

Digital Transformation of a Family-Owned Clothing Store: Designing and Developing a Digital Wardrobe Solution

Rui Xia

Beijing 21st Century International School

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ABSTRACT

After the epidemic, the global economy suffered significantly, leading to recession and reduced consumer demand. Moreover, because of the strict regulations on offline activities during the pandemic, online shopping platforms have advanced tremendously, which creates unparalleled competitive pressure for the real economy on aspects such as pricing, operational costs, and demand distribution. Using a family-owned clothing store in Beijing as a case study, this research combines interviews with store owners and a questionnaire survey of 153 consumers to examine current industry challenges, consumers' demands, and the pros and cons of both online and offline shopping modes. The results show that although e-commerce platforms provide greater convenience and product variety, consumers continue to experience significant product fit uncertainty. Meanwhile, physical stores can provide opportunities for consumers to try on clothes, to determine whether they are suitable for specific occasions, and to directly feel the fabric.

Based on these findings, the store can build on its existing advantages through digital channels, instead of replacing them. This report therefore proposes a low-cost digital wardrobe that digitalizes store owners' tacit knowledge into standardized customer profiles, including their sizes, style preferences, and purchase history, and uses this information for personalized recommendations. From the data collected from the survey, many consumers were interested in having their preferences and past purchases remembered, while privacy was the main concern. The proposed system is intended to bring some of the store's personalized service to digital channels and encourage customers to return, while keeping the system practical and protecting customer data. The next stage of the project will use AI and programming to develop the digital wardrobe, followed by a pilot test to evaluate customer responses and changes in store operations.

1. Introduction

1.1 About the store and its owner

According to the interview, Mr. and Mrs. Xia first entered the clothing industry in the 1990s, learning under their elders. In the early stages of their business, they mainly operated through market stalls in the Yabaolu foreign trade market and conducted trade with Russian merchants. As their business experience grew, the Xia couple entered the clothing wholesale industry in the 2000s and operated a store in the wholesale market for 17 years until the market closed. At the peak of their business development, the annual profit could reach 3.5 million yuan. The operating conditions during this period indicated that the traditional physical clothing retail model had strong profitability and customer appeal at that time.

After Mr. and Mrs. Xia left the wholesale market, they established their own brand and started to operate a physical clothing store located in Haidian District, Beijing, which was chosen as the case study object. It has been in operation for nearly 10 years since its establishment in 2018.

The store offers a wide range of products, including men's and women's clothing. It is a typical family-run physical clothing retail enterprise.

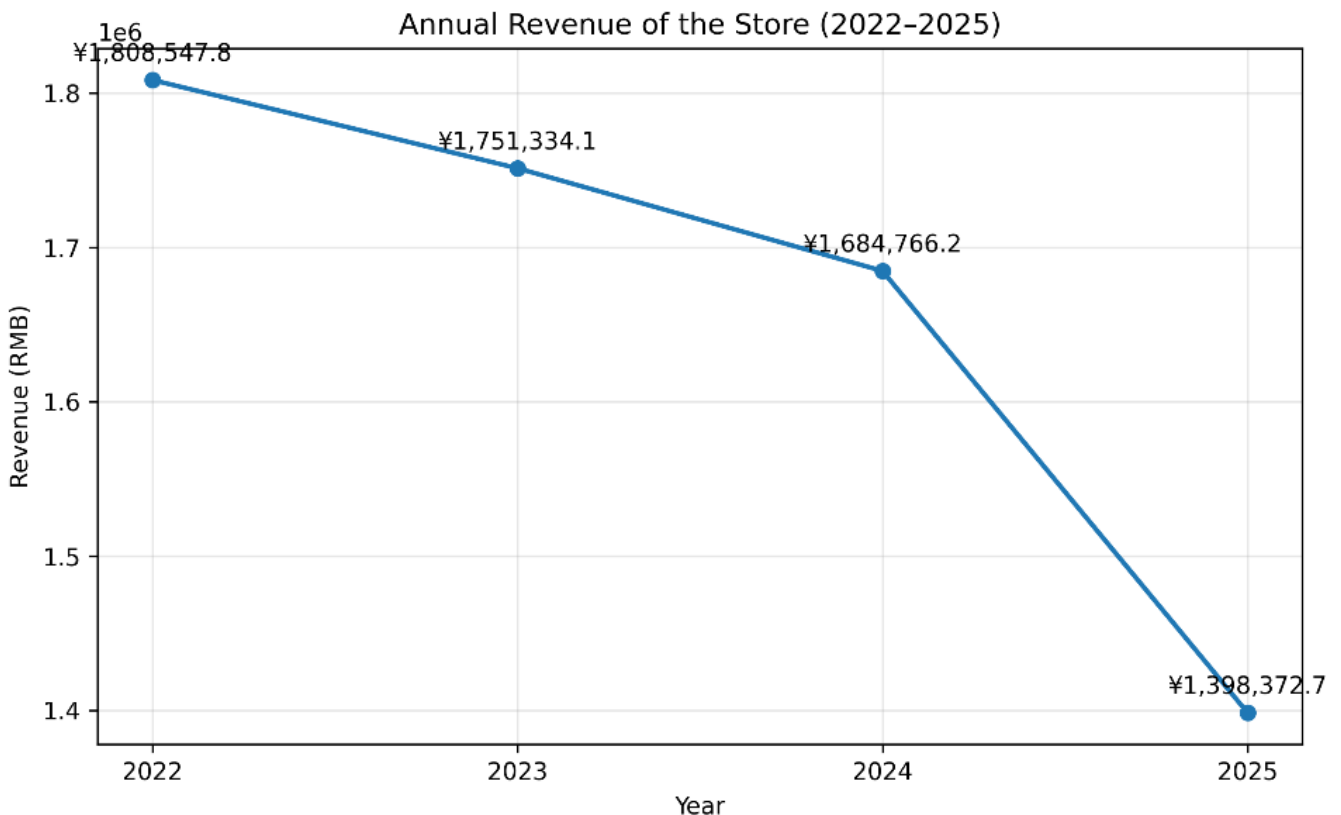
Currently, the target consumers of the store are mainly middle-aged women with higher incomes, and sales and customer retention are mainly achieved through referrals from regular customers. The data collected from the survey shows that more than half of the consumers have already purchased from the store for more than 3 years.

Unlike large chain clothing brands and e-commerce platforms, this store does not rely on a standardized operational system. Instead, it has long relied on the owner's own experience, familiarity with customers, and professional suggestions to maintain its popularity. Therefore, this store has strong family operation characteristics and provides a useful case for studying how a small, family-owned physical retailer can preserve its existing customer knowledge while adapting to an increasingly digital shopping environment.

1.2 Current Business Performance and the Emerging Problem

From 2022 to 2025, the store's revenue showed a downward trend, declining from 1.8085 million yuan in 2022 to 1.3984 million yuan in 2025, a cumulative decrease of approximately 22.68%. The decline was relatively moderate between 2022 and 2024, with year-on-year drops of 3.16% and 3.80%, respectively. However, in 2025, the revenue fell by 17.00% compared to the previous year, which could not be fully explained by the impact of COVID-19, especially considering that the government in China had relatively weak control over offline activities in 2025 compared to

previous years. Thus, the pandemic may just have been an initial shock in this shift. The restrictions on offline activities directly affected foot traffic and shopping frequency at physical clothing stores, while also accelerating consumers' adoption of digital channels such as e-commerce and live-streaming shopping.



Based on interview and questionnaire findings from this study, a more plausible explanation is that the pandemic accelerated the evolution of consumer shopping habits toward digital channels. For the case store, its original core competencies such as product selection and long-term customer relationships still exist, but these tacit knowledge assets are highly dependent on the individual store owner and have not yet been digitized or scaled. The emerging problem, therefore, is not simply declining demand for physical clothing stores, but the growing disconnect between the store's existing capabilities and an increasingly digital shopping environment.

1.3 External Market Environment: Why the Problem Has Emerged

A successful physical clothing shop builds its good reputation by strongly relying on product selection judgment, reliable after-sales service, and familiarity with customers' preferences.

Except for product quality or the store's location, one of its main strengths is the practical ability to reduce customers' selection risks. However, this ability is currently tied closely to the personal experience of the store owner, making it difficult to transfer to other employees or extend to online services.

This gives the store a possible direction for digital transformation. Rather than attempting to reproduce the entire physical shopping experience online, the store could first identify which parts of its existing service are most valuable to customers and consider whether these capabilities can be used through digital channels.

One potential advantage of physical stores is their ability to reduce the product fit uncertainty that frequently appears in online marketsⁱ. This uncertainty refers to the phenomenon that consumers find it difficult to determine whether the attributes of a product match their personal preferences, and therefore feel unsatisfied with the product or choose to return the product. Although online platforms contain more available information, a past experiment published in *Cognitive Research: Principles and Implications* shows that additional information can actually lead to worse decision-makingⁱⁱ. Physical stores, however, can reduce these uncertainties through conversations, observations, and fittings.

Nevertheless, the advancement in online platforms has brought unparalleled competitive pressure to physical stores compared to past decades.

By December 2024, China had 1,108 million Internet users, an increase of 16.08 million compared to last year. Internet penetration reached 78.6%, up by 1.1 percentage pointⁱⁱⁱ, and the number of online payment users in China had surpassed 1 billion, while 974 million Chinese people had engaged in online shopping, an increase of 59.5 million people from the end of 2023^{iv}.

In 2024, the national online retail sales reached 15.52 trillion yuan, and the proportion of physical goods online retail sales in the total social consumer goods retail sales continued to increase^v.

The emergence of large online platforms such as TikTok has transformed shopping into a type of entertainment and immediate interaction. However, well-presented clothing on live shows may not be suitable for daily use. Lighting, filters, and the movements of the models can all lead to illusions. It is the discrepancies between the real objects and the online reference pictures that have led to the uncertainty mentioned above.

Table 1. Challenges faced by physical clothing stores

Structural Challenges	Market Manifestations	Implications for Physical Clothing Stores
Platform Economy Disruption	Consumers increasingly rely on e-commerce platforms, livestream shopping, and algorithm-driven recommendations, leading to a continuous decline in offline foot traffic.	Declining customer loyalty, greater difficulty attracting new customers, and erosion of the competitive advantage offered by in-store shopping experiences.
Rising Operating Costs	Commercial rents, labor costs, and operating expenses continue to increase, significantly compressing profit margins for small retailers.	Even when sales volume is maintained, profitability remains lower than online stores.
Price Competition and Consumption Downgrading	Aggressive price promotions and high market price transparency encourage consumers to prioritize price over long-term product value.	Lower average transaction values and continuously shrinking profit margins.
Information Asymmetry and Market Disorder	Misleading advertising, counterfeit or substandard products, deceptive livestream marketing, and high product return rates are widespread across the market.	Consumer trust in online shopping declines, yet physical stores are still forced to compete primarily on price.
Weak Intellectual Property (IP) Protection	Best-selling products are rapidly copied, original designs are easily imitated, and brand equity becomes difficult to accumulate.	Small and medium-sized retailers are increasingly inclined to sell homogeneous products rather than invest in building distinctive brands.
Transformation of Consumer Trust	Consumers increasingly place their trust in sales volume, online reviews, livestream hosts, and algorithmic recommendations rather than in individual retailers.	The competitive advantage built on long-term customer relationships and loyalty is gradually diminishing.
Limited Digitalization of Tacit Knowledge	Small retailers rely heavily on owners' tacit knowledge and experience, while lacking standardized management systems and digital capabilities.	Years of accumulated expertise in product selection, styling recommendations, and customer profiling are difficult to codify, transfer, or scale.

(Source: Compiled by the author based on thematic analysis of semi-structured interviews with family-owned clothing store owners (2026).)

The changes in the industry create a paradox: there are more choices for consumers, prices are more transparent, and access to information is more convenient, but the selection process has

become more complex. Inconsistent sizes, uneven product qualities, excessive promotions, and return and exchange costs have made consumers undertake new judgmental efforts. Physical stores have lost their monopoly on information access, yet they still have the opportunity to differentiate themselves in terms of reliability and reducing product fit uncertainty. But if the store still possesses valuable knowledge and service capabilities that online platforms cannot fully reproduce, why are these advantages not being effectively converted into sustained customer engagement and revenue?

Answering this question requires looking at the consumers the store has traditionally served, particularly middle-aged women. For these customers, clothing choices involve more than appearance; fit, comfort, fabric quality, and how clothing fits their personal and social lives also matter. The study therefore looks at what these consumers struggle with when shopping online and what they continue to value about physical stores. These findings help show which parts of the store's existing service could be carried into a digital setting.

2. The demand of middle-aged female consumers

The target users of the system are middle-aged women because they are simply the main consumers of the physical stores involved in the study. More importantly, during middle age, people may experience physical changes, adjustments in their professional roles, increased family responsibilities, and diversification of social scenarios. Consumers need to strike a more complex balance among comfort, dignity, age identity, budget, and self-expression compared to younger groups. Past research by a scholar from the University of Kent found that clothing is not only a means of covering the body, but also an important way for people to express their age, identity, and construct their self-identity. The article points out that an individual's clothing choice is influenced by both the changes in the body with age and the social norms regarding clothing for different age groups^{vi}. Therefore, middle-aged women will have a more prominent demand for choosing suitable clothes, especially under a social trend that overemphasizes a youthful image that restricts the clothing choices of women.

Although online platforms have expanded the range of available products, they are still influenced by the age norms of the fashion industry, standardized body models, and algorithmic recommendation mechanisms, making it difficult to fully meet the diverse needs of different age, body, and identity groups. Therefore, the problems faced by consumers are not merely "not being able to buy clothes", but "having difficulty finding clothes that are suitable for one's own body and also conform to one's own identity and social expectations." This also raises the question of whether the store's current understanding of individual customers can be recorded and used beyond face-to-face interactions.

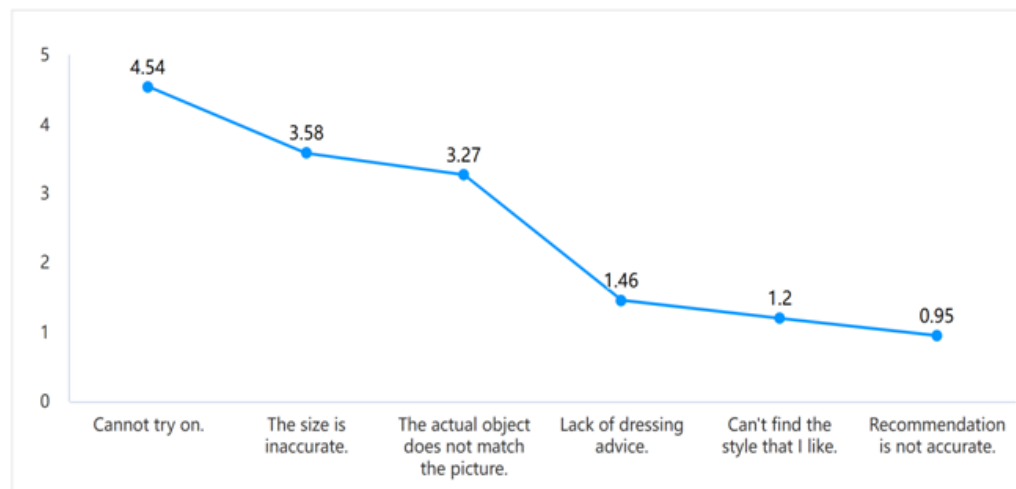
3. The Design of the digital wardrobe system and data analysis

3.1 Problems consumers face during online shopping

According to the survey, 61.44% of respondents have returned or exchanged items due to incorrect sizing, the highest proportion; 51.63% have experienced significant differences between the actual product and the images; and 50.33% found the fabric or craftsmanship to fall short of expectations. These three issues each exceed 50%, significantly higher than other options, indicating they are the core pain points in online clothing shopping. In contrast, only 30.07% of respondents rarely encounter problems, showing that most consumers have experienced at least one type of issue.



When asked about the biggest drawback of purchasing clothes online, respondents most frequently identified the inability to try on items, followed by inaccurate sizing and discrepancies between the actual product and the images. Based on the analysis of the comprehensive scores of the sorting questions, "Cannot Try-On" received the highest score (4.54 points), significantly higher than the other options, indicating that the lack of try-on experience is the most crucial concern for consumers. The next two items, "Incorrect Size" (3.58 points) and "Discrepancy between the Physical Item and the Picture" (3.27 points), constitute the main pain points of online clothing purchases. The specific ranking distribution shows that 69% of the respondents ranked "Cannot Try-On" first, 50.49% ranked "Incorrect Size" first, while the proportion of "Discrepancy between the Physical Item and the Picture" ranking first was only 14.29%, but it was concentrated in the second and third positions, indicating that its importance is also relatively high.



(This conclusion is derived from Q4: What do you think is the biggest drawback of purchasing clothes online?)

(Note: The average comprehensive score of the options in the sorting question is automatically calculated based on the ranking of all respondents for the options. It reflects the overall ranking of the options, and the higher the score, the higher the overall ranking. The calculation method is written below.

$$\text{Average comprehensive score of options} = \frac{(\sum \text{Frequency} \times \text{Weight}(\text{the chosen position}))}{\text{Total Valid responses}}$$

3.2 The advantages of physical stores

There is no obvious advantage.	4	2.61%
Easier after-sales communication.	47	30.72%
Be able to receive more professional product recommendations.	56	36.6%
Establishing a long-term trust relationship with the store staff will make your shopping experience more reassuring.	62	40.52%
The store staff can offer professional dressing advice.	74	48.37%
Can purchase and take away the goods immediately.	75	49.02%
Be able to directly experience the fabric and quality of the clothes.	124	81.05%
You can try them on, which makes it easier to find the clothes that suit you.	133	86.93%

(This conclusion is derived from Q5: What do you think is the greatest advantage of offline clothing stores compared to online shopping?)

Based on the data, "Being able to try on clothes makes it easier to find the ones that fit you" (86.93%) and "Being able to directly experience the fabric and quality" (81.05%) led the way, indicating that consumers value the unique sensory experience offered by physical stores. Hence, this result directly reveals how physical stores can help to address the product fit uncertainty problem. Second, "Being able to purchase and take the item away immediately" (49.02%) and "Having professional matching advice from the staff" (48.37%) also received nearly half of the support, reflecting immediacy and service value. However, "Establishing a long-term trust relationship" (40.52%) and "More professional recommendations" (36.6%) had lower selection rates, suggesting that trust and professional recommendations are not the core demands, which deviates from our expectation that consumers are attracted to a certain store based on trust. "Easier communication after purchase" (30.72%) ranked last, indicating that after-sales service is not the main advantage of offline stores. The most significant problems mentioned above can mostly be solved in physical stores, which reflects the unparalleled advantages of physical stores. If consumers continue to value personalized in-store service but increasingly use digital channels for convenience and information, the question becomes how the store can connect these two experiences.

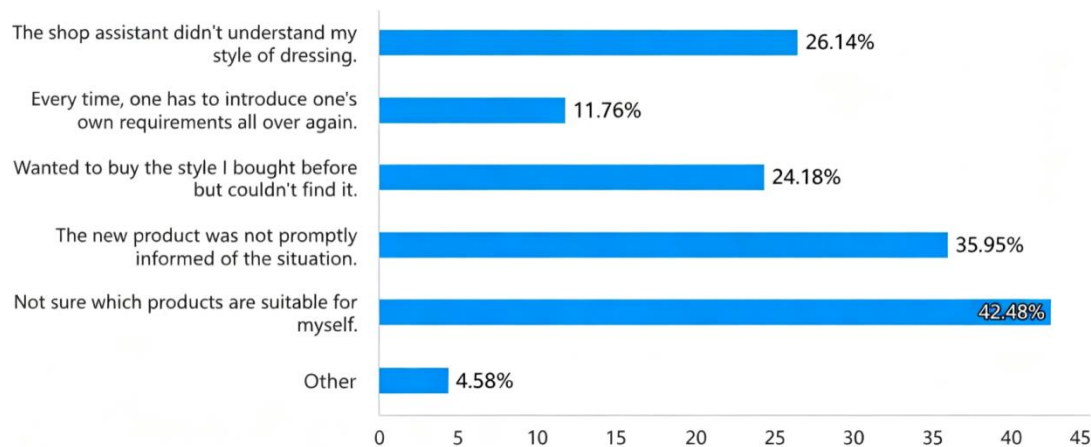
3.3 The expected demand for digital wardrobe system

- The most common problems that customers encounter during shopping are "uncertain which products are suitable for them" (42.48%) and "new products not being notified in time" (35.95%), which can be solved by establishing a personalized clothing style file.
- The vast majority of respondents believe that if stores could better understand their clothing preferences, it would significantly or to some extent enhance the shopping experience.
- The vast majority of respondents expressed a positive attitude towards the establishment of digital wardrobes in stores, with a support rate of 84.96%.

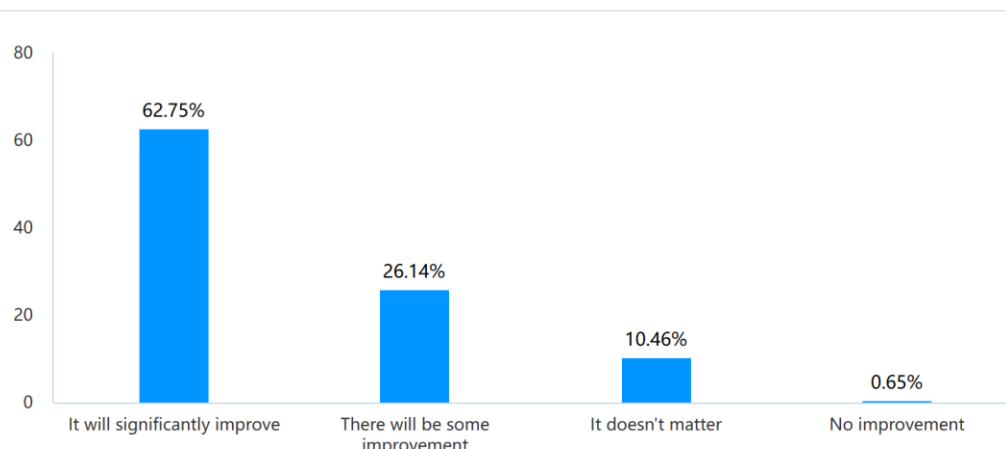
Among the 153 respondents, the multiple-choice results showed that 42.48% of the customers were unsure which products were suitable for them, which emphasizes the problem of product fit uncertainty again; next, 35.95% of the customers did not receive notifications about new products; 26.14% of the customers felt that the store staff did not understand their dressing style; 24.18% of the customers wanted to make a purchase but couldn't find the previous styles; 11.76% of the customers needed to be repeatedly informed of their needs; only 4.58% chose other situations. These data indicate that the main pain points for customers during the shopping process are the lack of personalized product recommendations and proactive information.

Moreover, the data show that 62.75% of the respondents chose "significantly improve", 26.14% chose "somewhat improve", and a combined total of 88.89% of the respondents held a positive

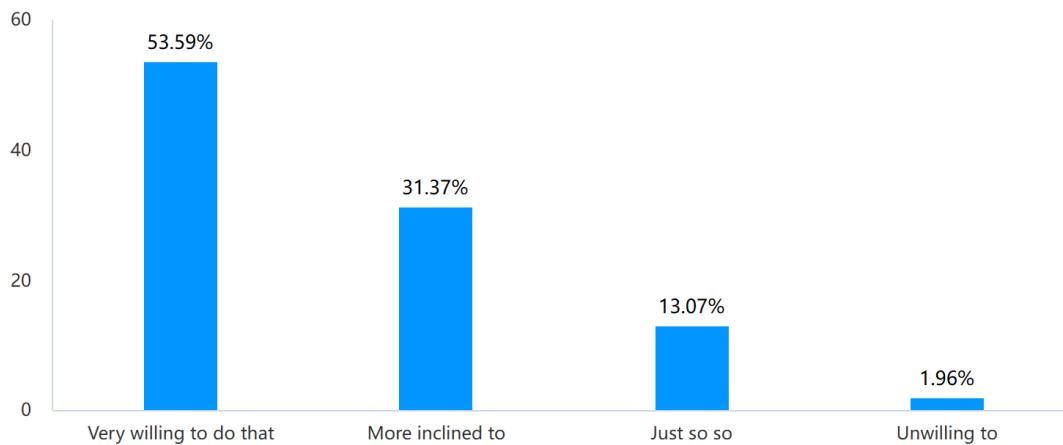
attitude; only 10.46% thought it was irrelevant, and 0.65% thought there was no improvement if the store could better understand their clothing preferences. This indicates that improving the ability of personalized recommendations is crucial for enhancing the customer experience. In addition, after combining "very willing" (53.59%) and "more inclined to" (31.37%), the proportion of positive intentions reached nearly 85%, while those who explicitly stated "unwilling" accounted for only 1.96%. This indicates a strong market demand for this service. Therefore, the design of the digital wardrobe system is not merely about acquiring advanced techniques but about an agglomeration of operational capabilities: In the past, store decisions relied heavily on the owner's experience, and the role of a digital wardrobe is to break down these hidden experiences into recordable and reviewable service actions, so that operations no longer depend entirely on an individual operator's memory or on-the-spot judgment.



(This conclusion is derived from Q7: What situations have you encountered during your shopping process?)



(This conclusion is derived from Q8: If the store could better understand your clothing preferences, do you think it would enhance the shopping experience?)



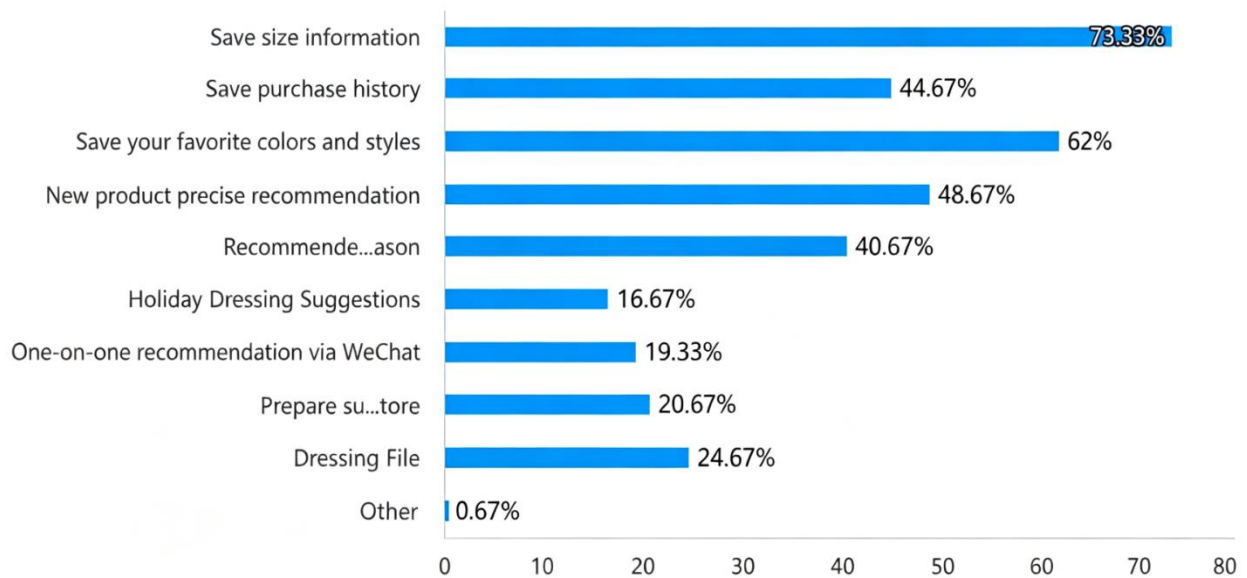
(This conclusion is derived from Q9: Would you like the store to set up your digital wardrobe for you?)

3.4 The functions of the digital wardrobe system

- What customers most hope the store remembers about them is their style preferences and basic physical information.
- The most anticipated basic functions for users are to save size information and personal style preferences; personalized recommendations and purchase history records are also important requirements, while personalized services such as holiday suggestions and one-on-one recommendations via WeChat have relatively lower demand.

According to the survey results, saving size information has the highest selection rate of 73.33% and has become the most core functional requirement. This reflects the strong demand of users for a convenient shopping experience, especially in terms of clothing fit. Saving preferences for color and style (62%) follows closely, indicating that personalized customization is an important value of the digital wardrobe. Precise new product recommendations (48.67%) and saving purchase history (44.67%) are also expected by nearly half of the users, indicating that the functions of intelligent recommendation and consumption records can enhance shopping efficiency. In contrast, seasonal matching suggestions (40.67%) and preparing suitable products before visiting the store (20.67%) have lower demand, while more specific services such as holiday dressing suggestions (16.67%) and one-on-one WeChat recommendations (19.33%) have lower demand. Therefore, when building a digital wardrobe, priority should be given to developing functions such as size storage, style preference setting, purchase record integration, and precise recommendations based on these data, to address the most concerning pain points of users. Subsequently, life scenario recommendations and one-on-one consultation services as

value-added modules can be gradually introduced.

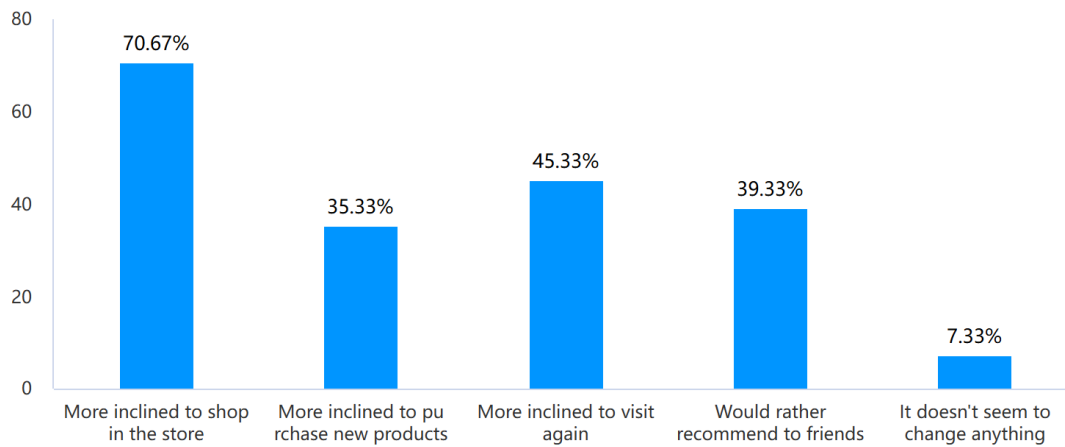


(This conclusion is derived from Q10: If you were to establish a digital wardrobe, what functions would you most desire to have?)

3.5 Expected potential effects and concerns

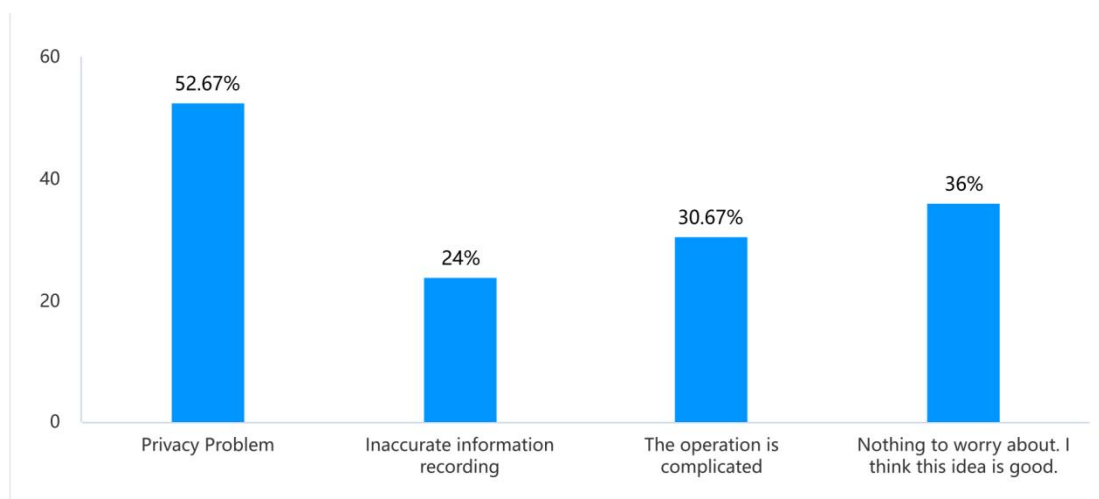
- Over 70% of the respondents prefer to shop in physical stores. Their willingness to make repeat purchases and recommend the store is significant. Only a few consider it to have no impact.
- The main concerns of users regarding the digital wardrobe are privacy issues. At the same time, the complexity of operation and inaccurate information recording have also raised concerns among some users. However, there are still many users who hold a positive attitude.

The option "More inclined to shop in the store" accounted for the highest proportion of 70.67%, indicating that the rapid matching function of the digital wardrobe can effectively stimulate the desire for offline shopping. "More inclined to visit again" (45.33%) and "Would rather recommend to friends" (39.33%) show that this function has a positive impact on enhancing loyalty and word-of-mouth promotion. "More inclined to purchase new products" (35.33%) indicates that there is still room for improvement in the conversion rate of new product purchases. Only 7.33% believe there will be no change, reflecting that this function is attractive to the vast majority of consumers.



(This conclusion is derived from Q12: If the digital wardrobe can help you find the items that suit you more quickly, do you think you would:)

Nevertheless, 52.67% of the users are concerned about privacy issues, which is much higher than other options and is the primary concern. The complexity of operation (30.67%) and inaccurate information recording (24%) also account for a certain proportion, indicating that user experience and data accuracy need to be focused on. At the same time, 36% of the users stated that they have no concerns and consider the idea to be good, suggesting that the digital wardrobe has a potential market. It is recommended to focus on strengthening privacy protection measures, simplifying the operation process, and improving the accuracy of information recognition to eliminate users' concerns and increase acceptance.



(This conclusion is derived from Q11: What are the main concerns you have regarding the digital wardrobe?)

4. Conclusion and pilot plan

4.1 Conclusion

After analyzing the results of the questionnaire, we can see that customers highly appreciate the unique advantages of in-store trial and fabric experience, while dissatisfaction with online shopping, such as the mismatch between body shape and the actual product, shows an area where physical stores can further develop their advantages. At the same time, customers' expectations for personalized services have become more specific, with clear preferences for functions such as recording size information and style preferences. These findings suggest that a digital wardrobe could help connect the store's understanding of customers with its digital services, particularly by helping customers find products that are more suitable for them. However, the high privacy concern of 52.67% indicates that digital construction must take customer data security and transparent usage as prerequisites. The proposed digital wardrobe will therefore need to be tested in practice to determine whether it can improve the shopping experience and contribute to repeat purchases and sales.

4.2 Pilot Plan

During the initial stage of the pilot project, the store will invite some long-term customers to voluntarily participate and establish a digital wardrobe profile for them. The profile mainly records the customer's basic physical information, color and style preferences for wearing, historical purchase records, as well as personalized notes summarized by the store owner based on their long-term service experience (such as customers' identities).

Considering the limited financial and technical capabilities of the family clothing store, it is unnecessary to develop an APP. Instead, Excel can be used to manage customer information to ensure that the plan has a lower implementation cost and strong replicability.

During the formal operation phase, when new products arrive at the store, the staff can quickly select suitable items for different customers based on the digital wardrobe records and send new product recommendations to target customers through existing social platforms such as WeChat, instead of using the traditional mass distribution method. When customers make an appointment or come to the store for shopping, the staff can prepare clothing combinations that match their needs in advance, enabling customers to quickly complete the fitting process, reducing the time spent by customers in choosing products and improving shopping efficiency.

After the pilot program concludes, the effectiveness of the scheme will be evaluated based on two dimensions: operational data and customer feedback. At the operational level, indicators such as repeat purchase rate, average transaction value, new product purchase rate, and

recommended product transaction rate will be compared before and after the implementation of the pilot program to assess whether the digital wardrobe can enhance sales conversion. At the service level, feedback will be collected through customer satisfaction questionnaires. The store needs to assess whether customers believe that the store better understands their clothing needs and provides accurate recommendations, and whether they are willing to continue using the digital wardrobe service in the future.

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