

Research on Product Service Design of Intelligent Refrigeration Display Cabinet

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Abstract: This paper analyzes the contact points used in the refrigerated display cabinet of small supermarket, so as to find out the opportunity points to design products that meet the needs of users and businesses, and analyzes and studies the contact points in the user's journey diagram and the pain points in the use process, so as to find out the design points. Conclusion in this small supermarket shopping environment space area is lesser, fast and efficient as possible to complete the shopping or finishing goods is the user's requirements, through the analysis and study of user journey map to find the chance of product innovation design points, the existing refrigerated display cabinet in product innovation design to better meet the needs of users.

Keywords: Service design; User journey; Innovative design

1. Introduction

Service design starts from the perspective of service, gives overall consideration to the interests of all parties, analyzes and studies the whole system, and proposes comprehensive solutions. Product and service design is not pure product design, it combines product innovation design and service design, that is, an innovative product is designed through "tangible product" and "intangible service". For the environment of shopping supermarket, good design needs to start from the perspective of serving users, conform to user operation habits, save shopping time and improve shopping efficiency.

2. Service Design

Service design as early as 1991 the design of the management work of complete design has been put forward Bill Hollins couple, in the book of service design and traditional design are discussed in detail: the difference between a service design is not only to the design of the product itself, or use of product design at the same time, even to the design of products in use process using vision [1]. It can be seen that service design is not only a single product design but more of a systematic solution [2]. As a new design thinking method, service design has significant advantages in analyzing and dealing with complex problems. It is the biggest advantage of service design to decompose problems one by one and take into account the overall situation [3]. It is a new design paradigm that develops and integrates product, environment, information and other design ideas [4].

Due to the lack of material and production levels and a series of economic reasons, the lagging behind of products and services in order to solve the basic survival needs of the people is given priority to, so during the period of the industrial age, the design is mainly designed

for a single product, even stay available to the requirement of product, the level of use, rarely considering the beautiful sex, ease of use and experience the emotional needs of the people; With the development of economy, people's living standards have been gradually improved, consumers' requirements on services have become more and more strict, and the concept of service design has been paid more and more attention.

3. Product and Service Design

Product and service design refers to product or service design aimed at improving user experience from the perspective of stakeholders (customers, service providers, etc.). Its key points are: "user-first + experience process analysis + analysis of all contact points + product and service design" [5]. Therefore, product and service design can be considered as the combination of tangible products and intangible services [6]. In product and service design, it is necessary to pay attention to the tangible products centered on users, as well as the intangible service design of stakeholders, environment, materials, processes and the whole system. Both are the objects that need to be studied and designed in product and service design. The essence of product and service design is the experience exchange and global design method. Good product and service design realizes the communication between individuals on the basis of sufficient user experience, so as to guide new behavior and lifestyle [7].

4. Research on Product and Service Design of Intelligent Refrigerated Display Cabinet

This paper takes smart refrigerated display cabinet of small supermarket as an example for product service design, and analyzes the touch points, pain points and opportunity points of stakeholders in the process of prod-

uct use through user journey diagram. Refrigerated display cabinets are widely used in supermarkets or retail stores to display and sell food and other commodities [8]. In most cases, refrigerated display cabinets are used to display and sell drinks, yogurt and other liquids that need to be stored in low temperature. Refrigerated display cabinets are divided into single-door display cabinets, double-door display cabinets and three-door display cabinets. This paper takes single-door display cabinets as an example to conduct product and service design analysis and research. Because in small supermarkets and retail stores, due to the limited area of supermarkets, single-door refrigerated display cabinets are often used to save space.

4.1. User journey diagram analysis

User journey map is a tool to carry out design activities through brainstorming and co-creation [9]. It is a common method in product and service design method, which is used to show the user's experience in the process of using the product. Through the user journey diagram, the goal, efficiency and satisfaction of each "contact point" can be defined. Some "touch points" with poor consumer experience may be opportunities for improvement or redefinition [7]. Although the process of purchasing goods in the refrigerated display cabinet in the supermarket is relatively simple, some details, big and small, can be found through the analysis of each contact in the purchase process, understand the user-centered demand, and interpret the pain points of users. The user journey analysis of using the refrigerated display cabinet is shown in table 1 below.

Table 1. User journey chart of refrigerated display cabinets

Phase	Before the service		In the service		After the service	
User groups	The seller	The buyer	The seller	The buyer	The seller	The buyer
User goals	The refrigerator is expected to provide as many goods as possible	Walk into the supermarket and look for a cooler	Get buyers to buy as quickly and as often as possible	Open the refrigerator and take the goods you want directly	Try your best to provide good service to the buyer and hope to come again	Close the door and check out
Possible user behavior	1. Clean the freezer 2. Organize your freezer 3. Increase or replace the quantity or type of goods for the refrigerator	1. Look for freezers near the supermarket checkout counter 2. Ask the service staff about the location of the refrigerator 3. Ask the server if they have anything they want	To already sold refrigerated cabinet commodity undertakes putting again, facilitate a customer to take	1. Open the cabinet door and get the goods directly 2. Open the cabinet door and search for the goods you want 3. Open the cabinet door and find that there is no desired goods, close the cabinet door and open another refrigerated display cabinet	1. Display various payment apps 2.Wait for the customer to leave 3. Clean and arrange the refrigerator (increase or change the quantity or type of goods)	1.Close the door and go to the counter 2. After opening the cabinet door, I found that there was no goods I wanted, so I left directly
Pain points analysis	Refrigerated cabinet between the layer are used to pull, every time cleaning or increase or decrease the goods need to take out the most inside goods, so very troublesome	There is no marked refrigerator	When placing the goods, move the goods inside to the nearest place from the customer for the convenience of the customer	After opening the cabinet door, there may be more kinds of goods on every other floor. The goods needed by customers may be in the innermost part. At this time, they need to take out the goods they want	Counter checkout, crowded in the entrance, affecting customers to enter; Refrigerated cabinet between the layer are used to pull, every time cleaning or increase or decrease the goods need to take out the most inside goods, so very troublesome	Counter waiting for payment of more personnel, extended the payment time

4.1.1. Contact analysis during shopping behavior

Physical contact, through a user journey figure analysis shows that when buying goods need to be refrigerated, refrigerated display cabinet is the buyer and the seller to use the most physical contact, and the existing refrigerator smoked pull the layered design directly affects the service efficiency, for the buyer: if the buyer wants to buy the goods inside, need to the commodity outside move; Another example is when the buyer wants to see

whether the innermost commodity is the target he wants, he has to move the outer commodity away, but when he moves away, he finds that it is not the product he wants, which will affect the buyer's mood. For the seller: in order to sell more goods and increase the turnover, the seller needs to clean and arrange the goods in the refrigerated display cabinet in real time, and the frequency of use of the refrigerated display cabinet will be greatly increased. When cleaning up the push-pull refrigerated display cabinet, the seller has to take out all the goods to

clean up; When adding or changing items, you have to remove the items.

Visual contact: the existing refrigerated display cabinet for advertising posters, for the display of the contents of the interior of the cabinet without any instructions, users in the use of the refrigerator, may be unable to see the goods inside and open the cabinet door for many times, so as to lead to low shopping efficiency.

Payment contact: the existing payment methods are generally mobile phone APP payment and cash payment. All the payment staff gather at the cashier's desk, which leads to a large number of people waiting for payment at the counter and prolongs the payment time, which makes the insufficient space become more crowded.

4.2. Intelligent refrigerated display cabinet design

Tangible contact design: the existing refrigerated display cabinet is layered in the way of pulling, for users, want to take the most inside goods is very difficult, through the innovative design of the partition layer -- using the rotary way, only need to rotate the partition layer to take the desired goods. This greatly saves time and improves efficiency.

Visual contact design: intelligent interactive products connect products with the Internet of things for information exchange and communication, and then realize intelligent identification, monitoring and management through the process of product work feedback [10]. With the development of electronic information technology, intelligent interactive products have gradually become the mainstream direction of products. Intelligent refrigerated display cabinet can present commodity information through electronic screen display, so that users do not need to open the cabinet door to look for the desired target commodities, thus saving time.

Payment contact design: the price information of the goods can be known through the electronic screen, so that the buyers can pay the goods without going to the cashier.

5. Conclusion

Service is an eternal topic, the essence of service is to provide users with a good experience; Product and service design not only considers a single product, but also integrates various factors: environment, process, touch point, pain point, etc. Intelligent innovation of refrigerated display cabinet design in order to realize the main functions of the product as the basic starting point, under the premise of considering the product experience, according to different users (buyers and sellers), optimization of product design service blueprint, makes the users in the use process more simple and easy to implement, can effectively raise the use efficiency of products.

References

- [1] Xu Xiaoli. Research on maker office space design based on service design concept. *Packaging Engineering*. 2017, 38(14), 214-218.
- [2] Ding Xiong. Public product and service system design in scenic areas under the background of wisdom tourism. *Packaging Engineering*. 2016, 37(12), 149-154.
- [3] Polaiie L. *Service design: from insight to implementation*. Beijing: Tsinghua University Press. 2015.
- [4] Wang Guosheng. *Service design and innovation*. Beijing: China Construction Industry Press. 2015.
- [5] Tukker A., Tischner U. Product services as a research field: past, present and future, reflections from a decade of research. *Journal of Cleaner Production*. 2006, 17(14), 1552-1556.
- [6] Behrend S., Jasch C., Kortmap J. *Eco service development: reinventing supply and demand in the European Union*. UK: Greenleaf Publishing. 2003.
- [7] Yu Le, Li binbin. Research on product service design from a sustainable perspective. *Packaging Engineering*. 2011, 32(20), 73-76.
- [8] Di Qianqian, Wang Yahui, Liu Bin, Sun Xiaofeng, Guan Wenqiang. Effect of heat preservation cover on temperature distribution in refrigerated display cabinet. *Fluid Machinery*. 2017, 45(06), 61-65+86.
- [9] Chen Jiajia. *Service design -- definition*. language.tools. Jiangsu Phoenix Fine Arts Publishing House. 2016.
- [10] Zhao Shulin, Yin Xiaochen. Service design optimization of intelligent ticket system for rail transit. *Journal of Wuhan University of Technology*. 2015, 37(10), 67-72.