

Research on the Innovation Service of Garage Storage in High-end Community - focused Fuzhou Oak Bay

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고급 지역사회 차고 저장 서비스 혁신 연구 - 광저우 쌍수만에 초점을 맞추어

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Abstract With the rising of the middle-class in China, the garage reserve has become an important element considered by the high-end community in improving user's experience. Taking Oak Bay, China as an example, this study aims to present a new system of storage service that can help companies achieve sustainable development of storage services. In order to achieve this goal, a customized service process is made by investigating user's need with sample visits and in-depth interviews, and finding user's key points with journey maps. The final analysis shows that this storage service system helps to expand the space and improve user's satisfaction. Therefore, this paper provides theoretical support and practical basis of garage services for other construction companies, and greatly improves the service system of community.

Key Words : High-end community, Garage storage, User experience, Service design, Innovation

요약 중국 중산계급이 켜기하는 배경 하에 차고 저장 서비스가 고급 지역사회에서 사용자 체험을 제고시키는 중요한 구성 부분으로 되었다. 본 연구는 중국 쌍수만을 예시로 들며, 보관 서비스의 지속적인 발전을 위한 새로운 보관 서비스 시스템에 대해 소개하고자 한다. 연구 목적에 달성하기 위해 모델하우스 방문, 사용자 심층 인터뷰 조사와 사용자 여정도로 고객의 핵심 니즈를 파악하여 맞춤형 서비스 프로세스를 구축하였다. 최종 분석 결과를 보자면 해당 보관 서비스 시스템은 공간을 늘렸을 뿐만 아니라 고객 만족도도 높였다. 따라서 본고는 기타 건설회사에 이론적 서포트와 개리지 서비스의 실제 사례를 제공하며 커뮤니티의 서비스 시스템 성능을 대폭 개선할 수 있다.

주제어 : 프리미엄 아파트, 단지 주차장 보관, 사용자 체험, 서비스 설계, 혁신

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Received March 29, 2021

Accepted May 20, 2021

Revised April 19, 2021

Published May 28, 2021

1. Introduction

Aiming to formulate service contents, service design is a comprehensive research method integrating multiple disciplines[1]. Community service design focuses on designing of all the products and services provided by a community to its residents, with the goal of bringing them the best life services[2]. The coverage rate of comprehensive service facilities in urban communities was 78.75% in 2018, indicating that the community service industry will face huge market demands in recent years with the increasing improvement of people's life standards[3]. Garage is an important place and stores articles of specific types[4]. There were only a few of studies on garage use experience before. As for garage services in high-end communities, it is necessary to consider the role of garages in serving as well as meanings and goals of their storage services[5]. According to the 2020 Global Wealth Report released by Credit Suisse, China ranks the second place in the world in terms of the number of middle class, accounting for 11% of the total number of the rich in the world[6]. With the rapid rise of China's middle class, the demand for living environment is constantly improving, and high-end communities are emerging, so the service of high-end community needs to be improved greatly. China Resources Land is one of the most important real estate enterprises in the field of high-end community services. Its Oak Bay project is a classic product, which has covered 12 cities in China. Oak Bay in Fuzhou, as a strategic urban project of China Resources Land and a mature community which has been handed over for seven years, is a strong representative. The solution of garage storage services can not only satisfy the high-end group's demands for subdividing the life quality, but also expand the community service fields, and especially it is of great significance in construction of a perfect

community service system.

The research content is the design of garage storage service system for Oak Bay. The research is carried out in four stages by combining qualitative and quantitative methods. Firstly, new demands are found by investigating users' satisfaction towards the original service through visiting the sample. Secondly, users' storage goals and the specific degree of storage requirements are mined through the in-depth interview, which covers the process before, during and after use. Thirdly, the storage service system is redesigned after comparing the existing services, creating users' journey map and analyzing users' pain points, which not only ensures the privacy of the storage space, but also customizes the service process, thus constructing the service blueprint for garage storage. Finally, questionnaire is used to test the user satisfaction, showing that the new service system not only uses the service design accurately to effectively improve and upgrade the service, but also enhances the overall effect of storage service.

2. Status Quo of Garage Services in Chinese High-end Communities

At present, the increasing middle-class demands and advocacy of national policies are promoting emergence and development of garage service products, making these products gradually become one of the carriers for measuring comprehensive competitiveness of high-end communities. At present, only a few of high-end brands in the Chinese real-estate market start involving garage related services, but large-scale development does not take shape due to huge differences and varying quality of brands[7]. In Chinese resident service design realized with communities as a unit, a garage storage system playing an important part in

community garage facilities can enter a garage service activation stage by improving user satisfaction based on service design.

In August 2020, Chinese Resources Group ranked the 79th place among TOP 500 [8]. As a real estate giant under central governance, China Resources Group is featured by the Oak Bay high-end project in Fuzhou, one of its symbolic communities. As a giant enterprise of high-end communities, the project has started piloting of service practice in limited personalized home decoration storage since 2008. In 2013, it conducted exploration on the service storage modes in community public space. In 2014, it started piloting of storage service modes of underground garages. In view of its certain experience and remarkable representativeness, it is very suitable to take this project as the research sample.

3. Oak Bay Storage Service Research

Service design is a people-oriented method which can operate or improve new services[9]. Aiming at the current garage service services of Oak Bay, the survey was conducted in the three stages. Firstly, the mixed research method, namely qualitative sample visiting and quantitative questionnaire survey, is used to fully investigate the users' satisfaction with the sample service. Secondly, the qualitative research method is used for in-depth interview, which can explore the inner thoughts and real views of the interviewees more deeply. In order to summarize the users' accurate information, it is necessary to explore the use experience of garage storage and understand the storage problems encountered by users before, during and after use. Finally, a user journey map is created to comprehensively grasp and understand the users' pain points, analyze their pain points, and thus deeply analyze the imperfections of the original service.

3.1 Sample Visiting

Sample visiting is a method based on intuitive perception, which is explained properly by researchers, combined with the user's subjective experience, recording the user's use process and completing the test[10]. Preparation: recorder, camera, questionnaire. This stage focuses on user's experience. 50 interviewees, namely housing owners of Oak Bay, aged between 18 and 60, including 25 males and 25 females were invited. Implementation of sample visit: the customer service personnel invited the customer and received by a researcher, led the user to the garage storage sample area, systematically explained the function of the garage storage cabinet, and then let the interviewees experience it on site, as Fig. 1 show.



Fig. 1. Sample visiting site

After the experience, show the questionnaire face to face and fill in. The sample visiting aims at perceiving users' use feelings from 5 perspectives, including material selection, color matching, function design, personalized configuration and spatial size. Through questionnaire survey, their overall satisfaction with the garage storage service cabinets was evaluated.

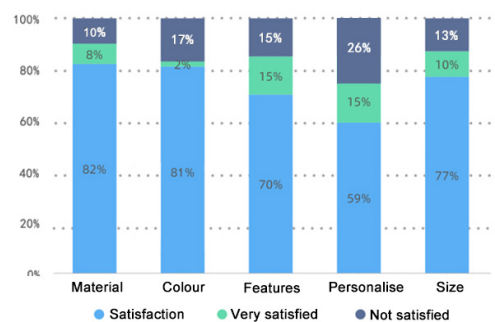


Fig. 2. Research results of Sample Visiting

As shown in Fig. 2, the data disclose the comprehensive satisfaction with the garage storage cabinets. As shown in sample visiting results: over 80% of users were satisfied with materials and colors; as for specific functions and space designed, the proportion of those basically satisfied with them decreases to 70%, and 15% of users were completely dissatisfied; and as for personalized configuration, nearly 30% of users were quite dissatisfied, indicating that high-end users have higher-level demands for personalized configuration and it is urgent to provide customized storage services for them.

3.2 In-depth Interview

In-depth interview is the most suitable to deepen users' experience[11]. To explore the use behavior and demand of the respondents for garage storage, the questions cover three stages: before use, in use and after use. There are a total of 60 owners, with 6 groups and 10 in each, aged from 18 to 60, 30 males and 30 females. One researcher is assigned to each group to conduct one-to-one interview, lasting about 5 to 7 hours (30 to 45 minutes for each member). The preparation includes interviewee selection and invitation, tool preparation and reservation of interview location. Interviewees are selected by customer service staff according to the characteristics: owning vehicles and experienced in living in high-end community; with high requirements on community facilities as well. Owners are invited by the customer service staff on telephone. With pen, white paper, interview sheet, computer, recorder and Sony headset all prepared well, the interview will be held on the 1st and 2nd floors of the owners' activity center.

For the benefit of recording the results, the purpose of this study is described before the interview, and the researchers shall only record the whole process after seeking the consent of the owners. The interview record is divided into three parts, as shown in Table 1: in the first part,

the users' feelings before use are recorded in detail (10-15 minutes); the second part is the pain points during use (10-15 minutes); and the third part is the suggestions after use (10-15 minutes). All the interviewees will be given a Sony headphone at the price of RMB120 as gifts.

Table 1. Questions in In-depth Interview

Before use	1.How about the route you use to go home? 2.Do you need garage storage cabinets and their services? 3.What is the reason? 4.What will you store if you own one storage cabinet?
During use	5.Which one do you value more during use, Temporary storage or convenience and practicability? 6.Do you store clean supplies, car supplies or sport goods during use? 7.Which problems do you encounter during use? 8.What are your demands for personalized design of storage cabinets?
After use	9.How about the route you use to go home after use? 10. What do you suggest for other improvements of storage services? 11. How about your requirements and suggestions for placement of the storage cabinets? 12. Will you pay for the garage storage service?

The in-depth interview results indicate that interviewees paid no less attention to the garage than the indoor space. Specific interview results can be concluded as follows:

Before use: over half of the interviewees preferred to drive cars to the garage and then go home. After finding the dedicated parking garage for parking, they could hardly find a proper facility to store temporary articles. High-end users have expectation for garage services and hope to have dedicated garage storage facilities.

During use: high-end users' goals for garage storage focus on convenience, practicability and temporary storage. As shown in Fig. 3, the primary requirement of over half of the interviewees (51%) for the storage cabinet functions is that they must be convenient and practical. 37% of interviewees took temporary storage as the key for their use of garage storage facilities. Only 12% of interviewees paid more attention to saving of time. Diversified articles need to be stored: as required by interviewees, sports articles, vehicle-mounted articles and

cleaning supplies accounted for 1/3 or so respectively, namely 34%, 34% and 32%.

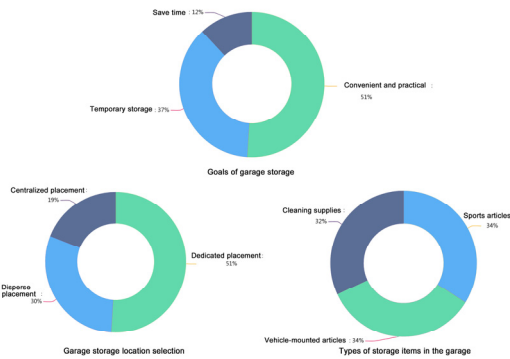


Fig. 3. Summary of In-depth Interview Data

After use: As for site selection, high-end users expressed to different appeals. 51% of the interviewees believed that conditional dedicated placement more conformed to the garage features and deemed this mode to be convenient and feasible; 30% deemed disperse placement to be more rational; and only 19% deemed centralized placement to be more suitable for themselves.

As indicated clearly in the in-depth interview, high-end users had high expectations for garage storage services in all the sages. Before use, interviewees expected to enjoy garage storage services with sense of exclusiveness as they deemed it to be a symbol of their identity. During use, high-end users paid most attention to convenience in use and satisfaction of storage demands. In addition, high-end users showed personalized demands in storage functions. After use, users expected to enjoy storage services inside the garage, so that they could go home quickly after completing the storage.

3.3 User Travelling Graph

Organization of a visualized user travelling graph aiming at each travelling stage can help the researcher more deeply understand and master users' emotions and feelings and better

master the user demands. The user travelling graph can be divided into 3 stages: before, during and after use. It can be found from the visualized user travelling graph in Fig. 4 that the role had unpleasing experiences throughout the course.

Before use, the user went home with calm emotions. The user felt excited while finding that the Oak Bay provided a garage storage service. After parking car, the user had expectation for article storage. There is a certain distance between his garage and the centralizing area of storage cabinets. The user gradually felt tired. There were a lot of cabinets in the centralized storage cabinet area, so he spent some time before finding his own cabinet. The user started feeling a little irritated.

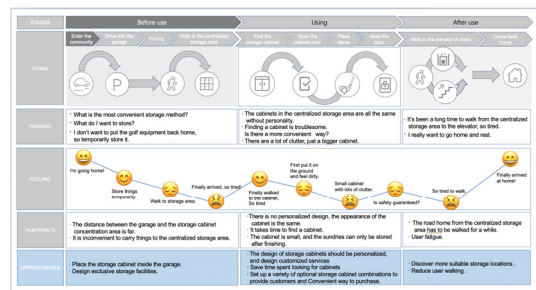


Fig. 4. User Travelling Graph

During use of the article storage service, he had to put the newly bought golf club and other equipment on the ground and took a key from the bag to open the storage cabinet. The user had to open the storage cabinet and store the equipment as soon as possible during the limited time. The user started feeling anxious, thought his privacy for storage could not be secured during article storage, and worried about after-sales services.

After use, the user was prepared to leave the storage area, finding that he still needed to walk for a time before reaching the elevator or stairs. Finally, he could reach home. The user already felt very tired during this course.

3.4 Compared with existing services

The storage service currently used is set up in a public area, which is inconvenient to use. The standardized storage box not only restricts the storage space of users, but also cannot meet the individual needs of users, which has strong limitations. The new system is positioned in the personal garage, which can be customized according to the garage space, and also protects the privacy of the user's storage. At the same time, the brand-new service system encourages users to purchase offline experiences online. The brand-new system is more complete and guarantees the service before, during and after the sale to promote sustainable development.

3.5 New Garage Storage System

The Oak Bay high-end community combines online and offline modes for garage storage services, so as to improve users' experience in parking and article storage and establish an interactive service model of the high-end community storage system for the sustainable development of storage services. The modeling is conducted from four perspectives, including user, space, enterprise and manufacture. In terms of users: users are centered, and their information, storage demands and storage behavioral habits are collected. In terms of space: classification and integration are conducted based on spatial size, form and resource of the garages. In terms of enterprise: the feedback of users is collected and sorted and then design proposals are adjusted based on in-depth survey, sample visiting and creativity R&D of the enterprise. In terms of manufacture: factory sample drawing, manufacture and processing. Fig. 5 displays that, during the interactive service process, user information feeds back the data collected and analyzed by the enterprise, and the enterprise provides users with customized proposals satisfying the garage

space; the garage space provides site support for the enterprise's storage services, and the enterprise provides feasible construction proposals for the space; and the enterprise provides a design proposal to the factory, and the factory implements and completes processing based on the design proposal. Parallel interactive services are based on the four perspectives of user, space, enterprise and manufacture. It is a fundamental closed cycle of four execution steps: demand, research, resource and implementation. Parallel interactive relations support and promote each other, so as to provide integral garage storage services for users.

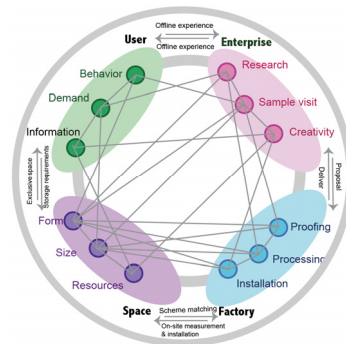


Fig. 5. Service Model of Garage Storage System

Taking the garage storage system of China Resources Oak Bay as a case, the system is established by centering on the garage storage space of each user. Based on analysis, a personalized garage storage proposal is customized for each user, so as to guide and improve actual storage situations. The best storage service effects can be reached only through customization of a scientific storage proposal based on differences in each garage space and combination of users' personal favors. Accurate storage service in high-end communities can fit users' personal storage information precisely and realize storage personalization through measurement of the garage space and users' personalized expression,

so that the spatial use efficiency can be increased, and the best storage service effect can be reached.

4. Use of Service system

4.1 Ensure the privacy of storage space

Aiming at the problem that the existing services lack guarantee with independent space, the original uniform storage form in the centralized area outside the garage is changed to the personalized setting and placement inside each garage.



Fig. 6. Change of garage service location

So that storage space, storage modes and storage processes are changed, and privacy in garage storage is guaranteed fundamentally. As shown in Fig. 6, the storage space is transformed from the original external space to the space inside the garage, meaning the transformation of the storage from public space to independent space; the storage process is changed from the complicated path of walking to the centralized area for storage after parking to a convenient path of completely storage immediately after parking, which is the transformation of the storage process from “time-effort wasting” to “time-effort saving”; and the storage mode is changed from the original open storage to private storage, meaning the transformation of user experience from usability to practicability. Of course, from the perspective of enterprises, such transformation of the service

site from the centralized area to each garage makes the service provision more difficult as the original centralized storage service is more convenient for enterprise management; however, from the perspective of users, setting of the independent space really guarantees privacy of storage services and greatly improves exclusive experience of users.

4.2 Created customized services

Aiming at the current lack of customized storage service, it is necessary to set a customized process for garage storage services, take definition of clients’ garage space and storage demands as the starting point, focus on providing clients with customized garage storage services and realize tracking and guaranteeing of services before, during and after service provision of the customized storage services from the very beginning. Service process is one of the core contents of service design[12]. It is mainly characterized by depending on and interacting with users and it must highlight user interactions and service contact points[13]. As shown in the Fig. 7, visiting measurement is conducted according to clients’ demands; three different garage storage proposals, including universal products, partial customization and in-depth customization, can be selected according to personal preference and garage space; payment is made after the client reviews the proposal for customized storage services; and as for the contact point in the R&D and testing stage, after the testing report is checked by the client, he can sign the confirmation letter and then the order is placed for subsequent production, logistics transportation and installation. Contact points such as the proposal, testing report and client confirmation letter of the process provide guarantee for the user in different stages of customization.

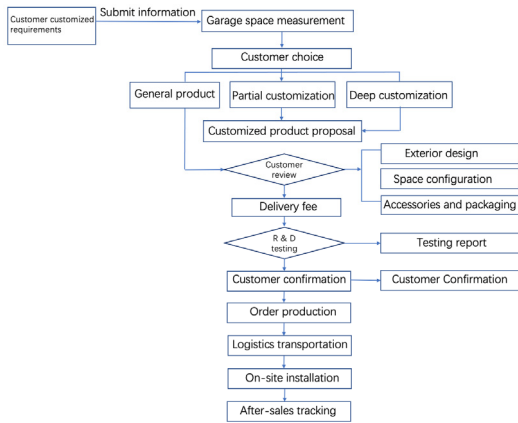


Fig. 7. Service Process of Garage Storage Customization

4.3 Expanded the scope of storage services

Service blueprint is a service process visualization technology which emphasizes user interactions and service contact points[14]. It is a method for demonstrating service processes based on steps and processes, which can easily determine service targets and involve activities and interactions conducted in different aspects as time goes[15]. By accurately positioning the high-end community garage storage services, broadening the garage storage service scope, and promoting integration of an online platform and offline experience of garage services, the service blueprint is used to rebuild the service process and organization form of garage storage services.

Based on the service timeline, service providers of the foreground, mid-ground and background, display tools, technical systems and other elements as well as hidden service elements are expressed during the service process. Through visualized manifestation of system service relations in service provision, cooperation and integration of foreground, mid-ground and background inside and outside the enterprise are systemized. Time sequence, logic sequence and behavior processes are expressed. Through optimization of the garage service system, the design of service contact points will be further normalized, and the

innovative design ideas of garage services of the Oak Bay can be embodied.

Specifically, online services are added based on original ones, and a service mode integrating offline physical visiting purchase and online purchase is established. Fig. 8 displays online-offline interactive experience which expands the sales channels, improves user experience and further promotes innovation and development of the storage system. From the perspective of users, they can use a parallel path to select storage cabinets, know about the service via the online platform at first and also directly experience the offline services such as storage cabinet purchase; and from the perspective of enterprises, foreground, mid-ground and background staffs have clear labor division, so that linkage services are more efficient. Original services are preserved, and new services are added to support the offline services. Online services can provide data support for offline services and provide selected product indices for storage cabinet update; and offline services can provide users with better use experience and a real sense of space. In this way, iteration and upgrade of relevant services of garage storage cabinets in high-end communities can be realized.

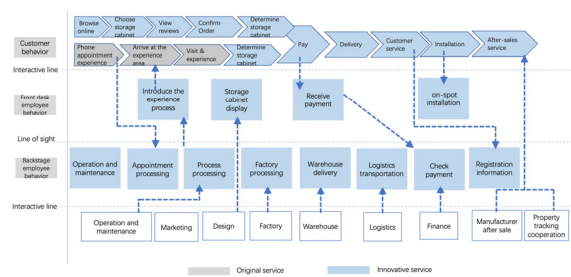


Fig. 8. Service Blueprint of Garage Storage Cabinets

4.4 Effectiveness Analysis

Through the upgrade of storage service, the interaction between users and enterprises is increased, and the user experience is greatly

improved. The results show that storage service does improve user satisfaction[16]. In the use of high-end community garage storage system interactive service model of new services.

The privacy of storage space, customized service, online service, online purchase and offline service are realized after using the new service of interactive service model for garage storage system in high-end community. After the demonstration of the paper model, the questionnaire is used to carry out the survey again. The advantage of using the in-subject design is that the influence of the variables on the experimental results can be controlled effectively. The 50 interviewees are all sample visitors, aged from 18 to 60, 25 males and 25 females. A total of 50 questionnaires are distributed, and all are recovered and valid. During user evaluation, standards are formulated: the service system is used to verify the service from the perspective of security, ease of use and service efficiency, and the options are set as very satisfied, satisfied, average, dissatisfied and not satisfied at all.

The survey contents include privacy of storage space, customized service, adding online service, adding online purchase and offline service, and interactive effect. These surveys show that all the respondents are satisfied with the optimized storage service. 90% of the respondents are very satisfied with the privacy protection service of storage space, 10% are basically satisfied, and 0% are not satisfied; 92% of customized services are very satisfied, 6% are basically satisfied, 2% are not satisfied, 85% of the people who add online purchase and offline services are very satisfied, 15% are basically satisfied, 0% are not satisfied, 30% of them are very satisfied with the interactive effect, 64% are basically satisfied, 6% are not satisfied, which shows that these are ideal results. Therefore, my research proves the validity of the service model.

5. Conclusion

This research solves the problem of garage storage service, and contributes to the practice and basic theory of storage service. In the context of the rise of the middle class, enterprises are urged to seek more detailed garage storage services. This study takes Oak Bay as an example, and develops a new service model from the perspective of service design, so as to maximize the interests of service stakeholders and rationalize the service process. In order to find a breakthrough in user needs, the questionnaire is used to conduct in-depth survey. On the whole, the system ensures the privacy of space, expands the storage customized service content, builds the basic theoretical model of community storage service, and realizes the integrated experience of online purchase and offline experience. All of these expand the research field of garage storage to a certain extent, and enrich the research content and theoretical basis of garage storage. The practical significance of this research is that Oak Bay garage storage service system can be directly used to guide the specific practice, provide reference for other enterprises to integrate the existing garage space resources and form their own service system, at the same time, it has important practical significance for the service field.

Through the use of this research results, the establishment of their own garage storage service platform is expected to establish a sound and continuous cooperative service system for all stakeholders, and improve the overall service effect. The practical significance of this study is that the Oak Bay garage storage service system can be directly used to guide the specific practice. From the micro perspective, on the one hand, China resources can directly copy the Oak Bay project of other city companies to complete the landing, updating and iteration of the garage

storage service system; on the other hand, it also provides more specific practical reference for other real estate enterprises in integrating the existing garage space resources and forming their own garage storage service system, which greatly improves the practical efficiency and the operability of practice. From a macro point of view, it has important practical significance for the whole community service research field to realize the sustainable development of storage services. In addition, it is expected that in the future research, the storage service system can be combined with artificial intelligence to help designers deal with more complex and detailed garage storage design tasks.

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