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An Empirical Study on the Measurement of Mobile Social Media Users' Privacy Policy Reading Perception under Hard Rules: Postprint

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Abstract

[Purpose/Significance] To investigate mobile social media users' reading perception of privacy policies under hard rules and construct a reasonable measurement and analysis model for user privacy policy reading perception, thereby providing theoretical and practical guidance for the formulation and improvement of privacy policies.

[Method/Process] By integrating domestic and international research literature on privacy policies, conducting a survey on users' reading perception of privacy policies for ten commonly used mobile social media platforms, and employing the matter-element extension analysis method, this study measures user perception of privacy policy reading across five dimensions: appearance and format, privacy protection, information collection and storage, information use and sharing, and user rights.

[Results/Conclusion] Both the appearance and content of the text affect users' reading perception of privacy policies. Privacy policies featuring complete content, moderate length and line spacing, and more numerous subheadings with detailed explanatory notes receive higher evaluation scores in user reading perception.

Full Text

Preamble

An Empirical Study on Measuring Mobile Social Media Users' Reading Perception of Privacy Policies Under Hard Rules

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Abstract: [Purpose/Significance] This study investigates mobile social media users' reading perception of privacy policies under hard rules and constructs a reasonable measurement model for user privacy policy reading perception, providing theoretical and practical guidance for the formulation and improvement of privacy policies. [Method/Process] By integrating domestic and international literature on privacy policies and surveying users' reading perceptions of privacy policies across ten commonly used mobile social media platforms, this research employs matter-element extension analysis methods to measure user privacy policy reading perception across five dimensions: appearance and format, privacy protection, information collection and storage, information use and sharing, and user rights. [Result/Conclusion] Both the appearance and content of privacy policy texts influence users' reading perception. Policies with complete content, moderate length and line spacing, appropriate numbers of subheadings, and detailed annotations receive higher user evaluation scores.

Keywords: mobile social media; privacy policy; reading perception; matter-element extension evaluation

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With the development of digital technologies and the continuous improvement of network functionalities, social networking sites have found it increasingly easy to obtain users' personal information [1]. In December 2019, China's Ministry of Industry and Information Technology announced its first batch of Apps infringing upon user rights and interests, identifying 41 Apps with problems including unauthorized collection and use of personal information, unreasonable demands for user permissions, and obstacles to user account cancellation [2]. In the new media environment, mobile social media platforms enforce privacy policies that compel users to "agree after reading," allowing these platforms to collect, use, and store user privacy information. Users who do not consent to these policies are denied access. Under such hard rules and strong social needs, users must accept platform privacy policies to obtain usage permissions. This mandatory collection of user privacy information beyond reasonable scope invisibly infringes upon user privacy rights, while the information asymmetry, imbalance, and inadequacy between enterprises and users regarding privacy policies have become increasingly prominent. According to the "2018 China Mobile APP Privacy Rights Assessment Report," only 12.4% of surveyed internet users carefully read privacy terms [3]. As privacy policies represent a crucial means for users to understand how their personal information is collected and used, questions remain about whether they effectively and timely inform users of their rights to selectively disclose privacy content. To better protect user privacy, the 2017 Cybersecurity Law of the People's Republic of China requires network operators to formulate relevant privacy policies [4]. In 2018, the Cyberspace Administration launched rectification efforts targeting applications that maliciously steal information and harm user privacy, and in 2019, jointly issued the "Announcement on Special Governance of Illegal and Irregular Collection and

Use of Personal Information by Apps” [5]. Furthermore, during the 2020 Two Sessions, “personal information protection” once again became a hot topic, with the first Civil Code of the People’s Republic of China further strengthening the protection of citizens’ privacy rights and personal information [6]. These developments indicate that the legality and standardization of personal information collection and use through privacy policies have attracted national-level attention. Meanwhile, users’ reading perceptions of different mobile social media privacy policies under hard rules directly reflect the content and direction of privacy policy governance and regulation. Therefore, this study’s analysis of user reading perception measurements for privacy policies of commonly used domestic mobile social media platforms can facilitate in-depth comparison and scientific evaluation of platform privacy policies, offering practical significance for mobile social media sites to formulate more reasonable privacy policies.

2 Literature Review

2.1 International Research Status

International scholars have conducted comprehensive research on the definition of privacy policies, user reading habits, and their influence on user information behavior. They view privacy policies as essential safeguards for user privacy protection when using Apps [7], arguing that only standardized and reasonable privacy policies can constrain businesses from legitimately collecting and using personal information while effectively informing users of privacy risks associated with App usage [8]. As social media Apps have diversified in type and theme, negative reading of privacy policies has become normalized [9]. Characteristics such as readability [10], richness [11], complexity [12], comprehensiveness [13], and hard-rule nature [14] constitute primary reasons for users’ non-reading behavior. However, when privacy policies are presented by default, participants tend to read them carefully and actively [15]. Additionally, personalized management design in privacy policies can alter user reading behavior [16], with scholars finding that website privacy policy permissions affect users’ information sharing behavior [17]. When the effectiveness of user information sensitivity is influenced by privacy policy length, visibility, and specificity, users’ willingness to share personal information changes accordingly [18]. Table 1 summarizes major international research findings on privacy policies (including researchers, year, research type, analytical methods, and variables).

2.2 Domestic Research Status

Privacy policy research has recently attracted widespread attention from Chinese scholars. First, regarding research objects, scholars have analyzed privacy policies related to health Apps [25], short video applications [26], medical consultation Apps [27], foreign library websites [28], B2C online merchants [29], and top 100 Chinese website-ranked media sites [30], examining the implementation of privacy policies across various platforms. Second, concerning research content, studies have compared and analyzed the display methods, length, visibility,

specificity, information sensitivity, perceived relevance, privacy policy models, readability, and compliance of social media App privacy policies [31-33], revealing that Chinese social media App privacy policies suffer from uneven quality and concluding that policy formulation should adopt a user perspective with professional, comprehensive content presented in diverse formats [34]. Third, regarding management strategies, research indicates that government and enterprises should collaborate to regulate social media privacy policies from the legal and policy text level [35] to achieve readable content and visible formats [36]. Fourth, concerning impact, social media App privacy policies can not only reduce users' privacy concerns [37] but also moderate users' information sensitivity [1]. Table 2 summarizes major domestic research findings on social media App privacy policies (including researchers, year, research type, analytical methods, and variables).

In summary, privacy policy issues have attracted extensive attention from domestic and international scholars, with existing research primarily addressing presentation methods and policy impacts on users. Methodologically, scholars tend to employ theoretical perspectives such as privacy calculus theory, signaling theory, and communication privacy management theory to analyze privacy policy effects on user behavior, predominantly using content analysis and questionnaire surveys to summarize privacy policy information or compare overall content and appearance indicators of social media privacy policies. This study innovatively applies matter-element extension evaluation analysis methods, transforming evaluation indicators from traditional quantitative values to interval value domains, and conducts empirical analysis of mobile social media users' privacy policy reading perception under hard rules, further providing theoretical and practical guidance for mobile social media developers to formulate more reasonable privacy policies.

3 Framework for Measuring Mobile Social Media Users' Privacy Policy Reading Perception

This study constructs a measurement model framework for mobile social media users' privacy policy reading perception primarily through literature analysis, referencing research results from Erik et al. [18], Wan Ling et al. [47], Fan Huiqian et al. [48], Tang Yuanqing et al. [34], He Peiyu et al. [41], and Zhu Hou et al. [40]. Combining the textual characteristics and content norms of mobile social media privacy policies, the model adopts a five-dimensional indicator architecture: "appearance and format," "privacy protection," "information collection and storage," "information use and sharing," and "user rights." Table 3 presents the specific content, definitions, and literature sources for indicators at all levels.

4 Matter-Element Extension Evaluation Analysis Method

Extension theory utilizes formal tools to analyze the laws of contradictory problems [51]. In the 1980s, Cai Wen [50] proposed the matter-element analysis model to address the extension laws of matters containing multiple incompatible factors. This model can characterize matter-elements and their transformation processes from both qualitative and quantitative perspectives, objectively reflecting the real state of the material world. Matter-element extension analysis methods organically combine these two approaches, expanding the value domain of correlation functions and transforming evaluation indicators from fixed values to interval values, making the calculation of membership degrees between evaluation objects and evaluation sets more objective and accurate [52]. Scholars have applied matter-element extension models to evaluate online health consultation platform service quality [53], library alliance performance [52], and financial informatization performance [54]. Based on this, applying matter-element extension models to evaluate mobile social media privacy policy reading perception can comprehensively reflect user evaluation results. The analysis process is shown in Figure 1 [Figure 1: see original paper].

The specific steps are as follows:

4.1 Determine Classical and Node Domains

In the matter-element model, a matter-element describes three basic elements: name (N), characteristic (C), and value (V), formally recorded as $M = (N, C, V)$. The characteristic values of evaluation objects at different levels often have certain ranges, called classical domains, while the combination of all counting regions under different indicators is called the node domain [53]. Assuming mobile social media users' privacy policy reading perception can be divided into m levels with n evaluation indicators, the classical domain matter-element model is shown in Equation (1):

$$M_j = (N, C, V) = \begin{matrix} N_j & c_1 & [a_{1j}, b_{1j}] \\ & c_2 & [a_{2j}, b_{2j}] \\ & \vdots & \vdots \\ & c_i & [a_{ij}, b_{ij}] \\ & \vdots & \vdots \\ & c_n & [a_{nj}, b_{nj}] \end{matrix}$$

where M_j is the j -th isomorphic matter-element, N_j is the evaluation level of mobile social media users' privacy policy reading perception, c_1, c_2, \dots, c_n are n different evaluation indicator characteristics of N_j , and $V_{ij} = [a_{ij}, b_{ij}]$ is the value range interval defined by N_j for indicator C_j , i.e., the classical domain; a_{ij} and b_{ij} represent the lower and upper boundary values of the i -th indicator at the j -th evaluation level ($i = 1, 2, \dots, n; j = 1, 2, \dots, m$).

The corresponding node domain matter-element is shown in Equation (2):

$$M_p = (N_p, C, V_p) = \begin{matrix} N_p & c_1 & [a_{1p}, b_{1p}] \\ & c_2 & [a_{2p}, b_{2p}] \\ & & \vdots \\ & c_i & [a_{ip}, b_{ip}] \\ & & \vdots \\ & c_n & [a_{np}, b_{np}] \end{matrix}$$

where N_p represents all evaluation levels of mobile social media users' privacy policy reading perception, and $V_{ip} = [a_{ip}, b_{ip}]$ represents the overall value range interval of the i -th indicator across all levels, i.e., the node domain. The node domain is the combination of broader counting region ranges for each indicator level in the evaluation.

4.2 Determine the Matter-Element to be Evaluated

Assuming the mobile social media user privacy policy reading perception level to be evaluated is N_x , the matter-element of the evaluation object can be expressed as Equation (3):

$$M_x = (N_x, C, V_x) = \begin{matrix} Q & c_1 & v_1 \\ & c_2 & v_2 \\ & & \vdots \\ & c_i & v_i \\ & & \vdots \\ & c_n & v_n \end{matrix}$$

where c_i represents the determined evaluation indicators for mobile social media users' privacy policy reading perception, Q is the evaluation object, M_x is the matter-element of evaluation object Q , and v_1, v_2, \dots, v_n are the actual measured values of N_x regarding c_1, c_2, \dots, c_n across various indicators.

4.3 Calculate the Extension Correlation Function of the Matter-Element to be Evaluated

In extension theory, the correlation function characterizes the degree to which an element possesses a certain property. When applying matter-element extension models to study mobile social media users' privacy policy reading perception, it is necessary to establish different privacy policy reading perception content levels and determine the value ranges of corresponding indicators at each level. The correlation function calculation helps researchers determine the proximity between the evaluation object and each level. Before calculating the correlation function, the proximity between the matter-element to be evaluated and the classical and node domains must first be obtained. The proximity to the classical domain is shown in Equation (4):

$$\rho(v_i, V_{ij}) = \left| v_i - \frac{a_{ij} + b_{ij}}{2} \right| - \frac{b_{ij} - a_{ij}}{2}$$

The proximity to the node domain is shown in Equation (5):

$$\rho(v_i, V_{ip}) = \left| v_i - \frac{a_{ip} + b_{ip}}{2} \right| - \frac{b_{ip} - a_{ip}}{2}$$

Thus, the extension correlation function of the matter-element to be evaluated can be further calculated as shown in Equation (6):

$$K_j(v_i) = \begin{cases} -\frac{\rho(v_i, V_{ij})}{|V_{ij}|} & v_i \in V_{ij} \\ \frac{\rho(v_i, V_{ip})}{\rho(v_i, V_{ip}) - \rho(v_i, V_{ij})} & v_i \notin V_{ij} \end{cases}$$

where $|V_{ij}| = |b_{ij} - a_{ij}|$, and $K_j(v_i)$ represents the correlation degree between the i -th evaluation indicator of mobile social media users' privacy policy reading perception and the j -th evaluation level; $\rho(v_i, V_{ip})$ and $\rho(v_i, V_{ij})$ represent the distances between the i -th evaluation indicator's matter-element value and the node domain and classical domain, respectively.

4.4 Determine Indicator Weights

To effectively avoid bias from subjective weighting, this study adopts the extension weight method [51] to determine weight coefficients for each indicator. The process is as follows: First, calculate the weight interval coefficient for secondary indicators based on the actual scores of mobile social media users' privacy policy reading perception, as shown in Equation (7):

$$r_{ij}(v_i, V_{ij}) = \begin{cases} \frac{2(b_{ij} - v_i)}{b_{ij} - a_{ij}} & v_i \leq \frac{a_{ij} + b_{ij}}{2} \\ \frac{2(v_i - a_{ij})}{b_{ij} - a_{ij}} & v_i > \frac{a_{ij} + b_{ij}}{2} \end{cases}$$

where $v_i \in V_{ij}$, then $r_{ij}(v_i, V_{ij\max}) = \max\{r_{ij}(v_i, V_{ij})\}$. In actual evaluation, researchers must focus on each indicator's actual score; if its value belongs to a higher level, the indicator should have a larger weight interval coefficient.

After calculating secondary indicators' weight interval coefficients, the weight characteristic value for each secondary indicator must be further calculated as shown in Equation (8):

$$r_{ij}(v_i, V_{ij\max}) = \begin{cases} j_{\max} \times (1 + r_{ij}(v_i, V_{ij\max})) & r_{ij}(v_i, V_{ij\max}) \geq -0.5 \\ j_{\max} \times 0.5 & r_{ij}(v_i, V_{ij\max}) < -0.5 \end{cases}$$

where j_{\max} is the maximum value of evaluation level j . Thus, the weight of the k -th secondary indicator under the i -th primary indicator can be calculated as $a_{ik} = r_{ik} / \sum r_{ik}$, and the weight of the i -th primary indicator as $a_i = r_i / \sum r_i$, with $\sum a_{ik} = 1$ and $\sum a_i = 1$.

4.5 Determine the Evaluation Level of Mobile Social Media Users' Privacy Policy Reading Perception

The correlation degree between the evaluation object and a certain evaluation level under a primary indicator is calculated as shown in Equation (9):

$$K_j(Q_i) = \sum_{k=1}^{N_i} a_{ik} K_j(v_{ik})$$

where N_i represents the total number of secondary indicators contained in primary indicator C_i . Similarly, the overall correlation degree between evaluation object Q and evaluation level j is obtained as shown in Equation (10):

$$K_j(Q) = \sum_{i=1}^n a_i K_j(Q_i)$$

Through the above calculations, the comprehensive correlation degrees between the matter-element to be evaluated and all evaluation levels can be obtained. According to the maximum correlation recognition principle, the preliminary evaluation level j_0 of the matter-element to be evaluated is determined as shown in Equation (11):

$$K_{j_0}(Q) = \max K_j(Q)$$

To more precisely determine the tendency characteristics of the evaluation object on the evaluation level, the comprehensive correlation degrees between the evaluation object and each evaluation level are standardized as shown in Equation (12):

$$K_j = \frac{K_j(Q) - \min K_j(Q)}{\max K_j(Q) - \min K_j(Q)}$$

where $\min K_j(Q)$ and $\max K_j(Q)$ are the minimum and maximum values of the evaluation levels to which the evaluation object belongs. The evaluation level variable characteristic value of the matter-element to be evaluated can then be calculated as shown in Equation (13):

$$j^* = \frac{\sum_{j=1}^m j \times K_j}{\sum_{j=1}^m K_j}$$

The level variable characteristic value can determine the degree to which the evaluation object tends toward another level beyond its determined evaluation level.

5 Empirical Research

5.1 Object Selection

This study selected ten commonly used mobile social media platforms as survey samples: WeChat, QQ, Sina Weibo, Baidu Tieba, Sina Blog, Momo, Douban, Zhihu, Kuaishou, and Douyin. All selected samples represent currently popular social media platforms. Survey respondents primarily consisted of mobile social media user groups, including university students, corporate white-collar workers, and enterprise employees, aged 18-45, representing the user population to a certain extent. A total of 300 questionnaires were distributed, with 273 returned. After eliminating invalid questionnaires (e.g., malicious responses, contradictory answers, omissions, and excessive neutral responses), 252 valid questionnaires were obtained, yielding a valid response rate of 92.31%. Table 4 presents the demographic statistics.

5.2 Data Collection and Matter-Element Model Construction

Based on the mobile social media users' privacy policy reading perception evaluation indicators, a questionnaire was designed with all secondary indicators scored on an 11-point scale from 0-10 (where 0 represents the lowest score and 10 the highest). Building upon the evaluation indicator system established in Table 1 and combining user ratings, comprehensive scores for each indicator were obtained. After normalization through calculating average scores, five experts in information systems and user behavior research (all professors in library and information science) were consulted to divide the mobile social media users' privacy policy reading perception evaluation levels, thereby determining the classical and node domains for each evaluation indicator. The reading perception levels were ultimately divided into four grades: N_1 (Poor), N_2 (Fair), N_3 (Good), and N_4 (Excellent). Using WeChat user privacy policy reading perception data as a detailed example, secondary indicator weights were calculated according to Equations (7) and (8). Taking indicator C_{11} as an example: $C_{11}(0.71, < 0.6, 0.8 >) = 2 \times (0.8 - 0.71)/(0.8 - 0.6) = 0.9$, thus $C_{11} = 3 \times (1 + 0.9) = 5.7$. Similarly, $C_{12} = 4.94$, $C_{13} = 6.04$, and $C_{14} = 8.04$. Therefore, $C_1 = C_{11} + C_{12} + C_{13} + C_{14} = 5.7 + 4.94 + 6.04 + 8.04 = 24.72$, making the weight of C_{11} equal to $5.7/24.72 = 0.23$. Other secondary and primary indicator weights were calculated using the same method. Table 5 presents the specific value ranges.

5.3 Calculation of Correlation Degrees Between Privacy Policy Reading Perception Evaluation Levels

Taking the correlation degree between secondary indicator C_{11} and level N_1 as an example, according to Equations (4) and (5), the proximity degrees of C_{11} to level N_1 and node domain N_p are: $\rho(v_{11}, V_{111}) = \rho(0.71, [0.2, 0.4]) = |0.71 - (0.2 + 0.4)/2| - (0.4 - 0.2)/2 = 0.31$, and $\rho(v_{11}, V_{11p}) = \rho(0.71, [0.2, 1]) = |0.71 - (0.2 + 1)/2| - (1 - 0.2)/2 = -0.29$. Since $0.71 \notin [0.2, 0.4)$, according to Equation (6), the correlation degree of C_{11} to level N_1 is $K_1(v_{11}) = 0.31/(-0.79 - 0.31) = -0.52$. Similarly, $K_2(v_{11}) = -0.29$, $K_3(v_{11}) = 0.43$, and $K_4(v_{11}) = -0.23$. Table 6 presents the correlation degrees between other secondary indicators and evaluation levels.

After obtaining correlation degrees between secondary indicators and evaluation levels, the correlation degrees between primary indicators and evaluation levels are calculated according to Equation (9). Taking primary indicator C_1 as an example, its correlation degree with level N_1 is: $K_1(Q_1) = 0.23 \times (-0.52) + 0.20 \times (-0.09) + 0.24 \times (-0.52) + 0.33 \times (-0.46) = -0.41$. Similarly, $K_2(Q_1) = -0.23$, $K_3(Q_1) = 0.22$, and $K_4(Q_1) = -0.33$. Further calculation yields $j^* = 2.89$ for C_1 . Table 7 presents the correlation degrees between other primary indicators and evaluation levels.

Based on these results, the overall correlation degree between WeChat users' privacy policy reading perception and each evaluation level is obtained using Equation (10): $K_1(Q_1) = 0.16 \times (-0.41) + 0.25 \times (-0.56) + 0.19 \times (-0.45) + 0.21 \times (-0.51) + 0.23 \times (-0.61) = -0.54$. Table 8 presents the correlation degrees for the other three evaluation levels.

5.4 Calculation of Privacy Policy Reading Perception Evaluation Levels

According to the maximum correlation recognition principle, the preliminary evaluation level j_0 for WeChat users' privacy policy reading perception is 3. To more accurately determine the tendency characteristics of the evaluation object, Equation (12) yields $K_1 = (-0.654 + 0.54)/(0.22 + 0.54) = 0$, $K_2 = 0.35$, $K_3 = 1$, and $K_4 = 0.38$. Using Equation (13), the evaluation level variable characteristic value for WeChat users' privacy policy reading perception is: $j^* = (0 \times 1 + 0.35 \times 2 + 1 \times 3 + 0.38 \times 4)/(0 + 0.35 + 1 + 0.38) = 3.01$. Following the same analytical process for WeChat's primary indicators and total evaluation level correlation degrees, evaluation results for other social media platforms' privacy policy reading perception can be obtained. Rankings are based on j^* values, and ratings are determined according to the evaluation levels in Table 5. Table 9 presents the specific results.

6 Results Discussion and Research Findings

The calculation results indicate that WeChat, QQ, Sina Weibo, Zhihu, Kuaishou, and Douyin users' privacy policy reading perception level variable characteristic

values j^* approach “3,” with overall evaluation levels j_0 rated as “Good.” Baidu Tieba, Sina Blog, Momo, and Douban users’ privacy policy reading perception level variable characteristic values j^* approach “2,” with overall evaluation levels rated as “Fair.” This study explores specific indicator perception from two dimensions: appearance and format (C_1) and textual content (C_2, C_3, C_4, C_5).

6.1 Analysis of Privacy Policy Appearance and Format

Based on previous research and actual survey results, privacy policy appearance and format are categorized into: (1) text length, (2) font size, (3) line spacing, (4) number of subheadings, and (5) annotations. Table 10 presents the statistical results.

Analysis of the ten mobile social media privacy policies’ appearance reveals several patterns. First, regarding text length, privacy policies range from 4,000 to 15,000 words. Sina Blog has the shortest policy at only 4,050 words, while Zhihu’ s exceeds 14,000 words. Statistical results show that Baidu Tieba, Sina Blog, Momo, and Zhihu have primary indicator correlation degrees of 2 for appearance and format, with overall evaluation levels tending toward “Fair.” Text that is too short cannot effectively reflect privacy policy content, while excessively long texts increase reading burden and reduce readability. Thus, both overly long (Zhihu, Baidu Tieba, Momo) and overly short (Sina Blog) texts negatively impact mobile social media users’ reading perception.

Second, regarding font and line spacing, most platforms use Song font, while Zhihu and Douyin use Microsoft YaHei. Momo and Douban use smaller fonts with poor readability. Additionally, Sina Blog, Momo, and Baidu Tieba have smaller line spacing and lack bold highlighting for key statements. In comparison, other platforms have more appropriate font and line spacing sizes. Overall, WeChat, QQ, Kuaishou, and Sina Blog are more suitable for user reading in terms of font and line spacing.

Third, regarding subheadings and annotations, most platforms have 9-10 subheadings, with only Zhihu exceeding 10. Longer privacy policies contain significantly more annotations than shorter ones. Notably, Douban, Zhihu, and Baidu Tieba attach a glossary at the beginning or end of their privacy policies to facilitate user reading and comprehension. Overall, mobile social media platforms with prominent appearance and format features (QQ, Sina Weibo, WeChat) have moderate policy length (around 8,000 words), appropriate font and line spacing (Song font, size 10.5 or 5), 9-10 subheadings, and detailed annotations, resulting in higher user perception evaluations. This further validates Zhu Hou et al.’ s [40] conclusion that readability features positively influence users’ privacy policy reading intention.

6.2 Analysis of Privacy Policy Textual Content

Statistical analysis of the ten mobile social media privacy policies’ textual content indicators reveals completeness levels shown in Table 11 . Overall, platforms

with higher level variable values (QQ, Weibo, WeChat) demonstrate higher content completeness than those with lower values (Momo, Douban, Sina Blog), resulting in higher user perception evaluations. However, content completeness ranking differs slightly from perception evaluation ranking.

Specifically, in privacy protection, WeChat, Sina Weibo, Momo, and Kuaishou explicitly state the use of legal systems, information technology, and management systems to protect user privacy, with bold highlighting for sensitive information and detailed explanations for minor protection. Other platforms provide minimal coverage of privacy protection issues, describing only one or two aspects of legal, technical, or management protection without special font treatment for sensitive information or detailed minor protection explanations. This aligns with users' evaluation correlation degrees for the privacy protection indicator. In the big data era, mobile social media developers demonstrate weak awareness of user personal information protection when formulating privacy policies. Therefore, relevant supervisory departments should standardize the formulation of reasonable and compliant privacy policies, strictly reviewing whether user information protection content exists before App official release, and further safeguarding user information security through enhanced policy transparency.

Regarding information collection and storage, QQ, WeChat, Sina Weibo, Sina Blog, Momo, and Zhihu have primary indicator correlation degrees of 3 ("Good" level). Most platforms clearly state the purpose, content, scope, and methods of information collection, as well as storage duration and location, cookie and similar technology usage explanations, disclaimers, and third-party service descriptions. Only Sina Blog, Douban, Kuaishou, and Douyin lack disclaimers or third-party service descriptions. The results reveal that some Apps have unclear descriptions of personal information collection and storage, indicating that developers should improve privacy policy content quality by providing detailed descriptions and key markings of collection and storage purposes to enhance user trust.

In information use and sharing, most platforms explicitly state the purposes of using personal information, data sharing, disclosure, and transfer, as well as the extent of personal information use under special circumstances. However, Baidu Tieba, Sina Blog, Momo, and Douban devote minimal coverage to how personal information is used and shared, without declarations on security protection measures for special circumstances. Given users' weak personal information protection awareness, network regulatory departments should standardize the qualifications for using and sharing personal information, clarifying purposes and boundaries, and further improve privacy policy content standardization through government intervention and guidance.

Regarding user rights, all surveyed platforms provide detailed explanations of modification rights (C_{54}), deletion rights (C_{55}), and cancellation rights (C_{56}), allowing users to modify, delete, or cancel their personal privacy information as needed. However, the right to know (C_{51}), access rights (C_{52}), and choice rights (C_{53}) receive limited mention, with only WeChat disclosing and opening all per-

missions. These rights represent implicit usage permissions for mobile social media platforms to control and operate user privacy and constitute important content for user privacy protection and rights maintenance. Therefore, developers should provide users with corresponding basic rights including the right to know, modify, and decide when collecting, using, and sharing user information, while appropriately adding and improving other user rights based on current big data technologies to achieve information sharing and rational resource use under the premise of ensuring personal information security.

7 Conclusion and Future Outlook

This study conducts a matter-element extension evaluation analysis of mobile social media users' privacy policy reading perception under hard rules from five dimensions: appearance and format (C_1), privacy protection (C_2), information collection and storage (C_3), information use and sharing (C_4), and user rights (C_5). Results demonstrate that privacy policies with complete content, moderate length and line spacing, appropriate numbers of subheadings, and detailed annotations receive higher user scores and overall "Good" evaluation levels, leading to enhanced reading perception and willingness. This study enriches and improves the theoretical system of user behavior research by constructing a matter-element extension model that enhances objectivity and accuracy in evaluating mobile social media users' privacy policy reading perception across different levels. The findings not only improve users' understanding of privacy policy content and strengthen their reading ability and personal information protection capacity but also provide practical guidance for developers to formulate more reasonable and professional privacy policies.

This research has certain limitations. First, the influencing factor indicator dimensions in the matter-element extension evaluation model have expandability. Second, during the determination of classical and node domains for evaluation objects, evaluation level value intervals are subject to expert group influence, and different intervals may exhibit certain differences. Future research will refine evaluation indicators to improve model elements, expand survey scope, and achieve more accurate matter-element extension evaluation results for mobile social media users' privacy policy reading perception.

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