

# An Empirical Study on User Search Service Satisfaction of Shopping Mini-Programs under Social Marketing Mode: A Case Study of “Yunhuoyouxuan” Mini-Program

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## Abstract:

This study investigates the user search service satisfaction of shopping mini-programs within the social e-commerce sector. Taking the mobile shopping mini-program “Yunhuoyouxuan” as a case study, and based on the research team’s long-term sales practice on the platform and in-depth user interviews, we designed and implemented a scale questionnaire survey targeting user search behaviors, perceptions, and expectations. A pre-survey (20 samples) yielded a reliability of 0.961, and the formal survey retrieved 296 valid questionnaires (a valid response rate of 98.67%). Reliability and validity tests showed that the questionnaire possessed extremely high reliability (Cronbach’s Alpha = 0.984) and excellent structural validity (KMO = 0.966, Bartlett’s test of sphericity  $p < 0.001$ ). The empirical data indicated that most users had low overall satisfaction with the existing search services of Yunhuoyouxuan, with their weekly browsing frequencies heavily concentrated between 0 and 1 times. Through exploratory factor analysis (EFA), we successfully constructed a 3-dimension, 6-factor model of user search service satisfaction indicators, which comprises user search ability (search purpose and strategy, information needs), search functionality provided by the mini-program (retrieval interface usability and response speed), and user perception of retrieval results (satisfaction, completeness, and accuracy). Further analysis of user expectations revealed exceptionally high demand for product filtering and sorting options based on brands, reviews, and image-based searches, as well as fuzzy search. Based on these findings, we proposed specific search optimization strategies across four dimensions including relevance, functional diversity, intelligent error correction, and user experience interaction.

## Keywords:

Social Marketing, Shopping Mini-programs, User Satisfaction, Yunhuoyouxuan, Exploratory Factor Analysis

## 1. Introduction

The rapid advancement of the mobile internet and information technologies has fundamentally transformed consumers’ channels for acquiring information and their consumption patterns. Supported by social media and online communities, social

commerce has emerged as a novel and prominent retail paradigm. Within this ecosystem, WeChat mini-programs, characterized by their installation-free and “use-and-go” features, have become a key vehicle for social commerce. According to the latest data from the China Internet Network Information Center (CNNIC, 2026) [1], as of December 2025, the number of internet users in China reached 1.125 billion, with mobile internet users reaching 1.121 billion, representing an overwhelming mobile access rate of 99.6%. Among them, the online shopping user base reached 937 million, with a penetration rate of 83.2% [1]. In mobile shopping scenarios such as instant retail, which are closely integrated with mini-program consumption and private domain traffic, the monthly active users (MAU) of the industry reached 565 million, maintaining a steady growth rate of 3.3% [1]. This indicates that mobile online shopping and digital consumption scenarios have achieved a pervasive connection, laying a massive and stable user foundation for the further development of search services in shopping mini-programs such as Yunhuoyouxuan.

“Yunhuoyouxuan” as a discount e-commerce platform embedded in the WeChat mini-program ecosystem, integrates decentralized private domain traffic and supply chain resources, rapidly emerging as a unicorn enterprise with a user scale exceeding 100 million. Currently, the platform has aggregated over 6 million shop owners, among whom 90% are female, and 39% of these female shop owners are full-time homemakers, demonstrating a prominent sociological hallmark of “She Power” and representing a significant pathway for female micro-entrepreneurship (Ifeng Ningbo, 2021) [2].

Despite its massive user scale, extensive feedback from platform users and shop owners indicates that the current search functionality suffers from issues such as retrieval inaccuracies and operational inconveniences. Theoretical frameworks from information systems, such as the SERVQUAL model (Kappelman, 1997) [3] and classic customer satisfaction theory (Anderson, 1993) [4], suggest that high-quality search services can significantly elevate user satisfaction, which subsequently translates into long-term user loyalty and repeat purchasing behavior (Johnson, 1991) [5]. Currently, academic research on user search satisfaction remains heavily concentrated on general-purpose search engines or mature, standalone e-commerce applications (Xuehan Zhong, 2024; Yiming Zhao, 2024; An Yan, 2013; Hui Wang, 2015) [6][7][8][9]. Conversely, empirical studies addressing search service satisfaction within decentralized shopping mini-programs, which exhibit distinct social and private-domain characteristics, are conspicuously sparse (Xiaoning Sun, 2018) [10]. Therefore, this study employs a quantitative questionnaire survey and exploratory factor analysis (EFA) to construct a comprehensive search service satisfaction model for shopping mini-programs, identifying the core driving factors to provide empirical decision-making support for enhancing the service quality of social commerce platforms.

## 2. Survey Implementation

### 2.1. Survey objectives and subjects

This study aims to systematically investigate the status and core determinants of user search satisfaction in social commerce mini-programs. The survey target population consists of active users and registered shop owners of the “Yunhuoyouxuan” mini-program. To ensure the contextual validity of the research design, the research team engaged in actual operations on the platform, establishing

private social groups and conducting product sales and community operations for over three years. This long-term immersive experience provided deep insights into the platform's transactional flows and search interface layouts. Geographically, although the respondents span multiple provinces, they are primarily concentrated in the Guangxi Zhuang Autonomous Region due to the regional networks of the research team, reflecting the localized, trust-based relational diffusion characteristic of social marketing.

## **2.2. Questionnaire design and survey content**

Based on established search engine satisfaction and information retrieval evaluation frameworks, the survey questionnaire was developed using a 7-point Likert scale (where 1 represents 'strongly disagree' and 7 represents 'strongly agree'). The measurement items are structured into five main blocks:

- (1) Demographic characteristics and basic usage profiles (V1-V10), capturing variables such as gender, age, occupation, education, monthly income, household structure, and weekly browsing frequency;
- (2) Personal search capabilities (V11-V24), measuring search intent clarity, explicit search demands, and individual retrieval strategies;
- (3) Mini-program search functionality (V25-V33), assessing commodity categorization, button hierarchy, page layout, aesthetic interface design, and system responsiveness;
- (4) Perception of retrieval results (V34, V51-V57, V62-V70), capturing result completeness, accuracy, navigational assistance, and multi-dimensional satisfaction;
- (5) User expectations for search service optimization (V35-V50, V58-V61), measuring user demands for specific filtering, sorting, and intelligent retrieval options.

## **2.3. Survey quality control**

A rigorous full-process quality control mechanism was implemented to ensure the authenticity and reliability of the empirical data:

- (1) Pre-survey and Pilot Test: A pilot study with 20 valid respondents was conducted. The preliminary reliability test yielded a Cronbach's Alpha of 0.961, indicating high scale reliability. Minor textual refinements were made based on pilot feedback to clarify question phrasing.
- (2) Process Monitoring: To prevent confusion among similar items, key phrases such as "fuzzy search" and "multi-phrase combination" were highlighted using double quotation marks. Additionally, the backend system monitored response duration, flagging questionnaires completed in under 5 minutes to ensure attentiveness.
- (3) Post-survey Data Cleaning: Casual or inconsistent responses were strictly filtered out during data cleaning. Ultimately, 300 questionnaires were distributed, and 296 valid responses were retrieved, yielding an effective response rate of 98.67%. This sample size (N=296) strictly satisfies the rule-of-thumb threshold for exploratory factor analysis, which requires the sample size to be at least five times the number of scale items.

### 3. Descriptive Statistics and Reliability-validity Analysis

#### 3.1. Analysis of sample demographic characteristics

Descriptive statistics for the 296 valid survey responses are summarized in Table 1.

*Table 1. Demographic characteristics of the survey sample.*

| Demographic Variable      | Category                                   | Valid Sample Size (N=296) | Percentage (%) |
|---------------------------|--------------------------------------------|---------------------------|----------------|
| Gender                    | Male                                       | 86                        | 29.00%         |
|                           | Female                                     | 210                       | 71.00%         |
| Age                       | Under 18                                   | 18                        | 6.00%          |
|                           | 18~25 years old                            | 139                       | 47.00%         |
|                           | 26~35 years old                            | 68                        | 23.00%         |
|                           | 35 years old and above                     | 83                        | 28.00%         |
| Occupational Distribution | Students                                   | 110                       | 37.00%         |
|                           | Other employed and freelance personnel     | 186                       | 63.00%         |
| Family Structure          | Two-generation nuclear family              | 142                       | 48.00%         |
|                           | Three-generation and above extended family | 80                        | 27.00%         |
|                           | Others (couples, single, etc.)             | 74                        | 25.00%         |
| Browsing Frequency / Week | 0~1 times                                  | 139                       | 47.00%         |
|                           | 2 or more times                            | 157                       | 53.00%         |

As indicated in Table 1, female respondents constitute the vast majority of the sample (71.00%). This is highly consistent with the platform's demographic profile, where over 90% of registered shop owners are female [2], and aligns with established e-commerce literature indicating that females exhibit a higher propensity for social shopping. In terms of age, the sample is dominated by young users aged 18 to 25 (47.00%), with users aged 26 to 35 and above 35 accounting for 23.00% and 28.00%, respectively. Correspondingly, students represent the largest occupational category (37.00%), leading to a concentration of monthly income below 3,000 RMB. Regarding family structure, nuclear families consisting of two generations comprise 48.00% of the sample, followed by extended three-generation households (27.00%). Crucially, 47.00% of the respondents browse the "Yunhuoyouxuan" mini-program only 0 to 1 times per week. This low level of user stickiness highlights a critical retention bottleneck, suggesting that suboptimal search experiences may be a primary driver of user attrition.

#### 3.2. Analysis of questionnaire reliability and validity

To verify the scientific rigorousness of the formal survey, reliability and validity analyses were conducted on the 59 quantitative scale items. Reliability was evaluated using Cronbach's Alpha coefficient, while construct validity was examined through the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. The results are presented in Table 2.

The results in Table 2 demonstrate that the Cronbach's Alpha coefficient for the formal survey is 0.984, significantly exceeding the standard threshold of 0.800, which

indicates outstanding internal consistency and high reliability of the scale. The KMO value is 0.966, well above the academic threshold of 0.900, confirming that the variables are highly interconnected and exceptionally suitable for factor analysis. Furthermore, Bartlett's test of sphericity yielded an approximate Chi-Square of 23223.702 with 1711 degrees of freedom and a significance level of  $p < 0.001$ . This highly significant result confirms excellent structural validity, providing a solid mathematical foundation for subsequent factor dimensionality reduction.

**Table 2.** Scale reliability and construct validity analysis.

| Statistical Test Metric                   | Value     | Academic Threshold | Interpretation & Significance                            |
|-------------------------------------------|-----------|--------------------|----------------------------------------------------------|
| Cronbach's Alpha (Formal Scale)           | 0.984     | $\geq 0.800$       | Excellent internal consistency; scale is highly reliable |
| Cronbach's Alpha (Pilot Scale)            | 0.961     | $\geq 0.700$       | Strong preliminary reliability; robust item design       |
| KMO Measure of Sampling Adequacy          | 0.966     | $\geq 0.900$       | Excellent adequacy; highly suitable for factor analysis  |
| Bartlett's Test - Approx. Chi-Square      | 23223.702 | -                  | -                                                        |
| Bartlett's Test - Degrees of Freedom (df) | 1711      | -                  | -                                                        |
| Bartlett's Test - Significance (Sig.)     | 0.000     | $< 0.05$           | $p < 0.001$ ; highly significant structure validity      |

## 4. Exploratory Factor Analysis and Model Construction

To understand the latent construct of user search service satisfaction, we performed principal component analysis (PCA) with Varimax Orthogonal Rotation on the scale modules. Through factor reduction, we established a robust three-dimensional, six-factor hierarchical index model to evaluate user search experience.

### 4.1. Factor analysis of user search ability

For the user personal search ability module (V11-V24), PCA extracted two factors with eigenvalues greater than 1, explaining a cumulative variance of 71.751%. Specifically, Factor 1 and Factor 2 explained 38.739% and 33.012% of the variance after rotation, respectively. The rotated component matrix is displayed in Table 3.

**Table 3.** Rotated component matrix of variables V11-V24.

| Variable                                  | Component 1 (Purpose & Strategy) | Component 2 (Information Needs) |
|-------------------------------------------|----------------------------------|---------------------------------|
| V20 (Brand search ability)                | 0.881                            |                                 |
| V19 (Product name search ability)         | 0.869                            |                                 |
| V18 (Navigation positioning ability)      | 0.843                            |                                 |
| V21 (Autonomous find-goods ability)       | 0.815                            |                                 |
| V16 (Combined search skills)              | 0.814                            |                                 |
| V15 (Simple name search)                  | 0.755                            |                                 |
| V22 (Search with peer assistance)         | 0.737                            |                                 |
| V12 (Browsing intention for new arrivals) |                                  | 0.887                           |
| V13 (Community recommendation following)  |                                  | 0.847                           |
| V11 (Autonomous search intention)         |                                  | 0.823                           |
| V17 (Main page navigation reliance)       |                                  | 0.795                           |
| V24 (Requesting shop owner)               |                                  | 0.760                           |

|                                 |  |       |
|---------------------------------|--|-------|
| recommendations)                |  |       |
| V14 (Precise demand clarity)    |  | 0.622 |
| V23 (Auxiliary search reliance) |  | 0.560 |

As shown in Table 3, variables V15, V16, V18, V19, V21, and V22 exhibit high factor loadings (ranging from 0.737 to 0.881) on Component 1. These items principally describe users' specific search strategies and active retrieval habits; thus, Component 1 is named 'User Search Purpose and Search Strategy.' Conversely, variables V11, V12, V13, V17, V24, V14, and V23 load heavily on Component 2 (ranging from 0.560 to 0.887), reflecting users' cognitive clarity regarding their own information needs and reliance on external suggestions. Therefore, Component 2 is designated as 'User Information Needs.'

#### 4.2. Factor analysis of mini-program search functionality

For the mini-program search functionality module (V25-V33), principal component analysis extracted a single dominant component with an eigenvalue greater than 1. This single factor explains an exceptionally high variance of 75.537%, as shown in Table 4. Because only one factor was extracted, Varimax Orthogonal Rotation was not required.

**Table 4.** Total variance explained of mini-program search functionality.

| Component | Initial Eigenvalue (Total) | Initial Eigenvalue (Var. %) | Initial Eigenvalue (Cum. %) | Extraction Loadings (Total) | Extraction Loadings (Var. %) | Extraction Loadings (Cum. %) |
|-----------|----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|
| 1         | 6.798                      | 75.537%                     | 75.537%                     | 6.798                       | 75.537%                      | 75.537%                      |
| 2         | 0.621                      | 6.904%                      | 82.441%                     |                             |                              |                              |
| 3         | 0.402                      | 4.463%                      | 86.904%                     |                             |                              |                              |
| 4         | 0.340                      | 3.783%                      | 90.687%                     |                             |                              |                              |
| 5         | 0.220                      | 2.445%                      | 93.132%                     |                             |                              |                              |
| 6         | 0.203                      | 2.260%                      | 95.392%                     |                             |                              |                              |
| 7         | 0.170                      | 1.884%                      | 97.276%                     |                             |                              |                              |
| 8         | 0.142                      | 1.574%                      | 98.850%                     |                             |                              |                              |
| 9         | 0.103                      | 1.150%                      | 100.000%                    |                             |                              |                              |

This extracted factor heavily loads on items concerning commodity categorization accuracy, hierarchical button navigation, layout adaptiveness, and loading responsiveness. Consequently, this objective technical dimension is designated as 'Retrieval Interface Usability and Response Speed.'

#### 4.3. Factor analysis of user perception of retrieval results

For the 17 variables (V34, V51-V57, V62-V70) evaluating user perceptions of the retrieval results, PCA with Varimax Orthogonal Rotation extracted three factors with eigenvalues greater than 1, accounting for a cumulative variance explanation of 78.076%. The rotated variance explanation rates for the three factors were 36.806%, 25.146%, and 16.124%, respectively. The rotated component matrix is presented in Table 5.

**Table 5.** Rotated component matrix of variables V34, V51-V57, V62-V70.

| Variable                                | Component 1 (Satisfaction) | Component 2 (Completeness) | Component 3 (Accuracy) |
|-----------------------------------------|----------------------------|----------------------------|------------------------|
| V65 (Satisfaction with retrieval speed) | 0.855                      |                            |                        |
| V64 (Satisfaction with                  | 0.831                      |                            |                        |

|                                                     |       |       |       |
|-----------------------------------------------------|-------|-------|-------|
| content display)                                    |       |       |       |
| V67 (Satisfaction with filtering functionality)     | 0.829 |       |       |
| V70 (Platform referral recommendation willingness)  | 0.815 |       |       |
| V66 (Satisfaction with sorting options)             | 0.813 |       |       |
| V69 (Overall service satisfaction score)            | 0.811 |       |       |
| V68 (Satisfaction with search interface)            | 0.808 |       |       |
| V63 (Satisfaction with aesthetic presentation)      | 0.733 |       |       |
| V62 (Satisfaction with layout design)               | 0.622 |       |       |
| V55 (Moderate-deep search dwell of 5-6 mins)        |       | 0.876 |       |
| V54 (Light-dwell search of 3-4 mins)                |       | 0.861 |       |
| V56 (High-deep search dwell of 7-8 mins)            |       | 0.824 |       |
| V53 (Extremely light search dwell of 1-2 mins)      |       | 0.719 |       |
| V34 (Transactional availability of orderable goods) |       | 0.609 |       |
| V52 (Filtering of irrelevant results)               |       |       | 0.794 |
| V51 (No omission of associated fields)              |       |       | 0.782 |
| V57 (Terminal search dwell until satisfied)         |       |       | 0.681 |

Table 5 indicates that: (1) Factor 1 loads heavily on variables V62-V70 (loadings between 0.622 and 0.855), which measure multi-dimensional satisfaction with search speed, layout, aesthetics, and content display. This factor is named ‘Satisfaction with Mini-Program Search Results.’ (2) Factor 2 displays high loadings on V34 and V53-V56 (loadings between 0.609 and 0.876), which correspond to users’ willingness to persist in browsing and the transactional availability of goods. This factor is designated as ‘Completeness of Mini-Program Search Results.’ (3) Factor 3 loads highly on V51, V52, and V57 (loadings between 0.681 and 0.794), reflecting the semantic alignment between search queries and displayed items, and the filtering of irrelevant results. Thus, it is named ‘Accuracy of Mini-Program Search Results.’

#### 4.4 Integrated index system

By synthesizing the results of exploratory factor analysis across all three modules, we constructed a hierarchical user search service satisfaction model. The integrated index system is detailed in Table 6.

**Table 6.** Integrated EFA index system of user search service satisfaction.

| Primary Dimension                           | Secondary Indicator                      | Representative Variables & Factor Loadings                                        |
|---------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------|
| User's Personal Search Ability (Subjective) | Search Purpose and Search Strategy (Var. | V20: Brand search ability (0.881); V19: Product name search ability (0.869); V18: |

|                                                                                        |                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Level, Cumulative Var. Expl: 71.751%)                                                  | Expl: 38.739%)                                                        | Navigation positioning ability (0.843); V21: Independent find-goods ability (0.815); V16: Combined search skills (0.814); V15: Simple name search (0.755); V22: Search with peer help (0.737)                                                                                                                                                                                                                                          |
|                                                                                        | Information Needs (Var. Expl: 33.012%)                                | V12: Browsing intention for new arrivals (0.887); V13: Community recommendation following (0.847); V11: Self-search intention (0.823); V17: Navigation browsing reliance (0.795); V24: Requesting shop owner recommendations (0.760); V14: Clear demand cognitive (0.622); V23: Auxiliary search reliance (0.560)                                                                                                                      |
| Mini-Program Search Functionality (Objective Level, Cumulative Var. Expl: 75.537%)     | Retrieval Interface Usability and Response Speed (Var. Expl: 75.537%) | V25-V33: Covers commodity classification accuracy, progressive and return button friendliness, search interface aesthetics, layout adaptiveness, mini-program loading efficiency, and database rendering and response speed                                                                                                                                                                                                            |
| User Perception of Retrieval Results (Perceptual Level, Cumulative Var. Expl: 78.076%) | Satisfaction with Search Results (Var. Expl: 36.806%)                 | V65: Satisfaction with retrieval speed (0.855); V64: Satisfaction with content display (0.831); V67: Satisfaction with filtering (0.829); V70: Overall search recommendation (0.815); V66: Satisfaction with retrieval sorting (0.813); V69: Overall search satisfaction (0.811); V68: Satisfaction with search interface (0.808); V63: Satisfaction with aesthetic presentation (0.733); V62: Satisfaction with layout design (0.622) |
|                                                                                        | Completeness of Search Results (Var. Expl: 25.146%)                   | V55: Moderate-deep search dwell of 5-6 mins (0.876); V54: Light-dwell search of 3-4 mins (0.861); V56: High-deep search dwell of 7-8 mins (0.824); V53: Extremely light search dwell of 1-2 mins (0.719); V34: Transactional availability of orderable goods (0.609)                                                                                                                                                                   |
|                                                                                        | Accuracy of Search Results (Var. Expl: 16.124%)                       | V52: Filtering of irrelevant results (0.794); V51: No omission of associated fields (0.782); V57: Terminal search dwell until satisfied (0.681)                                                                                                                                                                                                                                                                                        |

## 5. Analysis of User Expectations for Search Functionality

To pinpoint specific areas for backend database and interface optimization, we computed the approval rates (the proportion of respondents scoring 5 or above on the 7-point Likert scale) for various proposed search features and filtering options. The resulting expectation distribution is presented in Table 7.

**Table 7.** User expectations and approval rates for search service optimization.

| Expected Feature (V_item) | Measurement Description                                    | Approval Rate (%) | Strategic & Logical Interpretation                                                   |
|---------------------------|------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------|
| Brand Filter (V44)        | Provide direct filters for active brands in search results | 75.00%            | Since the platform focuses on brand clearance, users exhibit extreme brand alignment |
| Image Search (V49)        | Support photo upload                                       | 75.00%            | 37.00% strongly agree.                                                               |

|                             |                                                                 |        |                                                                                         |
|-----------------------------|-----------------------------------------------------------------|--------|-----------------------------------------------------------------------------------------|
|                             | or camera snap for search                                       |        | Visual input greatly simplifies mobile-end shopping pathways                            |
| Fuzzy Search (V48)          | Support fuzzy queries, synonyms, and homophones                 | 74.00% | 31.00% strongly agree. Lowers input thresholds and offsets linguistic errors            |
| Good Reviews Sort (V39)     | Sort products based on user ratings and favorable reviews       | 74.00% | Social proof strongly stimulates purchase intent and establishes private-domain trust   |
| Size Filter (V41)           | Filter search results showing items matching specific sizes     | 73.00% | 30.00% strongly agree. Essential in flash-sale contexts to rapidly locate fitting sizes |
| Product Type Filter (V42)   | Filter results by detailed sub-categories (e.g., jacket, shirt) | 73.00% | Filters out irrelevant product types inside specific campaign showrooms                 |
| Coupon Filter (V43)         | Filter search results showing products with active coupons      | 73.00% | Coupons act as major incentives; displaying them directly increases conversion rates    |
| Multi-phrase Search (V47)   | Support query combinations using spaces (e.g. jacket+L+blue)    | 72.00% | Caters to highly precise shopper segments and reduces broad match friction              |
| Sales/Popularity Sort (V40) | Sort search results by item transaction popularity              | 71.00% | Highlights bestseller goods, reducing browsing time and trial-and-error costs           |
| Gender Filter (V45)         | Filter search results showing male, female, or kids items       | 69.00% | Allows gender-based filtering on ambiguous keywords like “short sleeve”                 |

The results in Table 7 reveal that the highest demand is concentrated in “Brand Filter” (75.00%) and “Image Search” (75.00%, with an exceptionally high ‘strongly agree’ rate of 37.00%). Additionally, users express a strong demand for “Fuzzy Search” (74.00%, with 31.00% strongly agreeing) to accommodate typos and linguistic variations, as well as “Sorting by Good Reviews” (74.00%) to leverage social proof in purchase decisions. Other features, such as “Size Filtering” (73.00%) and “Multi-phrase Search” (72.00%), also received high approval rates. Furthermore, high-frequency keywords from user open-ended feedback, such as “diversification” and “fuzzy search,” reveal a deep-seated dissatisfaction with the platform’s current rigid, exact-match keyword matching mechanism. Users strongly desire multi-dimensional, fine-grained filtering and intelligent search services to streamline their mobile shopping experience.

## 6. Conclusion and Suggestions

### 6.1. Research conclusions

This empirical study on the ‘Yunhuoyouxuan’ mini-program reveals that while the platform has achieved rapid, explosive growth in user scale through social network word-of-mouth and private-domain traffic division, its search service infrastructure remains significantly underdeveloped. Most users report a low level of overall satisfaction with the existing search services. The exploratory factor analysis model highlights a distinct mismatch between subjective user search capabilities and the

objective search functionalities provided by the platform. As a commercial e-commerce platform, ‘Yunhuoyouxuan’ cannot expect or require users to possess high-level search strategies or technical query formulation skills. Instead, the platform must take systemic responsibility for optimizing search design, lowering retrieval barriers, and actively satisfying user expectations to elevate the search experience.

## **6.2. Optimization suggestions for social e-commerce mini-program search services**

Based on the empirical findings and user expectation analysis, we propose a four-dimensional strategic framework to optimize search services for ‘Yunhuoyouxuan’ and similar social commerce mini-programs:

(1) Enhance Search Relevance: Optimize backend search indexing and keyword ranking algorithms. By implementing advanced tokenizer techniques and semantic relevance models, the platform should perform deep semantic analysis on product titles and descriptions to ensure that top-ranked search results precisely match user purchase intents.

(2) Strengthen Search Diversity and Completeness: In response to the high user demand for multi-dimensional filtering, the platform should integrate a comprehensive set of sorting and filtering options within brand campaigns. Allowing users to easily filter products by brand, size, type, gender, and available coupons will significantly assist users with lower individual search capabilities.

(3) Lower Error Rates and Improve Intelligent Auto-correction: Build a robust semantic auto-correction database capable of recognizing typos, synonyms, and traditional/simplified Chinese characters. This intelligent error correction will bridge linguistic differences and significantly reduce the occurrence of ‘zero-result’ search queries.

(4) Elevate User Search Experience and Interactive Dwell Time: Introduce computer-vision-based image and photo search to drastically shorten the user’s retrieval path. Furthermore, the platform must optimize page loading speed and data rendering efficiency. Under the characteristics of social private-domain marketing, when a search query returns no results, the platform should display a prominent ‘One-click Help’ button to easily connect users with shop owners or online customer service, leveraging personal social relationships to elastically compensate for system limitations and foster higher user satisfaction and retention.

## **Conflicts of Interest**

The authors declare that there is no conflict of interest regarding the publication of this article.

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