Fika Living

- A sharing multifunctional furniture
  for single person households

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Abstract

The start point of this project is the research of single person household. According to a presentation from the Swedish government, in Sweden, the family structure is changing as time goes by. After 40 years, there will be more than 40% of household are single person households.

In addition, The project aims to create a sharing furniture, which used in living room, for young single person households. By using this furniture, they can enjoy the time being alone at home and also enjoy the leisure time with others, for example, through the Swedish social phenomena - fika.

The delineation of study and research of my project is furniture design towards single person households and fika. The theories I applied include sustainability, life cycle, human needs, and design methodologies.

Sustainable design put sustainable development theory into the design process, let the ecological environment and economic development connected as an the reciprocal causation. It lead to the use of energy resources effectively, and reduce the environmental pollution to the lower degree.
To achieve sustainable design theory, each steps within product life cycle need to be considered in a sustainable development way. Sustainable design principles not only refer to the design process, also stressed in engineering process, the production process, the sales process, the use process, the storage process, the maintenance/repair process and retirement process, to reduce resource consumption, to build a new production and consumption oriented concepts to achieve sustainable design.

The main practical methodology within the entire project and process is participatory design. Participatory design encourages all the users to directly design by using the simple tools, then do creative jobs by themselves and make own improvements during the process of practice. Furthermore, the participatory design can promote the users to realize the true value of designers, and finally they can also enjoy the conveniences which are brought by these designs.

**Key words**: Sustainable design, Furniture design, Participatory design, Single person household, Fika.
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1. Introduction

1.1 Brief project description and presentation of results

According to a presentation from the Swedish government, in Sweden, the family structure is changing as time goes by. After 40 years, there will be more than 40% of households are single person households. The research showed that the percentage of single person households is already more than 40% in big cities, for example, Stockholm, Gothenburg and Malmö.

The increasing of single person households is affecting the economical field, which includes the market of housing, furniture, daily life product, household appliance and food, etc. Generally, People who live alone almost purchase the same amount of household appliances, for example, television, refrigerator, or microwave oven, when compared with other households. Single person households require less amount of furnitures when they live in a small space.

But from the perspective of ecologic, it did not seem to good for creating sustainable environment. The per capita consumption of natural resources like water, energy and land is getting higher in the case of increasing single person households.

Considered the social-political perspective, the life living alone has both advantages and disadvantages. On the one hand, people who
live alone can enjoy the free time and space by himself/herself. On the other hand, solitaries lack of communications with others to some extent. As time passes, they may be out of touch with society.

Thus, my project aims to create a sharing furniture, which used in living room, for young single person households. They can enjoy the time being alone at home and can also spend the leisure time with others, for example, the Swedish social phenomena - fika.

The final concept of the furniture is a combination of coffee table, detachable tray and cushions. It has series ways of using, which can satisfy the different needs, for example studying and relaxing.

Through the study of sustainability theory, each steps of life cycle within this furniture was designed in sustainable concept.

1.2 Personal background and motivation

Five years ago, I started my university life that meant I needed to leave my parents and move to another city. I only went back to my home and spent time with my parents during summer vacation and Chinese new year period. For me, home is not only a place where my family members live in, but also a place where makes me comfortable. Rybczynski(1986) had written about this experience that “there were not only comfortable rooms and comfortable carriages, but comfortable meals, comfortable views, and comfortable situations”(p.120). I have the same view that the
comfortable feeling comes from the atmosphere created by the “… physical surroundings” (ibid). Especially, when the surroundings were organized by myself. Actually, this is my home but is not my house. The house belongs to my parents, which means most of the surroundings were organized by my parents. The living room shows their tastes.

At the same time, there were some differences compared with another home I have lived in before — the dormitory in my university. Mostly, there were 4 persons shared a 20m2 room, There was no space could be defined as a living room. In that case, we need to share the rest blank space to organize our personal stuff. The surroundings, without good organization, were no longer created by myself, but also my roommates.

It was another situation after I came to Sweden. I am living alone in an apartment, although I need to share the kitchen with others, but I have a totally personal space to organize and decorate by myself. On the other hand, I like to invite my friends to my place to spend time together. The living room is a place where I can relax by myself and also show off to my friends. Influenced by Scandinavian culture and style, I came to the idea to design a product used in living room, which could satisfy basic needs and has changed according to the living trend as well.

1.3 Aims and purposes
The project aims to create a sharing furniture, which used in living room, for young single person households. By using this furniture, they can enjoy the time being alone at home and also enjoy the leisure time with others, for example, through the Swedish social phenomena - fika.

Ecological perspective
As a furniture design project, sustainable design theory was applied in each steps of life cycle, including material, packaging, transportation and so on.

Economical perspective
The increase of single person household is affecting the consumer spending patterns, including housing, furniture, daily life product and food.

Cultural perspective
The project combines with Swedish culture, fika, which is a typical social activity in Sweden.
The furniture is designed based on Scandinavian style.

Sociopolitical perspective
Based on the future trend of family structure in Sweden, which is living alone, the project aims to provide a solution by designing a sharing furniture, which make people who live alone can enjoy the time being alone at home and can also spend the leisure time with others, for example, the Swedish social phenomena - fika.
1.4 Delineation of field of study

The delineation of field of study have multi faces in this project. Sustainability is the main theory through the whole process. As a furniture design project, the sustainable design theory was applied in each steps of product life cycle.

Human needs is the study of the importance of home, which represent a basic unit when establish a sustainable society.

In Addition, participatory design method is the theoretical framework through the project.

In the chapter of context, the condition of single person household, fika and Scandinavian design were done based on literature review.

The current projects and contemporary works were analyzed in critical way.

1.5 Delineation of project

Through the recombination of furniture, the space can be changed, which includes all the occurrences of changes in the space. These changes are not all predictable at the preliminary stage of the designers. And this change of combination bestow abundant context
on the variation of interior space. Different forms of furniture can definitely form different functions.
In my project, the sharing furniture is presented based on the activities of solitaries at home. It has series of combinations for meeting the need in different situation.

1.6 Formulation of question
The main question I raised was, “how does a furniture meet the needs of single person households within sustainable design field?”.
2. Theory

The delineation of study and research of my project is furniture design towards fika and single person households, different theories were used to develop my research and design. I present the followed theories in this chapter, including sustainability, life cycle, human needs, and applied methodologies.

2.1 Sustainability

In 1987, Brundtland Commission, now known as World Commission on Environment and Development, have defined sustainable development as “development that meets the needs and aspirations of the present without compromising the ability of future generations to meet their own needs” (Butlin, 1989) in the Brundtland Report.

Further more, Cabezas and Diwekar (2012) described the meaning of sustainability:

…sustainability is truly about insuring that people, generation after generation, can continue to exist, meet their needs, and prosper on planet Earth. This is about people. Sustainability is in summary a concept developed by people to help promote the welfare of people.

The global issues led sustainable development showing up; at least four unsolved problems caused the unsustainable life, which are over-consumption of materials, inefficient resource utilization,
pollution and overpopulation (Ljunberg, 2007). In design field, researchers and designers try to find solutions in order to achieve sustainable development. Greenwood(2012) described about, “design for the environment and eco-design are terms commonly used in reference to sustainable design.” Sustainable design put sustainable development theory into the design process, let the ecological environment and economic development connected as an the reciprocal causation. It lead to the use of energy resources effectively, and reduce the environmental pollution to the lower degree.

From the above we can see that, it was not until 1980s that the sustainable development of society was considered to be important actually by the people. Only at that time, the theory of sustainable design was more talked of and more concerned. People began to be aware of the importance of the relationships between environment, society, and the human being.

Therefore, to view my project, it demonstrates the sustainable development from an angle of design. What the sustainable design emphasizes is the coordination of products and environment, which means that the design is to meet the human being’s survival for material and spiritual needs by building up a sustainable production system with the theory of sustainable design so as to ensure the long-term development of the society and the continuous progress of human civilization.
Meanwhile, the theory of sustainable design also includes the functions of the product and people’s basic needs. Specifically speaking, this theory includes two aspects: technical aspect and environmental aspect.

Sustainable design which is called “Green Technology” is a process of applying the sustainable theory from a technological angle to reach a sustainable standard. This technology plays an important role in reducing energy consumption and relieving environmental burden. It is the sum of all kinds of technologies that can reduce environmental pollutions. For example, in the field of furniture design, green technology is used for the recycling, the maintenance and the reuse of the furniture, hence to meet the use and the functions of the furniture under the premise of the environmental ecological needs met already.

**Technical Aspect**

Sustainable design which is called “Green Technology” is a process of applying the sustainable theory from a technological angle to reach a sustainable standard (He, Tang and Huang, 2009). This technology plays an important role in reducing energy consumption and relieving environmental burden. It is the sum of all kinds of technologies that can reduce environmental pollutions. For example, in the field of furniture design, green technology is used for the recycling, the maintenance and the reuse of the furniture, hence to meet the use and the functions of the furniture under the premise of the environmental ecological needs met already.
Environmental Aspect

Environmental aspect includes the development of ecological cycle. It emphasizes on the environmental protection, the resource recycling and the ecological design. Staring from the processing of furniture itself till to the development of ecological cycle it combines mainly with the design theory of life cycle, focusing on the environmental protection, resource recycling and the ecological of the design.

From the above statement, we can see that, the theory of sustainable design is a designing way which forms based on the sustainable development concept. It is concerned fully about the relationship between design and other environmental resources. At the same time, it emphasizes on relieving the conflict between human economical development and environment on the basis that the human material and spiritual needs are met, so as to build up a long-term development system and meet the development needs of future generations, to promote the sustainable development of economy, environment and the society. However, there is no uniform definition for the theory of "sustainable design" in the relevant fields at home or abroad. At present, many scholars made different statements about this theory, such as Eco-design, Cleaner Design Environment Conscious Design, Life Cycle Design, Regenerative Design and so on. Whichever it is, the core of the theory is to find out the balancing point between the human being, the society and the environment.

2.1.1 Relating to Furniture Design
In my project of furniture design, the theory of sustainable design is demonstrated fully in every aspect such as designing, material, producing, packaging, and marketing.

Selection and Application of Material
Making a reasonable use of materials is the most intuitive reflection of the sustainable design theory. To use green materials in the furniture industry is the basis of realizing sustainable development. The selection of green material means that we should select the environmental friendly natural material for the furniture, which is legally harvested. To promotes the ecological of furniture products by the ecological of material. The flexible and innovative use of new material can enrich the furniture products, and for the green furniture products, the selection of environmental friendly material should break the original mode of blindly using natural materials, and try using the new environmental friendly materials instead of using the traditional materials only.

The functions of Furniture
In addition, the functionality of furniture is also one important aspect to reflect the theory of sustainable design. It includes 3 aspects: furniture structure, multi functions and disassemblibility.

The Structures and Forms of Furniture
The structures and forms of furniture should be as simple as possible so as to save the raw materials and reduce production cost. Just as the
figure 2.1 shows, the whole material of this chair is just one piece of aluminum plate. There is no any other material or accessory used, nor screws or adhesives. This is an example of extreme simplicity achieved. In the process of furniture designing, we should simplify the furniture structure as much as possible, reduce the amount of furniture parts and materials used to save and get environment protection under the conditions that the practicality and aesthetics are maintained.

Multi Functionals of Furniture

Multi functional design means that one piece of furniture can provide many functions for people. For example, the sofa bed is used as a sofa at ordinary times, but can be spread as a bed when it is necessary. Thus, the furniture is highly utilized with material saved and without room wasted. This is one of the forms of environmental friendly furniture. The combination design of furniture is referring to
a group of furniture which can achieve a diversified use by a variety of different assembling forms.

In 1968, the systematically assembled residential furniture from Hulsta Company, Germany became the first brand in the European residential furniture industry. The well-designed standard units can be assembled by a related diversified system and be adaptable to different interior spaces, which meets the public and personalized needs. This open-style furniture combination system makes the German designers’ dreams of many years come into true. In 1994, this company created a new furniture combination system called the first cash & carry range. These high-quality furniture standard units provide the possibility of limitless and diverse changes. The free and systematic furniture that only needed simple tools to make a rapid assembly work has given a shock to Europe and the global market. In the recent a few years, FLEXA of Denmark provided a great deal of flexible furniture for children. Each part of the furniture can be assembled flexibly as a building block. The height of the desk and the chair can be adjusted. The combination of the bed and the desk, the wardrobe and the bookshelf is more flexible and convenient. What is more, the height of the bed and the combination can be adjusted according to different ages. Bookshelves can be combined diversely with case cabinets and drawer cabinets or just installed on the wall. These freely assembled furniture broke through the previous concept of furniture integration. It not only reflects the avant-garde style, but also conforms with the personalized and practical housing life philosophy that modern people pursue.
Good assembly is an important aspect for green furniture designing. That means the furniture with good assembly upgrade the use rate of furniture parts and minimize the waste and besides that, it enables the green packaging design to be more convenient. The repeated disassembling and assembling is just the characteristic of modern panel furniture. However, the purpose for the assembility of green design we mentioned here is for the recycling and reusing of the furniture parts. Therefore, the size standardization and the interchangeability of parts should be considered during the designing process. Besides, the disassemblability design should be combined with the exploring of practical and pleasing disassembled hardware parts.

2.2 Life cycle

Life cycle (Figure 2.2) shows “artifacts in transition from one manifestation to another” (Krippendorff, 2006). In my point of view, to achieve sustainable design theory, each steps within product life cycle need to be considered in a sustainable development way. Sustainable design principles not only refer to the design process, also stressed in engineering process, the production process, the sales process, the use process, the storage process, the maintenance/repair process and retirement process, to reduce resource consumption, to build a new production and consumption oriented concepts to achieve sustainable design.
Life cycle is one kind of cost study method on the basis of the full life cycle of products, it means the sum of fee used in research, design, development, production, usage, guarantee and abandonment, the whole cycle ranges from the preliminary product planning, research, development, production all the way to scrap.

![Life cycle of technological artifacts—designers’ view.](image)

*Source: The Semantic Turn: A New Foundation for Design*

The environmental issues triggered in every link should be laid emphasis on, and we need to find outstanding methods of improvement as we can. By using existing knowledge and technology, designers should engage themselves in protecting environment, improving the usage of materials, adopting clean energy for production, taking use of sustainable production process, and choosing the products which are modern, innovative and has slight negative effects on the environment of earth.
In my opinion, the process can be analyzed from two levels, design is one part, and the second level is about technology, production, sales, and usages and so on. Why do I divide them into two parts? As far as I am concerned, the design already includes the rest whole procedures, when the products are designing, we should not concentrate on designing only, instead, we need to start from the sustainable perspective and consider the mutual interaction and connection among them in every link of the products, besides, the possible influence or results are in our consideration. What’s more, we can seek for their relationship from the critique angle and multiple aspects. For example, in the link of production, emphasis shall be put on each part of processing techniques, the treatment and recycle of materials, how to reduce more resource consumption, energy and produce less pollution. Moreover, in the link of selling, we should stress on the method of saving space in transportation after processing, the optimization of logistics and how to make dismantling and recycling more convenient for us. Each link must be perfectly arranged at the preliminary stage of design.

Therefore, in my eyes, these two parts are closely interconnected and also relatively independent. Each step shall be connected with design and critique, so we can truly realize sustainable development design from a more objective perspective of perfecting the design of products.

2.3 Human needs
To live a sustainable life, there are finite and classifiable human needs that need to be satisfied. Max-Neef, Elizalde and Hopenhayn (1991) classified “…needs according to the existential categories of Being, Having, Doing and Interacting and, on the other hand, according to the axiological categories of Subsistence, Protection, Affection, Understanding, Participation, Idleness, Creation, Identity and Freedom” (p.30). He created a matrix (table 2.3) to show different needs and satisfiers. The matrix gives examples of possible types of satisfiers. The satisfiers are suitable for individuals or groups and also depending on multiple cultures.

Maslow (1943) developed a theory of hierarchy of needs. The physiological needs could be classified as the basic needs, which include food, water, shelter, air and warmth. With these factors, human can continue to survive. Shelter and human life are inseparable. Home, as a shelter, could be defined as a platform to meet some needs.

Related to my project, based on Max-Neef’s analysis of human needs and satisfiers, some parts are helpful for my study and use.

From the axiological categories, home, it could provide subsistence, protection, affection, participation, leisure, creation, identity, etc. Wherein for subsistence, which is the most basic needs of life, home should provide a healthy and good environment for human. In functionality, home is a place to meet needs of food, shelter, rest and
work. Of course, as a living space, home also have the social setting function.

<table>
<thead>
<tr>
<th>Needs according to: existential categories</th>
<th>Being</th>
<th>Having</th>
<th>Doing</th>
<th>Interacting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subsistence</strong></td>
<td>Physical health, mental health, equilibrium, sense of humour, adaptability</td>
<td>Food, shelter, work</td>
<td>Feed, procreate, rest, work</td>
<td>Living environment, social setting</td>
</tr>
<tr>
<td><strong>Protection</strong></td>
<td>Care, adaptability, autonomy, equilibrium, solidarity</td>
<td>Insurance systems, savings, social security, health systems, rights, family, work</td>
<td>Co-operate, prevent, plan, take care of, cure, help</td>
<td>Living space, social environment, dwelling</td>
</tr>
<tr>
<td><strong>Affection</strong></td>
<td>Self-esteem, solidarity, respect, tolerance, generosity, passion, sense of humour...</td>
<td>Friendship, family, partnership, relationships with nature</td>
<td>Make love, caress, express emotions, share, take care of, cultivate, appreciate</td>
<td>Privacy, intimacy, home, spaces of togetherness</td>
</tr>
<tr>
<td><strong>Understanding</strong></td>
<td>Critical conscience, receptiveness, curiosity, astonishment, rationality...</td>
<td>Literature, teachers, method, educational policies, communication policies</td>
<td>Investigate, study, experiment, educate, analyse, meditate</td>
<td>Settings of formative interaction, schools, academies, communities, family...</td>
</tr>
<tr>
<td><strong>Participation</strong></td>
<td>Adaptability, receptiveness, willingness, determination, dedication, respect...</td>
<td>Rights, responsibilities, duties, privileges, work</td>
<td>Become affiliated, co-operate, propose, share, interact, express opinions...</td>
<td>Settings of participative interaction, parties, associations, communities...</td>
</tr>
<tr>
<td><strong>Leisure</strong></td>
<td>Curiosity, receptiveness, imagination, recklessness, sense of humour, sensuality...</td>
<td>Games, spectacles, clubs, parties, peace of mind</td>
<td>Day-dream, brood, dream, remember, give way to fantasies, have fun, play...</td>
<td>Privacy, intimacy, spaces of closeness, free time, surroundings, landscapes</td>
</tr>
<tr>
<td><strong>Creation</strong></td>
<td>Passion, determination, intuition, imagination, boldness, rationality, curiosity...</td>
<td>Abilities, skills, method, work</td>
<td>Work, invent, build, design, compose, interpret</td>
<td>Productive settings, workshops, cultural groups, spaces for expression...</td>
</tr>
<tr>
<td><strong>Identity</strong></td>
<td>Sense of belonging, consistency, self-esteem, differentiation...</td>
<td>Symbols, language, religions, habits, values, norms, memory, work...</td>
<td>Commit oneself, integrate oneself, confront, decide on, recognize oneself...</td>
<td>Social rhythms, everyday settings, maturation stages...</td>
</tr>
<tr>
<td><strong>Freedom</strong></td>
<td>Autonomy, self-esteem, determination, passion, boldness, tolerance...</td>
<td>Equal rights</td>
<td>Dissent, choose, be different from, run risks, disobey...</td>
<td>Temporal/spatial plasticity</td>
</tr>
</tbody>
</table>

Table 2.3 Matrix of needs and satisfiers, from Max-Neef

*Source: Human Scale Development Conception Application and Further Reflections*

Secondly, protection, home is one of the bearers of living space, social environment, and dwelling.
Thirdly, in the aspect of affection, house can be called as home. When people are at home, they all need to have emotional communication with their family or friends. To all of us, friendship, family, partnership, relationship with nature are all ways to share our emotions. There is no doubt that it has the functions of making love, caressing, sharing and so on, it can motivate people to find their emotional sustenance. In addition, living space is the place where people can gather together and hide their own privacy. For instance, when the Christmas day comes, people are accustomed to go back home and accompany their parents to enjoy the festival all the time. So, it can be said that home is the only place which can bring people a sense of belonging, which is the same all over the world. Home gathers people together and lets them have emotional communication; what’s more, it brings people both the sense of security and the sense of belonging.

Fourthly, it is participation. Home is not only the other place for social communication, but also the platform for communication. At home, all the people can study, share, and communicate with each other. To those who are living in a big family or those who live in solitude, these kinds of activities are definitely indispensable in their daily life; people experience and own them every day.

Fifthly, it comes to leisure. In spite of study and work, human beings also eager for the satisfaction in aspects like curiosity, sense of responsibility, imagination and so on. Therefore, people all need to have spare time, and the necessary functions possessed by the living
space are games, clubs, parties, day-dream, and play. People not only communicate and interact with other people, the objects or nature, but also with the rooms. The objects, furniture, decoration, light and even the smell are having interactions with people, so people may feel the sense of familiarity, the sense of security and the sense of belonging.

Sixthly, it comes to creation and identity. When people refer to their own living space, they are often apt to say: “It is my home!” The word “my” here can vividly reflect their inner senses of occupation. Then how can people make the home exclusively belong to themselves? People will often create something in their living space, such as decoration, furniture, souvenirs which they bought, some objects which made by their hands or even the nice activities they have done in this area, and the wonderful memories people share together with other people. All of these have become the exclusive features and marks of home.

From this table, I can conclude some key words of my design requirements, such as food, work, rest, play and share. For single person household, the furniture I designed should make them meet with these demands, offer more functions for them, lead them to enjoy the daily life truly and deeply and become more addicted into the life in a sustainable way.

2.4 Methodology
In this section, I introduced the methods I used in my design process. The design process could be broadly divided into idea generation period and visualization period.

In Idea generation period, the main goal was research, literature reviews, questionnaires, interview, AEIOU, and observation were the applied methods.

**Literature reviews**

Literature reviews are an indispensable design approach in academic paper, and it is a key process in any design project, and it is a research method which aimed at a specific theme to collect the comprehensive research result. (Martin et al, 2012, p.102).

The research for theory and method needs the support and reference of literature. Besides, it also needs to reference other author’s opinion to this question and then relate to my project and adopt the favorable theory and repudiate in the irrational place. To be specific, this project mainly surveys from 5 fields, including: single person household, fika, sustainability, furniture design, and Scandinavian design. Investigate the situation of Swedish single person household; research the history, and the state of development of fika; in the current design field, the binding pattern of sustainability and design project, for my project, is a way to connect these fields with sustainable design; in furniture design, I need to consider life cycle within my project; in addition, the style and feature of Scandinavian design.
**Questionnaires**

In my project, questionnaires is a written form survey tool to collect information. It is easy, fast, and wide to use, and it can make us have an intuitive understanding of the features, thoughts, feelings, ideas, action and attitude of the respondent. (Martin et al, 2012, p140)

To tie in with the target group, the questionnaire is oriented to young single person household to make sure that people can get the specific feedback. The motivation of the survey is to know about the current situation, reason for live alone, social contact, furniture consumption and questions about fika of single person household from 20 years to 35 years and to make sure the project feasibility and the involved sustainability.

**Interviews**

Interviews are a basic research approach that can contact with participant directly. By this approach, people can obtain the first-hand information, which include the participant’s experience, views, attitude and their opinions. (Martin et al, 2012, p.102).

In order to know about the Swedish single person household’s living conditions directly, at the beginning of the project, I interviewed 10 people randomly. The respondents include the ones who are under the condition of solitary, the ones who once to be single person household. Besides that, I also let some people presume to be in solitary. I want to know the reason why they choose to be single
person household, their activities in the living room, their unique requirements on furniture, their usual social activities, and the irrational place in their furniture. The purpose of the interview is to know the needs of the clients more directly, to let the user participate in the discussion of furniture design. So people can gain inspiration from their critical opinion and then perfect our project.

**AEIOU**

AEIOU is a design method that can help interview to conclude the feedback more clearly. When people are interviewing the respondent, using the method of AEIOU to raise questions, using the method framework to summarize answers and collect opinions. Setting up systematic opinion network, so that people can obtain relevant information quickly and efficiently in the next design steps. (Martin et al, 2012, p10)

**Observation**

Observation is a basic research skill; researcher should observe all kinds of phenomenon carefully and take systematic notes, including people, artifacts, environments, events, behaviors and interactions. (Martin et al, 2012, p120)

Observation method was mainly used to research fika in this project to observe people’s action in public places and in private houses. When people are fika, what kind of people they will meet, what object they use, what are their requirements, find questions about their fika and then give solutions in my project.
In visualization period, once I decided the concept, I made mood board and scenarios to explore the style and the environment around the product.

I draw sketches and made prototypes. At the same time, search for suitable materials, considering the life cycle of product, I intend to use sustainable materials and define a balance within material and service life, in order to maintain the sustainable ecological environment.

To develop a product for daily life, participatory design method is useful in this case. I made workshops with participants to test the prototypes.

**Scenario**

A scenario is a kind of narrative method from the user’s point of view. It can explore the direction of the product in the future usage. It can predict the role that the product will act in people’s daily life. (Martin et al, 2012, p152)

At the beginning of the furniture design, in order to have a more intuitive feeling about the use of product, I plan the scenario of my project, and pre-judge the situation that the user uses the product in each step. So that I can know the specific design thought, and foresee the possible way of usage and process from user’s point of view, and provide a basis for making sketch and prototype.
**Image board**

Image board is a method that collecting pictures, illustrations or conceptual graphs from literature and then collage them together to let the reader have a macroscopical concept of the design intention of the designer, including color, style, shape, material and so on. (Martin et al, 2012, p100)

This design method was utilized after the built of the rudimentary furniture model. After knowing about the usage condition from the critical respect, people would have an orienting notion to the appearance of the furniture. By this way, people can make certain of the style of the furniture, and let users foresee the development tendency of the furniture after it finished.

**Prototyping**

Prototyping is a kind of simple prototype made according to different solutions. It is a design method used by the designers, clients together with users to develop and test the feasibility of the product. (Martin et al, 2012, p138)

In my project, in the first place, in the process of making the prototype, there may burst into many problems and inspiration, and it is a step of perfecting the project. In the second place, after the model finished, people can invite users to experience and test it, so people can find out the problems and improve our design project. Such as whether the size of the furniture is suitable, whether the structure is
reasonable, whether the function is perfection, and whether it is comfortable to use and so on.

**Participatory design and workshop**

“Participatory design is a human-centered approach advocating active user and stakeholder engagement throughout all phases of the research and design process, including co-design activities.” (Martin et al, 2012, p128)

![The experience domain](image)

**Figure 2.4** The experience domain (adapted from Sanders 2001)

In order to find the satisfiers from users’ perspective, co-design is a tool for exploration that involve users in the design process.

Sanders presented the experience domain(Figure 2.4) to show the steps of experiences (Visser et al., 2005). Experiences include past memories, present moment and future dreams, which could be
collected from users/participants by using interviews or other participatory design methods.

![Figure 2.5](image)

Figure 2.5 Different levels of knowledge about experience are accessed by different techniques

Figure 2.5 presented the techniques of collect informations of people’s experience (ibid), which are classified from surface - what people say, to what people do, to deeper level - what people know. The more interaction that designers have with participants, the deeper knowledge that designers can get from participants.

In a broad sense, people can take part in design in their life whenever and wherever. In this condition, the participation is generally positively, and can be passively as well.

All of the participants in the work of design, which include producers, users and the related stakeholders. The great emphasis of the participatory design is put on combining the knowledge and skill of the group of stakeholders and current or future users with related sys-
tematic and professional skill. The participatory design encourages all the users to directly design by using the simple tools, then do creative jobs by themselves and make own improvements during the process of practice. Furthermore, the participatory design can promote the users to realize the true value of designers, and finally they can also enjoy the conveniences which are brought by these designs.

From the perspective of production stage, the furniture of participatory design connects the behavior of users with furniture (refers to a kind of medium). That is to say, the object of design expansion is not just one single user; it tolerantly intends to offer more opportunities to more people to participate. There are several users who have the design expansion on the same piece of furniture, they can discuss, cooperate with each other in order to achieve communication. Therefore, the participatory design can realize the communication among different users. Design expansion will also be one of the vital design methods adopted by my project.

During the whole process of design the furniture, it is necessary to fully consider the texture, mobility and participation of furniture, which can make the future actually immerse in the whole interior atmosphere. Therefore, in the process of actually designing the furniture, the relationship between furniture flexibility and function should be the first thing to be considered. On one hand, focus on the role of furniture in space; on the other hand, maintain the flexibility of furniture and the entirety of other necessary functions. Only by taking the function, spatiality and flexibility into consideration at the
same time, participatory design furniture can be used in the space to the fullest.

After I defined my target group, I came to initial ideas of my project by using questionnaire and interview methods. After the accomplishment of each prototype, I will hold a workshop, invite some participants together to have an experimental test on my furniture. Next step is observation. I will record the behavior and interactions between the prototype and participants. Thirdly, communication and discussion is the way to gather participants’s feeling and feedback, which can lead to the a more complete design concept. From my point of view, the second step and third step can be done together. I will talk with the participants while observing them. It is more direct to know the reaction of the participants immediately and get depth study of users’ needs. so I can be inspired to better optimize my project.

**Stakeholders Maps**

Stakeholders Maps can make me have an intuitive understanding for the design project’s main task, while making clear the clients, users, beneficiaries, relevant departments, enterprises and so on, and preparing for user-centered research, design and development. (Martin et al, 2012, p166).

In my project, stakeholders include raw material suppliers, such as wood, fabric, foam suppliers; manufacturers, such as furniture manufacturing companies; furniture sellers, such as proxy stores, online
distribution channel; user, people who use the furniture, our aimed clients are single person household who are at 20 to 35 years.
3. Context

In this chapter, the related context, which are single person households, fika, Scandinavian design, were described through economical, ecological, social-political and cultural perspectives. Furthermore, the contemporary works and current projects are furniture or product design, which analyzed based on product life cycle. Function and material could be pointed out.

3.1 Single person households

Households and families are the most basic units of society, are also important driving force of social development. Bernard and Shea (2013) quotes Paul (2001) “the family has the indispensable role of providing to its members the fundamental human environment needed for their physical, moral, psychological, social and spiritual development”. The development of household not only promotes the physical and mental development and self-realization of each member of the family, but also plays an important basic role on the realization of long-term equilibrium of sustainable development goals (Bernard and Shea, 2013) from economical, socio-political and ecological perspective.

Euromonitor International Blog (2014) forecasts that “single person households will be the fastest growing household profile in 2014-2030 worldwide”. A prediction presented by Swedish government showed that there will be 40% of household are single
person households after 40 years. I did research about Swedish households. According to table 3.1 percentage of all households by region, household size and year - Sweden, which is from Statistics Sweden, 37.8% household are one person in 2014. In the capital city

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>0180 Stockholm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 person</td>
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<td>43.8</td>
<td>43.3</td>
<td>43.0</td>
<td>43.0</td>
</tr>
<tr>
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<td>27.0</td>
<td>27.1</td>
<td>27.2</td>
<td>27.3</td>
</tr>
<tr>
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<td>12.4</td>
<td>12.6</td>
<td>12.7</td>
<td>12.8</td>
<td>12.6</td>
</tr>
<tr>
<td>4 persons</td>
<td>10.5</td>
<td>10.6</td>
<td>10.8</td>
<td>10.9</td>
<td>10.9</td>
</tr>
<tr>
<td>5 persons</td>
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<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
<td>3.9</td>
</tr>
<tr>
<td>6 persons</td>
<td>1.2</td>
<td>1.3</td>
<td>1.3</td>
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<td>1.2</td>
</tr>
<tr>
<td>7 persons or more</td>
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<td>1.1</td>
<td>1.1</td>
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<td>1.1</td>
</tr>
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<tr>
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<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 3.1 Percentage of all households by region, household size and year

Source: Statistics Sweden

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
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<td>37.7</td>
<td>37.8</td>
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<td>31.3</td>
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<tr>
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<td>12.4</td>
<td>12.4</td>
<td>12.3</td>
<td>12.2</td>
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<tr>
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<td>12.3</td>
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<td>12.1</td>
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<td>4.3</td>
<td>4.3</td>
<td>4.3</td>
<td>4.3</td>
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<tr>
<td>6 persons</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>7 persons or more</td>
<td>0.7</td>
<td>0.8</td>
<td>0.8</td>
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<tr>
<td>All households</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 3.2 Percentage of all households by region, household size and year

Source: Statistics Sweden
Stockholm, the percentage of one person household is even more than 40% (table 3.2). The same trend are shown in Gothenburg and Malmö.

<table>
<thead>
<tr>
<th></th>
<th>0-4 years</th>
<th>5-14 years</th>
<th>15-24 years</th>
<th>25-34 years</th>
<th>35-44 years</th>
<th>45-54 years</th>
<th>55-64 years</th>
<th>65-74 years</th>
<th>75-84 years</th>
<th>85-94 years</th>
<th>95+ years</th>
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<tbody>
<tr>
<td>2011</td>
<td>0</td>
<td>0</td>
<td>135,992</td>
<td>219,457</td>
<td>157,269</td>
<td>186,779</td>
<td>241,953</td>
<td>254,499</td>
<td>220,506</td>
<td>141,426</td>
<td>12,286</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>0</td>
<td>136,013</td>
<td>220,934</td>
<td>153,213</td>
<td>189,795</td>
<td>238,989</td>
<td>263,449</td>
<td>219,937</td>
<td>140,822</td>
<td>12,537</td>
</tr>
<tr>
<td>2013</td>
<td>0</td>
<td>0</td>
<td>133,686</td>
<td>225,902</td>
<td>150,798</td>
<td>191,337</td>
<td>237,260</td>
<td>277,488</td>
<td>220,616</td>
<td>141,664</td>
<td>12,894</td>
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<td>2014</td>
<td>0</td>
<td>0</td>
<td>133,788</td>
<td>224,041</td>
<td>152,120</td>
<td>193,903</td>
<td>230,314</td>
<td>281,779</td>
<td>224,797</td>
<td>143,010</td>
<td>13,606</td>
</tr>
</tbody>
</table>

Table 3.3 number of persons by region, household status, year and age

Source: Statistics Sweden

According to table 3.3 - number of persons by region, household status, year and age, it is obvious that people between age 25-34 and age 55-84 occupied a large proportion of single person households. From the perspective of population change, the delay of the marriage age, the increase in the rate of non marriage and divorce, the low fertility rate, the extension of life expectancy, population mobility, and so on, have led to the increase of single person households. On the one hand, it is due to higher education, self realization demand and the development of career competition intensifies, making some people had to postpone the age of marriage. On the other hand, because some people did not find marriage partners. Furthermore, there are some people have changed the view of way of life, marriage and family values, taking the initiative to choose the single life. (Quintano and D'Agostino, 2006; Gordon, 2007)
The increase of single person households is affecting the economical field (Ezell and Russell, 1985; Quintano and D'Agostino, 2006; Gordon, 2007). Research has shown that the market of single person households is important, for instance the market of housing, furniture, daily life product, household appliance and food, etc.

More single person households, Euromonitor International notes, means a higher per capita consumption of natural resources like water, energy and land, which has led countries like Great Britain to consider an occupancy tax to encourage more space-efficient living arrangements. (Trowbridge, 2013)

All in all, from the perspective of ecologic, it did not seem to good for the environment.

3.2 Fika

According to the statistics of the International Coffee Organization, in 2015, the total consumption of Sweden is 1.6 million (60kg bags). Per capita consumption is 10.1 (kg). It was ranked second in the world, only next to Finland (Ico.org, 2015). In 1685, Swede started to drinking coffee. The habit of fika in Sweden was cultivated by the tradition of drinking coffee. (Tryswedish.com, 2016)

Fika is a kind of life style in Sweden, and it is an indispensable part of people’s life. Everyday, in the morning around 10 as well as in the afternoon around 3, people like to sit together to drink some tea,
coffee, eat some cakes and chat with each other. In this period, people can release themselves, and share with other people. This tradition offers chance for a Swede to snatch a little leisure from busy work and talk to other people. Expressing feelings by food, and live a casual life, this is where the charm fika lies. (Pravitz, 2013; Jones, 2012)

In fika time, there always are some freshly baked pastries, such as cinnamon bun, which are collectively called “fikabröd”. Besides, there is cup cake, cinnamon buns, berry tower, strawberry cake, and chocolate brownies and so on. They love all kinds of sweet food, and match the aroma of coffee, the fragrance of tea, and the excitement of sparkling water mix together perfectly. Other than dessert, sandwich and other light food also can be their choice in fika. (Thelocal.se, 2015)

Matts Johansson is the founder of Da Matteo, which is a coffee chain store situated at Gothenburg. He said that fika culture was rooted deeply in Sweden, most Swede would like to have many times of fika, and no matter they are weekends or work days. In this period of time, Swede like to share their own baked pastries with other people, and drink some coffee, just like people in other countries like to drink and chat in the bars. (Hotson, 2016)

To sum up, fika has already been a habit of Swede, and it is the most convenient way to communicate with other people. Now connect it with my project, I hope that when people enjoy their coffee and
dessert, there can be a more comfortable situation, environment and circumstance. The furniture that I design can just respond to the needs. Fika cannot be only in cafe, the company lounge, and a school canteen, it can also happen in our home. People invite their friends to their own home to enjoy the process of preparing dessert and making coffee. What they should advocate more is the interaction between human and home. A cozy home not only serves for the dweller, but also it can change its function and form to let the dweller and their friends share together. Therefore, my projects will emphasis on the comfort and versatility of the furniture. Make people at home and attract them to stay there to share the happiness of making food with friends.

3.3 Scandinavian design

In the 1950s, Scandinavian design appeared in Denmark, Norway, Sweden, Iceland and Finland. In general, Scandinavian designers are very conscious that “harmoniously combining artistic form and practical function” (Fiell and Fiell, 2002). Fiell and Fiell(2002) later described:

Scandinavian design is governed by the main principle of Modernism - to strike the optimum balance between form, function, material, color, texture, durability and cost so auto create democratic design solutions.
Scandinavian design is reflected in several design fields, for example, interior design, furniture design, graphic design, etc.

From ecological and cultural perspectives, Scandinavian area is under the full influence of glacier all the year around, the winter here lasts long with low temperature and limited resources, however, it is highly abundant in wood, which lays the material foundation for the development of Scandinavian furniture design. In the local, winter has a short time of sunlight; therefore the interior has become the main spots for activities in Scandinavian. The whole year of interior life let them concentrate too much on the environment of living space, which provides the driving force to Scandinavian furniture design. Confronting with the outside darkness and coldness, they prefer more to lay out soft, simple and comfortable furniture in the house, as a result of it, the furniture products of Scandinavia naturally merge with the modest national features in Scandinavian area. In the design of modern furniture, the Scandinavians have not opposed the traditional handicraft with industrialized machine production; they use the method of merging two of them together, which makes the design and production of Scandinavian furniture more easy-going, i.e. humanity characteristics.

From social-political and economical perspectives, most people in Northern Europe are coming from the middle class, the social welfare system is highly perfect with small social gap between rich people and poor people, so the lifestyle of people in this region remains the generally the same, all of them are in the state of easy,
satisfying and rich, so the aesthetic opinions tend to be in a same style.

All the countries in Scandinavia generally advocate and implement welfare system, democratic ideas designed for political stability, social democracy and human beings, together with the beautiful and elegant natural environment, all of these bestow the Scandinavian with the talents of design and romanticism, what’s more, these altogether promote the concept of functionalism in this place, and continuously carry forward, innovate and revise the concept in the future design practices, from then on, they indeed develop a people-centered and sustainable of functionalism which respects different traditions and different regions.

The Northern Europe teems with high-quality oak tree, maple tree, pine tree, white birch tree, all of them are the main raw materials to manufacture various kinds of furniture.

The furniture in Scandinavian design has a strong sense of function, it can be easily folded and dismantled, and also be combined as user’s will. Most of the Nordic choose their furniture in the store such as IKEA and so on. They will choose their favorite and proper furniture here, and purchase them home. This furniture is attached with a drawing of assembly, and family members will install them as they were told and their will.
At the same time, sustainable development within furniture design field is concerned in Scandinavian design. For example, in IKEA, they strived to ensure that by the end of 2015, all daily life products were produced of renewable, recyclable or recycled materials. For IKEA, they think it is a kind of responsibility. They make full use of resources at lower prices to sell high-quality products. Wood, bamboo, Water hyacinth, Wood plastic composite, Recycled PET plastic, more sustainable cotton, Flax and linen, which are ikea sustainable materials currently used. In terms of wood, to 2017, there will be 50% of wood, which used for making Ikea products, are the Forestry Stewardship Council (FSC) certified wood or recycled wood. (IKEA, n.d.)

On the other hand, in order to reduce the waste of resources and space, Ikea use as less package as it can and flat packaging.

Thus, in ikea, the research of sustainable material and technics has a leading ideas. FSC® (Forestry Stewardship Council) certified wood and flat packing are what I want to draw on in my furniture design.

Besides companies like Ikea, there also have a lot of outstanding Scandinavian designers. For instance, Bruno Mathsson was a famous Swedish designer, was the first modern furniture designer who studied ergonomics. In 1941, designed Eva(Figure 3.4) and a series chairs, which made of beech and birch and covered with plaited linen webbing. He used the same material and structure to design this series of chairs that used for working, sitting, or lying. Mathsson
deliberated every details based on the research of human behavior and ergonomics. Then, he came to these light and comfortable chairs. The chair there is no out of date until today, and it is still produced by Dux.

3.4 Current projects and contemporary work

The research of current projects and contemporary works relate to furniture design. According to the different steps during my design process and furniture’s life cycle, which relates to function and materials based on sustainable design theory.

Kyuhyung Cho came from Korea and he was studying at Konstfack. He has his own design studio in Stockholm now. He gave a meaning to corner by his product — Corners shelf(Figure 3.5). According to most of people’s habit, which is starting from upper left corner, when organize stuffs or write on a paper, he came to this idea that to start
from a corner. It has one shelf and two dividers with different colors that could be chosen by users. The movable dividers create flexible spaces for the objects. Then, users can organize the objects based on different shapes and colors. It could be used on desk or wall.

In my point of view, this product is not only a shelf, but also a kind of decoration, which combine the function of use and decoration. It came from people’s habit and also shares the knowledge of storage and organization.

Lazy working sofa(Figure 3.6) and My world(Figure 3.7) are designed by Philippe Starck. Beside the basic function, which is sitting, both of them are composed by different parts, such as side
table or shelf. From the names of those two sofas, I can see Philippe Starck does not just define the meaning of them as sofas. I guess he must had considered different scenarios of using and though about the interaction between sofa and people. Then, the sofa could satisfy several needs at the same time.

This sofa Jordbro(Figure 3.8) is Ikea new product that presented in 2016 spring. The internal filling material is the polystyrene plastic expanded. The lining material is polypropylene. Expanded polystyrene plastic is a highly liquid filling material, the shape will be changed as people affected with the forces. When the user sit on it, its shape perfectly fit the body lines of user, so that the user will feel very comfortable. That is why, this seat plasticity is poor, it is difficult for keeping the shape.

Figure 3.8 Jordbro  (Copyright ikea.com)
In my project, I took the first consideration of this kind of filling material, because it has light weight, low cost, very consistent with my design concept. But considering the shape and size of the cushion in my design, when people sit on it, the shape will deform severely. There is no certain shape, which will affect the appearance and comfort. The cushion’s shape is not a simple block, if I choose expanded polystyrene plastic as the filling material, it will influence the cushion’s shape. Therefore expanded polystyrene plastic is not suitable for my design. By comparison, the final choice is polyester foam. Although the cost will slightly higher but the original shape will keep perfectly.

Figure 3.9 Mister T  (Copyright designrulz.com)
Mister T (Figure 3.9) is a multifunctional furniture, which designed by Paris designer Antoine Lesur. Mister T is not just a product, which is composed of a basket, tray and two cushions, with many functions. It can be used as a low table, a tray, a seat or a footrest. It is a both stylish and versatile furniture. (DesignRulz, 2012)

From the positive point of view, the diversification of function prolong the service life of the furniture. This idea is an important element in the concept of sustainable design (Fuad-Luke, 2004).

From a critical perspective, this furniture also has many shortcomings. First of all, Mister T as a low table, when users bend down to pick up the tray, the span would be big. Users would bend deeper when they take the cushions after the tray is taken away. It is not comfortable for users. In addition, cushions have no handle can help users to carry. No matter take the cushion out from the basket or put it back, is not very convenient. Thirdly, the cushions’ size is small. We can see the user is not comfortable when he sitting on the top. In my design, I will pay more attention to the furniture size and details, so that users have a better sense of use.

In 1963, Danish architect Hans Bølling designed Bølling tray table (Figure 3.10). He said, “My favorite aspect is the construction. The stand needs the round trays to be able to stay up. It all works together. Function and shape become more than just the sum of the parts.” (brdr-kruger.com, n.d.)
I appreciate this table detachable way. The producer gives a number of options for the color of the tray. Customers can choose any combination according to their preferences. In addition, the pulley at the bottom makes it more convenient when the table is moved. Furthermore, the foldable design allows the table to be easier when transporting and storing.

Criticism, the classic design generally do not have cheap price. The price of this table in the official website is 3295 SEK. The coat performance is relatively not very high.
Alsedà (Figure 3.11) is also a product from Ikea. The dimensions of this cushion is 60 cm in diameter, 18 cm in height. I feel very comfortable after I sit on it. I believe it is also very suitable for European stature. It provides me a reference so the size of my project. In addition, the feeling of sitting is comfortable too, when two pieces of Alsedà stacked together.

From the positive aspect, this stool is made of banana leaves, which is a renewable material. It is a product that possible to separate for recycling or energy recovery (IKEA GB/EN, n.d.). From the ecological perspective, it play a positive impact for sustainable development.

But the aspect need to be critical is also that the banana leaves. In the process of using, the fiber is easy to fall off, then it will stick to the clothes or pierce into the skin. The stool is not easy to clean as well.

Related to sustainable design, the attention to the ecological environment is that green is one of the essential characteristics of the related concept of sustainable development (Fuad-Luke, 2004). However, people's understanding of the connotation of green is still rather vague. A lot of enterprises take advantage of the people’s good wishes of advocating low carbon life, make the green as a stunt of the commercial publicity but not make the real green measures implement in the life cycle of the complete products of design, production, use and recycling. In fact, for a long time, both the public and the designers, and even some of the design educators have a lot
of misunderstanding about what is the real green and the corresponding evaluation criteria.

Figure 3.12 Cardboard chair  (Copyright dornob.com)

The cardboard chair design (Figure 3.12) was designed by David Graas, for example, paper products have always been considered to be the most natural materials, which have the advantages of recycling, degradation, convenient transportation and assembly, low cost and other advantages. Moreover, this cardboard chair in figure 3.12 doesn’t make use of glue, even without the use of a metal connecting piece, which is very economical materials. At the same time, this cardboard chair makes use of flat packaging, which reduces the space and cost of the transportation. To a certain extent, it conforms with the idea of green and environmental protection in people’s hearts. However, considering the product life cycle, the process of paper making wastes water resources, makes pollution and
the consumption of wood, the service life of the cardboard chair is quite limited, obviously it cannot be compared with the traditional seat which is without any concept of environmental protection. The recycling of the waste cardboard, the transportation and reprocessing virtually contribute greatly to the energy consumption and emissions, and improve the economic cost. It’s visible that this type of product leads to a more expensive environmental costs so it can not be called sustainable design.

In short, in the analysis of the current furnitures and products, I found that a furniture need to be considered in comfort, material, price, function and other aspects. In particular, the details of the process need to be paid more attention, considered in a critical and sustainable way, in order to improve the design.
4. Project & Process

In this chapter, I presented my design process according to each steps, which were analyzed by summative subtitles from the beginning of research to the end of model making. Related design methods were showed in the following texts. My design process could be broadly divided into idea generation period and visualization period. Figure 4.1 is a timetable that was set up at the beginning of the project, which used for plan the whole process and different methods. At the same time, it was adjusted according to the actual progress. Basically, the timetable showed the development of the entire design process.

![Figure 4.1 Timetable](image)

Figure 4.1 Timetable
Necessary steps were documented by photos, for example, the process of participatory design workshops and the process of model making. Most photos in this chapter were taken by myself. Otherwise, the images, those composed the mood board are from internet.

4.1 Idea generation
In idea generation period, I chose single person households and fika as my start points.

I have involved participants in the early stage of my design process.

Sometimes, different methods were used at the same time, for example, interview method and AEIOU method, AEIOU helped me to analysis the information I got from single person households.

Based on the research of single person households, I choose young people as my target group. Thus, the respondents of my interviews and questionnaires are young single person households.

1) Questionnaires
I randomly selected 50 Swedish people to do this questionnaire. Among of the all, 96% of people live in Sweden, and 4% live in other countries. From this investigation, I have got some viewpoints about Swedish people who lives alone and some proofs for my
project. The following is the detailed analysis made for four key points stated in the questionnaire.

![Figure 4.2 Questionnaire](image-url)
Q2: Does living room represent a social place to you in your home?

There are 91% of the respondents gave a certain answer that people need social space at home. Therefore, it is necessary to design a type of multi functional furniture that is suitable for one person or several persons.

Q3: How often do/will you invite your friends to your home for 'fika' or having fun?

35% of the respondents said they invited their friends to their home every week. Other respondents invited their friends 2-3 times a week, or 2-3 times a month. Generally speaking, Swedish people invite their friends home very often.

Q4: Which lifestyle do you think is more reasonable when you are living alone?

87% of the respondents thought living alone not only required private space but also required the opportunity of communication and having fun with the friends. Thus, under the premise of meeting the two points, multi functional furniture seems particularly important, especially the solitaries do not have plenty of furnitures for their friends in such small living spaces.

2) interviews
I made interviews with some participants who live alone for analysis AEIOU, which represents activities, environments, interactions, objects, users, in this case, it is around living room.

Environments:
Living room

Users:
Homeowners, Homeowners’ friends.

Objects - product/furniture:
TV & media furniture, Storage, Sofa/Arm chair, Cushion, Throw, Rug, Coffee table/Side table, Lighting, Curtain, Tableware, Desk, Decoration.

Activities:
Watching TV/movie, Eating, Sleeping, Reading, Studying, Working, Meeting friends.

Interactions:
Watching TV/movie: TV & media furniture, Sofa/Arm chair, Cushion, Throw, Curtain, Lighting.
Eating: TV & media furniture, Coffee table/Side table, Sofa/Arm chair, Tableware.
Sleeping: Sofa/Arm chair, Cushion, Throw, Rug, Curtain.
Reading: Sofa/Arm chair, Cushion, Throw, Rug, Lighting, Storage.
Studying: Sofa/Arm chair, Coffee table/Side table, Desk.
Working: Sofa/Arm chair, Coffee table/Side table, Desk.
Meeting friends: TV & media furniture, Storage, Sofa/Arm chair, Cushion, Throw, Rug, Coffee table/Side table, Lighting, Curtain, Tableware, Desk.

The purpose to do this interview is to observe the relationship between solitaries and living room. Meeting friends is a special activity which could include all other activities, so I put all the products and furnitures.

3) Observation
I observed fika time in different places, for example, at home, at school or at cafe shop.

For the method ‘Observation’, I would like to say it is a good way to get information of people’s movements and behaviors. I can find the differences between individuals and small groups of people. But it depends on different areas, contexts and time. I

People just ignored me when I documented their behaviors. Because It is reasonable in that situation. But I think it will be another situation when I work with participants who know the contexts and concept, for example, using participatory design workshop, I will get some different results. Just like when people did questionnaires, they gave a answer, but they might do it in a different way.
4.2 Visualization

In order to build up my design, which is a furniture, sketching, prototyping and other participatory design methods were used throughout the visualization period. The visualization period could be roughly divided into 10 steps, as follow: 1) Sketching and prototyping 1; 2) Participatory design workshop 1; 3) Mood Board; 4) Sketching and prototyping 2; 5) Participatory design workshop 2; 6) Tutoring; 7) Contact relevant stakeholders; 8) Final concept; 9) Model making; 10) Document of results.

4.2.1 Sketching and prototyping 1

I came to the first sketches based on the activities at living room. The idea behind those sketches is the combination of coffee table and tray. Hence, with the multi functional characteristic, whether the coffee table is combined with the tray or not will let the users be easier to get and put down more objects, such as cups and tablewares, at one time.

4.2.2 Participatory design workshop 1

In this workshop, at first, I introduced the background and context of my project to the participants, which could help participants understand the function of this product.

This prototype was made in 1:10 size. In order to let the participants had interaction with it, I set up the toolkits by hand drawings. Considered different activities within living room, the drawings were
divided into objects of eating and working. The participants could choose the objects they need when they use this furniture in different situations. The participants also could give their own ideas about what objects lacked here.

Figure 4.3 First sketch and prototype
There were both positive and negative opinions about this prototype. For instance, It will occupy a seat when put it between two people on a sofa. More seats are needed.

4.2.3 Mood Board
The mood board (Figure 4.5) demonstrates my original idea. After studying on the form, the size, the material, the color and the style, I fixed the design direction finally which is suitable for my project.
1) In terms of the form, the room for the person living alone is usually smaller. I want to design some shapes mainly to reduce the unnecessary collision caused by the right angle.

2) In terms of the size, it should be suitable for one person to back rest and need to reach a maximized size when several persons use it as well.

3) In terms of the materials, the recyclable material which is in conform with the theory of sustainable design is the best choice, like wood and sponge liner.
4) In terms of the color, keep the Scandinavian design style and use the cool colors with low saturation as the main tone to cater the aesthetic of native Swedish.

5) In terms of the style, it is also the Scandinavian design style, with simple lines to express the design.

4.2.4 Sketching and prototyping 2

Figure 4.6 Second prototype making
At this stage, I selected the cardboard as the raw material for the prototype. The size ratio is 1:1. It is used for mainly testing the size, the structure and the stress of the furniture. According to the investigation, I set the original height of the cushion at 12mm and gradually added to 15mm after testing with more people of different height and weight, which makes it more suitable for the Europeans. In the structure, firmer jointed parts are necessary for the top surface and the pole. On the bottom panel, 3 round bases were added to make it more stable and convenient to move. On the other hand, the 3 round bases can protect the bottom panel in order to avoid friction.

### 4.2.5 Participatory design workshop 2

For the lifestyle and practical demands or requirement of people who live in isolation frequently change, which requires the living space to possess extremely both strong flexibility and variability. The furniture of participatory design becomes the best assistant to help users to realize changes in space, through taking advantage of the furniture features to layout the furniture and confirm the modes of combination and setting out, therefore the space can easily meet with the demands of variations of different function in space. If we want to realize space variation through furnishing, the simplest way is to move the furniture to achieve it.

This method is fully simple and convenient to operate. The movement of any piece of furniture can all lead to the space variation. For example, we can move the book shelf which was once
used as the partition wall in the room close to the wall, thus the previous two spaces which were separate by the partition can merge as one now. Through flexibly moving furniture in the room, we can see that different ways of partition generate totally diverse interior effects. The most fundamental variation in space of the users of participatory design is simultaneously realized by the variation of furniture. By means of taking part in the space design and combination, fold and dismantling of furniture, it can finally realize the variation of furniture use function and variation of space.

Figure 4.7 Second workshop
The key work at this stage is to test the structure between the tray and the desk and study the possibility of using by one person or several persons. In addition, by simulating the fika process to test the size and weight of food and tablewares that the tray can carry to improve the handle of the tray and the structure of the connection.

I have got feedback from the participants that the slot is not easy to assembled and the double side table is not clean enough.

4.2.6 Tutoring

Besides my curriculum supervisors Fredrik and Petra, I also conducted a one-to-one tutoring with Lena and Miguel. They provided me with a lot of favorable suggestions which were very helpful to develop my project.

Feedback from Lena

Lena, whose major is fabric design, gave me a lot of suggestions on the selection of the fabric and filling. She suggested that it is very important to feel the material of the fabric by hand. In terms of the filling, she offered me two choices, polystyrene foam and polyester foam. As polystyrene foam is small granule, which is not good at forming, Lena and I thought it was better to chose polyester foam as the filling of the cushion.

Feedback from Miguel
Miguel is very insightful in the field of sustainable design. For my project, he introduced many furniture companies to me which were engaged in sustainable design and proposed a lot of considerations in terms of furniture structures and the making process. To make sure the details is really helpful for my project.

4.2.7 Contact relevant stakeholders

Based on the stakeholder map, I have contacted six companies, which sell raw materials or might help me to build up my furniture.

1) LAMMHULTS
This is a furniture company much focusing on the theory of sustainability.

At Lammhults we work with timeless designs of the highest quality to ensure the longest product life. In order to reduce the consumption of resources and lessen the environmental impact we develop and produce products from materials that can be recycled as materials or
energy. We strive to prevent pollution in all of our company processes and work to successfully reduce the environmental and climate footprint of our production facilities. (lammhults.se, n.d.)

So, I want to contact them for the relevant documents about sustainable design and support on the raw material and technology. However regretfully, they replied me that their projects were already full and could not offer me any help in the near future.

2) OFFECCT

In 2015, we launched our OFFECCT LifeCircle® concept — an extensive and thorough program designed to prolong the lifespan of our products even further, to promote interest in a second hand market, and to create a life cycle for furniture and interiors.

The concept is much more than a service. It’s a new approach to furniture and interiors. OFFECCT LifeCircle® follows every single product from the beginning to the end and prolongs its lifespan through regular care, service, re-covering, renovation and trading in.

OFFECCT Life Circle comprises of four main areas, each offering choices to save money and contribute to a more sustainable society. (Offeccct.se, n.d.)

This theory is worth learning and I have also sent them an invitation, but got no reply from them.

3) IKEA
In the middle of designing process, I contacted Lars, who is the right person in charge of linking our school with IKEA company. I hope to present my project to him, but unfortunately, Lars also did not have the time to receive me.

4）Almtuna Tapetserarverkstad
This company is mainly engaged in plastic foam and small furniture. I hope they can provide me with the raw materials and help me with furniture production, but after sending many mails, I did not get any reply.

5）CEOS
This company is mainly engaged in timber raw materials. In my project, there are two options for wood material – birch plywood and birch solid wood. Since the time for the last process of furniture manufacturing is very tight and the delivery time of the material offered by this company is rather long, ultimately I chose birch solid wood as the main raw material for my products.

6）Special-plast
This company is mainly engaged in the plastic foam and fabric. After communicating by telephone, I decided to give up cooperation with them due to the limited purchasing quantity and the very high transportation cost.
4.2.8 Final concept

Figure 4.9 Dimensions. Unit of plan: mm.

Figure 4.10 3D model
Figure 4.10 shows the 3D prototype made by Rhino software at the end of the first designing stage. With this people could precisely understand the detailed sizes and structures of the furniture parts in the later step of making. The furniture included one tray, one table top, one bottom piece, two nails and three cushions.

Different materials I intend to use to build up this furniture. The table was made of edge glued birch wood and solid birch wood, which is certified by FSC® (Forestry Stewardship Council). The connection part is self locking thread insert pin screw. For the cushions, the filling is polyester foam which could be mechanical recycled and chemical recycled. lining is non-woven polypropylene and cover is cotton.

![Figure 4.11 Color collections for fabric](image)

<table>
<thead>
<tr>
<th>Color Code</th>
<th>Description</th>
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<tr>
<td>NCS</td>
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<tr>
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<td>S 5000-N</td>
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</tbody>
</table>
4.2.9 Model making

At the stage of prototype making, under the guidance of Stephan and Richard, I completed the making of table and tray within two weeks. I also found a manufacturer in China to help me make the cushions. The whole process mainly included 8 steps, as follow cutting table, bending tray, making stick, screw & nut, install nut, install screw, oiled and cushion.

1）Polishing
As the raw material has been already oiled with varnish on the surface, which is not what I want, I decided to polish the raw material first to restore its color and the texture of the wood itself.

2）Cutting table

![Cutting table images]

Figure 4.12 Cutting table

Cut the whole timber into 3 polygons which are close to the expected round shape and size by the machine. Then use another machine to polish and trim all the edges to make them more smooth. Although the tray and the table top are made of birch plywood and birch solid wood respectively, the cutting workmashhips are the same.

3）Bending tray
When making the tray, one piece of wood was added to make it more convenient to be held and also can distinguish from the table top. In the process of making, fixed a piece of 3mm thick wood which was of good tenacity to the tray with some white latex paint and bands. Removed the bands after 24 hours when the tray was shaped. Then, repeated those steps again, in order to make the edge more stable.

![Image: Bending tray](image)

Figure 4.13 Bending tray

4）Making stick
Cut a square wood stick and repeatedly cut it 2 to 3 times with the machine cutting angle to make it become a cylinder. Then polish the surface with the sanding paper till the surface touched smooth.

5）Making the connection
Drill at the both ends of the cylinder with an electric driller so that the nails can be well fixed to the two ends and then link the table top to the cylinder.
Figure 4.14 Making stick

Figure 4.15 Making the connection
6) Oiled by Dekorvax

![Image of a wooden bowl covered in Dekorvax]

Figure 4.16 Oiled by Dekorvax

I painted all the wood with Dekorvax to make them be in long-lasting colors and stable shapes, and make them be water proof as well.

7) Refining the cushions

I found a manufacturer in China through internet who produce plastic foam and fabric that could make the cushion’s filling and cushions covers for me. However, due to the weak technology and poor communications, in the first two times of production there were some problems, e.g, the handle of the cushion cover could not be held properly; the zipper was not well hidden; the cushion surface was not smooth enough. After three times of improvement it reached a satisfactory effect finally.
Figure 4.17 Refining the cushions
4.2.10 Document of results

Figure 4.18 Details and entirety
Firstly, I took photos of the details of the product, the using guide chart and the product demonstration.

Besides, I took four scene graphs about the people and the furniture, including one person using the furniture, two persons using the furniture, three persons using the furniture and more people using the furniture. This is to explore more possibilities of using furniture and reflect the theory of sustainable design and participatory design.

When a single person use the furniture, the three cushions can be used as a seat back, a cushion and a low table. The cushions also can be stacked to be a foot rest. That shows the multi-functionals of the product.

When two, three or more people use it, it can be combined with another sofa to create more space. It is convenient for the users to match by themselves according to their requirements.
Figure 4.19 Using by three users and two users
Figure 4.20 Using by one user
Figure 4.21 Using by one user
Figure 4.22 Scenarios at home
Figure 4.23 Scenarios at home
5. Summary and Discussion

This chapter is the summary and conclusion of my research and my study in this project. In the following text, I present what I have learned, the problem I have met and the further study of this project as well.

5.1 Summary of project and discussion of learning outcomes

In this project, I have learned a lot from different fields, which include theories, methods, furniture manufacture and academic report writing. The research of theories, methods and context required a plenty of literature reviews for developing the project and writing the report.

The sustainable theory is the most important theory within this project. The cultural, ecological, economical and socio-political perspectives of my project are related to sustainable design and sustainable life(human needs).

In addition, the main method I applied is participatory design method, which helped me designed my furniture from the users’ perspective. In order to got deeper knowledge from users, I need to get in touch with them not only using questionnaire, interview and observation methods. The most important part of participatory design is the workshop with people for my project. People gave an answer when they did the questionnaire, but they might do in another way.
Workshops is the direct way to observe the interaction between users and my furniture design.

The communication with producers/companies is important and difficult in the furniture manufacture part. I have been told to contact the relevant companies at the very beginning of this project. But I was wondering what and how should I present to the furniture companies. In that case, I did not contact any companies. After I had my final concept, I sent emails to several companies to ask could they help me with my project. The result was either they did not have time or they did not reply my emails. That was the challenge during the design process. It took long time to get the support from companies, which also could be considered my project was not perfect enough to get the support.

Fortunately, I have get in touch with a Chinese company, which helped me make the cushions. This was also a challenge for me, because the communication were all happened based on the internet. The manufacturer can not understand my requirements clearly. The cushions were modified three times after I satisfied with the crafts, which took a lot of time and money. Furthermore, because I can not test the dimensions of the cushions with my table, the cushions and the table can not perfectly fit together, because of the thickness of the fabric, which became a weakness of my project. I will consider the dimensions and the thickness of the fabric during the future work and manufacture.
The report was not writing efficiently. The language and writing habits need to be improved. Also the research was not enough to support the project. Those are also the weakness of my project, which I need to work more in the future of this project and other study as well.

5.2 Analysis of the potential for future work

For the furniture design field, it is one of the ways to meet people’s needs, which requires the designers not only consider the sustainable development within the product life cycle from designer’s view, but the designers also need to think about the problems from the users view.

Designers can be called as educators to some extent. For example, the recycle system in Sweden is complete now, but it is a totally different situation in China. The furniture designers may use sustainable recyclable material, but the users, even the society, do not have the awareness the importance of recycle to build a sustainable world. In this case, designer play an important role of raise the awareness of sustainable development within furniture design field.

Besides, in future, there will be more space to develop this product. For the time being, only the color of the cushion is changeable. The size, the shape, and the material may be re-designed in the future.
The sales and the recycling can be both improved, which reflects the theory of sustainable design.

At the moment, this table is only designed for the person living alone. But it is still suitable for the family with many members because of its multi-functional. This can be achieved only by expanding the size or making more assemble single furniture based on the present type. The person living alone can buy one piece first and when the family members get more, they can purchase more pieces of furniture of the same series. This is also one important aspect reflecting the theory of sustainable design.

In terms of material, as limited by the time and the budget, I could not use my ideal material—birch plywood, both for the tray and the table top. Besides, as the cost of birch plywood is high it can be tried with some other cheaper fast-growing wood, for example bamboo, or metals with weight sense. More abundant the product types are, more space for customers to choose. The selection of cushion material can be also made some changes. Now, I chose polyurethane foam for the filling, which has good hardness and is not easy to deform. For those younger customers who prefer the comfort, the softer material can be used. For those elder customers, they maybe like higher cushion which is more convenient for sitting and standing. More choices for the material of cushion’s cover are available in future, for instance, a higher-density material easier to clean, or more environmental friendly materials that can be degraded with wood. For the vision, there are a lot of chance to cooperat with a few famous illustrators to
push forward specific colors or patterns. These will help to upgrade the identification and the image of the furniture and reflect the theory of sustainable design as well.

In terms of sales, the online sales channel can be opened. This way not only can expand the range of sales, but also can save the intermediate sales cost caused by the brokers and reduce the unnecessary storage expense. This reflects the theory of sustainable design too. Lastly, recycling step can be connected with the online sales or stores. Remaking and re-designing the recycled furniture can give the designers more inspiration and also can make the best use of the resources. To do so, it will be more meaningful in sustainable concept than just recycling them as waste furniture.
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List of illustrations

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