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CAN302 Technologies for E-Commerce

COURSEWORK ONE

Group 32

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1. Business Requirement

A. Product Introduction

FURN+ is a furniture retailing company offering aesthetic and practical products in China, the United States, and Europe. We provide customers with style advice and inspirational content and a wide range of different products and their versions according to rooms or categories. The name “FURN+” means that our services are “more than furniture,” representing our idea of combining home furnishing with novel design and technology.

Our services can meet the demands of consumers with different budgets. We offer economical and durable finished furniture for consumers who want to get products quickly. In addition, everyone who pursues a personal identity, people can add their customized patterns or favored colors to the goods. We also have room and whole-house customization for customers who have just moved into a new home. Our website is consumer-centric, and our customers can easily reach our designers for whole-house customization services and personalized design.

The function we take pride in is a mockup room, in which customers can take a picture of their room and upload it to our website, and then they can put the simulation of the desired product on the image and check the effect.

B. Product positioning

The products are mainly designed to meet the needs of young and middle-aged users who use the Internet and usually have a tight schedule to select furniture offline and are not sure whether the furniture they choose is suitable for their current living space. FURN+ company helps users with specific analysis of the actual situation through the FURN+ website, allowing customers to see more intuitively whether the products are suitable.

Furthermore, they are reducing the time spent on offline selection. For this segment of digital users, the main features of FURN+ products are visualization of home furnishings, one-to-one customization of thematic solutions, and online transactions to save users' time.

1. Product appearance and packaging positioning.

a. Appearance: The product's appearance is basic minimalist style + additional customization style. In addition to the basic furniture for low and mid-range users, we also provide a one-to-one whole-house customization service for high-end users. According to the user's demand, all products can be changed to customized services by adding an extra service fee. Support such as tile pattern customization, furniture size customization, etc.

b. Packaging: We adopt a simple packaging method and support customers in assembling the products by themselves or delivering the produced products directly from the website. Through different pricing and ladder charges to meet different customer needs.

2. Product contrast positioning

Unique service (core selling point): mockup room - users can upload photos of their rooms and check the products they want to buy. After that, people can see the mockup of the purchased products put into their homes in the user-generated image. It is a great way to get a clear picture of their home without leaving home.

The leading key player in the furniture market regarding market share is IKEA's Swedish company (Wu, 2020). With more than US\$45billion, IKEA has by far the highest sales among furniture companies. Unlike IKEA -- a relatively successful furniture company at the moment, FURN+ has no offline stores. It may not be conducive to the brand developing more potential offline buyers. However, based on the brand's user base, the lack of offline stores will instead allow the company to devote more energy to improving a better online experience, such as saving offline costs for product investment in research and

development and upgrading simulated room functions. We will also pay attention to the last-mile delivery concerns of users after the website is maturely operated and expand the docking delivery service.

3. Product marketing strategy positioning

The concept of the FURN+ website is relatively new. For the current market, popular social media platform advertising and marketing strategy and online and offline e-commerce marketing strategy. We are willing to settle down and do an excellent job in product quality. Use word of mouth to create FURN+'s unique community marketing model. Save some of the marketing costs challenging to use in contracting better designers. The FURN+ website will also have a consumer opinion platform and will continue to strengthen the construction of a community platform based on the unique products when the user base expands later. It will allow more consumers to communicate and share. The company insists on impressing customers with its products, and good word of mouth is the best marketing. For both the company and consumers, they can achieve a win-win situation.

C. Business Model

This website aims to attract the attention of young and middle-aged people through low prices, a wide range of product content, and customizable choices. Then maximize benefits under the growing demand for house replacement and new house decoration. As long as people think of young-style custom decoration, they will think of FURN+ to generate profits. Customers can not only stay at home and customize decoration details but also more intuitively choose their comfortable home decoration environment.

Purchase of finished products:

The website provides furniture based on simple style and low sale prices to meet the needs of the customers' home decoration. In order to help customers to choose whether

to buy or not, this website provides the functions of uploading photos and viewing home through VR. Customers can upload indoor images to the website. For the goods they want to buy, customers can put the products in the images for comparison to evaluate if it is suitable for home decoration style and decide whether to purchase. Another choice is through the VR function, the photos of furniture are applied indoors, and the influence of the natural environment and virtual furniture are superimposed on the same picture as the basis of purchase decisions.

Private design:

For customers who need to customize the whole house or unique furniture, the website provides them with private customization services. Customers can contact the designer on the website and then send the furniture style, size, and other requirements to the designer. They can even carry out the arbitrary DIY design of furniture to create their own unique furniture. This service is more expensive than the purchase of finished furniture, but the final finished furniture will meet all customers' needs.

D. Business Value

Compared with traditional furniture companies, FURN+ can directly connect designers, furniture suppliers, and customers, saving the cost of intermediary agents. We have our own contracted designers to create products, and customers can choose these original designs directly on the website. Our designers can also meet the needs of full-house customization.—Customers can check designers' previous works and schemes and efficiently reach their favorite designers through customer service. Design fees and finished furniture will be paid separately on the website for customers' convenience. FURN+'s direct selling approach reduces the intermediate cost and shortens the distance with the customer, who can directly communicate with the designer to acquire the right products.

Compared with other furniture selling websites such as WAYFAIR, the largest online home retailer in the United States works as the intermediate. The cooperation with various suppliers shortens the time for customers to search and browse products, which indeed meets the basic needs of customers. However, FURN+ does more than that. In addition to providing basic furniture at a low price, FURN+ also adds customized services for customers with high consumption power. Although WAYFAIR has a large volume and many categories, it cannot meet the personalized needs of customers and has few interactions with customers. All products of FURN+ can be redesigned and adjusted according to users' needs, and there is exceptional customer service to communicate and interact with consumers as well. This can attract customers with different consumption capacities to purchase on FURN+, which solves the problem of demand differentiation.

E. Sustainability CSR

Corporate Social Responsibility has become a key term within the business world and has also become a central focus of some of the key players in the furniture world. FURN+ attaches great importance to sustainability and the global environment.

1. We use sustainably made or recycled cotton for our products with cotton. In addition, we switch our lighting bulbs to energy-efficient LEDs to fight against global climate change.
2. To reduce waste, damaged or returned products will not be disposed of but torn down and repaired instead. The renewed products will be sold at discount prices, benefiting both customers and companies.
3. We recommend solar panels and battery storage systems for our consumers. If they place the order, we will contact our partners to provide installation for customers.

2. Market requirement

A. Target Customer

The personas of this website include young consumer groups, such as young people living independently, unmarried couples, or married couples. FURN+ further divided these consumers into two groups. One is who can afford the high price. The other is with a tight budget. The website will provide different services for different customers. The purpose of our main buyers is to decorate new houses or transform old houses. The young consumer group needs products that can conform to modern aesthetics and breakthrough traditional online shopping form. For this website, there are three critical nodes in the consumer experience process, namely the “feeling link”, “personalization link”, and “transportation link”.

The first feeling link is the browsing link of product information when initially logging in to the website. The product design style of this website is diversified and more inclined to the current popular aesthetic standards. Customers can choose the products they want according to their favorite type. The following personalized link is the crucial point of this website. When users buy furniture online, there will be the problem of whether the newly purchased furniture is consistent with the family-style. FURN+ can enable the user to upload photos to solve it to solve this problem. Users can upload pictures of their homes to the website. Next, users can place the goods in the images to check the simulation effect for the products they want to purchase. This function meets users’ needs to judge whether the product is suitable for purchase in advance and can better help customers make decisions. They also can utilize VR to evaluate whether the product is qualified. Finally, if customers decide to buy a product, they can pay directly on the website. After payment, the products will be transported to the customers. The innovation and simplicity of shopping processes also contribute to winning the target customers’ favor.

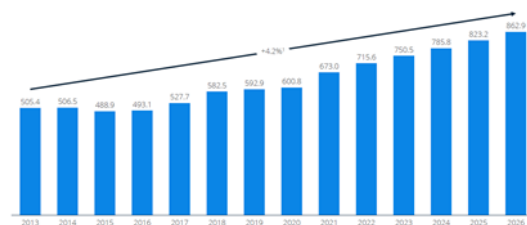
B. Market Analysis

Current market situation

In 2021, the Furniture market realized a revenue of US\$673bn worldwide

Overview: sales figures (1/4)

Worldwide revenue in billion US\$

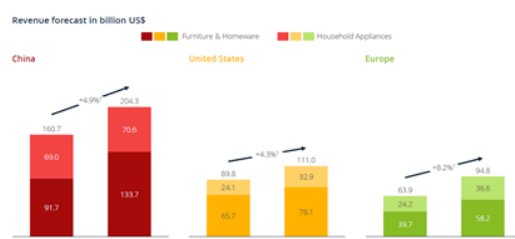


The furniture market and its online sales are very forwarding. The furniture market is constantly growing, and it realized revenue of US\$673 billion worldwide in 2021. The market is mainly driven by consumer spending in general. The steady increase in disposable income and the consequent rise in living standards are responsible for the continuous growth of the market, as is the constant demand for furniture.

Due to the epidemic, a digital shift has occurred in the furniture industry. The growing number of internet and smartphone users has not only changed consumer behavior but also fundamentally changed the sales channels and retail landscape: Consumers adopted online shopping, and Furniture is one of the fastest-growing markets in that regard, with a Compound Annual Growth Rate of 9% from 2021 to 2025 (Rotar, 2021).

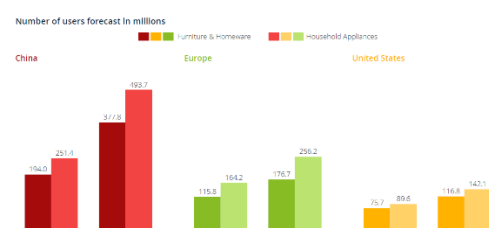
Europe shows the biggest growth in Furniture & Appliances with a CAGR¹ of 8.2%

Market sizes: regional comparison (1/2)



By 2025, most online buyers of Furniture & Appliances will live in China

User numbers: regional comparison (1/2)

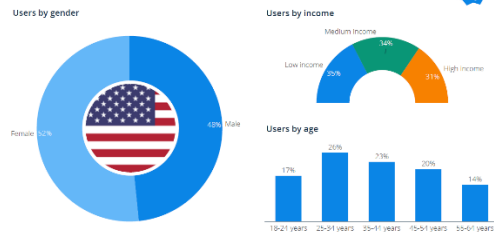


From this graph, the Furniture and Appliances segment contributes US\$383.2 billion to the global e-commerce market. In 2020, the market size reached US\$160.7 billion in China

and US\$89.8 billion in the United States, while Europe's revenue amounts to US\$63.9 billion. By 2025, China will have the most online buyers of furniture and appliance.

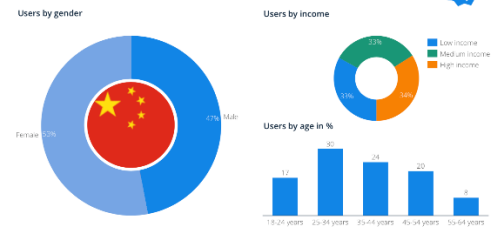
43% of eCommerce users in the US are under 35 years old

User demographics: eCommerce users in the U.S.



34% of Chinese online shoppers belong to the higher income demographic group

User demographics: eCommerce users in China



From the user demographics, most e-commerce buyers in US and China are young generations -- millennials and Gen Z. Chinese and American consumers come from different income classes.

We believe that the online furniture market is up-and-coming through market research. At the same time, we aim at young people and provide services for customers with different incomes.

C. Market strategy

1. Pop-up shop

Since our business model is mainly e-commerce, to let customers have an authentic experience of our service and products, we adopt the form of pop-up shops. By this means, the renting and store decoration fees can be saved, and resources are put to improve furniture quality and design. We held a one-week futuristic tech pop-up shop in Shanghai. The layout of the famous science fiction elements became a new internet-famous site. The strategy of a temporary shop contributes to the brand promotion, enhancing recognition and providing an opportunity to interact with consumers face-to-face.

2. Social Media Operation

As a startup company, we use social media to enhance our popularity. We post promotions, discounts, unique giveaways, and news on social media such as Twitter, Facebook, Instagram, and Chinese social media such as WeChat and Weibo. In addition to the traditional publication, we also post videos regarding furniture selection suggestions, house decorating tips, and furniture and housing design displays on YouTube and bilibili. We will ask online influencers and designers to try out and make comments on our advertised products so that consumers can learn about our furniture's user experience. Through these social media channels, we can raise awareness and be responsive to our followers and quickly address any customer complaints.

Furthermore, we launch a series of themed activities to let customers participate in the furniture design. An excellent design will be made into physical objects! For instance, we only held animal pillow design activities for children and turned children's lovely paintings into natural products.

3. Collaboration Products

We are always trying to design novel products. In addition to the design of our contracted designers, we also cooperate with other brands to launch co-branded furniture. For example, we collaborate with the Palace Museum to propose a Chinese household decoration that combines ancient style and modernization. For instance, we launched a series of mattresses, beds, and sofas using the figure of China's famous painting -- "Thousand miles of mountains and rivers". For customers who follow the fashion trend, we also collaborated with Nintendo to launch the "Animal Crossing: New Horizons" Furniture, which allows customers to have the experience of owning the same furniture as the game. Co-branded with other brands in other fields gives us the advantage of enhancing our awareness and giving customers more novel experiences.

4. Smart Home

We work together with innovative home companies (Aqara in China, C4 overseas) for our consumers to customize the whole house design for the entire house customer service. It includes various sensors such as temperature, humidity, doors, windows, light, and sleep and different intelligent controllers such as intelligent switches, sockets, curtain motors, air conditioning controllers, dimmers, and door locks. Whether people's home is flat or villa, new or modified, people can communicate their demands with our designers. People can dim lights, play music, adjust to a comfortable temperature, lock doors, and turn on the security system with one click.

5. Fast and cheap delivery

Aftermarket research found that the last-mile delivery service is a pain point. 56% of customers said they would avoid a boutique furniture retailer if they encountered high shipping costs, and 36% of them would give up a retailer if it had slow delivery. We cooperate with local logistics companies and rent third-party logistics warehouses to offer a satisfactory delivery service. As long as the inventory is adequate, we can ensure home delivery service within 48 hours. We apply a multi-tier step tariff according to the distribution range and shipping discount for every piece of furniture people purchase.

D. SWOT Analysis

SWOT analysis is a method to help companies choose the best business strategy by systematically evaluating their Strengths, Weaknesses, Opportunities, and Threats based on careful consideration of various factors in the internal and external environment.

1. Strengths

a. Reaching potential consumer groups.

FURN+ uses website sales to reach better the potential target group - young and middle-aged buyers who use the Internet. Most of these users have experience shopping online

and accept the website sales format used by the company (Muchammad and Fandy, 2021). In addition, this allows us to use various channels on the Internet, such as social media platforms, to promote our business. We allow customers to open our shopping platform and view our products directly online, without the extra process that offline furniture companies go through to entice customers to shop in their offline stores. Besides, our online consumer review interface and community building facilitate our ability to increase our expected non-robotic effective click-through rate and customer conversion rate. These help FURN+ companies to attract potential consumers better.

b. User Satisfaction

As a website feature, customization service allows us to understand the preferences of different user groups better. By continuously signing and optimizing our customized services, the website can be more accurate in clarifying the general intentions of other labeled users and some room preference data through backend data analysis. This well-analyzed data can also reverse drive our primary product to be better - because we understand our users and their rooms better than other furniture brands that lack customization services. In addition, this helps us to produce relevant furniture for specific user groups to improve their well-being. We can also have different furniture for different house types, thus enhancing the satisfaction of our user groups.

2. Weaknesses

Compared to established furniture companies, FURN+ may suffer from specific barriers to entry when entering the furniture industry as a new company, such as lower initial brand awareness, lack of designers, and higher product costs.

a. As a new brand, FURN+ lacks the appropriate consumer base. Companies may need to invest some initial advertising costs for brand marketing to drive traffic to the site to expand brand awareness. These costs can lead to an increase in the overall cost of the

brand or a decrease in the price of product design. Also, lower initial awareness may result in lower brand sales and inventory backlogs that need attention.

b. FURN+ needs to tap a lot of good designers to sign up. As a custom furniture website, FURN+ needs a lot of talented people to enrich the brand's design style to meet the needs of different users. Most of the experienced designers in the market have already signed up with brands, so it takes time and cost to convince them to join. The excavation of designers who have not yet become famous also requires a specific review process, which may increase the cost of corporate input and post-training costs to a great extent.

c. The cost of the product is high. FURN+ lacks a relatively stable supply channel and marketing platform as a startup company. Moreover, FURN+ products are mainly customized services, which may lead to some returned products not being able to be sold twice. All the above three disadvantages increase the platform operation cost and production cost.

3. Opportunities

a. Rich marketing activities.

FURN+ has a wide variety of online and offline activities. We are eager to actively engage with consumers through attractive new concept products and collaborations with different big-name hip brands. Diverse technology + furniture flash mob and big brand co-branded furniture shows can help us attract a wide range of consumer groups with other labels. We can also use the brand trust of big brands to strengthen the credibility of our brand and product status. Expand brand awareness while strengthening our own brand culture and image - a trustworthy young brand.

b. E-commerce platforms are on fire.

With the development of technology, online shopping has become a trend. More and more consumer assistant groups are flocking to online shopping platforms. Furthermore, due

to the relative maturity of e-commerce systems, mobile payment, logistics, and storage terminal services are complete. The explosion of social media platforms makes online promotion more and more effective. This saves the input cost of business-related nodes and increases the corresponding return rate. Moreover, after COVID-19 swept the world, online shopping has become the primary shopping method for some young and middle-aged people (Tan and Duan, 2018). As the leading target group of the FURN+ platform, it is relatively easy for young and middle-aged people under 40 to access the website.

4. Threats

a. The website may suffer from overload problems, such as random large-scale user access in a short period that may cause the network to crash and prevent further access, causing consumers to doubt the technological strength of the brand and thus reducing consumer trust.

b. The related technology is not yet perfect. The simulated room feature requires users to upload some personal information and room information. Other companies have not used this technology in a big way. Potential problems may be encountered in the implementation.

c. Information leakage and hacking attacks may cause losses to companies. Data processing and storage in the cloud may be stolen by hackers, leading to the leakage of company secrets and consumer information. The current Internet law construction is not yet perfect. It may be challenging to pursue and defend the rights.

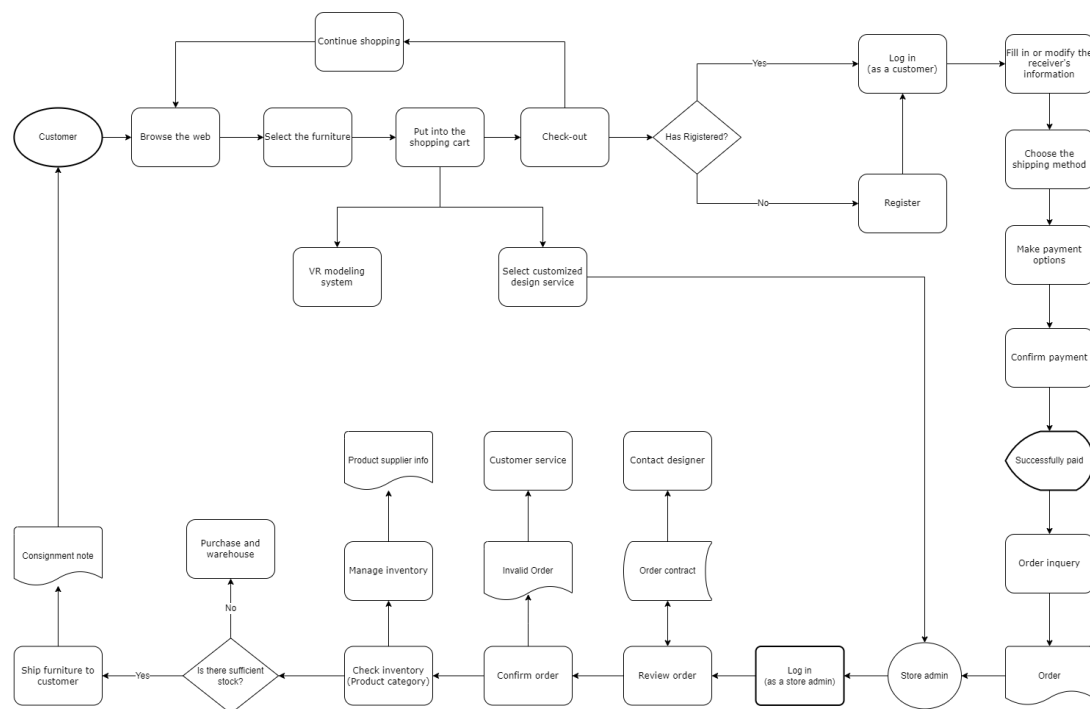
d. The service cycle is too long. If consumers have too much demand for additional customization, they may purchase a product with a relatively long production cycle and rather an expensive cost. This may reduce some competitive advantage of our products and other companies' lower-priced products.

e. Other competing platforms have realized the importance of the website model of e-commerce platforms and have joined. It is reported by WU (2020) that IKEA has created

an online shopping platform and is fully operational; other offline media are also using e-commerce systems to sell their products in cooperation with major e-commerce platforms such as eBay, Amazon, and Taobao, etc. The unique advantage of FURN+ is gradually diminishing.

3. Functional Requirements

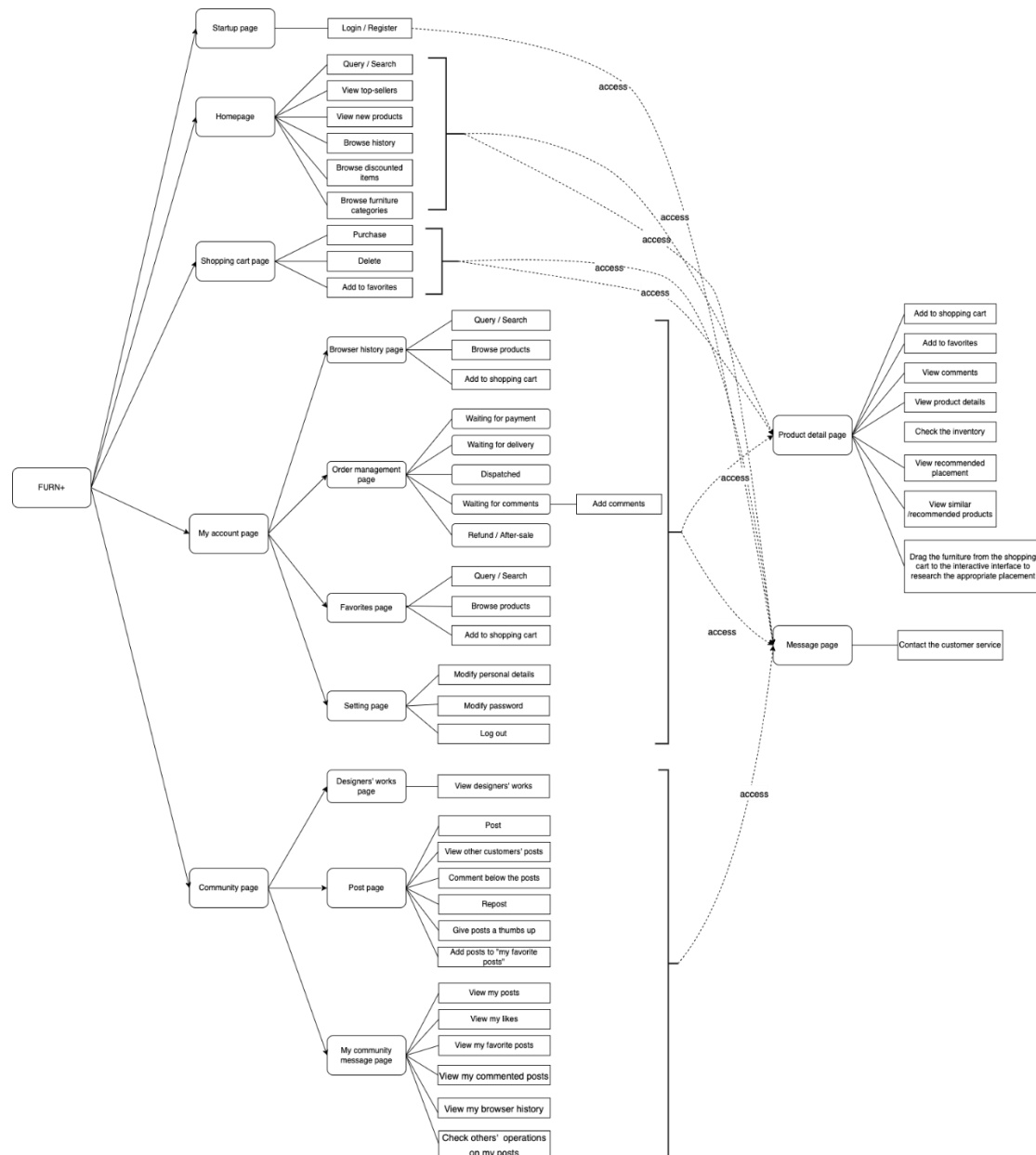
A. Operation Process



As shown above, there are two prominent roles in this process: customer and store admin. The customer can browse the web and select preferable furniture without logging in. They can also use the VR modeling simulation system to have a detailed view of the layout. If he is interested in any designer, the customer could contact the customer service center, which would be the store admin on the other side, providing more information about the designer. They can register or log in for check-out. If the order is confirmed and paid

successfully, the store admin will handle the order on receipt of the order form and contact the designer if necessary. The store admin will check the inventory or product category and connect related product suppliers to ensure sufficient stock. After that, the store admin will dispatch furniture and inform the customer of the delivery.

B. Customer Functions



As shown in the figure above, the website for customers incorporates seven pages: the startup page, homepage, shopping cart page, my account page, community page, product

detail page, and message page. Customers can browse our website without registering or logging in, but they have to log in when they intend to add products to their shopping cart or purchase.

Initially, on the startup page, potential purchasers can register an account or directly log in.

In addition, several things can be done on the homepage, including querying/ searching items of interest, viewing top-sellers, new products, browsing history, discounted commodities, and furniture categories.

Besides, my account page comprises four main pages: browser history page, order management page, favorites page, and setting page. The browser history page includes three functions: querying/ searching products that have already been searched, browsing products, and adding products to the shopping cart. For order management, there are five sub-pages so that consumers can pay, wait for delivery, check delivery status, comment on items, and request a refund or after-sale customer service. On the favorites page, three functions are realized. Consumers can query or search commodities that have been added to their favorites, browse product details and add products to the shopping cart. Additionally, customers can modify their details, change their password and log out on the setting page.

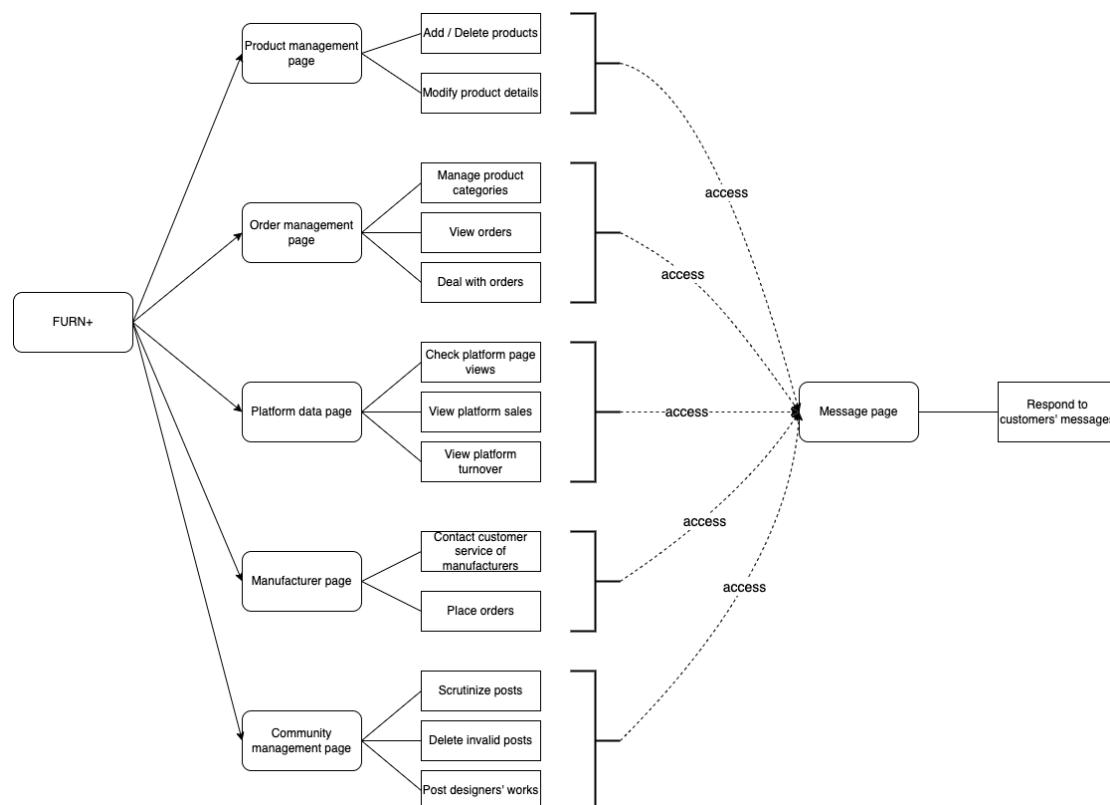
Moreover, the community page acts as a platform where customers can view designers' works, post, comment, repost, view my likes, and so on. An exceptional point of our website is that some customers with individualized demands can choose their loved furniture from various designers and then contact the designers through customer service to customize personalized items.

The product detail page demonstrates product comments, inventory, and information. Also, there exists an area that displays similar or recommended other commodities. A highlight here is the use of virtual reality. Taking advantage of VR, purchasers can try

different decoration styles, layout patterns, and furniture placement. On the product detail page, customers are inclined to drag the furniture from the shopping cart to the interactive interface to research the appropriate order and patterns. Besides, we also provide proper placement regarding disparate products. It is noticeable that the product detail page can be directly accessed by the homepage, shopping cart page, and my account page.

Eventually, the message page is chiefly utilized for consumers to get in touch with customer service, which is shown on every page mentioned above.

C. Store Admin Functions



“Store owners” here refer to the operators of our website. When store owners log into our website, the initial website display for them is the same as the customers; the difference is that for store owners, on their setting page of “my account page”, there is a button for them to press so that they can get access to the website page that is specific to the store owner version. Six sub-pages constitute the webpage for store owners.

Firstly, store owners can add or delete products on the product management page and modify item details (e.g., color, size, style).

Secondly, the functions of the order management page include managing product categories, viewing orders, and dealing with charges.

Thirdly, it is undoubted that platform data is of paramount significance for the platform. Therefore, there is a platform data page on which owners can check platform page views, sales, and turnover.

Besides, the manufacturer page functions act as a channel for owners to contact the manufacturers' customer service (suppliers) and place orders.

Next, since there is a community where customers can view designers' works and view others' posts, it is imperative to set up a community management page for owners to post designers' works, scrutinize all the bases, and delete invalid posts.

Finally, a message page can be immediately accessed through the message button on every page, which is used to respond to customers' messages.

D. Other Key Special Functions

VR Modeling and Simulation System	<p>For most ordinary customers, it is difficult to conceive the spacing effect based on the complicated blueprint provided by the interior designer. We will provide VR technology to help customers check an uncompleted building, internal decoration, style transformation, spatial layout, furniture placement, and lighting effects.</p> <ol style="list-style-type: none">1. The customer can upload the housing layout drawing. Then the simulation system will analyze and provide the
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	<p>3D modeling and visualization effects.</p> <ol style="list-style-type: none"> 2. The customer can drag the furniture image from the shopping cart and place the model in a preferable position and direction. 3. The customer can select the wallpaper, ceramic tile, and paint from our website based on the overall decoration style. 4. The intelligent layout analysis system, customized recommendation algorithm, and artificial customer shopping guide are the three leading VR modeling and simulation systems technologies.
Customized Design	<p>Since there is always a big gap between the real effect and expectation, we will provide opportunities for customers and designers to communicate and interact.</p> <ol style="list-style-type: none"> 1. The customer can choose whether use the intelligent VR modeling and simulation system to cut expenses or apply for an experienced designer through the customer service. <p>VR modeling and simulation system: turn to function VR modeling and simulation</p> <p>Customized designer: Next step</p> <ol style="list-style-type: none"> 2. On the reference page, the customer can view the designer's portfolio and select an appropriate designer. The customer can send a request for the designer's information to the customer service center (also store

	<p>admin).</p> <ol style="list-style-type: none"> 3. Once receiving the request, the customer service center will send the required documents and the annotated furniture information (the furniture list chosen by the customers) to the designer. 4. If both the time and effort of the designer are available, the customer center will confirm the contract with the customer and designer. 5. The designer can start the design process. The designer can also use our intelligent analysis system for the 3D modeling and recommended furniture for a unified style. Once finished the design, the customer center will send the final design to the customer and accept their comments and suggestions. 6. Through this process, the customer service center will build the communication channels between the two, check the product inventory, and contact the cooperative plant simultaneously.
User-friendly Delivery Service	<p>To improve the convenience of the customers, we have decided to provide more choices for customers on the order confirmation page.</p> <ol style="list-style-type: none"> 1. With the combo box and drop-down list, the customers have the freedom to add the “last-mile” delivery service. 2. The customer can select whether to assemble furniture of their will or ask the furniture factories to do the furniture

	assembly task.
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4. UI/UX Requirements

User interface broadly refers to the interface during the interaction between human and machine, and nowadays, it is common to refer to any graphical user interface displayed on the screen as simply UI. User experience usually refers to the user's personal and subjective feelings during the use of a product.

A. Website interface design style

As mentioned earlier, we have positioned our website brand FURN+ as uncomplicated yet straightforward. Therefore overall, the website's UI is designed in a minimalist style, presenting the elements of the website in a simple drawing style and conveying information to the user directly. In order to emphasize the sophisticated yet straightforward tone of the website, we have adopted dark green as the brand color, combining elegant green with simple white, highlighting critical information in appropriate places, and making the website interface look simple yet not too monotonous.

B. Making the user interface consistent

The site's interface design carries through the minimalist style to the end for a unified user interface. For example, only the top bar and the sidebar (only the personal center has a sidebar) use a large area of dark green to highlight navigation information and give users quick access to their destination. In addition, all the icons on the website are simple and linear in style to convey the meaning of the portal with minimal volume while enhancing visual clarity and reducing the user's cognitive load.

C. Fluency of use

There are two types of users of our website: customers and administrators. Obviously, customers want to access information here, and administrators want to manage it. To improve the user experience and service of the website, FURN+ is necessary to browse the pages to obtain user requirements repeatedly. Therefore, after entering the site, the choice of log-in status is not directly exposed. However, the user is allowed to experience and browse the whole area without any obstacles, and only when the user is about to enter the shopping check-out or enter the personal homepage will the log-in and registration page pop up, and the functions of the personal homepage will be displayed differently according to the choice of log-in status. It will enhance user fluency and increase customer retention and the likelihood of administrators finding bugs in the site.

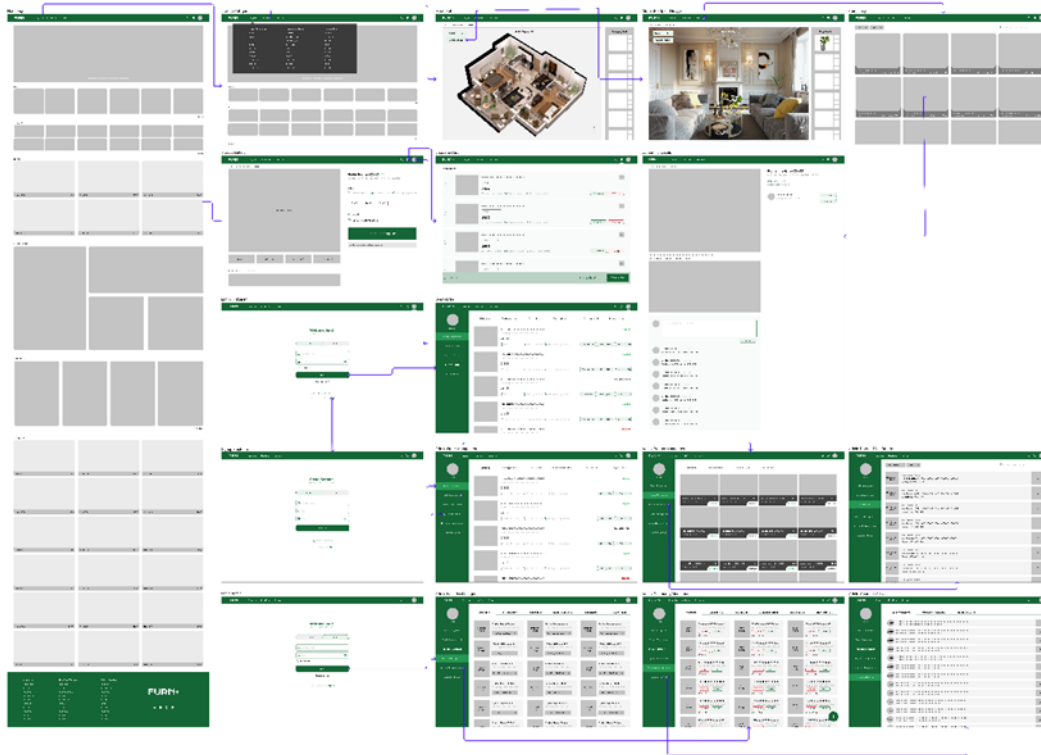
D. Reduction of memorized content

A fully functional website usually consists of a few core functions and countless smaller ones. To organize these elements in a structured way, we use a top bar and sidebar navigation to list the main features of the site, with the top bar displaying the core functionality of the site and the sidebar of the personal home page showing the type of information that will allow users to jump to the target page quickly. At the same time, the hover method was used to effectively hide excessive product category entries, allowing them to reappear when necessary. This design prevents users from spending much time looking for a destination path and making a choice and effectively focuses their attention on the areas of the web page where content is displayed beyond the navigation bar, allowing them to discover more detailed and exciting content.

E. Prototype

1. Overall interactions

The diagram below shows the layout and interaction design of the primary interfaces in the FURN+ website, including how the current log-in selects between customer and administrator status.



2. Interactions of customer part

This part of the interface design is the customer section and mainly shows the site's core functionality.

What can be seen is that, as mentioned earlier, the product category function in the top bar will be hovered to wake up.

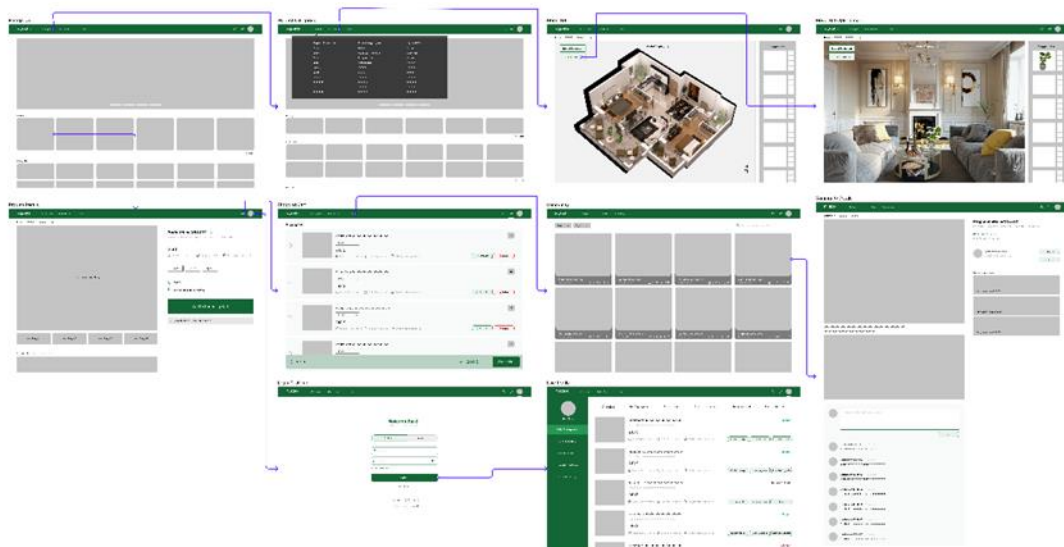
The community's home page is designed to list the design works released by each designer and will reveal the number of likes, comments, and views to attract users. The details of the results are laid out in a left-right layout, with the left side displaying the graphic content and comments of the works and the right side showing the information and recommendations of the results.

One of the central core functions - the online furniture arrangement - is also designed in a left-right layout. The left side of the interface shows the model layout or the images uploaded by the user, while the right side shows the shopping cart list, where the user can drag the products in the cart into the canvas on the left side and adjust the angle they want

to place them, to see if the product fits the home decoration.

The entrance to the shopping cart is on the right-hand side of the top bar, where you can access the shopping cart and check-out items. As you can see, there is only an Add to Cart button on the product details page but no direct check-out button. This design allows for a more aggregated and streamlined operation, reducing the interruption of the product browsing process.

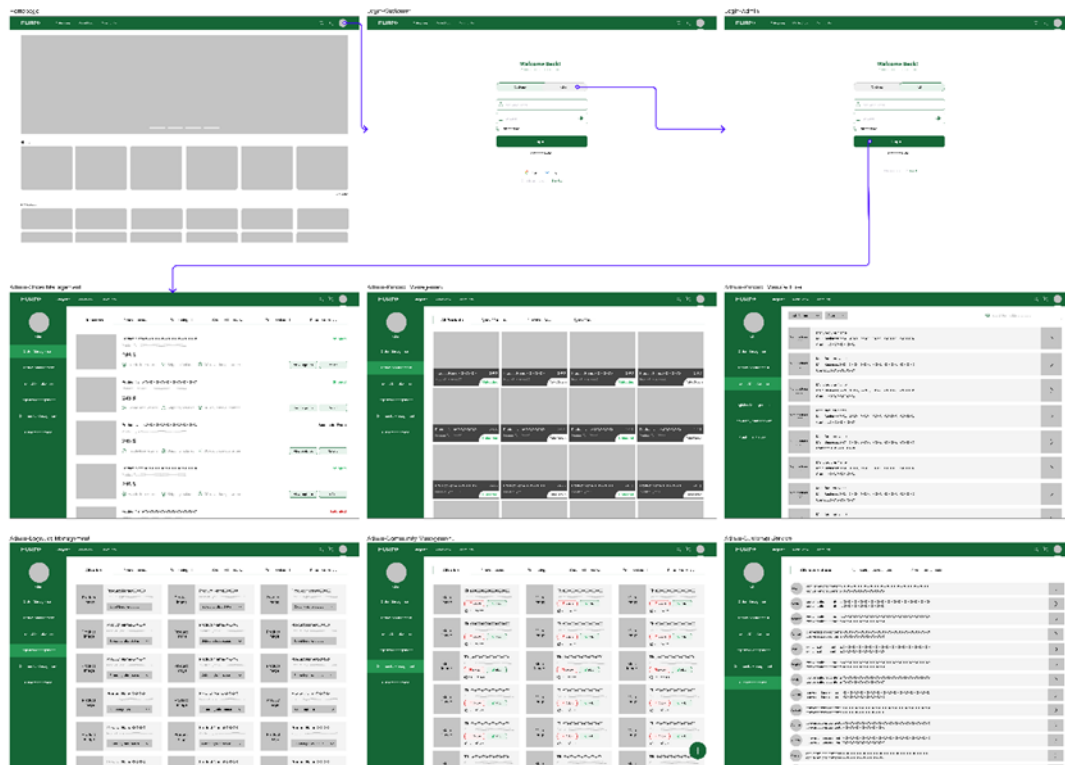
When the user clicks on the avatar on the right-hand side of the top bar or clicks on the check-out button on the shopping cart screen, it will evoke the log-in registration screen where the user can choose their log-in identity and log-in method. Furthermore, once logged in, you can view all orders, browsing history, favorite products, delivery address settings, account settings, and other functions on your homepage.



3. Interactions of the admin part

Similarly, the administrator's log-in has already been mentioned. After the administrator has logged in, they can view and set up some back-office functions on the personal homepage, such as order management, product management, manufacturer list, logistics management, community management, and customer service communication. The administrator's home page (or website backend) is based on the usual ToB product style

and layout, with a clear interface hierarchy in the form of a top bar + sidebar, making it easy for users to jump between pages and access information quickly. As you can see in the diagram below, the design of each functional interface varies according to the available attributes and applicable requirements, but the overall design is presented in a neatly arranged manner.



5. Non-functional Requirements

A. Performance Requirements

The number of resources used to perform the website's functions should be reused/resubscribed as soon as possible after the users cancel the same site.

The page feedback time of FURN+ should be less than three seconds, and the time of accurate search feedback result should be less than one second.

For the daily operation, load part of the webpage at a time and gradually load as the client pulls down.

The website can support 1000 people to access the system simultaneously, ensuring the throughput of regular operation.

The web design is simple and easy to understand, and users should find it not difficult to operate and interact—24-hour online customer service to deal with the technical problems encountered by users.

B. Reliability

FURN+ systems must operate reliably within their operating environment. A “reliable manner” is a specified period associated with the ability of the software to maintain its performance level under conditions as follows.

1. Maturity: The FURN+ system should minimize the frequency of failures and strictly monitor the site to reduce the potential for system problems as users move in and out of different links and transactions.

2. Fault Tolerance: The system should maintain a specified level of performance in the event of a software failure or violation of a specified interface. For example, the site should pop up alerts when there is a problem with the FURN+ system, while experienced operators can complete routine installation and maintenance within 30 minutes.

3. Restructuring Capability: The system should quickly restructure its performance levels after errors and failures to recover the data directly affected. Reconfiguration means increasing the speed of rebuilding performance levels after a defeat and recovering directly affected data while reducing the time and effort required to achieve this goal.

For example, the system should automatically save the user's filtered data by retaining the most recently recorded preference options and shopping cart contents of the customer service interface and order logistics information. Another example is that after a user cancels a purchase or successfully returns an item, the system must refund the deposit following the customer's original payment method. Delayed account arrival is not allowed, and database rollback must be ensured when the bank's transaction status changes and the transaction remain unpaid due to redundancy or other reasons.

The non-functional requirements for FURN+ system reliability are typically global. In addition, the operating system environment, platform selection, code quality, and other aspects also have a specific impact. In particular, implementing fault tolerance and easy recovery requires some specific features to support it.

C. Security Requirements

When the website is running, it should ensure the security of customer information and the protection of the website itself, such as:

1. Confidentiality:

The customer's identity and account information must be kept strictly confidential, and there should not be the problem of information disclosure to third parties.

Operators should carefully maintain the database to avoid information loss, information leakage, false information, and other problems

2. Anti-attack:

The website maintenance staff should regularly maintain the website security to prevent the website from being attacked and damaging the customer information or website commodity information.

3. Permission control:

Customers can only view their orders and purchase records, not others' orders.

The background service operating system only allows managers and operators to view customer orders, information, and feedback.

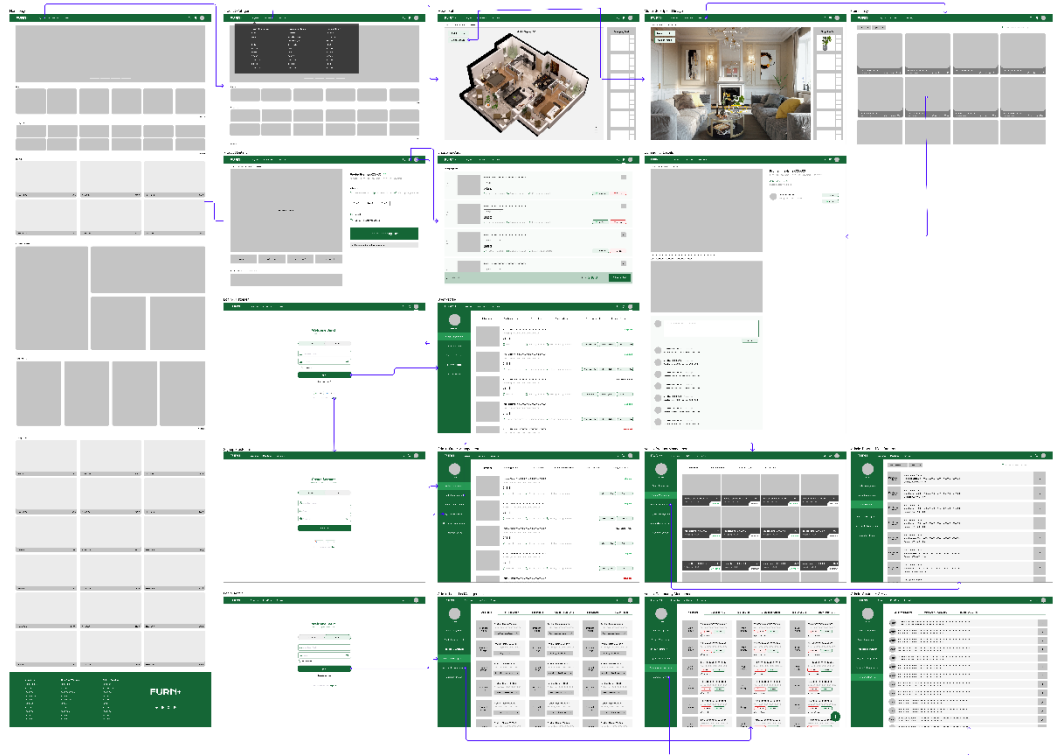
In addition to browsing, purchase and customization can only be carried out after logging in to the website.

Reference

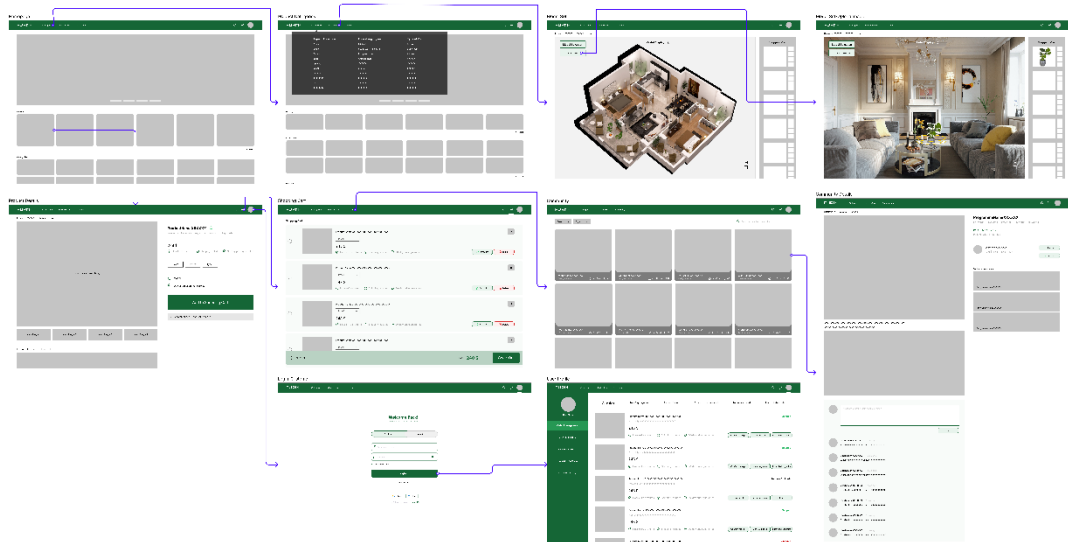
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Appendix: UI&UX Prototype

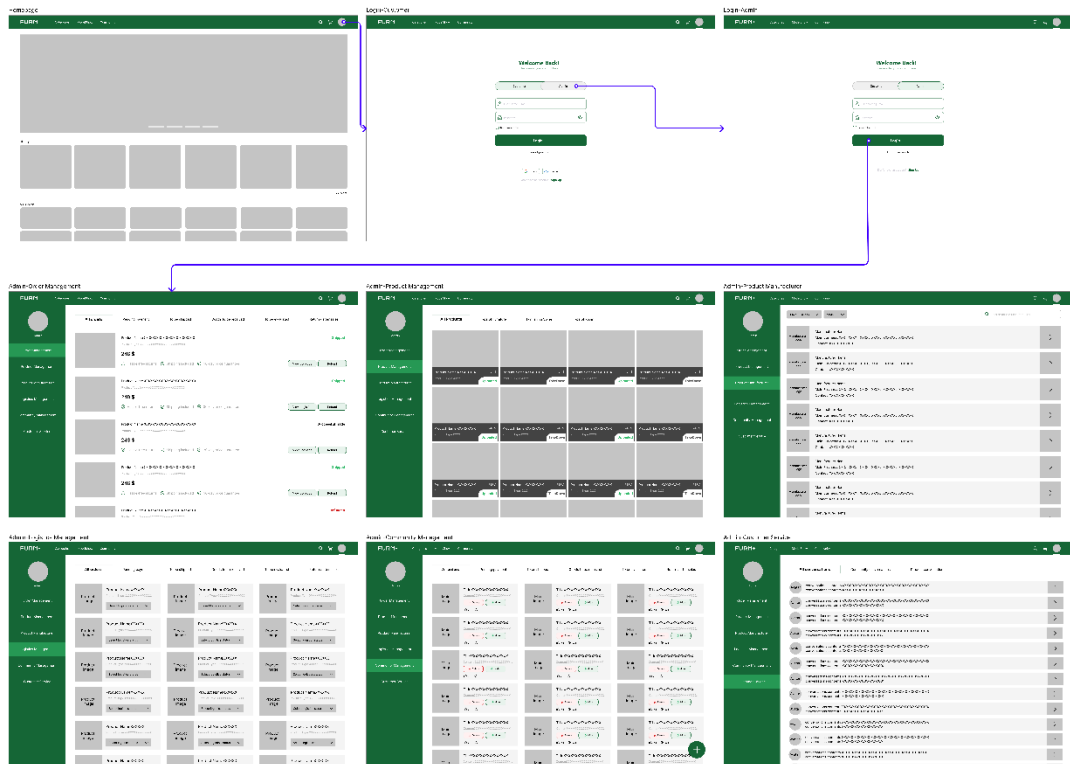
1. Interaction of all interfaces



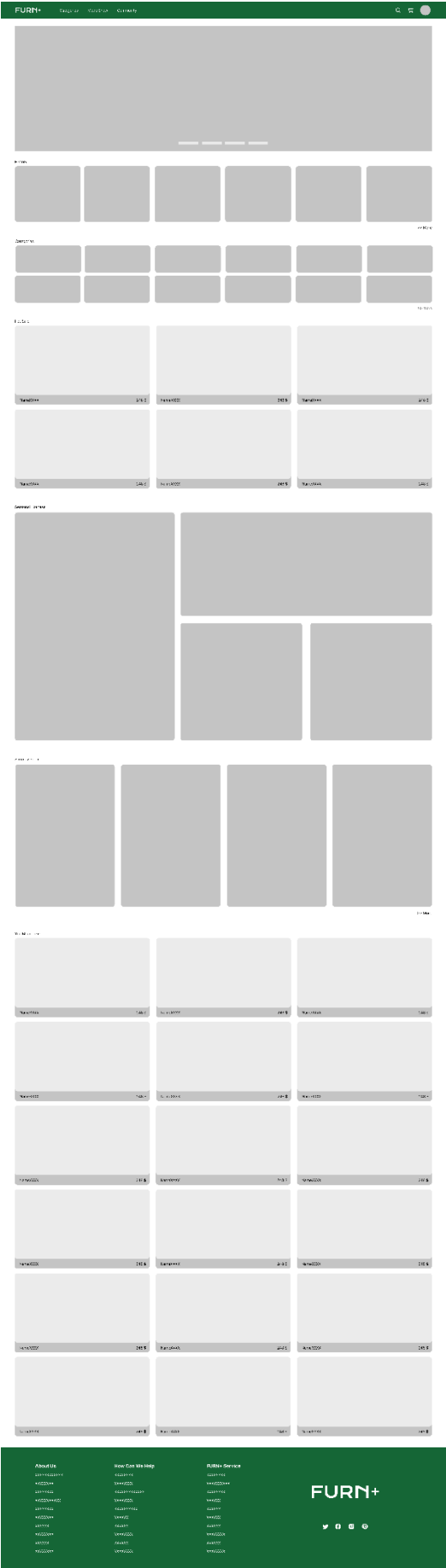
2. Interaction of customer interfaces



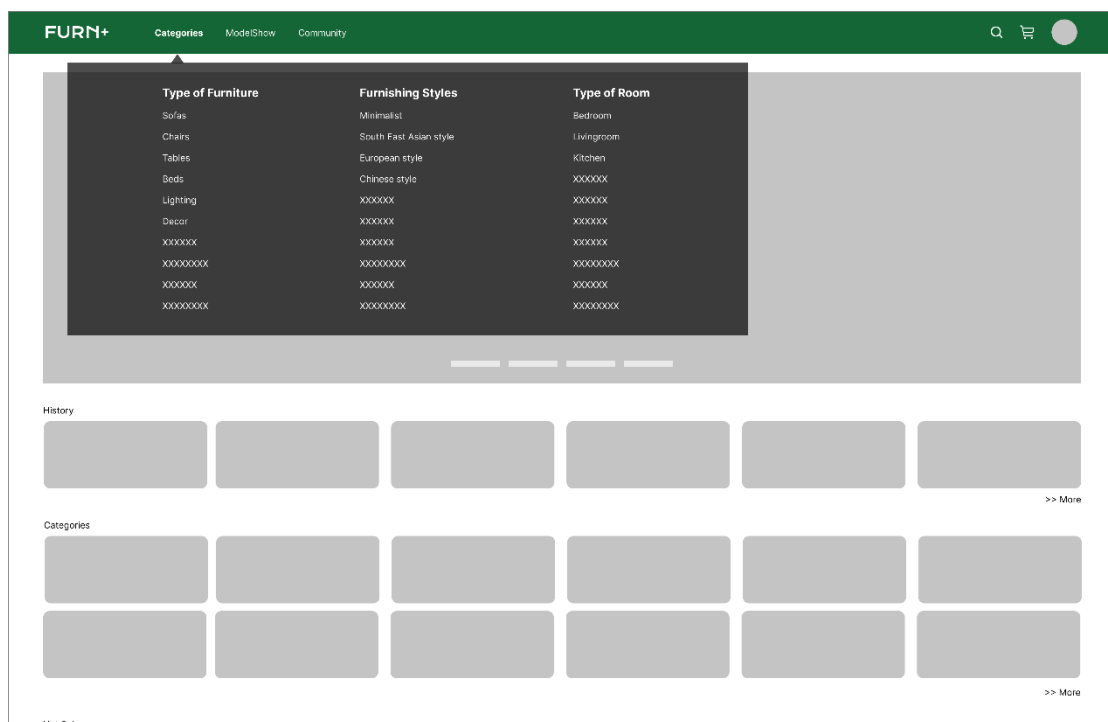
3. Interaction of admin interfaces



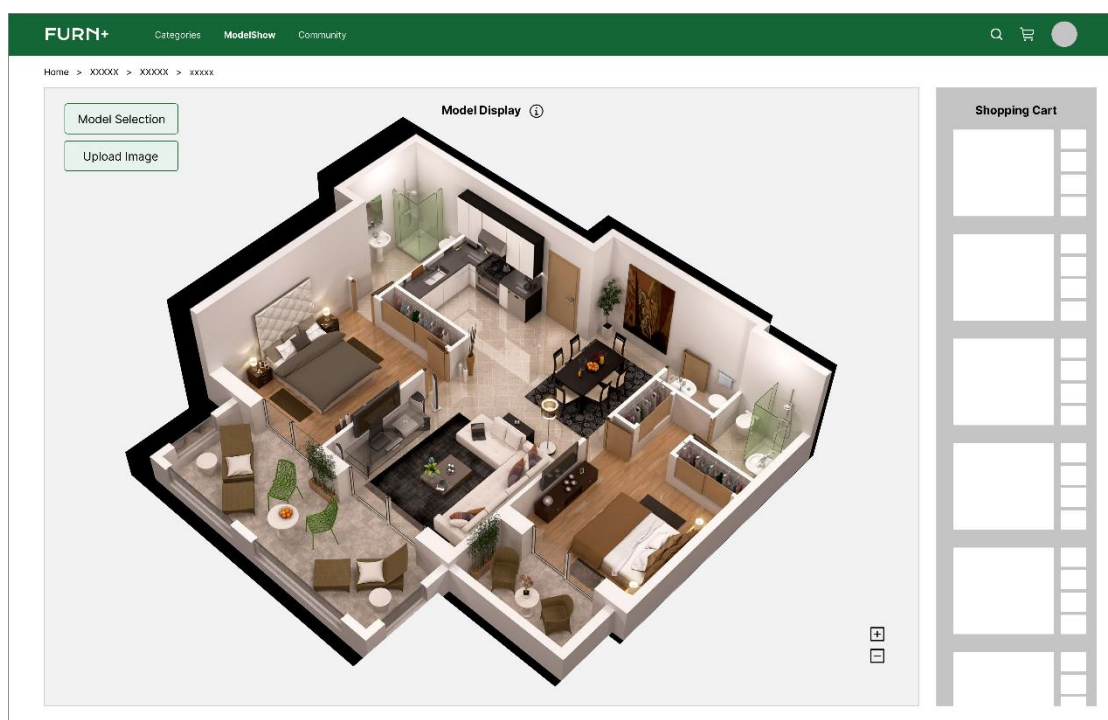
4. Home Page



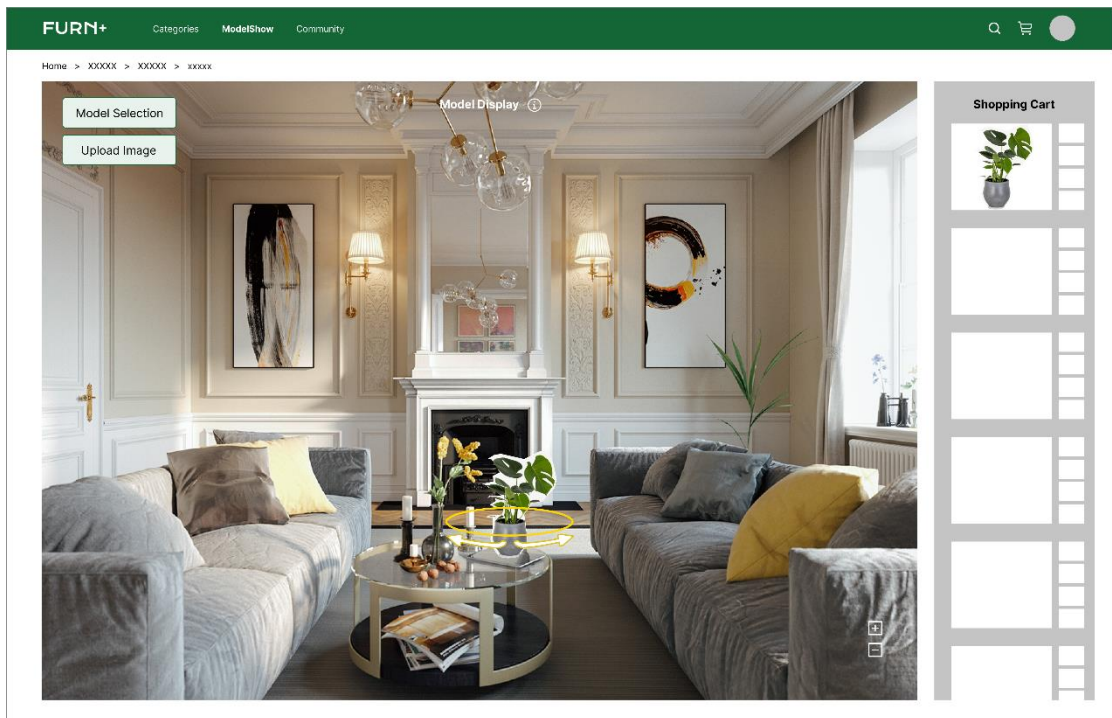
5. Categories (Wake up to the product category menu)



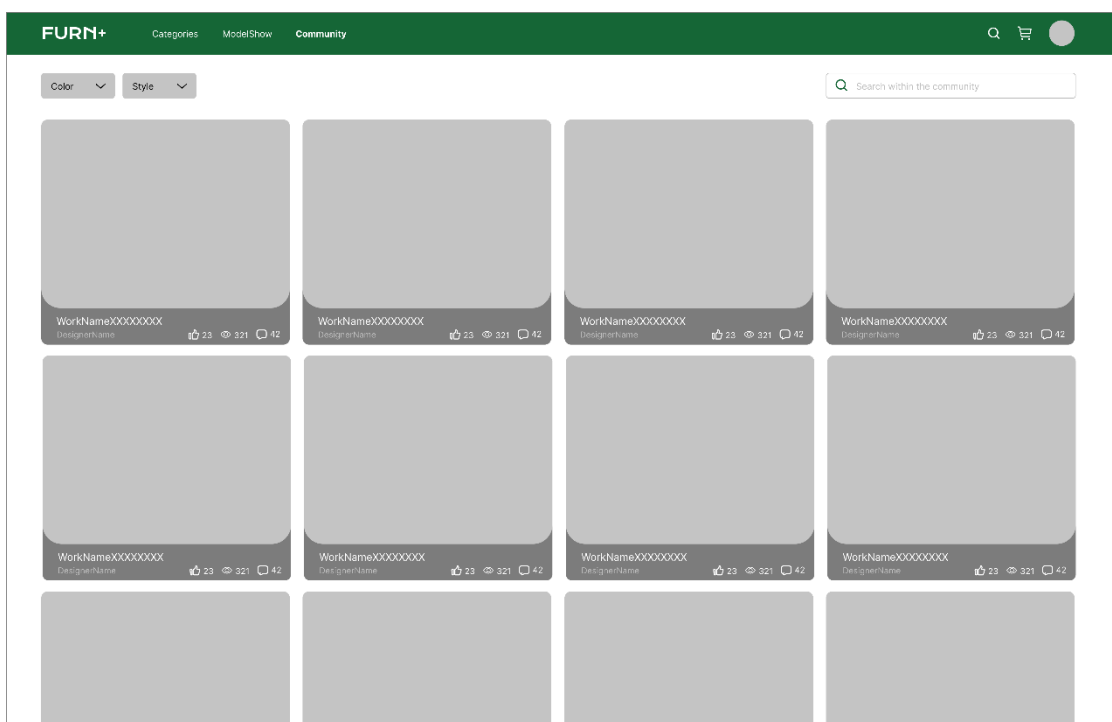
6. Model-after model selected



7. Model-after image uploaded (Drag and drop product)

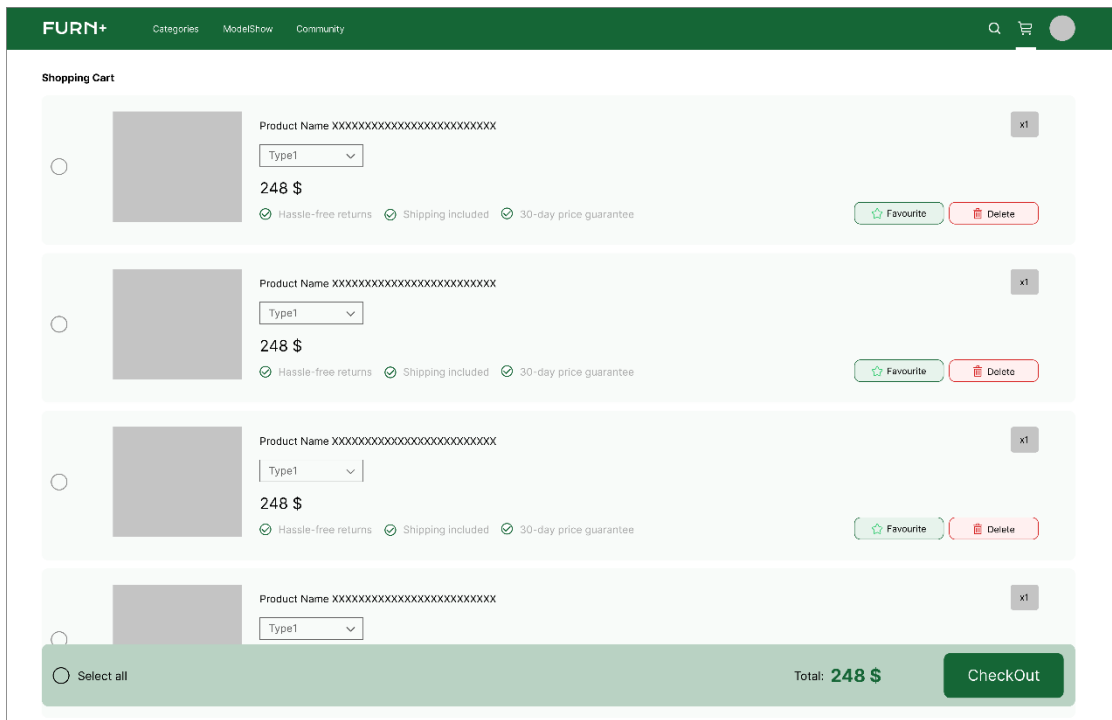


8. Community

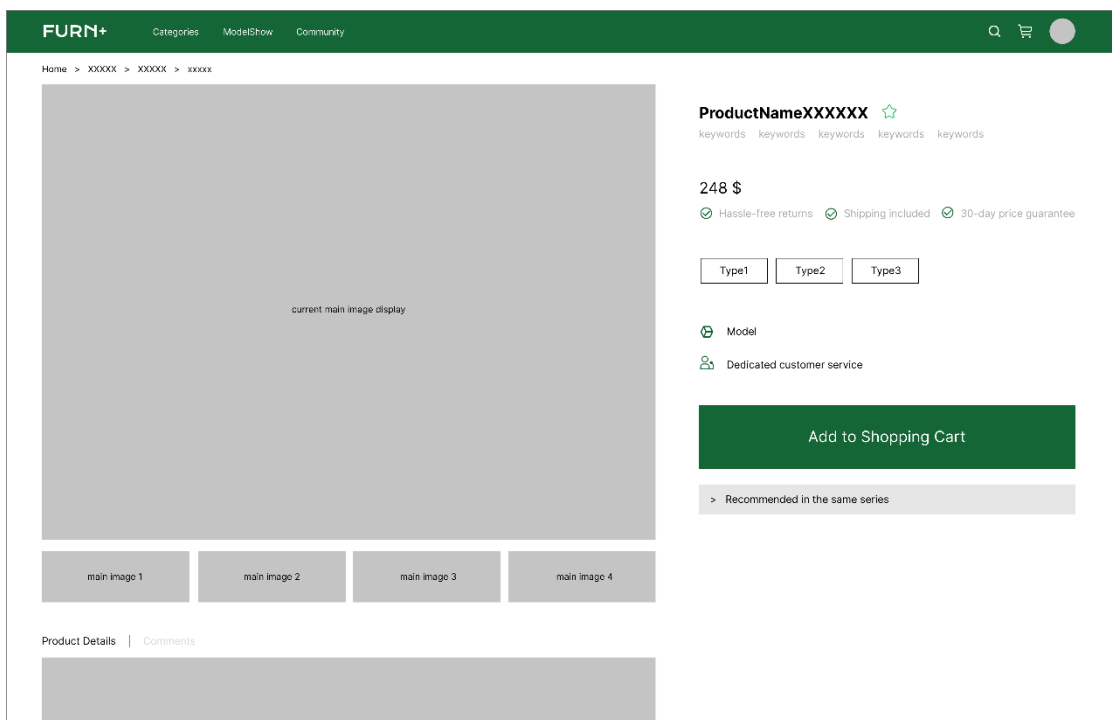


9. Community Details

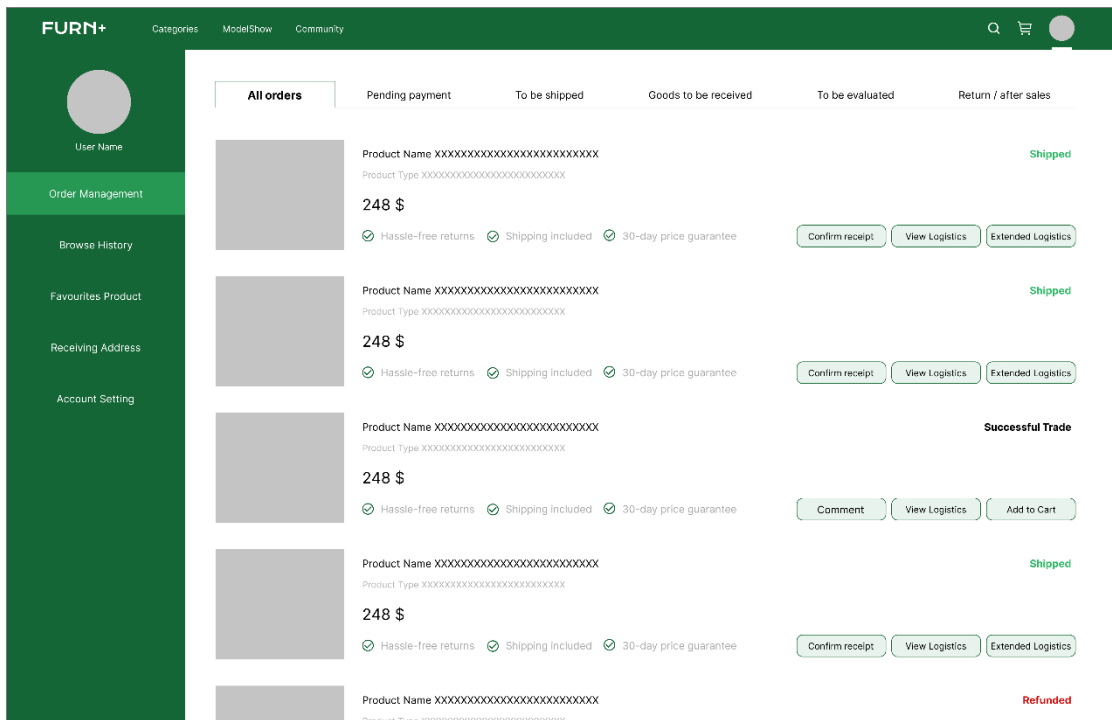




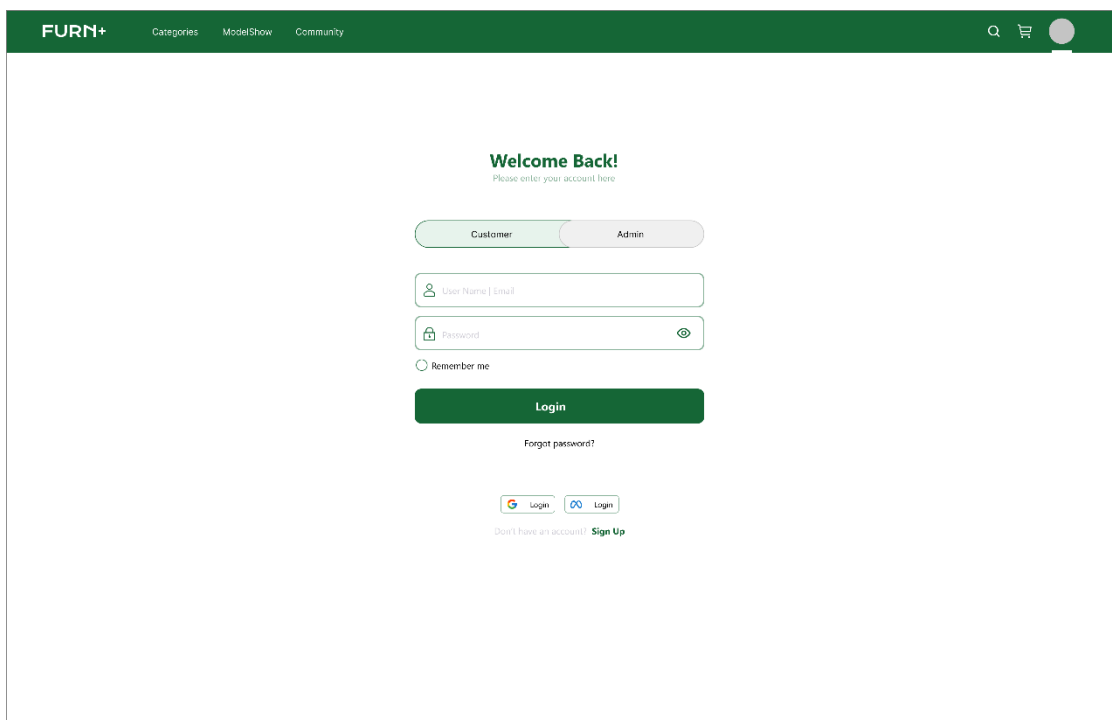
11. Product details



12. Profile (customer)



13. Log-in (customer)



14. Signup

FURN+

CategoriesModelShowCommunity

Create Account

Please enter your information here

CustomerAdmin

User Name | Email

Email

Password

Sign Up

Google Login

Facebook Login

Already have an account? Login

15. Log-in (Admin)

FURN+

CategoriesModelShowCommunity

Welcome Back!

Please enter your account here

CustomerAdmin

User Name | Email

Password

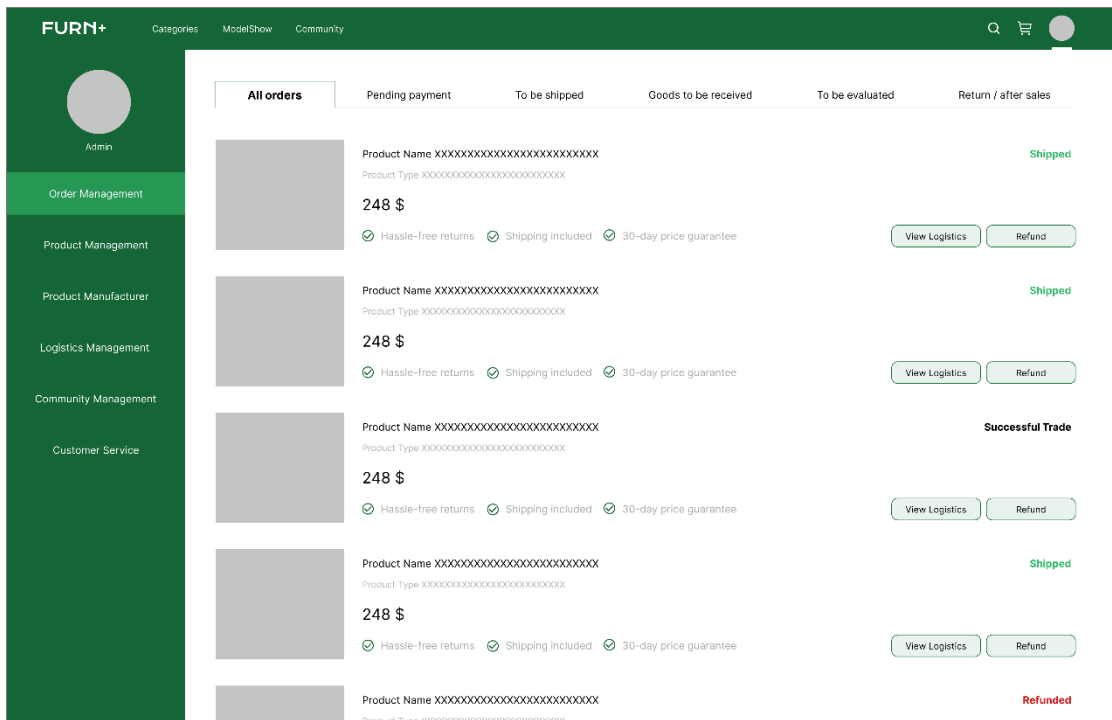
☐ Remember me

Login

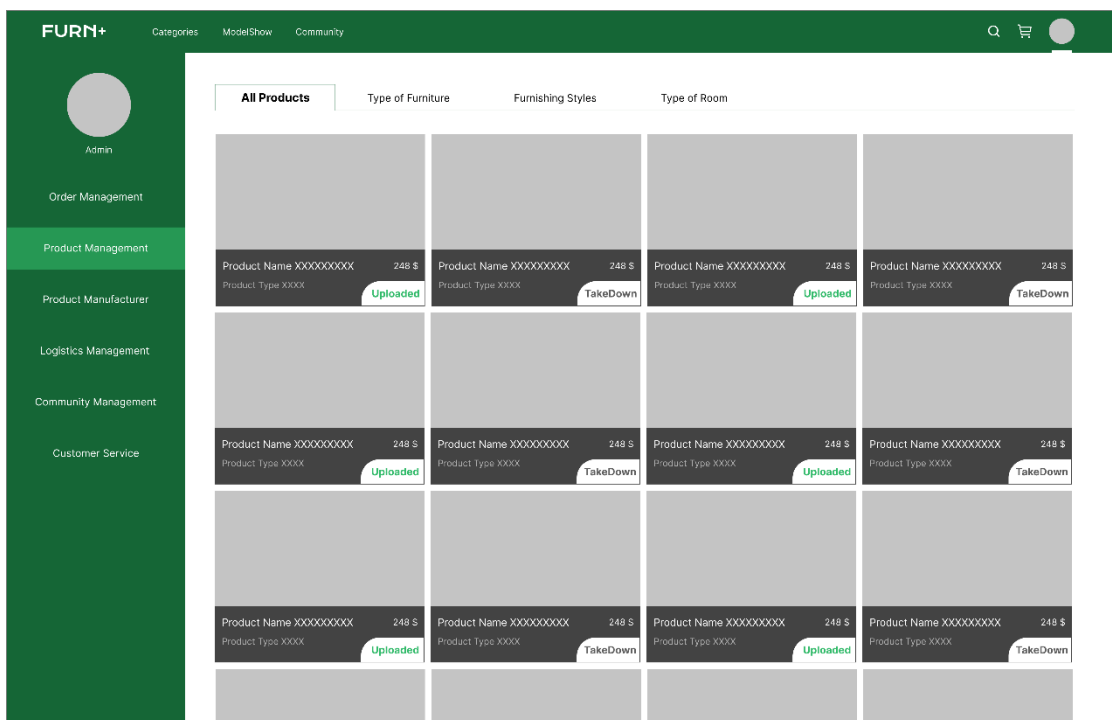
Forgot password?

Don't have an account? Sign Up

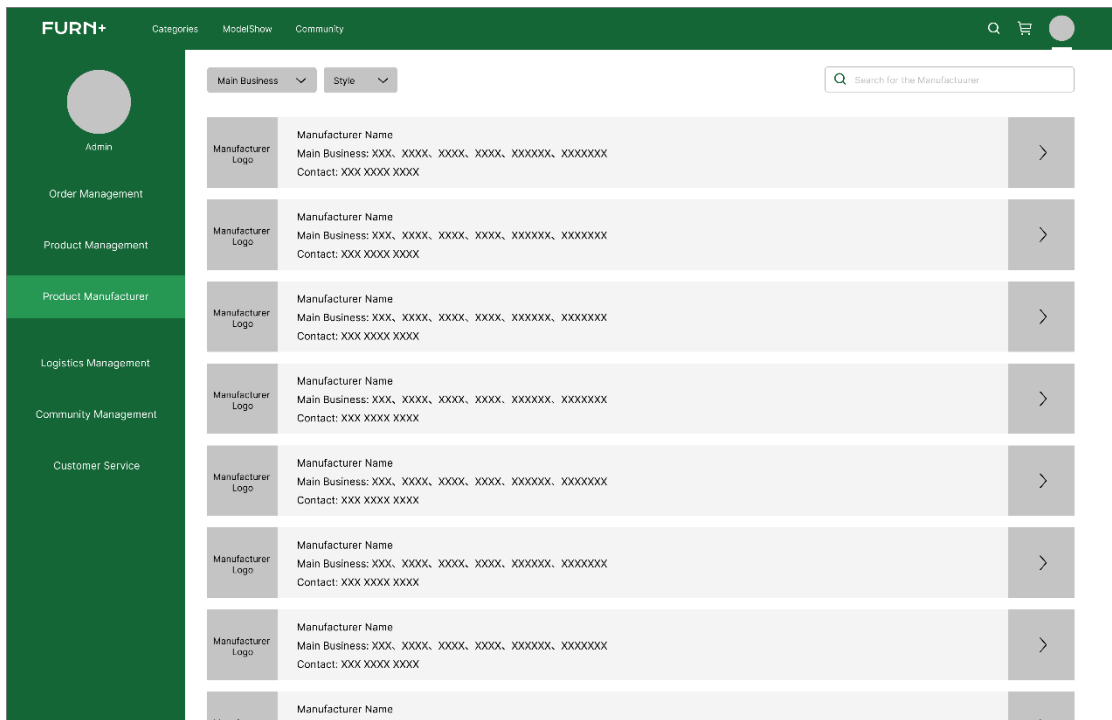
16. Admin Profile (order management)



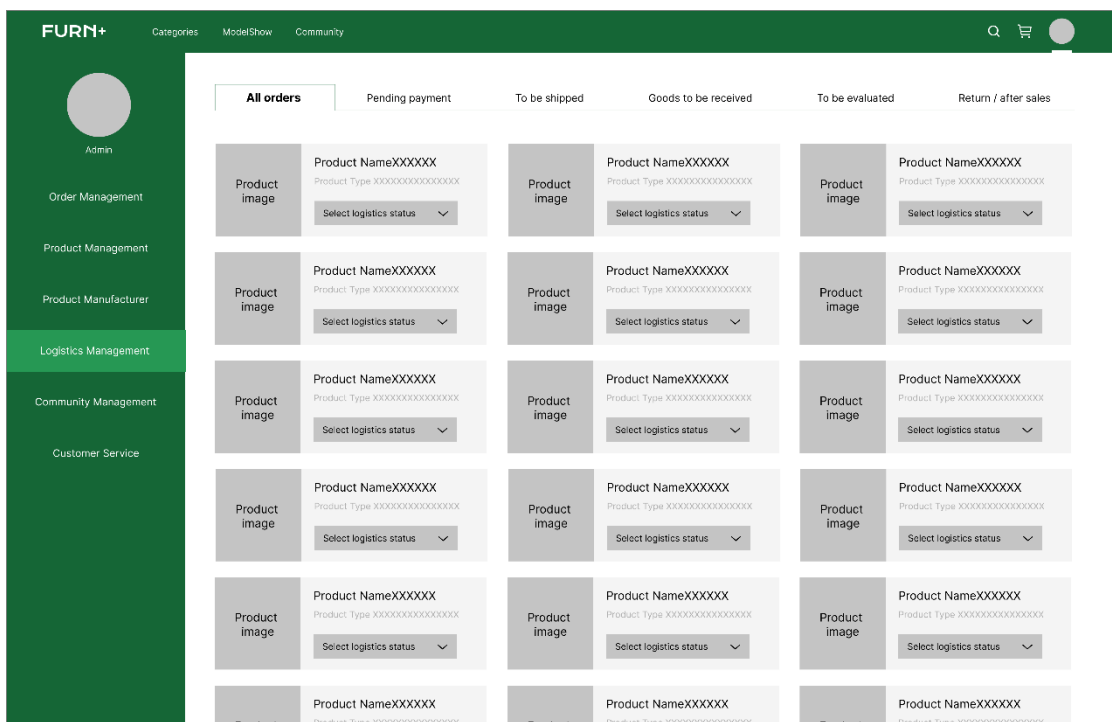
17. Admin Profile (product management)



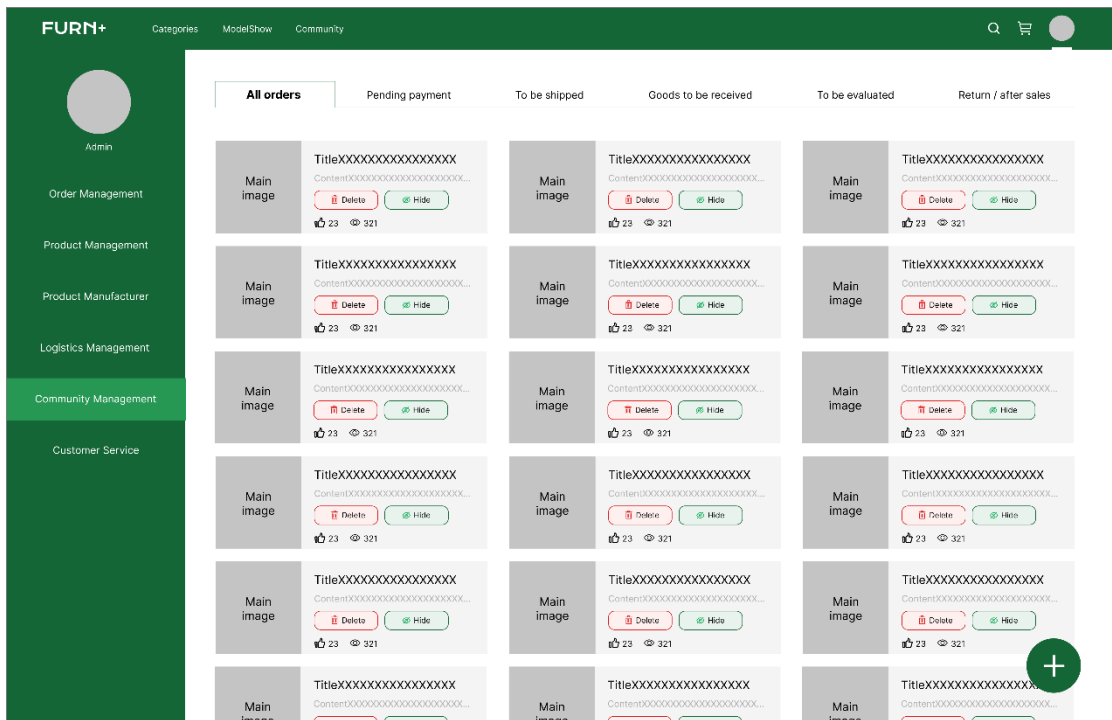
18. Admin Profile (product manufacturer)



19. Admin Profile (logistics management)



20. Admin Profile (community management)



21. Admin Profile (customer service)

