

Research on the Information Interaction Design of Special Agricultural Products Apps from the Perspective of Rural Revitalization

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Abstract: Driven by the Rural Revitalization Strategy, the promotion and sale of special agricultural products have become an important means to enhance the rural economy. With the development of mobile internet, e-commerce platforms based on mobile apps provide new channels for the sale of these products. However, market research reveals that many platforms for special agricultural products face issues related to poor user experience and low user engagement in their information interaction design. Therefore, this paper, from the perspective of information interaction design, identifies pain points in existing app designs through literature review and case analysis, and explores methods to optimize the user experience of agricultural product apps. We gathered user needs and feedback, built user personas, designed interactive prototypes, and validated their effectiveness in terms of user experience, operational convenience, and information transmission efficiency through usability testing. The research results show that the prototype significantly improved information hierarchy, simplified interaction processes, and better met users' personalized needs. The information interaction design of special agricultural product apps should not only focus on functional requirements but also emphasize the emotional experience and cultural identity of users. Visual design should incorporate elements of rural cultural characteristics to enhance users' sense of identification and engagement. Future designs should emphasize the integration of interaction design with rural culture, further improving user experience through innovative information presentation methods and personalized services, thereby supporting the Rural Revitalization Strategy and the sustainable development of agricultural e-commerce.

Keywords: Special Agricultural Products App; Information Interaction Design; User Experience; Rural Revitalization; Sustainable Development.

1. Introduction

With the rapid development of information technology, mobile internet has become a crucial force driving social and economic development, particularly in the agricultural sector where the promotion of special agricultural products has garnered significant attention. The Rural Revitalization Strategy has elevated agricultural development to a national strategic priority. However, the current promotion of agricultural products still faces challenges such as information asymmetry and limited sales channels. Against this backdrop, developing a special agricultural products app and optimizing its information interaction design can not only broaden sales channels but also enhance consumer awareness of agricultural products, thereby contributing to the success of rural revitalization.

This research focuses on the information interaction design of special agricultural products apps, aiming to enhance the user purchasing experience by optimizing the user interface and interaction processes. By increasing user engagement and preference, the app can attract more users, thereby promoting agricultural product sales and brand development. This is of significant importance to the realization of the Rural Revitalization Strategy and the upgrading of the agricultural industry. Through effective information interaction design, modern agricultural industrial systems can be established, fostering the integration of rural industries and promoting

rural development and increased income for farmers. The research addresses the following questions: What problems currently exist in the information interaction design of special agricultural product apps? How can the design of these apps be optimized to improve user experience?

2. Literature Review

The Rural Revitalization Strategy is an important national initiative proposed by China to achieve agricultural modernization, rural prosperity, and increased farmer incomes. It aims to promote the comprehensive development of rural economies and societies through five key areas: industrial prosperity, ecological livability, rural culture, effective governance, and affluent living [1]. This strategy has brought new opportunities for the development of special agricultural products, which, due to their regional uniqueness and high quality, play a vital role in promoting local economies, increasing farmer incomes, and preserving agricultural heritage.

Special agricultural product mobile applications, as emerging e-commerce platforms, provide new sales channels for agricultural products. Producers can interact with consumers through the app, offering product information, receiving orders, and providing after-sales services. Meanwhile, consumers can conveniently place orders, purchase, and leave reviews. As consumers become increasingly concerned with food safety and quality, special

agricultural products are gaining popularity for their distinctive qualities and regional culture. The application of apps, through big data analysis, not only improves the efficiency of product sales but also offers consumers a convenient shopping experience. Additionally, farmers can access market information through the apps, allowing them to adjust their planting strategies and improve yields[2]. However, there are still shortcomings in areas such as brand building, product quality, information updates, market promotion, and sales channels for special agricultural products. Many high-quality products fail to reach their full market potential due to a lack of effective promotion[3].

Information interaction design is a discipline that studies the exchange of information and interaction behaviors between users and products[4]. In app design, information interaction design focuses on how to enhance the user experience through interface layout, information presentation, and interactive elements[5]. For agricultural product apps, information interaction design can employ intuitive charts, images, and other formats to present product information, allowing users to quickly grasp the characteristics and advantages of the products. Good information interaction design can make the app more user-friendly and intuitive, improving user satisfaction and the visual presentation of the product to users, thereby increasing app usage and dissemination.

Existing literature primarily focuses on topics such as packaging design, cultural and creative design, fashion design, entrepreneurship talent development, and architectural landscape design in the context of rural revitalization. However, few studies have paid attention to the design of interactive platforms for special agricultural products from the perspective of rural revitalization. Scholar Wang Luming pointed out that agricultural development has become an indispensable part of China's national economy[6]. The country has proposed the implementation of the Rural Revitalization Strategy, aiming to empower agriculture through design, strengthen agricultural brands, and accelerate the modernization of agriculture. Many regions have started to focus on building local agricultural product brands, actively cultivating them based on local natural resources and cultural backgrounds to increase brand recognition and sales. However, local agricultural product brands in China are still in the early stages of development. The design of visual brand identities is uneven, often displaying issues such as design homogeneity, simplistic packaging, and a lack of regional cultural elements[7].

Long Wei emphasized the need to strike a balance between addressing current issues with farm products and meeting app users' needs, focusing on exploring ways to enhance the competitiveness and appeal of agricultural product apps[8]. Considering the widespread adoption of emerging technologies in China, it is essential to study how interactive design can help rural residents increase their wealth and achieve rural revitalization[9]. Only by maintaining the development of local brands and incorporating regional cultural identity can a sustainable business model be developed, continuously driving commercial and economic value creation.

By identifying the needs of land rental and transfer groups, this study analyzes the relationship between user needs and functional requirements to obtain the absolute weight of functional needs. The goal is to design a leisure agriculture app that meets user demands and offers a positive user

experience, thereby improving land utilization and operational efficiency in rural areas, contributing to rural revitalization [10]. This paper explores how design can intervene in rural issues and promote innovative changes against the backdrop of rural revitalization, integrating information interaction design theories with case studies[11]. By applying service design theory to improve agricultural product packaging services, the study aims to enhance consumer purchasing experiences, increase sales and farmer incomes, highlighting the leading and constructive role of design in addressing rural issues[12].

3. Research Methods

3.1. Research Design

This study employs a design research methodology, utilizing an iterative process to design and evaluate special agricultural product apps. The research framework includes demand analysis, app design, user testing, and evaluation. In the demand analysis phase, consumer needs are gathered through in-depth interviews. During the app design phase, a user-friendly and functionally comprehensive app is designed based on the analysis results. In the user testing phase, users are invited to test the app, and their feedback is collected. Finally, in the evaluation phase, the app's effectiveness is assessed based on the testing results, and suggestions for improvement are proposed.

3.2. Data Collection and Analysis

This study utilizes in-depth interviews to gather consumers' opinions and preferences regarding agricultural product apps, including their needs and expectations related to functionality, interface design, and shopping processes. The data is processed through both qualitative and quantitative analyses. Qualitative analysis helps to understand consumer needs and the issues they encounter while using the app, while quantitative analysis assesses the efficiency and effectiveness of the app design. Descriptive statistics are employed to describe sample characteristics and the distribution of needs, whereas inferential statistics are used to test hypotheses and evaluate differences.

3.3. Demand Analysis

Consumers of special agricultural products exhibit diversity, including variations in age, gender, educational background, and life experiences. Young people, middle-aged individuals, and seniors have different usage habits and needs when it comes to apps. Therefore, the app should incorporate age-friendly design features, such as larger font options. Gender differences may influence consumer preferences for product types, brands, and shopping experiences, while educational backgrounds can affect their understanding of app functionalities. Additionally, life experiences and cultural backgrounds may shape their demand for special agricultural products.

Through in-depth interviews, a substantial amount of data regarding user needs for agricultural product apps was collected, leading to the creation of a user journey map. This map highlights key terms and pain points such as education, green agriculture, eco-tourism, sustainable development, product quality assurance, incomplete information, limited payment options, and insufficient promotion of local characteristics and culture. Users generally expect the app to provide rich product information, a convenient shopping

process, high-quality customer service, and a good overall user experience. They wish to easily access information about the types, origins, prices, and quality of agricultural products, and to place orders, make payments, and track logistics through the app. Additionally, they hope for features that offer

personalized recommendations and feedback options to enhance the authenticity and intuitiveness of their shopping experience. The user experience journey map is shown in Figure 1.

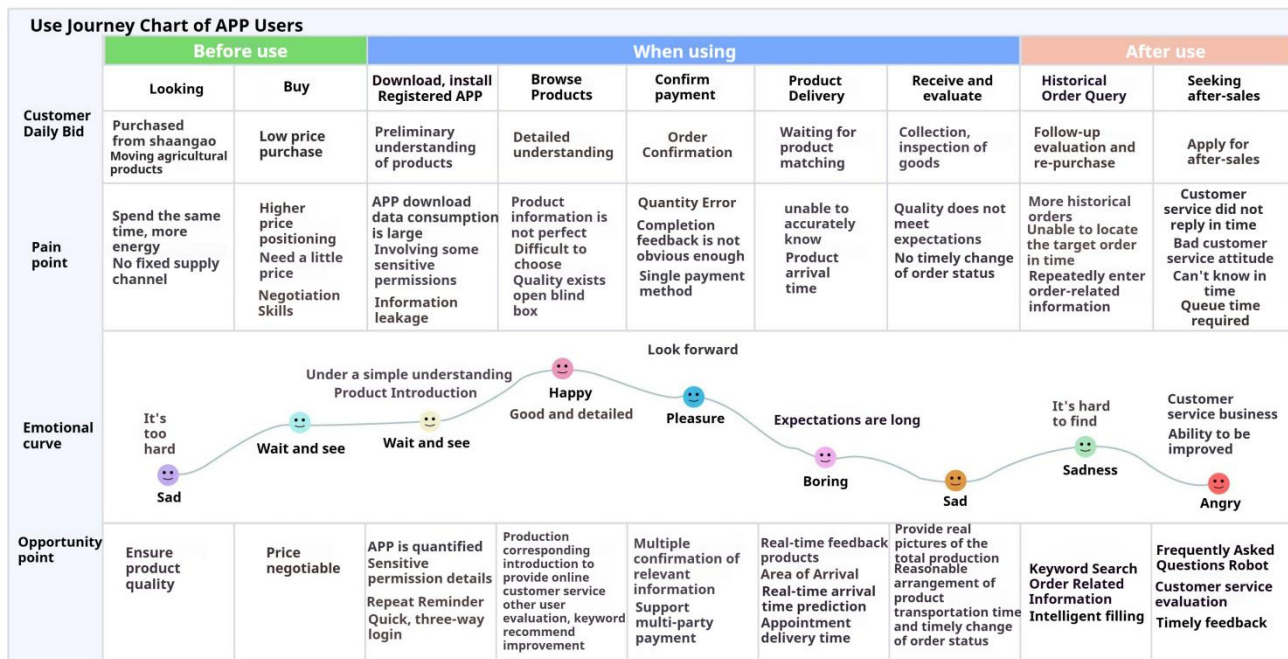


Fig 1. User Experience Journey Map Design

3.4. Design Objectives

Based on the results of the needs assessment, the primary goal of the special agricultural product app design is to create a green, comprehensive, and information-rich shopping platform that meets the diverse needs of different consumers. The design incorporates clear product categorization and search functionalities, utilizing images and charts to showcase the appearance, nutritional components, and cultivation environments of agricultural products. Additionally, sales data analysis tools will be introduced to assist farmers and vendors in understanding market trends.

The app will provide detailed product information and high-quality images, considering farmers' varying levels of technical proficiency to ensure that the interface is simple and easy to understand. It will also feature market analysis capabilities to help farmers adjust their production strategies. Consumers will have access to authentic product information, enjoy secure payment options, and benefit from fast logistics services. Furthermore, the app will promote the development of local tourism, attracting more customers and fostering the growth of related industries. It will also include feedback and review features to allow users to gain intuitive insights into product quality.

4. Interface Design of the Special Agricultural Product App

4.1. Design Principles and Framework

In the app design process, the following principles were adhered to: user-centered, simplicity, clarity of information, smooth operation, aesthetic appeal, and minimal pop-ups and advertisements. The user-centered principle ensures that the app meets user needs, while the simplicity principle allows

for short and clear operational processes, enabling users to quickly get accustomed to the app [13]. The clarity of information principle emphasizes the intuitive display of agricultural product features, making it easy for users to obtain information. The smooth operation principle guarantees quick loading and response times, enhancing user satisfaction. The aesthetic appeal principle requires a simple and cohesive interface design to provide a good visual experience.

In the interface design, a clean layout and intuitive operation process were adopted to reduce the learning curve for users. The design follows the principles of consistency, clarity, efficiency, and aesthetics: consistency ensures that the interface style and operational logic are unified, minimizing confusion; clarity makes interface elements easy to understand; efficiency emphasizes straightforward and efficient operational processes, reducing wait times; and aesthetics ensures that the interface design is visually appealing, providing a pleasant visual experience.

4.2. Function Module Design

The design of the app's functional modules is crucial for meeting user needs[14]. Based on the results of the user demand research, we have developed several key functional modules, including an agricultural product introduction module that provides users with rich product information and high-quality images to help them understand the features and advantages of the products. The product price display allows users to easily view the prices of different agricultural products, aiding in their purchasing decisions. The search and filter module enables users to quickly find the desired products through keyword searches and various filtering options. Users can add products of interest to their shopping cart for convenient subsequent checkout processes. The order

management module provides functionalities for order inquiry, payment, and logistics tracking, making it easy for users to manage their shopping orders. The user center allows users to manage their personal information, favorites, and browsing history, enhancing account management convenience. Finally, the feedback and review functionality

enables users to view and provide feedback on product quality, offering valuable insights to other users and facilitating informed purchasing decisions. These functional modules work together to create a comprehensive and user-friendly shopping experience for agricultural products.

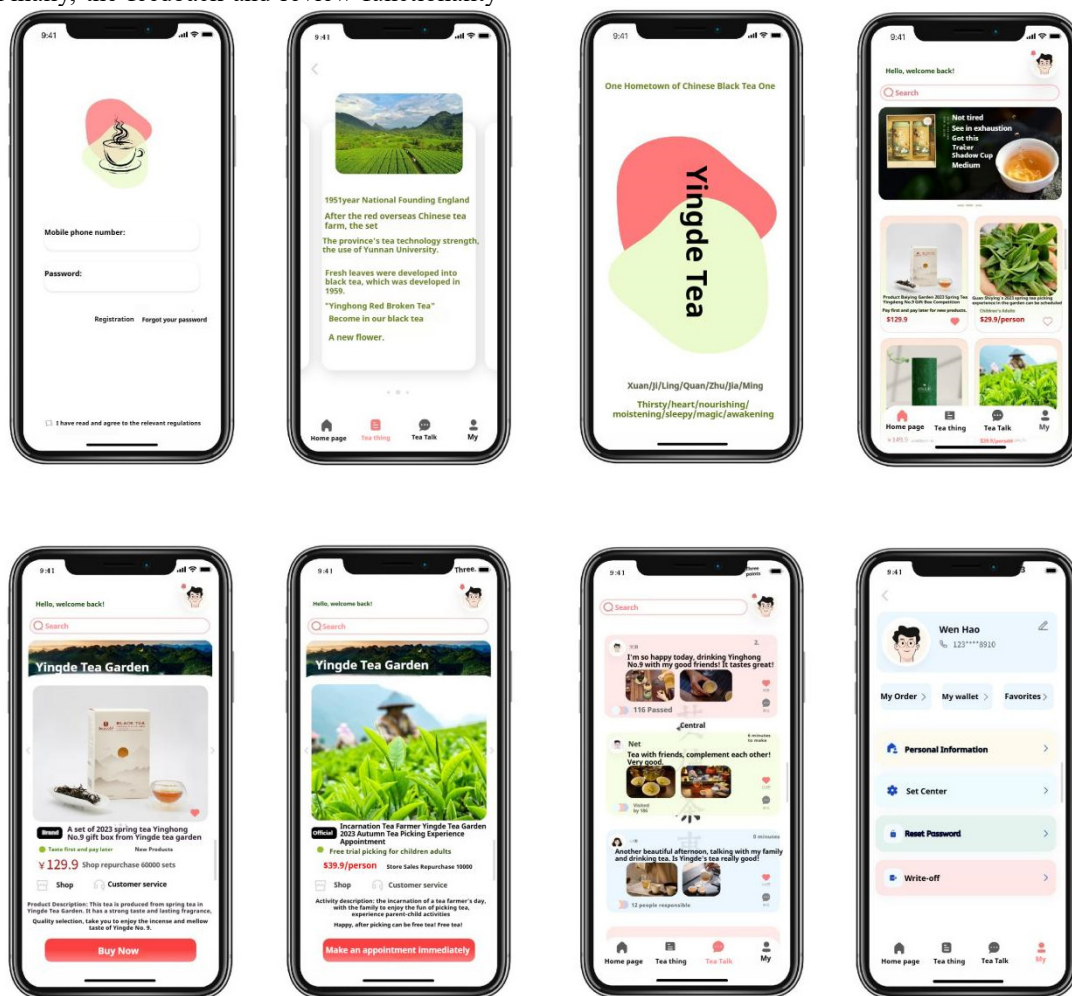


Fig 2. Interactive interface design for featured agricultural products

5. User Experience Evaluation

User experience evaluation is an important criterion for measuring the success of app design. This study employs various evaluation methods, including heuristic evaluation, usability testing, user interviews, and surveys. Heuristic evaluation utilizes expert experience to assess the design, while user interviews provide in-depth insights into needs and feedback. Surveys collect data on user satisfaction and usability. The primary data collection method used in this study is usability testing, which indicates that users are generally satisfied with the overall experience of the app, appreciating its aesthetically pleasing interface, simple operations, rich functionality, and quick responsiveness. Features such as product display, search and filter, customer service, and personalized recommendations received particularly positive feedback. However, users also provided suggestions for improvement, such as optimizing the smoothness of certain operations, increasing product variety, and offering more promotional activities.

Based on the results of user testing and surveys, several improvement suggestions have been proposed: First, enrich the variety of products by adding more special agricultural

products and ensuring that information is updated in a timely manner. Second, optimize the shopping process to enhance operational smoothness and reduce user wait times, while also strengthening product quality supervision. Third, enhance the promotion of local characteristics and offer more promotional activities, such as limited-time discounts, buy-more-save-more offers, and loyalty point exchanges to attract users. Finally, improve the response speed and quality of customer service and consider integrating technologies like AI and blockchain to enhance the app's intelligence and security.

6. Conclusion

This study successfully designed and evaluated a special agricultural product app within the context of rural revitalization. By conducting an in-depth analysis of consumer needs, we created a user-friendly and functionally comprehensive information interaction interface, followed by user testing and satisfaction assessment. The results indicate that the app design effectively enhances the shopping experience and consumer affinity for products, thereby promoting agricultural product sales. This research provides theoretical support for the design of special agricultural

product apps under the framework of rural revitalization, opening up new channels and models for agricultural sales through optimized information interaction design, which holds significant practical implications.

Despite achieving certain outcomes, the study has some limitations. The relatively small data size may affect the generalizability of the results, and the short time span did not allow for a comprehensive assessment of the app's long-term effects. In the future, we plan to expand the data size and duration of the study to obtain more comprehensive results while exploring additional business models and promotional strategies to enhance the app's market competitiveness.

This research also offers insights for policymakers and practitioners. The market introduction of special agricultural product apps relies heavily on government support and guidance. Policymakers can promote development through financial subsidies, tax incentives, and technical support. Practitioners should focus on user needs, continually optimizing design to enhance user experience and engagement, and strengthen collaboration with agricultural producers to jointly promote special agricultural products for mutual benefit. With technological advancements and market development, the rural revitalization special agricultural product app is poised to play a larger role in providing higher-quality services for farmers and consumers alike.

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