



# Research on UI and Intelligent Product Design of Prefabrication System for Urban white-collar Work Meals under the Background of Healthy China

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**Abstract.** To promote a healthy lifestyle in China, we began by examining the issue of unhealthy eating habits among urban white-collar workers. By conducting field surveys and using research methods such as interviews and observations, we identified common pain points related to their dining experiences. We then sought to address these issues by identifying potential opportunities and incorporating feedback from various stakeholders in the community. Our main focus was on creating a new service model that combines online and offline solutions, with an emphasis on improving the healthiness of white-collar workers' meals. To achieve this goal, we developed an online working meal app and accompanying public service products. Through these tools, we aim to provide users with the resources they need to make healthy eating choices and encourage the adoption of healthier eating habits.

**Keywords:** UI design, intelligent product design, urban white-collar workers, pre made work meals

## 1 Introduction

The importance of prioritizing public health was emphasized by General Secretary Xi Jinping during the Party's eighteenth National Congress, where he proposed the implementation of the "Healthy China" strategy. The National Health and Wellness Commission has recently released the "Health China Action 2023 Work Points" along with a notice, urging all regions and departments to implement the strategy effectively based on their specific circumstances. This demonstrates the significant emphasis that the Party and the State place on improving public health. Therefore, it is crucial to prioritize public health and effectively implement the "Healthy China" strategy to achieve a healthier future for all citizens.

Urban white-collar workers are facing increasing workloads and pressure, causing them to neglect their dietary health. The prevalence of chronic diseases among younger

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individuals is rising, and there is a growing population of sub-healthy white-collar workers in China's first-tier cities due to long-term unhealthy eating habits. To address this issue, we have centered our efforts on serving urban white-collar workers by studying their dietary habits and analyzing their nutritional needs.

Through the development of a pre-made service system for their meals, we aim to provide healthy and convenient options for urban white-collar workers. Our approach utilizes online tools to facilitate access to healthy working meals, helping to improve the overall nutritional balance of urban white-collar workers' diets.

## **2 Research Background**

### **2.1 Health China Strategy**

General Secretary Xi Jinping emphasized the importance of public health in the report of the 19th National Congress as early as 2017, stating that "people's health is a vital indicator of national prosperity, wealth, and strength." He called for improvements to the national health policy and the provision of comprehensive health services to the people. Additionally, he stressed the need to implement a food safety strategy to ensure that people can eat with confidence. Despite the overall improvement in living standards, the quality of public health has not necessarily improved, particularly among urban white-collar workers who work long hours in a "culture" of overwork.

### **2.2 Daily meals for urban white-collar workers**

Due to the fast-paced nature of modern life, it has become increasingly difficult for urban white-collar workers to find time to cook at home. In first-tier cities, statistics show that less than 30% of white-collar workers can guarantee cooking at home in the evening, and 80% of them work overtime regularly, leading them to rely on fast food and take-out for convenience and time-saving. According to the 2020 Takeaway Industry Report, the number of takeaway users increased from 0.63 billion in 2016 to 423 million in 2019, with post-90s consumers accounting for nearly 60% of orders, making them the main group of takeaway users [1]. Although most urban white-collar workers do not have the time to learn to cook, they still require healthy meals to cope with their heavy workloads and constant mental strain.

### **2.3 Prepared meals market situation**

The post-epidemic era has seen a surge in demand for pre-prepared meals among consumers. In 2021-2022 alone, there have been more than 20 financing events in China's prepared food industry, with a total funding amounting to tens of billions of yuan. Pre-prepared meals, also known as "quick" or "lazy" meals, are characterized by their convenience of processing. These meals are washed, cut, matched, and processed before being packaged and preserved in a frozen or vacuum-sealed manner. Consumers can

simply cook or open the package to eat, with the benefits of convenience, efficiency, and stable production.

### **3 User Research**

#### **3.1 Health situation of urban white-collar workers**

Presently, in China, the proportion of urban white-collar workers who suffer from sub-health due to excessive fatigue has reached 60%, and the proportion of deaths caused by chronic diseases has exceeded 85%. These statistics indicate that the nation's health situation is concerning [2]. Due to work pressure and poor personal habits, white-collar workers are unable to take care of their dietary health, which often poses hidden health risks to their bodies.

#### **3.2 Urban white-collar workers demand mining**

According to data from the China Statistical Yearbook, the number of legal entities in the national catering industry increased from 14,070 in 2007 to 233,990 in 2012, and the revenue from meals increased from 171.134 billion yuan to 396.673 billion yuan. In 2010, 21.2% of urban residents' food consumption expenditure was spent on dining out, which was 13.3 percentage points higher than in 1990. The 2018 Blue Book on the Dietary Health of White-collar Workers in First-tier Cities in China found that over 90% of white-collar workers primarily eat out, including canteens, restaurants, take-out, and roadside stalls. However, more than half of the white-collar workers reported that the nutritional composition of their meals is not balanced or healthy enough to meet their basic nutritional needs.

#### **3.3 Stakeholder research**

After analyzing the background of urban white-collar users, it was discovered that there are neighbors living in the same community as the users, including retirees and food enthusiasts, who have the time and enthusiasm to cater to the white-collar workers' need for healthy and tasty meals. Producer and consumer user experience analysis revealed that emotions were highest during the stages of cooking, eating, and sharing with friends.

Different touch points were generated in each stage, and pain points were identified to find opportunities for improvement. The emotional points during mealtime for consumers were generally not high, indicating that user's mealtime experience was not satisfactory. By analyzing the different stages of behavior, pain points and opportunities for improvement were identified.

## 4 Design Practice

### 4.1 Design concept

Due to their busy work schedules, urban white-collar workers often struggle to maintain a healthy and balanced diet. However, there are residents in their communities who have the time, experience, and willingness to make healthy meals. In order to meet the needs of urban white-collar workers and their community residents, we have developed a service system that operates through an online APP [3]. The APP provides pre-made ingredients for healthy working meals, which can be ordered by urban white-collar workers through the APP. Community residents then use the ingredients to make customized healthy meals. To ensure the safety of the ingredients and production process, both are controlled by the brand company. The ingredients are couriered to the maker, picked up at the catering counter, made according to the APP requirements, and the production process is shown to the buyer via video recording and real name verification, among other steps. Orders are placed through the APP and packaged and delivered by dispatchers in a unified manner, as shown in Figure 1.

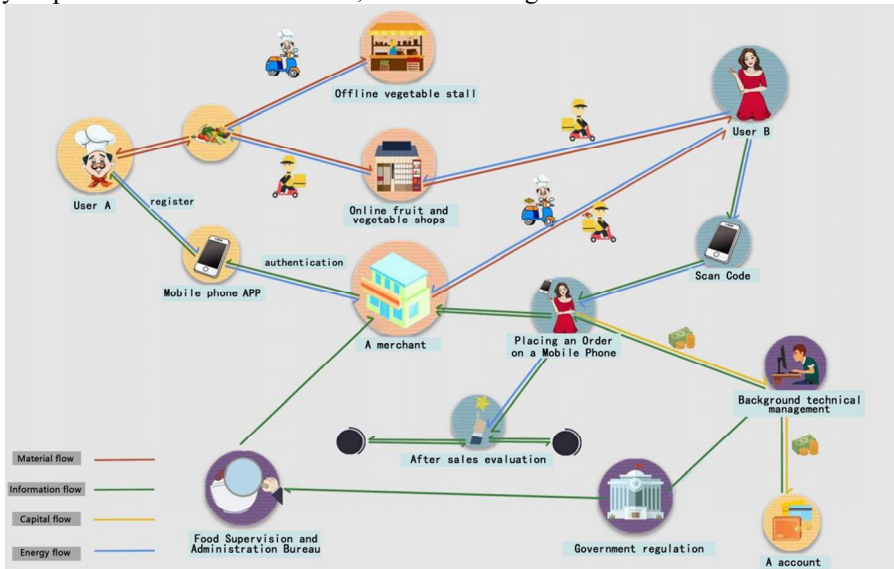


Fig. 1. System map

### 4.2 Design performance

#### 4.2.1 Overall visual image design.

By shaping the brand, experience and value can be created from the perspective of customers, ensuring continuous connection and interaction between design and users [4]. The logo features a circle with a missing piece, and the gap on the top right is shaped like antlers or a hand reaching upward, symbolizing the warmth and care provided by others. The main color is green, which represents health and vitality.

**4.2.2 APP UI design.**

The subjective empowerment method of AHP was used to organize and sort out complex multi-level issues. Four aspects were considered as the basis: interface aesthetics (L1), learning (L2), effectiveness (L3), and satisfaction (L4), as shown in Table 1. Based on these four aspects, the following sub-factors were evaluated: layout (L11), color matching (L12), ease of reading (L13), help guide (L21), ease of operation (L22), function completion (L23), function completeness (L31), resource comprehensiveness (L32), number of task operations (L33), satisfaction (L41), trust (L42), and willingness to use (L43). A judgment matrix was constructed by comparing each indicator with each other using a scaling method ranging from 1-9 levels. Quantitative data for each factor were obtained based on the opinions collected from several industry designers. Finally, the weights of each index were calculated using Matlab, as shown in Table 2-6.

Based on the evaluation results, it is evident that the APP scored high on dimensions such as effectiveness, learning, ease of reading, ease of operation, number of task operations, and satisfaction. Therefore, it is recommended that these factors should be given more attention during the design process.

**Table 1.** Scale values (1-9 levels) and their representative meanings

Scale	Meaning
1	Indicates that two factors are compared and have the same importance
3	Compared to two factors, a is slightly more important than b
5	Compared to two factors, a is significantly more important than b
7	Compared to two factors, a is more important than b
9	Compared to two factors, a is extremely important compared to b
2,4,6,8	Intermediate value of adjacent judgments mentioned above
Reciprocal	Represents a comparison between b and a to the same extent

**Table 2.** Criterion layer (L1-L4) judgment matrix

	L1 Aesthetics	L2 Learning	L3 Effective- ness	L4 Satisfaction	weight
L1 Aesthetics	1	1	0.5	2	0.2015477 35
L2 Learning	1	1	0.2	2	0.2022103 71
L3 Effective- ness	2	5	1	6	0.5485500 16
L4 Satisfaction	0.5	0.5	0.16	1	0.0886770 94

**Table 3.** Aesthetics layer (L11-L13) judgment matrix

	L11	L12	L13	weight
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	Layout	Color	Legibility	
L11 Layout	1	2	0.2	0.262591575
L12 Color	0.5	1	2	0.329212454
L13 Legibility	5	0.5	1	0.408195971

**Table 4.** Learning layer (L21-L23) judgment matrix

	L21 Guide	L22 Operability	L23 Functional Integrity	weight
L21 Guide	1	2	0.2	0.088422035
L22 Operability	0.5	1	2	0.709648304
L23 Functional Integ- rity	5	0.5	1	0.201929661

**Table 5.** Effectiveness layer (L31-L33) judgment matrix

	L31 Functional complete- ness	L32 Resource comprehen- siveness	L33 Number of operations	weight
L31 Functional com- pleteness	1	6	0.5	0.398077825
L32 Resource com- prehensiveness	0.16	1	0.3	0.105766526
L33 Number of oper- ations	2	3	1	0.496155649

**Table 6.** Satisfaction layer (L41-L43) judgment matrix

	L41 Satisfaction	L42 Trust	L43 Willingness to Use	weight
L41 Satisfaction	1	3	7	0.687037037
L42 Trust	0.3	1	2	0.210185185
L43 Willingness to Use	0.14	0.5	1	0.102777778

To design the main interaction architecture of the APP, we have identified six main interfaces: "Open" ,"Login" ,"Home" ,"Discover" ,"Order" and "My", as shown in Figure 2.

The "Open" interface displays the logo of the APP. In the "Login" interface, users can select to log in with their cell phone number. The "Home" interface will verify the identity of the user and direct them to either the "Buyer" or "Seller" interface.

The "Buyer" interface allows users to select various options such as fat reduction meals, special dishes, etc. Sellers can release information on their offerings, and buyers can make purchases based on that information.

The "Discover" interface contains several sections, including the "Food Court," "Tutorial," "Map," "Food Contest," and "Sweep." In the "Food Court," users can share their food experiences, and in the "Tutorial" section, they can share recipes and cooking tips. The "Map" feature will allow users to track their deliveries and locate pick-up counters. The "Food Contest" is held by the APP in collaboration with the community and food experts to encourage food makers to improve their offerings and better serve consumers.

The "Order" interface allows users to view their order history and track the status of their current orders. The "My" interface enables users to view their reward points and exchange them for gifts.

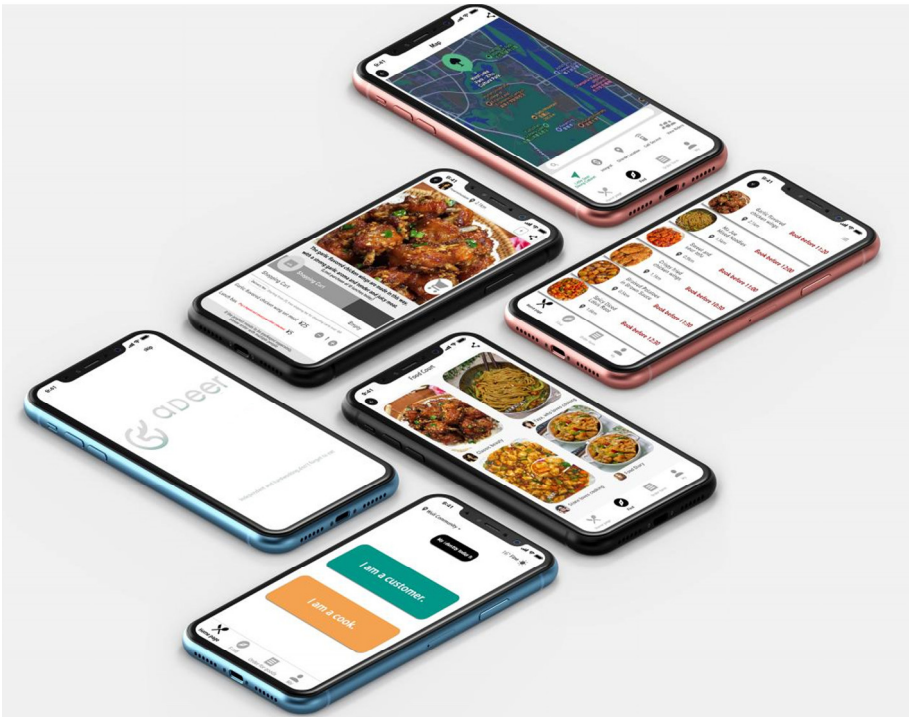


Fig. 2. APP UI design

#### 4.2.3 Lunch box design.

The lunch box design is inspired by the app name and features a unicorn deer specimen and a 3D image that can be detached and collected as a souvenir by users. The lunch box design follows a minimalist approach and is eco-friendly, making it easy to carry and reuse [5]. Users can choose from two colors, light blue and light red, and the design is aimed at providing a pleasant dining experience while promoting sustainability.

#### 4.2.4 Dining cabinet design.

The food cabinet is made of metal with a wooden door, which represents the combination of softness and rigidity that urban white-collar workers possess. The cabinet is connected to the app, allowing users to choose the nearest cabinet via their mobile phones, as shown in Figure 3. Producers will place the ordered products into the app-provided meal box and submit it to the distributor. The distributor scans the code and places the meal box in the corresponding cabinet. Consumers can scan the code at the chosen cabinet to open the door and retrieve their meal. The IP image on the meal box can be taken down by users as a collection. Once the consumer is finished with the meal, they can scan the recycling code on the circular door on the right-hand side of the screen, and the door will move down. The meal box can be placed inside for recycling. The system detects the returned meal box and awards points for recycling. The order is then considered complete. This design follows the concept of environmental protection and encourages the reuse of the meal box.

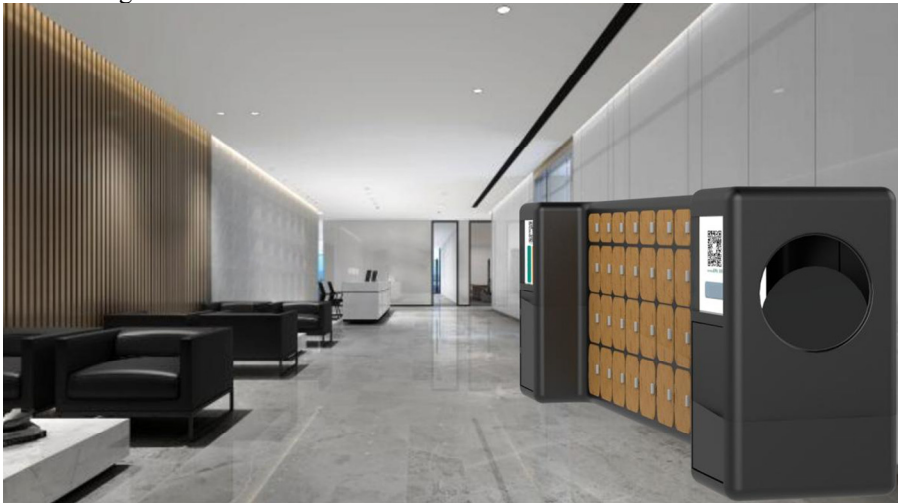


Fig. 3. Dining cabinet design

## 5 Conclusion

Currently, the health problems of urban white-collar workers have become a pressing issue. By focusing on user needs, researching the daily eating habits of urban white-



collar workers, and designing corresponding service systems and products, we can provide valuable insights to address these issues. This can not only improve the health and well-being of users, but also contribute to the implementation of China's Healthy China strategy.

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