

The Mechanism of Social Interaction on User Willingness to Pay for Knowledge (Postprint)

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Abstract

[Purpose/Significance] The proliferation of knowledge payment products with varying quality has reduced users' willingness to pay, potentially leading to the failure of the knowledge payment model. This study aims to investigate the mechanism through which social interaction influences users' knowledge payment intention, and examines the effects of trust and identification (including cognitive, emotional, and evaluative dimensions) on users' payment intention. [Method/Process] A total of 377 valid questionnaires were collected, and data analysis was conducted using SPSS and LISREL. [Results/Conclusion] The results indicate that information interaction and emotional interaction significantly affect trust, information interaction and trust influence identification, and trust and identification determine payment intention. Therefore, knowledge payment platforms should emphasize facilitating social interaction among users and foster users' trust and identification with the platform to promote their payment intention.

Full Text

The Effect of Social Interaction on Users' Intention of Knowledge Payment

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Abstract

[Purpose/Significance] The proliferation of knowledge payment products with inconsistent quality has diminished users' willingness to pay, potentially undermining the viability of knowledge payment models. This study investigates the mechanism through which social interaction influences users'

knowledge payment intention, examining the roles of trust and identification (including cognitive, emotional, and evaluative dimensions) in shaping payment willingness. [Method/Process] A total of 377 valid questionnaires were collected, and data analysis was conducted using SPSS and LISREL. [Results/Conclusion] The findings reveal that informational interaction and emotional interaction significantly affect trust; informational interaction and trust influence identification; and both trust and identification determine payment intention. Therefore, knowledge payment platforms should prioritize fostering social interaction among users and cultivating user trust and identification to enhance payment intention.

Keywords: knowledge payment; social interaction; trust; identification

Introduction

The rapid development of mobile communication technology has profoundly enriched internet application scenarios. Accelerated knowledge updates and the overwhelming abundance of free content have increased the difficulty for users to identify high-quality resources, thereby generating demand for paid alternatives. In this context, knowledge payment has experienced rapid growth by providing personalized information, experiences, and knowledge in vertical domains. According to an iResearch report, monthly active users of knowledge payment services in China reached 143 million in 2017, with annual usage time increasing by over 100% and the industry scale reaching approximately 4.9 billion yuan. This figure is projected to reach 23.5 billion yuan by 2020 [1], demonstrating enormous market potential. However, challenges such as content over-entertainment, lack of evaluation and screening systems, incomplete industrial chains, and limited user bases constrain the development of knowledge payment models. Since April 2017, nearly all knowledge payment products have shown significant declines in opening and playback rates. Consequently, stimulating user payment intention and encouraging participation are critical to the success of knowledge payment models.

Users' interactive behaviors, including informational and emotional exchanges, can influence other users' payment decisions. Zhang et al. found that knowledge payment users exhibit social needs [2], while international studies have demonstrated that social interaction significantly impacts health information seeking intention [3], social commerce [4], and impulse buying behavior [5], establishing social interaction as a notable factor affecting user behavior. Through social interaction, users obtain valuable advice, solutions, and emotional encouragement or support, which helps them build trust and identification with the community, thereby facilitating payment behavior. This study examines the influence mechanism of social interaction on users' knowledge payment intention, offering insights for platform decision-making.

Literature Review

Knowledge payment, as an emerging model, has attracted researchers' attention. Zou and Luo traced the development of knowledge payment, comparing features across four major platforms—paid Q&A/Live, Ximalaya FM, Dedao, and Zhihu Live—and analyzed three dissemination models [6]. Wang compared representative knowledge products across different platforms, concluding that knowledge payment remains in an exploratory phase with numerous future challenges [7].

User payment intention and behavior are crucial to the success of knowledge payment models. Existing research has focused on identifying factors influencing payment behavior through empirical studies. Trust helps mitigate risk and promotes payment behavior. Zhang and Peng found that trust in opinion leaders among paid observers influences continuous participation intention through perceived value [8]. Huang discovered that community users' trust significantly affects their attitude toward purchasing knowledge services [9]. Li et al., based on the theory of planned behavior, identified trust and experience as factors influencing knowledge payment intention [10]. Beyond trust, satisfaction and perceived value also affect payment behavior. Zhao and Yao found that perceived usefulness and satisfaction influence users' intention to continue using knowledge payment apps [11]. Fang et al. argued that perceived value is a primary determinant of knowledge payment in virtual communities [12]. Zhao et al. examined how structural, relational, and cognitive capital affect user payment behavior in Q&A platforms based on social capital theory [13].

These studies have investigated knowledge payment intention from perspectives including trust, perceived value, and satisfaction, but have largely overlooked social interaction. However, knowledge payment users frequently engage in social interaction—both informational and emotional—which helps build social networks and influences behavior. Therefore, examining social interaction's impact on knowledge payment is essential.

Research Model and Hypotheses

3.1 Social Interaction

Social interaction refers to activities where individuals or groups interact and influence each other to satisfy certain needs. Through social interaction, individuals accept social influence, internalize social norms, learn social behaviors, and achieve survival and development. N. Wiener first proposed the concept, defining social interaction as bidirectional communication [14]. D. Horton and R. R. Wohl found that media and audiences form emotional connections through social interaction [15].

With the development of social networks, user interactions have become increasingly frequent. Real-time online communication enables users to transcend spatial limitations and exchange information with others, establishing social re-

relationships. Compared to platform-published content, user-shared information is more readily trusted. Numerous scholars have confirmed social interaction's impact on user behavior. C. C. Chang demonstrated that social networking site interactions facilitate flow experiences [16]. C. S. Ng found that social interaction enhances intimacy and familiarity among users, thereby influencing trust [17]. Y. C. Shen et al. and H. Y. Jang et al. confirmed that social interaction in virtual communities effectively increases user loyalty [18-19]. Y. F. Kuo and L. H. Feng proved that user interactions in online brand communities increase perceived benefits [20]. C. W. Phang et al. showed that user interaction enhances participation levels [21]. L. Xiang et al., using the Mogujie app as an example, found that social interaction significantly affects impulse buying intention [5]. These studies demonstrate that social interaction influences user experience, trust, loyalty, and purchase behavior, though most have focused on traditional e-commerce rather than the emerging knowledge payment context.

Social interaction comprises informational and emotional dimensions. Informational interaction involves the exchange of information and knowledge among users, including information seeking, provision, and sharing. Emotional interaction involves exchanges about personal feelings and emotions. Under deep emotional exchange, users are willing to confide more personal feelings to others and listen to others' emotions [22].

In knowledge payment platforms based on social networks like Zhihu and Sina Weibo, user interactions are frequent. Platforms such as Dedao and Ximalaya FM have established comment sections where multiple users can exchange experiences, learning insights, and product-related information.

Frequent informational and emotional interactions help users build trust. When information shared by other users is repeatedly verified as correct, useful, or helpful, users develop trust in the platform, believing it can meet their expectations. Discussions about platform features and recommendations of high-quality paid content help users utilize knowledge payment services more efficiently, enhancing their platform cognition. In frequent informational interactions, users establish and maintain social network connections. Positive emotional interactions foster trust among users. According to trust transfer theory, trust in a known entity can transfer to an unknown entity [23]. Trust among knowledge payment users can thus translate into trust toward the platform. When platforms make efforts to encourage user communication and enhance exchange experiences, users perceive that the platform values user experience, leading them to believe the platform can effectively control content quality. Moreover, publicly posted user reviews (both positive and negative) make users perceive the platform as transparent and honest.

Therefore, we hypothesize:

H1: Informational interaction significantly affects trust.

H2: Emotional interaction significantly affects trust.

In the initial stage of joining a knowledge payment platform, users engage in

simple information exchange. As social relationships deepen and familiarity increases, R. B. Zajonc's mere exposure effect suggests that higher familiarity leads to greater liking [24], making users more likely to identify with the group. Frequent social interaction strengthens relational connections among users. In discussions about platform functions and paid knowledge, users perceive collective learning and progress, facilitating community identification. When users share consistent views on products or have common interests, they benefit from exchanges and are more likely to engage in deeper emotional interaction. After establishing emotional connections, users become willing to share personal feelings with others [25]. In knowledge payment platforms, emotional interaction creates a friendly atmosphere where users feel supported, understood, and empathized with. Lou et al. demonstrated that emotional interaction among community members establishes intimacy and fosters attachment and belonging to the platform [26].

Therefore, we hypothesize:

H3: Informational interaction significantly affects identification.

H4: Emotional interaction significantly affects identification.

3.2 Trust

Users' trust in payment platforms includes three dimensions: competence, benevolence, and integrity [27]. Competence refers to the platform's professional expertise; benevolence means the platform prioritizes user interests over its own; integrity indicates the platform keeps its promises. H. T. Keh and Y. Xie confirmed that trust significantly affects identification [28]. In trustworthy knowledge payment platforms, user interactions become deeper and more frequent, making it easier for users to develop platform identification. Additionally, trust enhances satisfaction and increases usage frequency. Satisfaction reflects users' positive emotions toward the platform, leading them to reevaluate their relationship with the platform and facilitating identification development. M. Hultman et al. confirmed that satisfaction significantly affects identification [29].

Numerous studies have confirmed trust's significant impact on purchase behavior [30-32]. J. J. Xu et al. found that platform trust significantly affects user satisfaction, which in turn strengthens purchase intention [33]. Trust mitigates perceived uncertainty and risk. In trusted platforms, users believe product information is accurate and they can select high-quality knowledge content matching their needs, significantly reducing perceived risk and promoting payment intention. Therefore, we hypothesize:

H5: Trust significantly affects identification.

H6: Trust significantly affects payment intention.

3.3 Identification

Social identity theory, developed from group behavior research, was first defined by H. Tajfel as an individual's perception of belonging to a specific group and the emotional value derived from group membership [34]. N. Ellemers et al. proposed social identification as a second-order factor comprising three dimensions: cognitive, emotional, and evaluative [35], a perspective widely adopted. The cognitive dimension represents group identification—alignment between individual and group values. The emotional dimension refers to members' sense of belonging and attachment. The evaluative dimension reflects individuals' positive or negative assessment of their value within the group. Research shows that cognitive, emotional, and evaluative identification effectively measure social identification [36].

Social identity theory effectively explains individual-group relationships and is widely applied in virtual community research. C. Teng found that identification significantly affects online gaming community participation [37]. R. Chen et al. and B. Popp and B. Wilson confirmed that identification significantly influences loyalty on Facebook [38-39]. S. L. Shapiro et al. investigated factors influencing users' willingness to pay for combat sports broadcasts, finding that stronger identification leads to greater payment intention [40]. In knowledge payment contexts, when users' self-perception aligns with platform identity—believing paid content matches their preferences and needs—payment intention strengthens. Users' sense of membership and belonging, combined with positive evaluations of their platform value, stimulate active participation and payment intention. Therefore, we hypothesize:

H7: Identification significantly affects payment intention.

The research model is shown in Figure 1 [Figure 1: see original paper].

Questionnaire Design and Data Collection

The questionnaire was designed based on the research model. The first part collected sample characteristics including usage experience, frequency, and payment preferences. The second part used a 7-point Likert scale to measure user interactions in knowledge payment contexts. All items were adapted from existing international literature, with sources shown in Table 1.

The online questionnaire was distributed via Wenjuanxing, yielding 377 valid responses. The sample comprised 195 males (51.7%) and 182 females (48.3%), closely matching China's internet user gender distribution. Age distribution showed the highest proportion (59.2%) in the 20-29 range, followed by 30-39 (30.0%). Occupations included company employees (30.0%), students (26.5%), and technical professionals (19.4%). These demographic characteristics align with iResearch reports [1]. Users with over one year of knowledge payment experience accounted for 30.77%, and 84.6% held bachelor's degrees or higher. Regarding payment preferences, 72.41% paid for vocational skills content, followed by personal skills (48.54%) and professional knowledge (47.74%). Investment

and financial knowledge accounted for 36.87%. Platform usage showed Zhihu as most popular (77.72%), followed by Ximalaya FM, Weibo, Douban Time, Dingxiang Doctor, and Dedao.

Data Analysis and Results

Data analysis proceeded in two stages. First, exploratory factor analysis was conducted. The factor loading matrix is shown in Table 2. All items loaded highly on their respective factors and lowly on others, demonstrating good discriminant validity.

Second, confirmatory factor analysis (CFA) examined standardized loadings, average variance extracted (AVE), composite reliability (CR), and Cronbach's Alpha, as shown in Table 3. Most standardized loadings exceeded 0.7, all AVE values surpassed 0.5, all CR values exceeded 0.7, and all Alpha values exceeded 0.7, indicating good validity and reliability.

The structural model was then analyzed using LISREL. Fit indices are shown in Table 4. Except for RMSEA slightly exceeding the recommended value, all indices met or exceeded recommendations, indicating good model fit. Path coefficients and significance levels are shown in Figure 2 [Figure 2: see original paper].

Results support all hypotheses except H4. The path coefficient from informational interaction to trust is 0.43, indicating a strong effect. In knowledge payment platforms, informational interaction helps solve usage problems and enhances user experience. High-quality paid products generate positive word-of-mouth, enabling users with specific needs to find suitable products more quickly. Interaction increases information transparency, and users perceive platform sincerity, fostering trust.

The path coefficient from emotional interaction to trust is 0.30. When users share happiness or seek comfort through emotional interaction, resonance from other users makes them feel understood, satisfying social needs and building trust among users. This trust deepens reliance on the platform and can transfer into platform trust through trust transfer mechanisms.

The three first-order factors of identification all show strong loadings, with the emotional dimension having the largest effect (0.90). When users develop attachment and belonging to a platform, overall identification is strong. The cognitive dimension loading is 0.83—when users perceive alignment between their values and the platform's goals and positioning, they categorize themselves with the platform. The evaluative identification loading is 0.74, indicating that users' assessment of their own value within the platform affects their identification. According to Maslow's hierarchy of needs, fulfilling self-actualization needs can unleash human potential and self-motivation. When users believe they can achieve self-worth within the platform, they develop commitment and overall identification.

Both trust and identification significantly affect payment intention, consistent with existing research [31,40,43]. The path coefficient from trust to payment intention is 0.23, while from identification to payment intention is 0.35, indicating that identification has a stronger effect and represents the primary factor influencing payment intention. Knowledge payment users have learning and improvement needs as well as social needs. In payment platforms, knowledge sharing based on experience and skills yields more obvious results in shorter time than conventional courses. When users identify with the platform—perceiving alignment between their knowledge and learning attitudes and the platform’s orientation—they develop a sense of membership, belonging, and dependence. Satisfied social needs deepen connections with the platform and strengthen willingness to contribute to its development.

Among trust’s antecedents, informational interaction primarily affects rational platform evaluation, while emotional interaction influences trust judgments through affective pathways. In trusted platforms formed through both rational and affective mechanisms, users believe the platform can control product quality and provide professional services, expecting to achieve self-improvement goals through paid learning. Simultaneously, they perceive that the platform cares about user interests and growth, not just economic benefits, leading to positive attitudes and strong payment intention.

Emotional interaction does not significantly affect identification. Possible reasons include: (1) emotional interaction’s strong effect on trust indirectly influences identification through trust; (2) usage habits vary across platforms—for instance, in non-social-platform-derived knowledge payment apps like Ximalaya FM’s listening circles, some users share emotions to vent to strangers rather than build stable, continuous relationships, making group identification difficult to establish.

Discussion

This study developed a model of users’ knowledge payment intention from a social interaction perspective. Results show that platform trust is significantly influenced by both informational and emotional interaction. Identification’s three dimensions effectively measure overall identification, which is significantly affected by informational interaction and trust—with trust having a very strong effect. Trust and identification jointly influence payment intention.

Managerial Implications:

1. **Platform Community Development:** Platforms should emphasize interactive community construction and incentivize user participation. For example, Zhihu leverages years of accumulated community data to provide users with paid content better suited to their needs, thereby promoting payment. In vertical domains, integrating social and content features creates significant value. The finance-focused knowledge payment app Xiaohongquan accumulated 100,000 registered users between May and August

2018 [44], demonstrating strong growth potential.

2. **Content Quality Control:** Platforms should deeply explore user needs and strictly control paid content quality. Unlike top-tier platforms with brand advantages, mid-tier and long-tail platforms (accounting for 65% of the market [1]) can gain user trust through consistently high-quality content. Robust evaluation and feedback mechanisms help reduce content screening costs and improve new users' payment intention.
3. **Value Communication:** Platforms should convey their values to build user identification. Identification increases usage time and frequency and enhances repeat purchase intention. Strongly identified users spontaneously recommend the platform to others, facilitating value propagation.

Limitations:

First, knowledge payment includes two models: social platforms adding payment functions and new payment platforms introducing social features. This study did not differentiate user behaviors across these models—future research could compare behavioral differences. Second, some platform users are inactive, using platforms solely for learning with minimal social participation. This study did not examine factors influencing payment intention among these users, representing another avenue for future research.

References

- [1] iResearch. 2018 China Online Knowledge Payment Market Research Report [R/OL]. [2018-06-01]. <https://www.iresearch.com.cn/Detail/report?id=3191&isfree=0>.
- [2] Zhang S, Wang W, Li J. Research on influencing factors of users' online knowledge payment behavior [J]. Library and Information Service, 2017, 61(10): 94-100. [3] Wu T, Deng Z, Zhang D, et al. Seeking and using intention of health information from doctors in social media: the effect of doctor-consumer interaction [J]. International Journal of Medical Informatics, 2018, 115(7): 106-113. [4] Wang Y, Yu C. Social interaction-based consumer decision-making model in social commerce: the role of word of mouth and observational learning [J]. Information & Management, 2013, 50(8): 661-672. [5] Xiang L, Zheng X, Lee MKO, et al. Exploring consumers' impulse buying behavior on social commerce platform: the role of parasocial interaction [J]. International Journal of Information Management, 2016, 36(3): 333-347. [6] Zou B, Luo H. Knowledge payment: a knowledge dissemination model centered on openness, sharing, and payment [J]. New Media Research, 2017, 3(11): 110-112. [7] Wang C. The singularity and future of knowledge payment [J]. Internet Economy, 2017(S1): 68-71. [8] Zhang Y, Peng Z, Liu Q. Influencing factors of users' continuous participation intention in paid Q&A platforms [J]. Library Tribune, 2018, 38(6): 1-8. [9] Huang B. Research on purchase intention of network community knowledge services [D]. Shanghai: East China Normal University, 2017. [10] Li G, Lu Y, Teng S. Research on users' online knowledge payment behavior: based on the theory of planned behavior [J]. Library Science

Research, 2018(10): 49-60. [11] Zhao B, Yao Y. Research on influencing factors of users' continuous usage intention of knowledge payment apps [J]. Library Science Research, 2017(17): 96-101. [12] Fang A, Lu M, Liu K. Empirical study on users' knowledge payment intention in virtual communities [J]. Library and Information Service, 2018, 62(6): 105-115. [13] Zhao Y, Yuan X, Li L, et al. Research on influencing factors of users' knowledge payment behavior in Q&A platforms based on social capital theory [J]. Library and Information Knowledge, 2018(4): 15-23. [14] Wiener N. Subtle and obvious keys for the minnesota multiphasic personality inventory [J]. Journal of consulting psychology, 1948, 12(3): 164-170. [15] Horton D, Wohl RR. Mass communication and para-social interaction [J]. Psychiatry: interpersonal and biological processes, 1956, 19(3): 215-229. [16] Chang CC. Examining users' intention to continue using social network games: a flow experience perspective [J]. Telematics and informatics, 2013, 30(4): 311-321. [17] Ng CS. Intention to purchase on social commerce websites across cultures: a cross-regional study [J]. Information & management, 2013, 50(8): 609-620. [18] Shen YC, Huang CY, Chu CH, et al. Virtual community loyalty: an interpersonal-interaction perspective [J]. International journal of electronic commerce, 2010, 15(1): 49-73. [19] Jang HY, Kois S, Koh J. The influence of on-line brand community characteristics on community commitment and brand loyalty [J]. International journal of electronic commerce, 2008, 12(3): 57-75. [20] Kuo YF, Feng LH. Relationships among community interaction characteristics, perceived benefits, community commitment, and oppositional brand loyalty in online brand communities [J]. International journal of information management, 2013, 33(6): 948-962. [21] Phang CW, Zhang CH, Sutanto J. The influence of user interaction and participation in social media on the consumption intention of niche products [J]. Information & management, 2017, 54(7): 837-850. [22] Chen J, Zhang C, Xu YJ. The role of mutual trust in building members' loyalty to a C2C platform provider [J]. International journal of electronic commerce, 2009, 14(1): 147-171. [23] Stewart KJ. Trust transfer on the world wide web [J]. Organization science, 2003, 14(1): 5-17. [24] Zajonc RB. The attitudinal effects of mere exposure [J]. Journal of personality & social psychology monograph supplements, 1968, 9(2): 1-27. [25] Preece J. Empathic communities: balancing emotional and factual communication [J]. Interacting with computers, 1999, 12(1): 63-77. [26] Lou T. Empirical study on the psychological connection mechanism between virtual communities and members: based on identification and bond perspective [J]. Nankai Business Review, 2011, 14(2): 14-25. [27] McKnight DH, Choudhury V, Kacmar C. Developing and validating trust measures for e-commerce: an integrative typology [J]. Information systems research, 2002, 13(3): 334-359. [28] Keh HT, Xie Y. Corporate reputation and customer behavioral intentions: the roles of trust, identification and commitment [J]. Industrial marketing management, 2009, 38(7): 732-742. [29] Hultman M, Skarmeas D, Oghazi P, et al. Achieving tourist loyalty through destination personality, satisfaction, and identification [J]. Journal of business research, 2015, 68(11): 2227-2231. [30] Yahia IB, Al-Neama N, Kerbache L. Investigating the drivers for social commerce in social media platforms: importance of trust, social support and the

platform perceived usage [J]. Journal of retailing and consumer services, 2018, 41(3): 11-19. [31] Oghazi P, Karlsson S, Hellström D, et al. Online purchase return policy leniency and purchase decision: mediating role of consumer trust [J]. Journal of retailing and consumer services, 2018, 40(6): 88-102. [32] Fu S, Yan Q, Feng GC. Who will attract you? Similarity effect among users on online purchase intention of movie tickets in the buyer-seller context [J]. Journal of strategic information systems, 2016, 25(1): 15-31. [33] Xu JJ, Cenfetelli RT, Aquino K. Do different kinds of trust matter? An examination of the three trusting beliefs on satisfaction and purchase intention in the social shopping context [J]. International journal of information management, 2017, 37(3): 179-189. [34] Tajfel H. Differentiation between social groups [M]. London: Academic Press, 1978. [35] Ellemers N, Kortekaas P, Ouwerkerk JW. Self-categorisation, commitment to the group and group self-esteem as related but distinct aspects of social identity [J]. European journal of social psychology, 1999, 29(2/3): 371-389. [36] Zhou T. Understanding online community user participation: a social influence perspective [J]. Internet research, 2011, 21(1): 67-81. [37] Teng C. Impact of avatar identification on online gamer loyalty: perspectives of social identity and social capital theories [J]. International journal of information management, 2017, 37(6): 601-610. [38] Chen R, Sharma SK, Rao HR. Members' site use continuance on Facebook: examining the role of relational capital [J]. Decision support systems, 2016, 90(10): 86-98. [39] Popp B, Wilson B. Investigating the role of identification for social networking Facebook brand pages [J]. Computers in human behavior, 2018, 84(7): 141-152. [40] Shapiro SL, Reams SL, SokKF. Is it worth the price? The role of perceived financial risk, identification, and perceived value in purchasing pay-per-view broadcasts of combat sports [J]. Sport management review, 2018, 21(4): 1-12. [41] Liang TP, Ho YT, Li YW, et al. What drives social commerce: the role of social support and relationship quality [J]. International journal of electronic commerce, 2011, 16(2): 69-90. [42] Wan JL, Lu YB, Wang B, et al. How attachment influences users' willingness to donate to content creators in social media: a socio-technical systems perspective [J]. Information & management, 2017, 54(7): 837-850. [43] Lu BZ, Fan WG, Zhou M. Social presence, trust, and social commerce purchase intention: an empirical research [J]. Computers in human behavior, 2016, 56(3): 225-237. [44] Jing T. 36Kr exclusive | Using content + social features to enter knowledge payment, "Xiaohongquan" secures 8 million RMB Pre-A round financing [EB/OL]. [2018-09-08]. <https://36kr.com/p/5148621.html>.

Author Contributions

Zhou Tao: Overall research design, revision, and finalization;
 Tan Qi: Data collection and analysis, initial draft writing;
 Takirova Bayan: Data collection and analysis;
 Deng Shengli: Overall research design.

Note: Figure translations are in progress. See original paper for figures.

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