US articles and reviews

mentioned the length restriction at 6 meters, but none of them have mentioned the driver's

license requirement. Then there might be a misunderstanding that only the RV under 6 meters can go on the road, but actually, it can be longer with a different type of driver's license. Therefore, for a designer to research local road laws, accessing local websites could be a better way to get more accurate and detailed information. It usually requires a VPN to access foreign websites and may need translation if the designer is not familiar with the local language. If possible, a collaboration with a local would be great for this kind of research.

3.3.6 Determine the Types and Demand of Recreational Vehicles

At the end of the market research, designer should conclude the demand of the market and determine the type of recreational vehicle that is going to be designed. Ensuring the recreational vehicle type can help the designers make decisions on the choice of functions. Certain types of recreational vehicles may not have a toilet or, other areas, or certain functions, so then designer does not need to do research on those parts. From the market research, designer should also be able to know the market demand very well. Then, in the next step, the decided recreational vehicle type and demand can be used for brainstorming. If the type of recreational vehicle can not be determined or the market demand is not yet clear, the design should go through the market research again to make sure these two elements are found and clear.
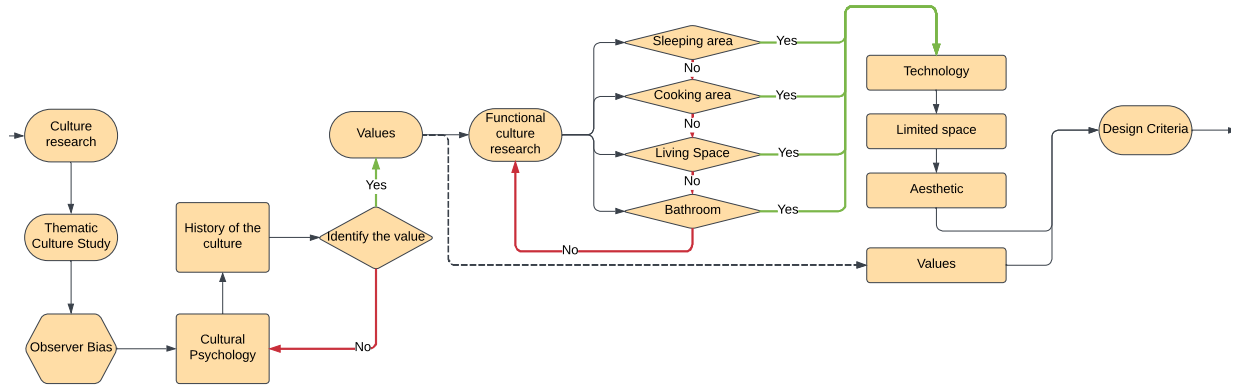
Figure 26. Section 4, Culture Research – From Flow Chart.

3.4 Looking at Culture

In the process of studying culture, designers can learn about what the culture is like and why it

has become what it is today. Then, in later research, many of the results should make more sense

to the designer as the designer may know the causes of why the result is like this. Through the

study of culture, designers should study cultural psychology and the history of the culture, then

conclude the values of culture. The values could be used for brainstorming with the result from

market research and then the designer can come up with a design theme.

3.4.1 Thematic Culture Study

Culture is a really complex topic that is very subjective. Although the purpose of this tool is

not to fully understand the meaning of culture, it is helpful to know about different

understandings of culture. Getting to know a culture, especially a new culture, is difficult. The

selected culture could be totally different than what the designer is familiar with, or the designer

may already have an impression about the selected culture from the designer's past experience.

During the research of selected culture, the designer wants to carefully make sure the

information received is relatively raw and accurate. The study of selected culture could go alongside the study of recreational vehicles.
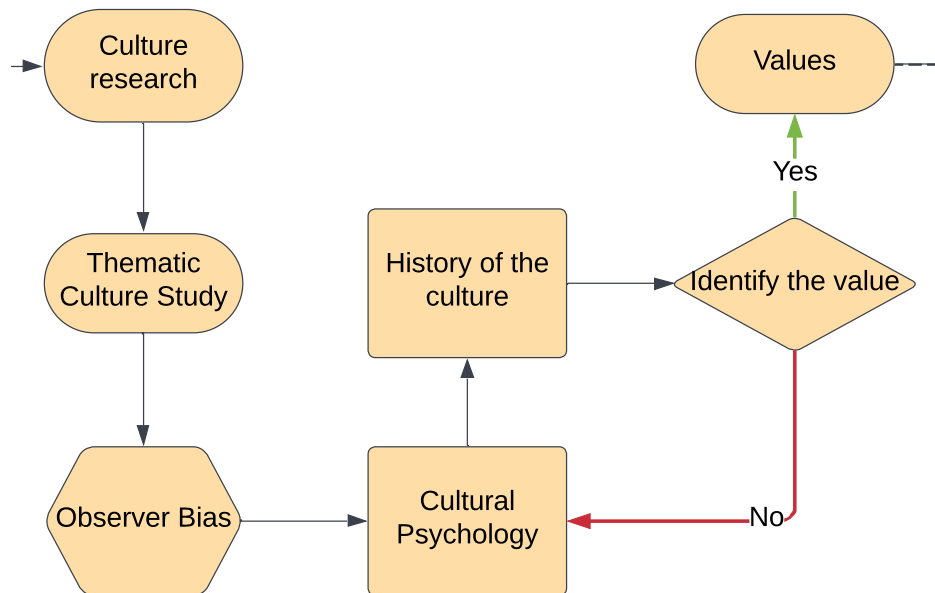
Figure 27. Section 4.1, Thematic Culture Study – From Flow Chart.

3.4.2 Observer Bias

Before studying the selected culture, a precondition that the researcher needs to understand is bias is almost impossible to eliminate. Because the researcher already has a cultural background, this background is going to influence the observation of the selected culture. "Observer Bias is the mistake led by the motivation and expectation from the observer" (Gerrig, 2003). Therefore, during the research of selected culture, the bias from existing culture background should be realized and minimized. Oftentimes, before the research even starts,

the researcher may already have an expectation of the outcome. Then, during the research, while

browsing information, the unexpected opinions could be subconsciously ignored, which will

lead to lopsided or incomplete conclusions. Especially when designer has not understood the

culture yet but hurry to make a conclusion. According to Gerrig (2003), observer bias could be

reduced by having a more standardized evaluating system, making sure all the information is

measured with the same scale. Also, by studying and understanding the selected culture more

deeply, the bias can be reduced as the designer gets to know the reason behind why the culture

has become what it is like now.

3.4.3 Studying Cultural Psychology

After having a targeted culture, it may be hard to find a starting point to start researching.

Beginning with existing research about cultural psychology about the targeted culture could be a

good start. While discussing psychology, especially related to culture, there will always be a

brief mention of the history and development. For example, in Nisbett et al.'s (2001) study, in

order to learn about the differences among cultures, there is a brief overview of the history of

ancient Greek and Chinese society and a detailed analysis of the development in multiple aspects

(Nisbett et al., 2001). This research really helps designers have a basic understanding of the

culture and provides clues and topics for deeper research. Psychological analysis usually

involves the fundamental elements of one's behavior. The goal of psychology is to describe,

explain, predict, and control individual behavior (Gerrig, 2003). Designing an RV involves a lot

of thought in designing the user experience, which is really similar to the approaches of

psychology. Yet psychology is a broad and general topic that "looks at individual behavior and

mind" (Gerrig, 2003). To get more specific at "the individual within the targeted culture", more cultural influence should be considered in the frame of psychology.

3.4.4 Studying the History

Culture has a strong relation to history. A lot of the characteristics of a culture is developed from the history. For example, the individual in East Asia tends to put more cultural value on the group, and this tendency is related to the common societal system in East Asian history (Brown & Kobayashi, 2002). From the research of cultural psychology, there should be detailed examples and explanations of how some of the characteristics developed in the culture and the reasons behind them. However, because the focus of cultural psychology study is not history, the historical reason is often not comprehensive. While studying the history, the idea is to look broad, understanding the selected culture in a bigger picture and having an overview of what this culture is like. Later on, when the designer starts to dig into the details of the values, spirits, and preferences of this culture, everything should make more sense. In this case, history related to camping is the most straightforward topic to learn from. For example, the history of recreational vehicle camping in America and Britain provides plenty of past examples of how cultural values influence recreational vehicle design. However, a lot of the regions does not have much history of recreational camping. Therefore, history of camping can be looked at too. However, the study of history should not only focus on camping related information; many other subjects could be helpful too. But at this point, the goal is to know about the overall history of the development of the culture.
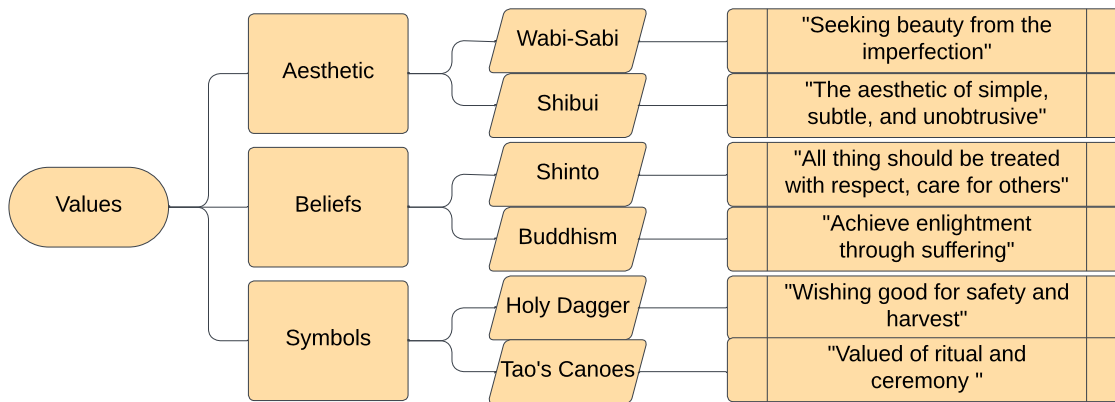
Figure 28. Extracting Cultural Values.

3.4.5 Cultural Values

With an understanding of the culture and its history, the designers can try to extract values from

this culture. Cultural value is like a summary of a portion of the culture's characters, and it often

relates to history. A culture can have multiple values, and they could be conflicting or

correlating. Things like family, education, economy, and social system all have an influence on

cultural values (Schwartz, 1999). Designers can use these values as a guide for the decided

theme or even come up with a theme with these values. Then, the following design process can

follow this theme. Design concepts should be related to the theme, and the values forming the

theme can be used to tell a very good story supporting these concepts. Examples include, the

handbag inspired by Tao culture in Taiwan provided by Lin (2007) mentioned in 2.4.2, for which

the design is influenced by the Pin-Ban boat and holy dagger in Tao culture. Then, the story of

the Pin-ban boat and holy dagger, their meaning in Tao culture, could be a really good story to

support the product. Cultural values should be found at this point of the study, and designers

need to make sure these values are usable and supported. If the values are still unclear,

the designer may go through the culture study process again until the values are found. When a

designer is having trouble identifying the cultural values, the designer can use the chart from

Figure. 27 By looking at the aesthetics, beliefs, and symbols in the selected culture, the designer

should be able to identify cultural values better. Some examples are also provided for reference

in Figure 27.
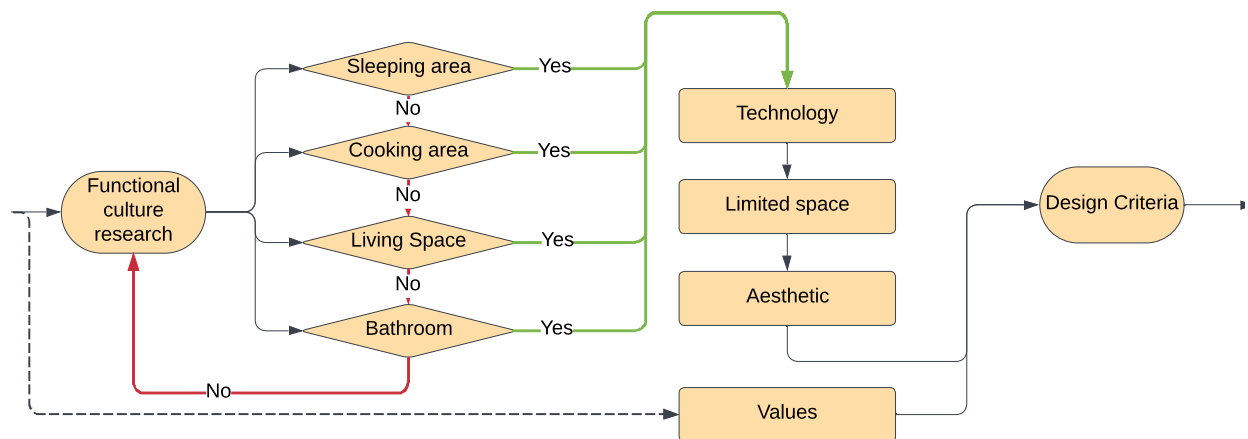
Figure 29. Section 4.2, Functional Culture Research – From Flow Chart.

3.4.6 Functional Culture Research

The design of recreational vehicles is related to many other fields, like interior design and

furniture design. Therefore, if the existing recreational vehicle market is not considerable, or in

another words, if the recreational vehicle is still a relatively new concept to the targeted

area, these related fields could be used as references. Therefore, the design process has been

divided into seven topics: Living space, Bathroom, Cooking area, Sleeping area, Technology,

Limited space, and Aesthetics. But the living space and bathroom are optional based on the

designer's decisions since, under some circumstances, these areas could be put away. And the

rest is important for study in order to design a culturally oriented recreational vehicle. Designers

will follow the tool to do research for each topics and come up with design criteria at the end of this section.
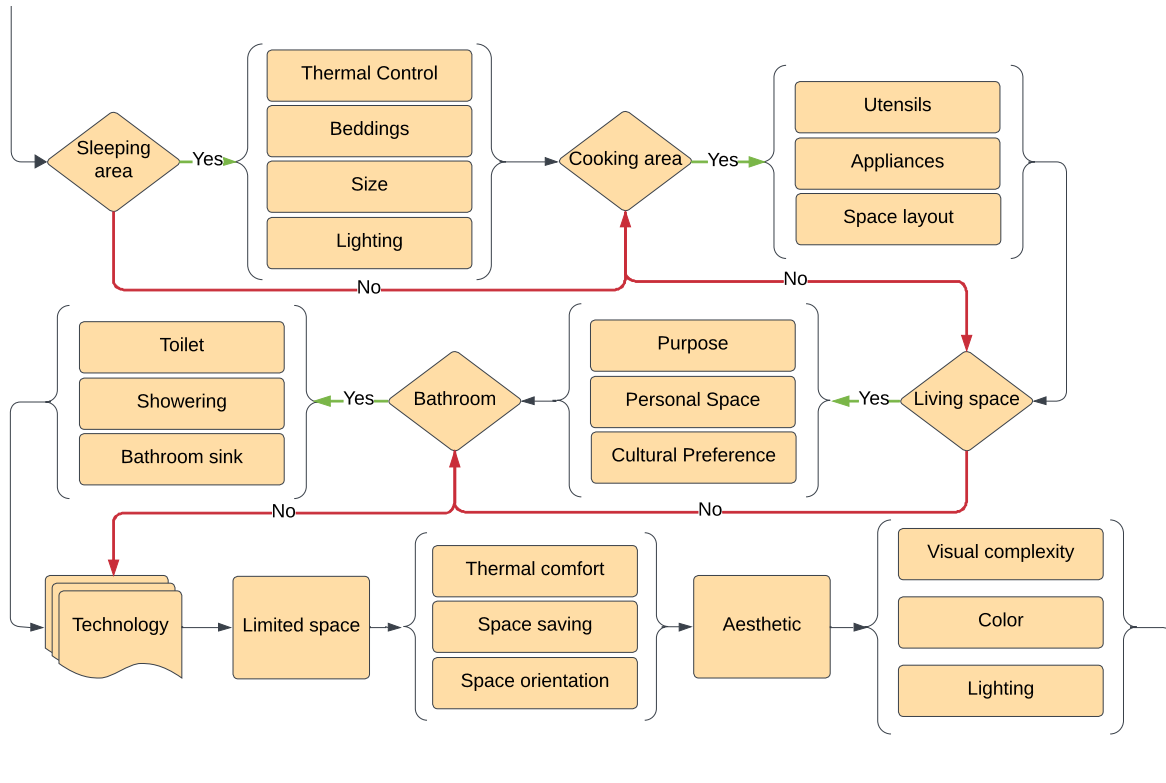
Figure 30. Related Subjects Chart

3.4.7 Living Space

Living space is commonly used as a dining area and can also be converted to a sleeping area in smaller size recreational vehicles. But in the large size high-end model, the living room is often separated from another areas with all kinds of luxury functions. Living space is usually designed as a public sharing area, but people from different cultures may have different imaginations about this sharing area. Like in early discussion according to Atabey (2013), people

may have different preferences of physical distance with each other. And the purpose of using living spaces may be different. Like in Japan, having family activities is the primary function of living space, but in England, as they prefer more private space, living space may not be as important (Ozaki, 2002). Therefore, designers should look into the purpose and significance of living space in the selected culture through research.

3.4.8 Sleeping Area

Having somewhere to sleep is necessary for a recreational vehicle. A sleeping area requires more privacy consideration than a living space. And users may prefer having separate sleeping areas. According to Ozaki's (2002) study, while searching for houses, the number of bedrooms is an important factor to British as they prefer more personal space. Then, instead of having one nice bedroom, having multiple sleeping areas may be the better option for member of thus culture. And according to Cheung (2021) and Li (2022), people in different cultures have different preferences for thermal comfort, lighting, bedding, and size in sleeping spaces.

3.4.9 Cooking Area

Providing somewhere to cook is also another basic function a recreational vehicle needs to have. In a large recreational vehicle, the cooking area could be a fully furnished kitchen, but there needs to be a smaller cooking area in many compact mini-campers. Designer can design a solution based on the cultural background to best fulfill the needs. According to the study by Chung (2005) and Tao (2019), the kitchen appliances, kitchen utensils, and cooking space layout vary in different cultures.

3.4.10 Bathroom

The cleanliness and hygiene of the bathroom can largely affect people's impression of the interior space of the recreational vehicle. One of the important things designers need to consider is the ventilation. Bathrooms can get very wet and smelly if it is not taken care of nicely, so it is better to make sure the bathroom is easy to clean and maintains. As suggested in Tumwebaze's (2013) investigation, smell and cleanliness is the top factor that influences the satisfaction of the toilets. And there are various different bathing cultures around the world. While considering the design of bathroom, the idea behind those bathing culture might be borrowed. While researching for more information, designers can focus on toilets, showers, and bathroom sinks.

3.4.11 Limited Space

As the space is limited in recreational vehicle, designer will need to understand how to design in limited space. In a recreational vehicle, different areas often overlap as the multifunctional area to save up space. For example, the dining area usually is combined with the living space, and storage space is put into almost every interspace. There are different ways to design the furnishing to save up space, which can be referred to in Li and Wu's (2021) study. Another thing to keep in mind when designing limited space is the thermal comfort. According to Frontczak and Wargocki (2011), thermal comfort is the main factor that affects comfort in the indoor limited space environment. More research could be done about limited space to better design the interior of recreational vehicle. After knowing the basics of designing in limited space, designer can begin to look at different areas in recreational vehicles.

3.4.12 Technology

It is good to know about new technologies and what has been used and could be used in recreational vehicle design. For example, the evolution of batteries allows a larger volume of electric usage, which can either extend operational time or power more appliances and devices to improve user experiences. Proven fully electric cars are already on the market for several years, and a fully electric recreational vehicle is just on the way. And if the power system is strong enough, bringing in more smart devices into recreational vehicles not only can improve user experience but can also automatically control all the devices and appliances to save electricity. Designers can refer to the technology section in chapter two for more newer technologies that are being developed for recreational vehicle.

3.4.13 Aesthetics

Aesthetics is a very subjective topic and various studies shows that culture background has a lot of influences on it. In the interior of recreational vehicles, the aesthetic decision can affect many choices of other functions, and the design of function may limit the choices the designer can make on aesthetics. While ensuring the design is aesthetically pleasing, the designer needs to incorporate cultural elements and also make sure they fit to the theme. And to better study the aesthetics, this section can be divided into visual complexity, lighting design, and color design.

3.4.13.1 Visual Complexity

Many research show that people from different culture may have different acceptances of how complex the interior space is. Ham and his colleagues' (2004) study suggests that some cultures may prefer interior furnishing to be simpler and more regular, but some could have more

acceptance with multifarious furnishings. So, while designing recreational vehicle interior space, the designer may research and analyze what is the tolerance of complexity of the selected culture. Otherwise, overdesigning, like adding too many functions or elements, can happen. These functions and elements may be beneficial, but consumers can get overwhelmed by them. Therefore, through the study of complexity designer can know when to reduce design and when to design more.

3.4.13.2 Color

Color is another element that has been influenced by culture a lot. Colors can have meaning behind them and sometimes this meaning is different under different cultural backgrounds and sometimes is similar. According to Saito (1994), Chou and Chen's (1935), and Bur Shen's (1937) research, white seems to be the most popular color in Asian Culture. White is in the top three choices in most Asian regions based on research. But other than white, the preference of other color is quite different. And the preferences of color palettes are different in different culture. Designers can think of the meaning of color in the selected culture and may be it can resonate with the theme and represent culture elements in design.

3.4.13.3 Lighting

In interior space, the lighting system is the main light source most of the time. Due to vehicle body strength, the windows on recreational vehicle can not be too big so the light from outdoor is limited. A good lighting design can generate positive feelings, but a bad lighting design can make users feel mentally discomfort. According to research by Park (2010) and Sharama (2016), the preference of lighting conditions varies in different cultures. Some basics of lighting design

are found in Sharama's study. Designers should research the preference of lighting conditions in the selected culture but also be reminded that people seem to have more acceptance of contemporary lighting style.

3.4.13.4 Design of Color and Lighting

In RV interior design, color is heavily affected by the lighting. The main two light sources in RV are the sun light coming from the window and the indoor lighting system. Due to the limitation of structure strength, the windows on the RV body can't be too big. Therefore, the illumination largely depends on the lighting system. While designing the color palettes that will be used in a recreational vehicle's interior, the influence of the lighting system should be under consideration. Otherwise, the designed color may appear different than the desired manifestation when the light is turned on. This unintended situation should be limited for the best user experience possible.

3.4.14 Detailed Culture Research

During the research process for each topic, designers can look at the cultural preferences of the topics and learn the reason behind them. There are plenty of research and studies online or in print. Some common academic research sources like Google Scholar, Science Direct, Research Gate, JSTOR, and more are really helpful. However, the research result is not one hundred percent reliable. Data in the research may come from years ago, and the situation could have already changed a lot. The study may contain inaccurate steps, so the result is not always right. The best way to increase the accuracy is just to find more information and then compare and analyze. This way, the designer can determine the cultural trends because they are based on cultural preferences. Through analysis, designers can make predictions about the near future

market. Also, for each topic, the designer needs to research about restrictions. For example, if research shows that this culture may not prefer complex interior design, then the designer should try to avoid it. By knowing the trends and preferences restrictions, designers can relate to the decided theme and start ideation. If it is still hard to think of concepts, then designers can go back to the research process to find more inspiration.

3.4.15 Design Criteria

With all the research, designers should be able to develop a list of design criteria. During the conception stage and design process, designers can follow the design criteria to design every detail of the recreational vehicle. Then, the final recreational vehicle design should be culturally representative.
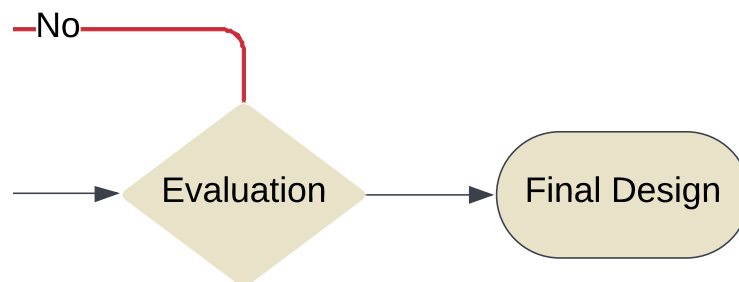
Figure 31. Section 5, Evaluation and Final Design – From Flow Chart

3.5 Evaluations and Final Design

In this section, designers will carefully evaluate the concepts looking for the best solution. The concept needs to be culturally representative, which means the design contains cultural elements

that can resonate with the selected culture. And the design should be market-friendly. Based on the research on market demand and trends, designers should evaluate if the design is going to be successful in the market. Then, designers need to evaluate if the design follows all the criteria. The last evaluation is to check if the design follows all the regulations from recreational vehicle market research and restrictions from detailed cultural research. If everything is fulfilled, then the designer will have the final design, but if not, the designer can go back and analyze the reason why it does not work. If the designer decides to keep the concept, the designer can go back to the research process and refine the concept. Or the designer can choose to use other concepts or develop new concepts, then go through the design and evaluation process again.

Chapter 4: Demonstration

4.0 Introduction

In this chapter, a design project is conducted to demonstrate how to use the design tool and its effectiveness. The goal is to use the tool to design a culturally representative recreational vehicle interior.

4.1 Select Culture

Japanese culture is selected as the target group for this design project. To specify the location, since there are Japanese living all around the world, Japan will be the destination location. Therefore, the recreational vehicle in the demonstration will be designed for Japanese living in Japan.

4.2 Market Research

Since the pandemic, people in Japan started to look for a more private way to travel. Recreational vehicles have become more and more popular in Japan as they offer a unique travel experience and can allow travelers to avoid crowds. According to Kazunari (2023), recreational vehicle camping used to be a hobby mostly among the retired elderly, but now, more younger people are starting to enjoy the fun of recreational vehicle camping. Recreational vehicle camping is a good way to go sightseeing, to hot springs, and enjoy local food in Japan. Based on investigations from Spînu (2021), Kazunari (2023), and Ryoma (2024), one of the most popular recreational vehicle options in Japan is "Kei Camper". There are many reasons, like gas emissions, common road conditions, and consumers' demand. The road in Japan is generally

narrower than in America and Europe, where you are able to find larger-sized recreational vehicles. Most of the recreational vehicle manufacturers are from America and Europe, and the recreational vehicles they produce are slightly too big for the roads in Japan. Therefore, a lot of the popular recreational vehicle choices are modified based on a Japanese minivan or mini truck. The smaller size allows consumers to drive vehicles in most of the urban cities and villages. These Kei campers are usually under 3400 by 1480 by 2000 millimeters, a size which is rarely found outside of Japan. The small size also reduces the highway fees, tax, insurance, and maintenance costs. Kei campers can also be parked at most of the parking lots on street, although there is a regulation forbidding long term overnight parking in public parking lot. There are more and more campgrounds and RV parks built in Japan, and as of June 2023, there are over 350 of them across Japan (Kazunari, 2023). From the market research, the Japanese recreational vehicle demand can be concluded as a compact economic motorhome that can easily travel through small roads and narrow environments.

Figure 32. Interior of One of the Japanese Kei Campers (Kazunari, 2023).

4.3 Culture Study

4.3.1 Thematic Culture Research

According to Szczepanski (2019), Japan has one of the most abundant various histories in the world. Most of the time, Japan has been under the rule of an emperor. In the Heian era (794-1185), Japan's unique culture developed rapidly, and many of the characteristics continue to nowadays, like samurai. The value of "care" was emphasized very often throughout the history of Japan. "From a very young age, Japanese children are taught 'Omoiyari,' which means 'to notice and think of others" (Kanagy, 2023). And there is also "Ganbaru," which means effort, and "Gaman," which means enduring. In a lot of daily scenes, these values can be found. Kanagy (2023) mentions there are plenty of phrases in Japanese daily life to show polite and smooth relationships. For example, "Irasshai-mase" is used to welcome consumers in hotels, restaurants, and stores. A lot of phases are used to emphasize the attitude of "sincere". This could be related to the collective and conformity values of culture in Japan throughout history. "Shinto' is a Japanese traditional religion that is the root of many Japanese values, like 'all things should be treated with respect." (JapanesePod, 2021). Therefore, the Japanese tend to be careful and respectful of everything in daily life. The value of "care" can be found in a lot of packaging designs in Japan.

Figure 33. Japanese Pudding Packaging (Ikidane, 2019).

In Figure 33 is a Japanese pudding packaging. There is a stick down at the bottom of the pudding packaging. Consumers can break off the stick and easily drop the pudding on a plate.

Figure 34. Japanese Milk Packaging (Imada, 2021).

In Figure 34 is an example of Japanese milk container packaging design. On most of the milk packaging in Japan, there is a notch on the opposite of the opening. It is used to indicate the correct side to open, which is extremely useful for those with disabilities.

Figure 35. Japanese Onigiri Packaging (Imada, 2021).

In Figure 35 is an example of Japanese onigiri packaging design. This onigiri packaging design can be found everywhere in Japan. The seaweed is packed in a different layer with the rice in order to keep it crispy until it is ready to eat. These are all great examples of Japanese value of "care" in design. Therefore, while designing the recreational vehicle for Japan, more of these thoughts that can represent the value of "care" can be incorporated. Also, according to Tanic (2023), Japanese traditional concept of "Wabi-Sabi" is representing a lot of the Japanese culture. The value of "Wabi-Sabi" is the admiration of imperfection. It aims to seek beauty in

imperfection and gain acceptance toward growth and decay. In interior design, it often shows as aged materials and design that is authentic.

4.3.2 Functional Culture Research

To design a Kei Camper, the sleeping area, living space, and cooking area is necessary, but bathroom is usually not considered. Japan has a lot of clean public restrooms along the street and in convenience stores, and many rest areas on highways provide public restrooms. There are plenty of public bathhouses that the Japanese visit frequently (Merry, 2013). Also, the Japanese do not usually live in a camper for a long period, so a camper without a bathroom is totally fine.

4.3.3 Living space & Sleeping Area

In a Kei Camper, both living space and sleeping area are needed. But since the interior space is so limited, living space and sleeping area are often merged together. While the Japanese are seeking living space, they are looking at the sense of being "homely" (Ozaki, 2002). Japanese really pay attention to social time, the time spent with others. Although Asians usually prefer to keep a certain distance between people, the Japanese seem to keep a distance from others most of the time; while staying with people with closer relationships, the Japanese appear to like "physical contact." This is often found between family members, like mom and children (Daniels, 2015). According to Daniels (2010), the sofa is quite common in Japanese families, and it is a popular choice for naps among men as they don't have much personal space. "A good example was the thirty-seven-year-old Mrs. Matsui in Nara, who joked that she insisted on buying a two-seater instead of a three-seater sofa, because it would preclude her husband from lying down for a nap" (Daniels, 2010). Typical Japanese marriages segregate work by gender, so

that women do most of the housework. Yet, married woman sometimes complains about this "laziness" in a humorous way. Daniels' (2015) later study found this kind of behavior, using jokes to deny the intense relationship between genders, actually plays an important role in the production of "domestic intimacy." While designing the sofa bed, leaving enough space or having an easy way for the sofa bed to quickly expand may be appropriate for this nap habit. According to Archi-Designer-Master (2022), the bed size in Japan is generally smaller and lower. Box springs, which are commonly found in Europe and America, are not popular in Japan. Most Japanese beds are placed on a wooden platform. The space below the mattress is usually used for storage space, which is commonly designed as a drawer or flip-up mattress type.

Japan	Bed Size	United States	Bed Size
Single	98cm x 195cm (38" x 77")	Twin	99cm x 190cm (39" x 75")
Semi-double	122cm x 195cm (48" x 77")	Full	137cm x 190cm (54" x 75")
Double	140cm x 195cm (55" x 77")	Queen	152cm x 203cm (60" x 80")
Queen	170cm x 195cm (67" x 77")	King	193cm x 203cm (76" x 88")
King	194cm x 195cm (76.5" x 77")	California King	183cm x 213cm (72" x 84")

Figure 36. Bed Size Comparison Between Japan and the US (Archi-Designer-Master, 2022).

Figure 37. Common Storage Space Under Mattress in Japan (Archi-Designer-Master, 2022).

4.3.4 Cooking Area

Cooking area is also necessary for a Kei Camper. Japanese prefer to eat together with family. According to Daniels (2015), the dining table is usually the biggest table at home, and it has been used for other purposes other than dining and cooking. The dining table is a popular choice for children to do homework, and it usually functions as extra storage space for daily supplies, like mail, newspapers, magazines, sauce containers, tissue boxes, nail polish sets, and so on. According to Archi-Designer-Master (2022), although Japanese like eating bread, rice is still the most favorable in their diet. Rice cookers are really common in Japanese families. Microwaves are also widely used in Japanese families as they are so easy to use. And often under the gas stove, there is a Sakana Yaki grill used to toast fish. To get water supply, users may need a key to use water taps because a lot of the keys have been removed. Water taps can be found in many places like parks, public toilets, and beaches (Kuma, 2023).

Figure 38. Sakana Yaki Grill (Archi-Designer-Master, 2022).

4.3.5 Technology

According to Damiati (2016) and Daniels' (2015) research, Japanese people care about indoor thermal comfort. Damiati (2016) suggests that Japanese preference for indoor temperature is around 25.8 Celsius, and they feel more comfortable in the drier environment rather than in a humid environment. Webasto heater is often used for camper vans in Japan (Kuma, 2023). Webasto is a small size diesel powered heat generator. And because a Kei camper is often modified from a minivan, there is usually an air conditioner built in. Sometimes, rental dealers offer portable fans for additional cooling.

4.3.6 Limited Space

Japanese houses and apartments are small, but people do not feel crowded and cramped quite often. They have put in many thoughts to utilize space and provide comfort in limited spaces. According to Brown (2023), lowering the sitting position and furnishing can reduce the sense of narrowness. Smaller and lower furnishing cast less shadows and occupy less space, and by contrast, the interior space feels larger. Another idea is "bringing the exterior into the interior" (Brown, 2023). It could mean a forest, a glance at the sky, a view that can lead users' attention outside.

4.3.7 Light

According to Daniels (2015) and Wilhite (1996), Japanese are not a fan of incandescent light, thinking this kind of light is "cold", not homely. Japanese usually care more about visibility than the mood of the interior. They prefer bright and gentle lights. And they often keep the light

switched on throughout the day. Also, Japanese widely utilize window covering devices, window blinds, curtain, and frosted glass for windows not only to prevent bad weather but also block the gaze of neighbors. And they leave the light switched on all day to help reduce the darkness at home. According to Brown (2023), the use of indirect light can make the space feel slightly larger.

4.3.8 Visual Complexity and Color

Japanese interiors have their own unique style. According to Tanic (2023), the traditional Japanese interior is very minimalist and often uses natural color. In many small spaces, the multifunctional area is often used to make the most of space and to maintain simplicity. The color choice is often neutral to emphasize peace and tranquility. Colors like light beige, cream, brown, and hoary are recommended to retain peacefulness. Another key to keeping the interior clean is to keep everything in order and organized. Also, according to Tanic (2023), another idea of Japanese simplicity is "the less is more." The interior space is often minimalist and clean, but the wood grain will be kept instead of using plain color. There are many hidden details in the interior space, but the overall vibe is kept simple. Repetitive patterns are often used in interior spaces to make the space more interesting but still keep the space coherent.

4.4 Design Criteria

From the thematic study and functional culture research, several criteria can be used as a guide for designing the Kei camper for Japanese Culture.

-Value of "Shinto", all things should be treated with respect, the value of "care." Be thinking of every detail of consumer. Design small detail that can make the user feel like the design cares about the user.

-Value of "Wabi-Sabi", seeking for beauty from imperfection. Aesthetically mimic aging material or utilize raw, nature material instead of industrialized material.

-In living space, the sense of "homely". Space for social time with close person. Prefer physical contact with family but not others.

-In the living space, you may consider napping while designing the sofa.

-In the sleeping area, Japanese beds are generally smaller and lower. Mattress on a wood platform. Storage space under the bed.

-In cooking area, having a dining table. Sakana Yaki grill under the stove. Microwave is recommended.

-Having a key for water taps.

-Having a Wabasto or another kind of compact heater. Could have the choice of a portable cooling system.

-Multifunctional storage space.

-Lower sitting position and lower furnishing.

- "Bringing exterior into the interior."

-For lighting, make sure of visibility and use of indirect light.

-For windows, use a shield, frosted glass, or some kind of physical block

-Different settings for daytime lighting and nighttime lighting.

-Minimalist design with neutral color. Colors like beige, cream, or brown.

-The idea of "less is more." Keep the design clean but keep the natural grain from the material.

-Repetitive patterns, small detail decorations.

Based on the concluded design criteria, the designer should be starting to come up with concepts for the interior design.

4.5 Design Process

With the design criteria, the designer can start brainstorming the concept. According to the research, the designer chooses to design a Kei camper, the interior space of which will be a maximum of 3,400 by 1,480 by 2,000 millimeters. There should be a living space, a sleeping area, and a cooking area.

4.5.1 Concept 1

The first concept is a more modernized interior design for a Kei camper. It has a kitchen with stoves, a wash sink, storage space, and a fridge. As many Japanese families will need a Sankana Yaki grill, it should be built under the stove. According to the design criteria, a key for the water tap could be included somewhere in the kitchen. The living area has two seats and a multifunctional table. A large space is left open for activities. The seats and table should be at a lower position according to the design criteria. Moreover, when the seats transform into a bed, the position will also be lower. The material choices will mostly be wood and a raw finish to emphasize the value of "Wabi-Sabi." Figure 38 is the floor plan sketch for the initial concept.
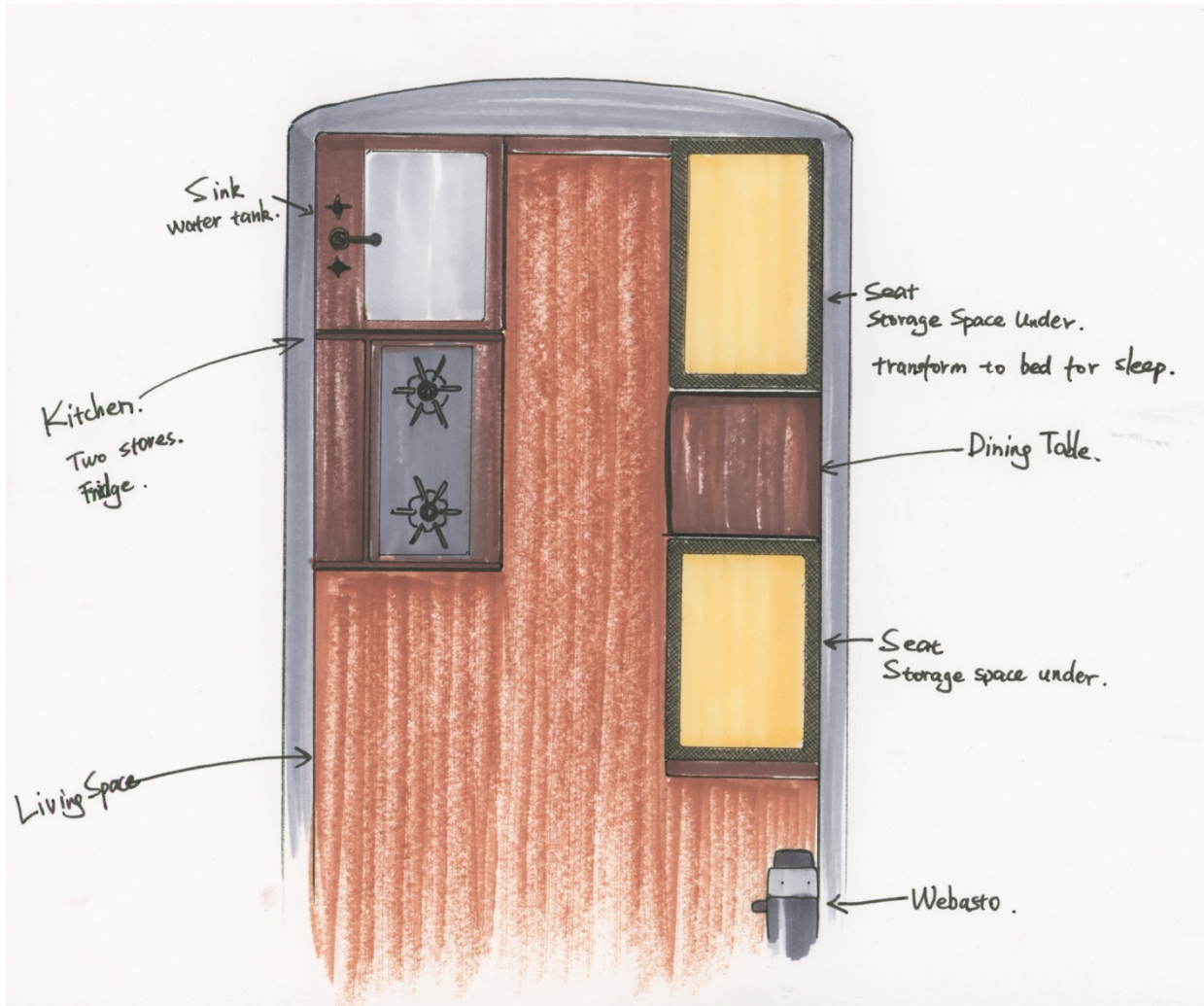
Figure 39. Concept 1 Floor Plan Sketch.

To ensure the proportions are correct, a 3D print model is made to see the rough design in real space. Figure 40 shows the printed model. All the furnishings look in proportion, and the layout is good. Renderings are made to assess the design aesthetically. Figure 41 is a rendering of the interior design.

Figure 40. Scale Model Prototype.

Figure 41. Rendering of Interior for Concept 1.

In concept 1, the furnishings are more modernized but decorated with Japanese elements. There are window covers to keep the interior space private. According to the design criteria, all the colors used are neutral. Dark brown wood is used for the flooring and most furnishings. Windows covers, seat mats, and shelf doors are light brown. The wall is in cream. All lighting is hidden on both sides of the ceiling, and the light is soft and gentle. Figure 42 shows the sleeping area. Extra seat mats can be put out, and hidden structures can be pulled out to hold the extra seat mats to form the bed. The bedding uses traditional Japanese bedding material and finish.

Figure 42. Rendering of Sleeping Area for Concept 1.

4.5.2 Evaluation

The design needs to be evaluated before the final product. Functionally, it must satisfy the design criteria's demands. According to the design criteria, the design should be able to satisfy most Japanese consumers' need to use a Kei camper. Aesthetically, it must resemble the Japanese style. The design has Japanese elements, like the color theme and bedding. However, the design needs to better represent Japanese culture.

4.5.3 Concept 2 and The Final Design

For concept 2, the interior space has been redesigned to make the design more representative of Japanese culture. Instead of two seats, a more traditional sitting method can be used. Tatami is used as the flooring, seats, and sleeping area for the living space. When needed, the dining table

can be lowered, and the whole living space can be used for sleep. Instead of window blinds, rice paper, a more "Japanese" material, can be used as window shielding. Then, the design should be functionally satisfying and aesthetically representative of Japanese culture. More detail will be shown in 4.6.
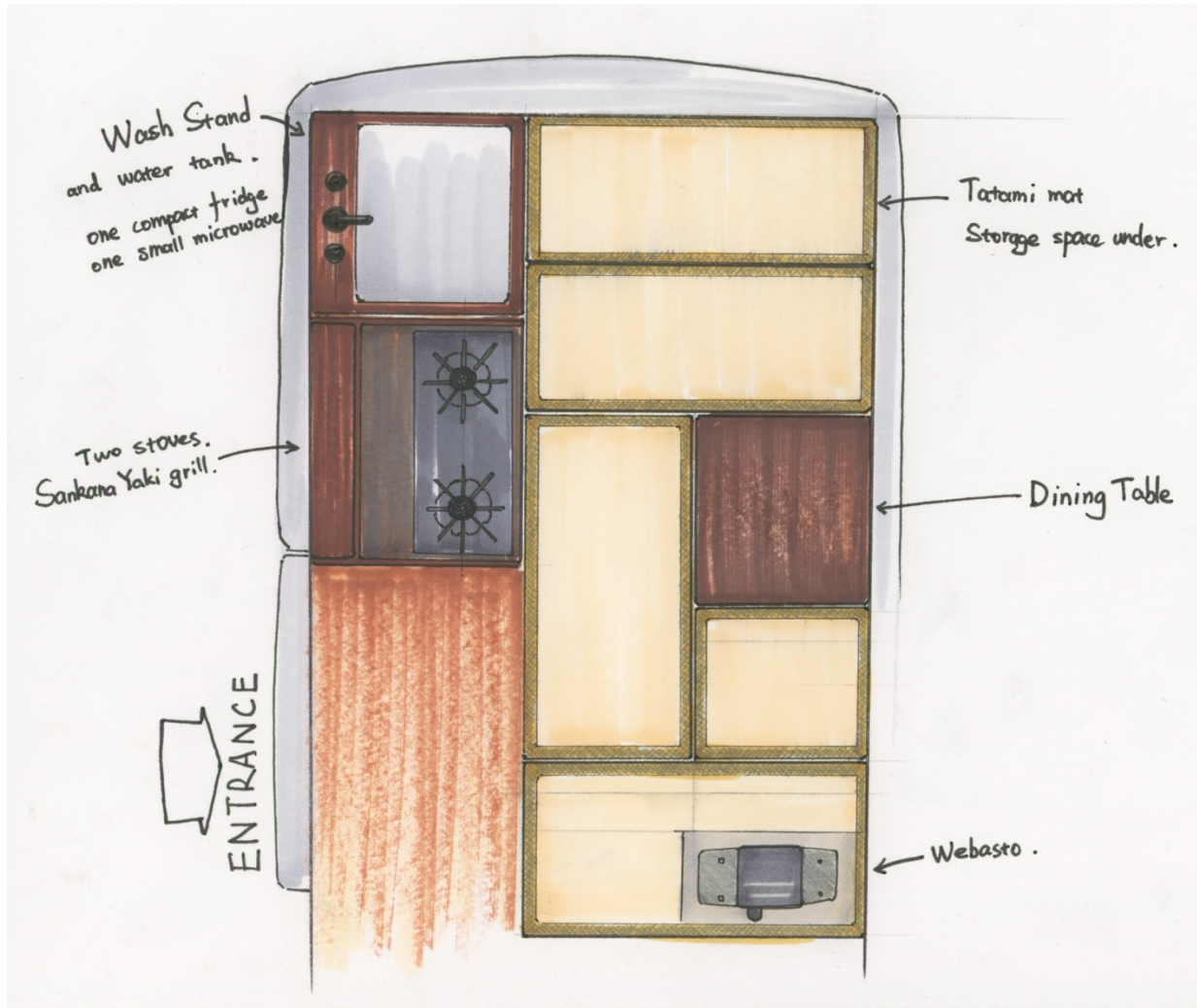

Figure 43. Concept 2 Floor Plan Sketch.

As there are two stoves, propane is needed to power the device. Also, both the Webasto and the engine are powered. There needs to be a place to hold the diesel. As shown in Figure 44, the red

tank is the diesel tank for powering the engine and the Webasto. The dark blue device under the

Webasto is the ventilation opening. The green tank is the propane tank, which is placed far away

from the heat source behind the water tank. The light blue tank is a freshwater tank, and the grey

tank is a grey tank. All the tanks can be refilled from outside on the left side of the vehicle. The

yellow device is the central control that allows monitoring and control of all tanks.
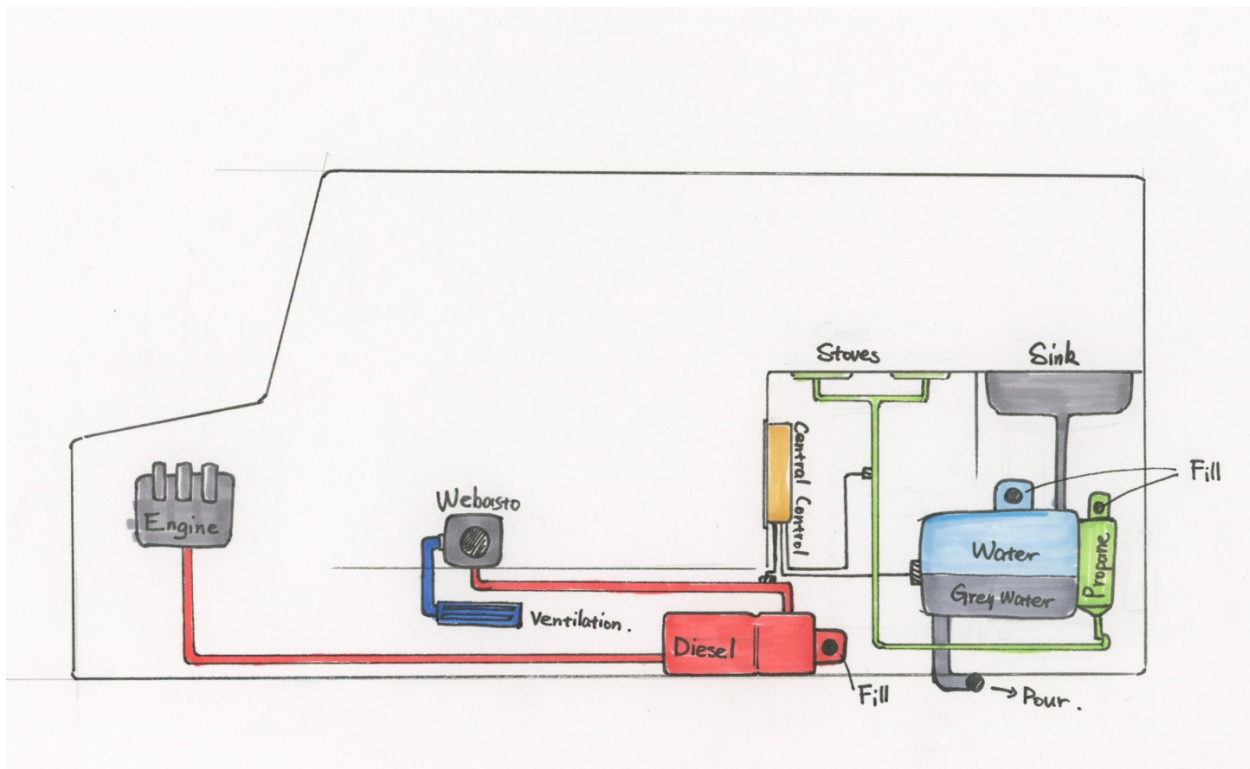

Figure 44. Gas Tank and Water Tank Placement.

4.6 The Final Design

Through the conception and designing process, the outcome is a Kei camper concept designed

for Japanese culture. The camper is designed for 1 to 2 travelers and equipped with a kitchen,

sleeping area, and living space.

Figure 45. Rendering of Interior of The Final Design.

Figure 45 is the interior space rendering. Tatami is used as the flooring, and the user can sit and walk on it. While the windows are closed, the two hidden light bars can provide gentle lighting for the interior space. There should be enough visibility throughout the day. The interior has a large open space, and nothing really blocks the view. According to the design criteria and research, this should reduce the crowdedness and make users feel the space is relatively wide. As shown in Figure 46, the rice paper-made window shielding can be slid open.

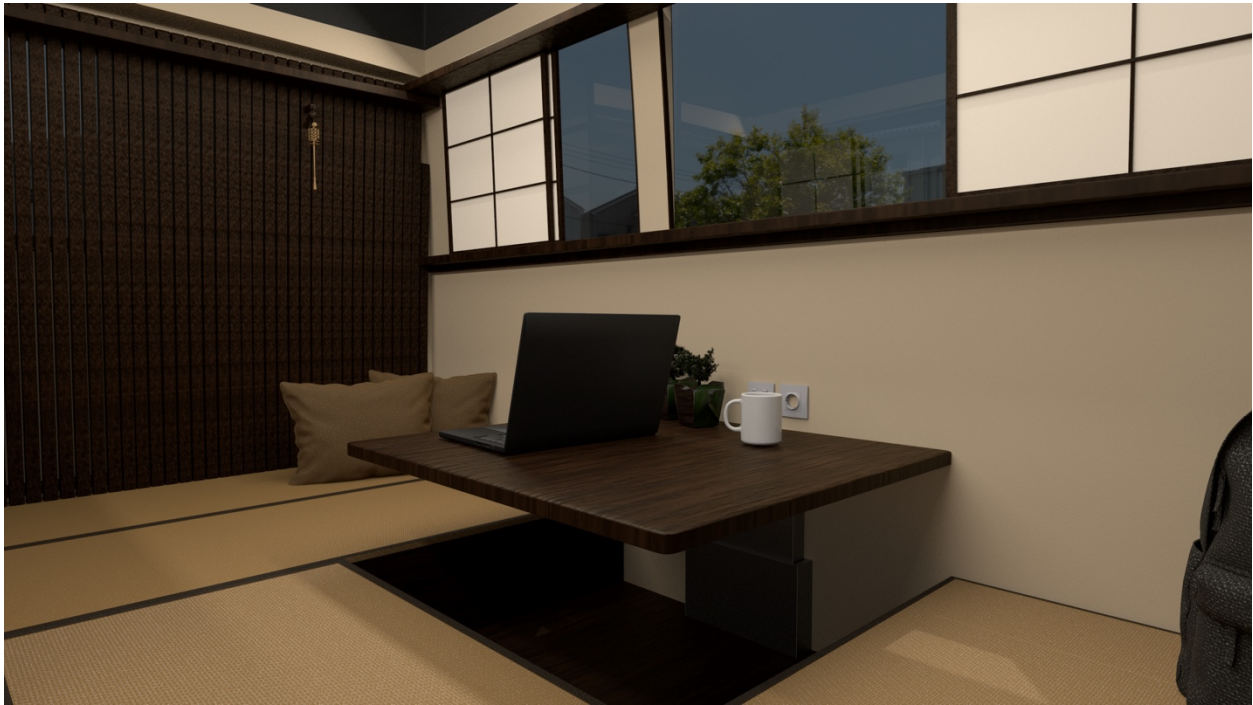Figure 46. Rendering of Interior of The Final Design with Opened Windows.

Figure 47. Rendering of The Multifunctional Table of The Final Design.

As shown in Figure 47, the multifunctional table is at a low position. If needed, there is space under the table for more legroom. Small plants can be placed on the table to reference the idea of "bringing the exterior into the interior." The table can also be pressed down to the floor level to make way for more space. When the table is down, an extra tatami can be placed on top, and then the space could be used for sleeping. Even if the table is still up, there is space for napping. Figure 48 is the rendering of the sleeping area. When at night, the light can be turned dim. The bedding is the traditional Japanese bedding, which is not pretty bouncy.

Figure 48. Rendering of The Sleeping Area of The Final Design.

Figure 49 shows the kitchen. It has two propane gas stoves and a Sankana Yaki grill. The sink can be used for simple morning cleaning and cooking. Under the stoves and sink are two storage

spaces. A compact microwave and fridge are also set up here. There is also an open storage space for seasoning bottles. The trash can is placed beside the kitchen shelf and has three sections for garbage sorting.

Figure 49. Rendering of The Kitchen of The Final Design.

Figure 50 shows the storage space under the flooring. By removing the tatami, multiple storage spaces can be found. Bedding, pillows, clothes, and other items can be stored safely in these spaces. The Webasto is also placed under the flooring, with a ventilating hole for the airflow. As shown in Figure 51, the flooring with tatami is set higher than the actual flooring of the vehicle. There is an open storage space for luggage or shoes at the entrance. When the camper is parked, the ceiling can be raised to provide more headroom.

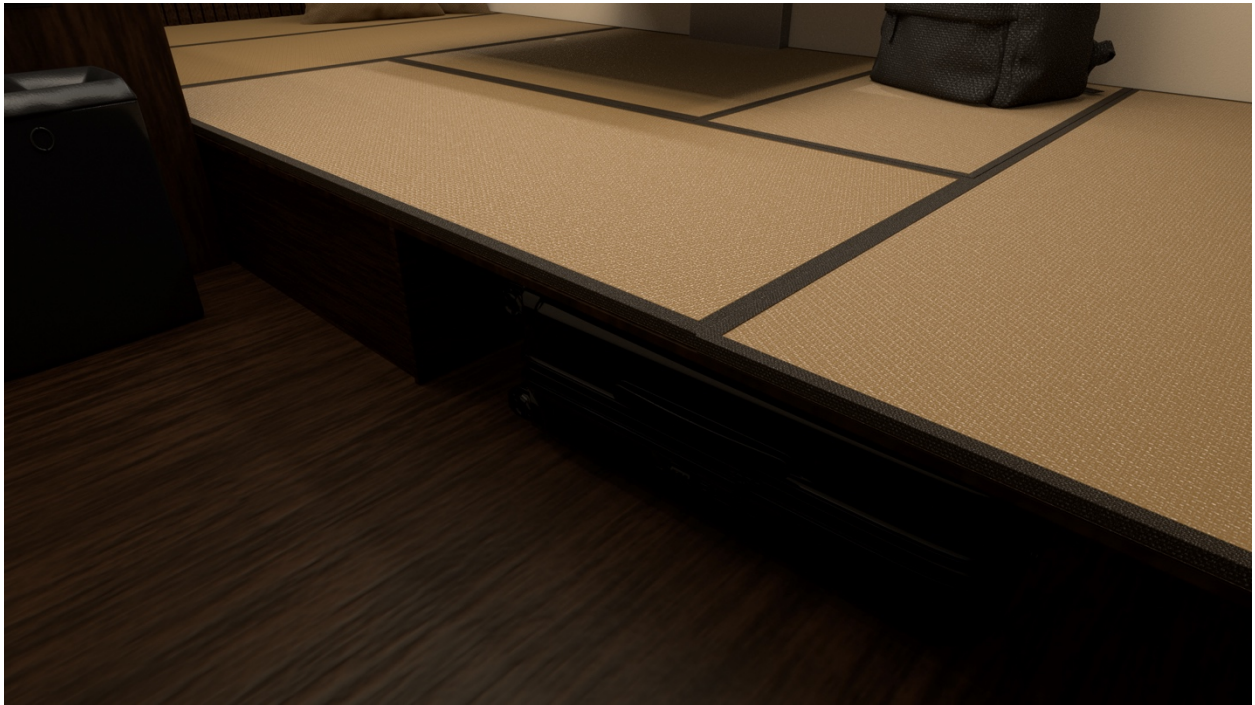Figure 50. Rendering of Storage Space Under the Floor of The Final Design.

Figure 51. Rendering of More Storage Space Under the Floor of The Final Design.

Figure 52 shows the back wall. The wooden wall is used as the window shielding and decoration. This style of wall can be found in many of the "Wabi-sabi" style interiors. The barrier style represents the incompleteness of the wall but also maintains simplicity. It adds more Japanese cultural elements to the design. Users can also hang or mount things on this back wall for a more "homely" vibe. There are trim decorations around the windows to represent the Japanese style. All the wood furnishings are raw finished to represent the value of "Wabi-Sabi." The value of "care" from "Shinto" can be found in many details. The handles are all behind the surface level to avoid hitting them while moving around. A water tap key is provided to get access to water from public facilities.

Figure 52. Rendering of the Back Wall of The Final Design.

Chapter 5: Conclusion

5.0 Conclusion

The designing process for recreational vehicles is complex and miscellaneous. It relates to so many subjects and fields that designing a successful recreational vehicle takes a vast amount of work. Also, culture is such an abstract concept that although nobody doubts its existence, no one is able to give an exact definition for it. So, while studying how to design a recreational vehicle for one culture, there is a large amount of work that needs to be done to find, understand, and categorize. This study has tried its best to gather all the needed information in a limited time and develop a tool to help designers better go through the process of designing recreational vehicles for one culture. The design tool should be a solid outcome with arguments backed up and useful to the designer who needs to design a recreational vehicle culturally or who needs an insight into culture.

5.1 Future Study

For future studies, more research could be done for each section in recreational vehicle design, like the living space, sleeping area, limited space design, and so on. Then, a smaller design tool can be generated for each of these sections. Also, more research and study about cultural values could be looked at to better explain this complicated concept in the thesis. A better demonstration could also be provided to show the benefits the designer can get from the tool.

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