

How did the Intelligent Search Engine Become Popular Among Chinese Residents Since the Emergence of Deepseek?

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Abstract—This study, based on the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB), combined with the Stimulus-Organism-Response (SOR) theoretical framework, explores the influencing factors and promotion mechanisms for the popularization of “Deepseek” intelligent search engines in China. Through a questionnaire survey, 343 valid samples were collected, and the structural equation model (SEM) was used for data analysis, verifying 8 out of 10 research hypotheses. Perceived usefulness (PU) and perceived ease of use (PEOU) significantly and positively influence the intention to use, indicating that users' cognition of the functional value and operational convenience of AI search engines is a key driving factor. Subjective norms (SN) directly promote the intention to use but do not indirectly affect it through perceived usefulness, suggesting that the influence of the social environment stems more from irrational paths (such as group atmosphere infection). Perceived behavioral control indirectly enhances the intention to use by improving perceived ease of use and usefulness, highlighting the importance of users' own abilities and device support. Perceived playfulness only indirectly affects the intention to use through perceived usefulness and has no significant effect on ease of use, possibly because the entertainment function increases operational complexity. Technological facilitation has a significant positive impact on both perceived usefulness and ease of use, indicating that the optimization of technical performance (such as interaction efficiency and powerful functions) is the core for enhancing user experience.

Keywords—AI search engine; Deepseek; SOR; Technology Acceptance Model; Theory of Planned Behavior

I. INTRODUCTION

In today's society, where digitalization and mobility are highly integrated, AI search engines, as an intelligent tool of information retrieval, are changing the way people acquire knowledge and information at an unprecedented speed. Their unique features, such as semantic understanding, personalized recommendations, and intelligent interaction, not only enhance the efficiency and accuracy of information retrieval but also provide users with a highly personalized experience. Notably, AI search engines have transcended traditional PC usage scenarios and have achieved widespread adoption through various mobile applications and services, becoming an indispensable tool for information acquisition in daily life and work. As shown in the research by Kaiser et al. [1], generative AI search engines exhibit significantly different user preferences and interaction patterns compared to traditional

search engines during practical search tasks, and this technological innovation is reshaping the behavioral paradigm of information retrieval.

However, the users' acceptance behavior towards AI search engines is a complex decision-making process influenced by multiple factors. Relying solely on one single theoretical model to analyze users' acceptance behavior may not fully reveal its underlying influencing mechanisms. Combining the Technology Acceptance Model (TAM) with the Theory of Planned Behavior (TPB) can provide a more comprehensive and in-depth analytical framework for this research. The TAM has theoretical advantages in deconstructing individual technology cognition, while the TPB effectively supplements the explanatory dimensions of social psychological factors [2, 3]. The integration of the two models has become a trend in technology acceptance research in recent years.

The TAM focuses on two key dimensions in the technology acceptance process—perceived usefulness (PU) and perceived ease of use (PEOU). PU reflects users' beliefs about whether the AI search engine can effectively enhance information retrieval efficiency, helping them obtain the information more quickly and accurately. PEOU concerns the ease of operation during the usage process, involving technological designs such as interface friendliness and interaction smoothness. These two factors play an important role in users' initial attitudes and willingness to use [4, 5]. Actually, users' acceptance behavior is often influenced by factors beyond personal cognition, and the single TAM has certain limitations in explaining users' social psychological processes.

TPB explains user behavior from a broader perspective. TPB concerns that behavioral intention is a factor that directly leads to actual behavior, and that behavioral intention is influenced by attitude, subjective norms, and perceived behavioral control. Subjective norms reflect the perceived social or group pressures or expectations, such as the attitudes and behaviors demonstrated by family, friends, colleagues, and professional circles towards using AI search engines. Perceived behavioral control refers to an individual's assessment of their ability to execute the behavior, including aspects such as technical operation skills, relevant knowledge reserves, and resource availability. The introduction of subjective norms and perceived behavioral control can effectively compensate for the traditional Technology Acceptance Model's neglect of social contextual factors [6]. Incorporating TPB into AI search engine

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research can more comprehensively reveal the social psychological factors influencing user acceptance behavior, supplementing the TAM's shortcomings in explaining psychological factors such as social norms and self-efficacy [7, 8].

Reviewing previous user studies on intelligent search engines, we find that researchers generally combine the TAM and SOR models for research, but seldom consider the Theory of Planned Behavior. Considering the collectivist cultural atmosphere advocated in Chinese society, Chinese users may use intelligent search engines as "Deepseek" for the reason of following the social trend. The influence of social norms is a factor worth considering when we conduct research on the use of intelligent search engines by Chinese users. Therefore, we have introduced the relevant variables of the Theory of Planned Behavior into the model.

A comprehensive understanding of the internal mechanisms of user acceptance behavior is of crucial strategic significance for developers and promoters of AI search engines. Utilizing a combined theoretical framework of TAM and TPB for research can provide clear and systematic guidance for product optimization and market promotion. This research path not only has theoretical innovation value but also offers actionable, practical guidance for the actual implementation of AI technology.

II. LITERATURE AND HYPOTHESIS

In the digital age, the rapid development of artificial intelligence (AI) technology has profoundly changed the way people access information. As one of the important applications of AI technology, the willingness to use AI search engines is influenced by various factors. This study aims to systematically identify the key factors affecting the willingness to use AI search engines by integrating the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB) within the Stimulus-Organism-Response (SOR) theoretical framework.

A. Theoretical Foundation and Research Framework

Define abbreviations and acronyms the first time they are used in the text, even after they have already been defined in the abstract. Abbreviations such as IEEE, SI, ac, and dc do not have to be defined. Abbreviations that incorporate periods should not have spaces: write "C.N.R.S." not "C.N.R.S." Do not use abbreviations in the title unless they are unavoidable (for example, "IEEE" in the title of this study).

1) *Core perspective of TAM*: TAM, proposed by Davis [9], provides a foundational framework for understanding users' acceptance behaviors towards information technology. This model posits that PU and PEOU are the two core variables determining the extent of user acceptance of a system. Specifically, PU refers to the degree to which a user believes that using a particular system can enhance their work efficiency, while PEOU reflects the extent to which the user perceives the system as easy to use [4]. These two beliefs together form the user's attitude towards using the system, which in turn influences their behavioral intentions and actual usage behavior [10-13].

2) *Extended perspective of TPB*: TPB, proposed by Ajzen, serves as an extension of the Theory of Reasoned Action and holds significant importance in explaining the mechanism of individual behaviors [6, 14]. TPB posits that behavioral intention is the most direct factor influencing individual behavior, and that behavioral intention itself is a result of the combined effects of attitude, subjective norms, and perceived behavioral control. Subjective Norms (SN) refer to the social pressure perceived by an individual to perform a certain behavior, reflecting the individual's cognition of the expectations of significant others regarding compliance with that behavior. Perceived Behavioral Control (PBC) indicates "the extent to which people perceive they have the ability or control to perform a given behavior", representing the individual's perception of their capability to execute that behavior [15, 16].

3) *SOR theoretical framework*: The SOR model was proposed by Mehrabian based on the "stimulus-response" framework, where S represents the stimulus, O represents the cognitive organism, and R represents the response made by the subject after receiving the stimulus, following certain internal activities [17-20]. The SOR model is widely applied in fields such as marketing, consumer behavior, and information systems user behavior. It is extensively used to study how individuals perceive environmental stimuli and their behavioral responses, providing a research basis for exploring the mechanisms of individual or group behavior formation. Therefore, it is appropriate to study the willingness of Chinese residents to use AI search engines based on the SOR theoretical framework.

B. Theoretical Integration and the Proposal of Research Hypotheses

Under the SOR theoretical framework, the combination of TAM and TPB provides a more comprehensive theoretical perspective for a deeper understanding of the willingness to use AI search engines [21-23]. This study integrates these two major theories and incorporates emerging variables such as perceived playfulness and technological facilitation, proposing ten research hypotheses aimed at systematically exploring the impact pathways of various factors on the willingness to use AI search engines.

PU and PEOU, as core variables of TAM, have been confirmed in numerous studies to have a critical impact on the willingness to use technology. Davis [9] emphasized that these two key beliefs are the main factors determining users' acceptance of information systems. After Davis' research, the impact of both PU and PEOU was demonstrated [24-26]. Rahman et al. [27] found that PU and PEOU are crucial for fostering a positive attitude towards AI technology when examining students' intentions to use ChatGPT, directly supporting the core tenets of TAM. In specific application scenarios of AI products, these conclusions have been further validated. Ahn and Chen [28] discovered that familiarity with or experience using AI applications positively influences government employees' willingness to use AI, largely achieved

by enhancing users' PEOU. Based on the above research, this study proposes the following hypotheses:

H1: Perceived usefulness has a significant positive impact on the willingness to use AI search engines.

H2: Perceived ease of use has a significant positive impact on the willingness to use AI search engines.

Subjective Norms (SN), as one of the core variables of TPB, reflect the social pressure individuals perceive from significant others. SN can be viewed as "the social pressure perceived to perform a behavior", where behavioral intention is the result of the combined effects of attitude, subjective norms, and perceived behavioral control [29-31]. From this perspective, SN represents the extent to which individuals recognize the expectations of significant others, such as family and friends, to engage in certain behaviors. Ham et al. [32] found that SN are closely related to individuals' perceptions of social pressure from significant others when studying intentions to purchase green food, with the strength of motivation to comply with these views directly affecting behavioral intentions.

In the field of technology acceptance, the role of SN has also been validated. Hansstein & Echeagaray [33] found that young adults in urban China who believe that their parents and friends would approve of certain behaviors reported higher behavioral intentions regarding the use of pollution masks. Morris & Liu [34] further pointed out that SN could influence individuals' acceptance of new technologies through psychological effects. Based on the above research evidence, this study proposes the following hypotheses:

H3: Subjective norms have a significant positive impact on the willingness to use AI search engines.

H4: Subjective norms have a significant positive impact on the perceived usefulness of AI search engines.

Perceived Behavioral Control (PBC) in TPB is considered to moderate the effects of attitude and subjective norms on intention. The theoretical origins of the concept of perceived control can be traced back to Rotter's [35] research on internal versus external locus of control, while Bandura's [15] self-efficacy theory further elaborated on the important role of individuals' beliefs in their capabilities in behavioral regulation. Yzer [16] explicitly pointed out that PBC is conceptually similar to self-efficacy, defined as "the recognition of a person's ability to organize and execute a specific type of performance."

In research on AI technology acceptance, the role of perceived behavioral control has also been empirically supported [36-39]. Hong [40] found that PBC affects individuals' willingness to adopt AI technology. Ajzen [14] emphasized that positive attitudes and supportive subjective norms lead to positive behavioral intentions only when individuals believe they have the ability to perform the discussed behavior. Based on these researches, this study proposes the following hypotheses:

H5: Perceived behavioral control has a significant positive impact on the perceived ease of use of AI search engines.

H6: Perceived behavioral control has a significant positive impact on the perceived usefulness of AI search engines.

With the development of technology, Perceived Playfulness (PP) has gradually gained attention as an emerging variable in technology acceptance research [41-43]. Lin et al. [44] found that PP significantly influences users' attitudes in their study of the Nintendo Switch, indicating that the enjoyment derived from participation can enhance PU. This study extends TAM by incorporating variables such as PP, providing a new perspective for understanding user interaction with technology. In the application scenarios of AI tools, the role of PP is also noteworthy. By expanding TAM with variables like PP, related research has further refined the understanding of students' use of AI tools like ChatGPT in educational settings, ultimately finding that PP has a significant positive impact on both PU and PEOU [45]. This integration offers a more nuanced perspective on technology adoption, highlighting the multifaceted nature of user interaction with AI. Based on this, this study proposes the following hypotheses:

H7: Perceived playfulness of AI search engines has a significant positive impact on perceived ease of use.

H8: Perceived playfulness of AI search engines has a significant positive impact on perceived usefulness.

Based on information ecology theory, Technological Facilitation (TF), as an important contextual factor, holds unique theoretical value in technology acceptance research. The concept of "technological facilitation" proposed by Guo & Zhang [46] emphasizes the significant impact of the technological context on users' information needs. They argue that the technological context includes aspects such as system performance, visual effects, ease of use, perceived user risk, and device context, which together constitute the external environment affecting users' technology acceptance behavior. This has been confirmed in subsequent research, indicating that TF reflects the extent to which technological systems provide support and convenience to users. Studies have shown that the technological context positively correlates with users' information needs, and the differentiated personalized services provided by technology are positively correlated with users' perceived benefits of personal information disclosure [47]. This suggests that good TF can promote technology acceptance by enhancing users' PU and ease of use. Based on this, this study proposes the following hypotheses:

H9: Technological facilitation has a significant positive impact on the perceived ease of use of AI search engines.

H10: Technological facilitation has a significant positive impact on the perceived usefulness of AI search engines.

Based on the above theoretical analysis and hypothesis derivation, this study constructs a research model integrating TAM and TPB within the SOR theoretical framework (see Fig. 1). This model takes the willingness to use AI search engines as the dependent variable, with subjective norms, PEOU, and PU as core independent variables, while also examining the impact pathways of perceived behavioral control, perceived playfulness, and technological facilitation. The model clearly illustrates the causal relationships among the variables, providing a comprehensive theoretical framework for understanding the willingness to use AI search engines.

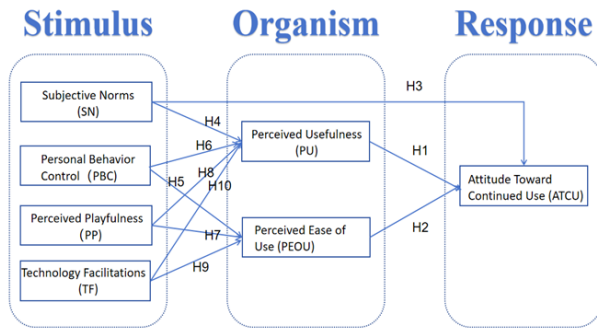


Fig. 1. Research model.

III. METHODS

A. Questionnaire Design

Based on the theoretical model developed in this study, seven latent variables were identified. To ensure the reliability and validity of the questionnaire, measurement items were primarily derived from well-established scales and

appropriately modified to reflect the characteristics of AI search engine usage intention and behavior. The measurement scales and their associated items for each construct are detailed in Table I.

This study employs a survey questionnaire method to investigate internet users' willingness to use AI search engines. The survey questionnaire consists of two sections. The first section collected demographic information and presented contextual details, including gender, age, educational level, occupation, and average monthly and which AI search engines users have used. The second section measured the latent variables specified in the research model including seven measurement constructs. All items are rated on a Likert 5-point scale. Each variable consists of a set of statements, with response options ranging from “Strongly Agree” to “Strongly Disagree”, corresponding to scores of 5 to 1. Since the target population of this study is Chinese residents, the questionnaire was administered in Chinese. Specifically, key constructs (TF, PU, PEOU, and ATCU) adopted Chinese scales developed by domestic scholars.

TABLE I. MEASUREMENT CONSTRUCTS

Construct	Items	Source
Subjective Norms (SN)	SN1: Friends/family often discuss AI search engine.	Lam and Hsu [48] Hsieh et al. [49] Wang et al. [50] Zhao & Liu [51]
	SN2: Friends/family enjoy AI search engine.	
	SN3: Friends/family recommend AI search engine to me.	
	SN4: Friends/family believe I should use AI search engine.	
	SN5: Friends/family support my use of AI search engines.	
Perceived Behavioral Control (PBC)	PBC1: I have the ability to use AI search engines to obtain the information I need.	
	PBC2: My device supports the use of AI search engines for information retrieval.	
	PBC3: If I want to, I can use AI search engines at any time.	
Perceived Playfulness (PP)	PP1: Using AI search engines is enjoyable to me.	Liu & Hsu [52]
	PP2: Using AI search engines stimulates my curiosity.	
	PP3: Using AI search engines makes me happy when I need them.	
Technology Facilitation (TF)	TF1: The features provided by AI search engines make me more willing to interact with them.	Pang et al. [53]
	TF2: The efficiency provided by AI search engines makes me willing to interact with them.	
	TF3: I think the technology behind AI search engines is powerful, and I am willing to use them to solve problems.	
Perceived Usefulness (PU)	PU1: The information retrieved through the AI search engine is helpful to me.	Venkatesh [54] Wang et al. [55] Davis [9] Pang et al. [53]
	PU2: The information retrieved through the AI search engine helps me solve problems.	
	PU3: The information retrieved through the AI search engine contributes to my knowledge acquisition.	
	PU4: The information retrieved through the AI search engine enable me to obtain the information I need.	
Perceived Ease of Use (PEOU)	PEOU1: It is easy to retrieve information using an AI search engine.	Pang et al. [53]
	PEOU2: The information retrieved through AI search engines is easy for me to understand.	
	PEOU3: Accessing and using the information retrieved from AI search engines feels effortless to me.	
Attitude Toward Continued Use (ATCU)	ATT1: I intend to use AI search engines frequently in the future.	Zhang & Zhang [56]
	ATT2: If given the opportunity, I would recommend AI search engines to others.	
	ATT3: Overall, I am willing to continue using AI search engines.	

For the remaining constructs, we adapted established English scales, translated them into Chinese, and administered the questionnaires accordingly.

B. Data Collection and Processing

This study utilized the “Question Star” platform, a professional survey platform in China, for questionnaire design and distribution. Prior to the formal distribution of the questionnaire, the research team conducted a small-scale pilot survey with ten randomly selected participants to test the logical structure and clarity of the questionnaire. Based on the preliminary survey results, necessary modifications and optimizations were made to items that were ambiguous or difficult to understand, ensuring the comprehensibility and measurement validity of the questionnaire content.

During the formal survey phase, the questionnaire was distributed through various social media platforms such as WeChat, Xiaohongshu, and Douban. A snowball sampling method was employed to enhance sample diversity and representativeness, with the aim of covering a broad spectrum of AI search engine users. A total of 501 questionnaires were collected during the survey period. To ensure the validity and analytical rigor of the collected data, rigorous data screening was conducted. Questionnaires from respondents who had not used AI search engines and invalid questionnaires with short response time were excluded, resulting in a final sample of 339 respondents, with a validity rate of 68.5%.

C. Data Analysis

1) *Sample characteristics*: Descriptive statistics on users' basic information are presented in Table II. The largest age group among the respondents, accounting for 61.0% of the total, was between 18 and 25 years old. This reflects the recent trend that AI applications are predominantly adopted by younger internet users. Approximately 80% of respondents held a bachelor's degree or higher. In terms of frequently used AI search engines, participants showed a clear preference for locally developed Chinese AI search engines, including Tencent Yuanbao, Deepseek, and Doubao. In comparison, platforms developed outside China, such as ChatGPT, were used less frequently. On average, respondents had used 2-3 types of AI search engines.

TABLE II. RESPONDENT PROFILE CHARACTERISTICS

Characteristics	Items	Number	Percentage (%)
Gender	Male	89	25.9
	Female	254	74.1
Age	Under 18	45	13.1
	18-25	217	63.3%
	26-35	15	4.4%
	36-45	29	8.5%
	46 or above	37	10.8%
Education	High school or below	44	12.8%
	Associate degree	15	4.4%

	Bachelor's degree	250	72.9%
	Master's degree or above	34	9.9%
Frequently used AI search engines	Deepseek	277	80.8%
	Doubao	251	73.2%
	Tencent Yuanbao	41	12.0%
	ERNIE Bo	67	19.5%
	Qwen	10	2.9%
	ChatGPT	33	9.6%
	Other	10	2.9%

TABLE III. RESULTS OF THE RELIABILITY AND VALIDITY ANALYSIS

Construct	Item	Factor loading	Cronbach's alpha	Composite reliability (CR)	Average variance extracted (AVE)
Subjective Norms (SN)	SN1	0.832	0.940	0.940	0.758
	SN2	0.847			
	SN3	0.859			
	SN4	0.906			
	SN5	0.907			
Perceived Behavioral Control (PBC)	PBC1	0.883	0.923	0.923	0.799
	PBC2	0.910			
	PBC3	0.889			
Perceived Playfulness (PP)	PP1	0.939	0.927	0.929	0.815
	PP2	0.910			
	PP3	0.857			
Technology Facilitation (TF)	TF1	0.905	0.936	0.933	0.824
	TF2	0.910			
	TF3	0.908			
Perceived Usefulness (PU)	PU1	0.920	0.949	0.948	0.821
	PU2	0.916			
	PU3	0.889			
	PU4	0.889			
Perceived Ease of Use (PEOU)	PEOU1	0.880	0.924	0.923	0.799
	PEOU2	0.888			
	PEOU3	0.914			
Attitude Toward Continued Use (ATCU)	ATCU1	0.911	0.943	0.942	0.844
	ATCU2	0.906			
	ATCU3	0.938			

2) *Reliability and validity analysis*: This study used SPSS 26.0 to test the reliability and validity of the measurement scale. The overall Cronbach's alpha coefficient is 0.980, well above the commonly accepted threshold of 0.9, indicating that the

scale has good internal consistency and a high level of reliability. As per the data in Table III, all variables achieved Cronbach's alpha coefficients greater than 0.9. The Cronbach's Alpha coefficients and composite reliability (CR) values for each variable are all greater than 0.9, further confirming the good reliability of the measurement scales.

In the confirmatory factor analysis (CFA), the factor loadings for each item were greater than 0.8, indicating the scale has good construct validity. For the vast majority of constructs, the square root of the Average Variance Extracted (AVE) exceeds the correlation coefficients between that construct and others (see Table IV). This shows a clear level of discriminant validity and demonstrates that each construct captures a distinct theoretical dimension and is not confounded with unrelated variables. Although one correlation coefficient slightly exceeds the corresponding AVE, this is considered acceptable according to the research results of Hair et al. [57]. Furthermore, the AVE for each construct is greater than 0.7, indicating strong convergent validity of the scale.

TABLE IV. RESULTS OF THE DISCRIMINANT VALIDITY ANALYSIS

	PP	TF	PBC	SN	PU	PEOU	ATCU
PP	0.903						
TF	0.901	0.908					
PBC	0.767	0.804	0.894				
SN	0.672	0.732	0.738	0.871			
PU	0.872	0.922	0.784	0.676	0.906		
PEOU	0.816	0.887	0.816	0.693	0.832	0.894	
ATCU	0.789	0.847	0.767	0.732	0.846	0.845	0.918

3) *Structural model*: This study uses AMOS 26.0 software, based on the hypotheses and conceptual model presented earlier, and adopts the maximum likelihood method to conduct structural equation model analysis. The model fitting results are shown in Fig. 2.

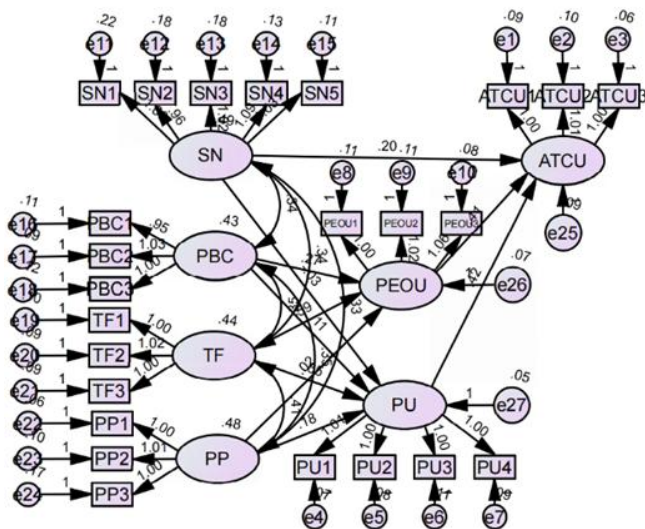


Fig. 2. Structural modeling result.

According to the criteria for good data and model fit provided by Hair et al.'s research [57]. As shown in Table V, all indicators except the GFI value, which is slightly less than 0.9, are above the standard. Considering the complexity of the model in this study, and referring to the research by Yuan and Bentler [58], a GFI slightly less than 0.9 is also acceptable. Therefore, the overall fit of the research model is good.

TABLE V. STRUCTURAL MODEL FIT INDICES

Indices	CMID/DF	GFI	CFI	RMR	RMSE
Value	2.591	0.871	0.962	0.015	0.068
Standard	<3	>0.9	>0.9	<0.08	<0.08

IV. RESULTS

The path standardized coefficients in the structural equation model reflect the significance of the relationship between variables. In this study, the significance is tested by the ratio of the parameter estimate to the standard error (C.R.) and the P value. When the absolute value of C.R. is greater than or equal to 1.96, it can be concluded that there is a significant difference at the significance level of 0.05.

According to the data analysis results of the structural equation model in Table VI, except for H4 and H7, the other eight hypotheses have received varying degrees of support. The influence of subjective norms on the intention to use verifies the theory of planned behavior to a certain extent, indicating that the use, recommendation, and demonstration of AI search engines by people around have an important impact on an individual's intention to use. Especially after Deepseek was launched in China, AI search engines began to be widely popularized, significantly lowering the threshold for using AI search engines. The opinions and attitudes of people around play an important role in an individual's attempt to use new technologies such as intelligent search engines.

From the perspective of the Technology Acceptance Model, perceived ease of use and perceived usefulness remain important influencing factors and paths for the acceptance of new technologies. The results of the hypothesis test show that both perceived ease of use and perceived usefulness have a significant impact on the intention to use intelligent search engines. Moreover, perceived enjoyment, technology facilitation, and perceived behavioral control are also important antecedent variables in the Technology Acceptance Model.

Perceived playfulness has a significant impact on perceived usefulness. From the perspective of technological affordance, the functions provided by intelligent search engines, such as image generation and creative copywriting generation, enhance the enjoyment of using intelligent search engines. Using intelligent search engines has even become a form of entertainment. However, at the same time, the richness and complexity of these enjoyable functions objectively increase the threshold for using intelligent search engines and do not significantly contribute to the improvement of perceived ease of use.

For H4, subjective norm has no significant impact on perceived usefulness. Considering the supported result of H3, the reason might be that people are indeed influenced by those

around them and the environment when using AI search engines, but the mechanism of influence does not operate through a rational path. With the development of the Technology Acceptance Model, researchers have found that the influencing factors of the mechanism are no longer limited to rational and cognitive aspects; emotional and affective factors have also gradually gained attention[59]. Therefore, we believe that the interpersonal environment and social atmosphere do indeed make Chinese residents start to use AI search engines out of subconscious motives such as conformity and imitation, but this external influence does not make them clearly recognize the functions and values of intelligent search engines.

For H7, the interesting functions provided by AI search engines may not significantly enhance the ease of use of AI search engines. This indicates that although AI search engines objectively possess some interesting attributes that can be developed, these interesting attributes, although objectively enhancing users' perception of the functions and values of intelligent search engines, do not significantly improve the convenience of using AI search engines.

TABLE VI. RESULTS OF HYPOTHESIS TESTING

Hypothesis	Path	Estimate	S.E.	C.R.	Test results
H1	PEOU->ACTU	.407	.072	5.672	Supported
H2	PU->ACTU	.424	.067	6.329	Supported
H3	SN->ACTU	.198	.043	4.588	Supported
H4	SN->PU	-.035	.040	-.856	Not supported
H5	PBC->PEOU	.270	.055	4.881	Supported
H6	PBC->PU	.107	.053	2.030	Supported
H7	PP->PEOU	.021	.078	.272	Not supported
H8	PP->PU	.179	.071	2.539	Supported
H9	TF->PEOU	.592	.093	6.381	Supported
H10	TF->PU	.652	.087	7.461	Supported

V. DISCUSSION

Based on the model's measurement results, we propose three strategic recommendations for promoting intelligent search engines represented by Deepseek in China: lowering usage barriers, enhancing entertainment attributes, and emphasizing the influence of social norm factors.

First, lowering the threshold for usage can significantly enhance users' perceived behavioral control. When users feel that they possess sufficient ability to operate AI technology, they tend to exhibit a stronger intention to adopt them. Suryadi et al. [60] argued that improving users' understanding of how AI systems can reduce usage-related anxiety, thereby strengthening their sense of control and willingness to engage with the technology. Our findings further suggest that providing clear tutorials and transparent interface cues can effectively lower perceived complexity and strengthen adoption intentions.

Secondly, enhancing the entertainment attributes of AI systems directly impacts users' behavioral attitudes.

Incorporating elements of playfulness and affective interaction can stimulate positive emotional responses and improve overall user experiences. Gaur et al. [61] showed that gamification in AI systems can increase perceived enjoyment and shape users' performance and effort expectancy, thereby strengthening their intention to use the technology. Accordingly, designing AI search interfaces with interactive features, personalized humorous responses, or playful task mechanisms can not only enhance users' enjoyment but also strengthen their positive attitudes toward the system. For example, offering rewarded optional mini-tasks or gamified character settings in the AI interactive interface can make users continue participating.

Finally, social norms play a crucial socio-psychological role in the adoption of AI search technologies. Zhang et al. [62] pointed out that social influence factors can promote group cohesion and enhance users' intention to adopt AI products. Therefore, leveraging social media, expert endorsements, and community interactions associated with the use of AI search engines with socially approved behavior can further enhance users' willingness to use. For example, platforms may highlight expert-recommended search practices or showcase community challenges that reward proficient AI search engine usage, thereby reinforcing the perception that adopting AI search is both normative and desirable.

Regarding research methodology, this study employs structural equation modelling, which effectively measures correlations between latent variables to elucidate the operational mechanisms of various influencing factors. Moreover, this study selects limited variables and cannot cover all potential influencing factors. Also, the structural equation model method does not have causal explanatory power, although it has explored the mechanisms influencing the intention to use. In future research, on the basis of improving the representativeness and typicality of the data, it is necessary to further explore potentially important influencing factors and adopt methods such as experimental methods, instrumental variable methods, and regression discontinuity design to seek causal explanations.

VI. CONCLUSION

Based on the Technology Acceptance Model, this study selects perceived ease of use and perceived usefulness as mediating variables. From the perspective of the Theory of Planned Behavior and technological affordance, subjective norms, perceived behavioral control, perceived playfulness, and technological facilitation are selected as antecedent variables. This study systematically explores the factors influencing the intention to use intelligent search engines and their mechanisms after their wide popularity in China.

The research finds that among Chinese users of intelligent search engines, perceived behavioral control can influence the intention to use through perceived usefulness and perceived ease of use, indicating that users' own ability to use intelligent search engines and objective conditions support are important factors affecting the intention to use. In the promotion of intelligent search engines like Deepseek, it is necessary to cultivate users' relevant knowledge and further lower the usage threshold.

Perceived enjoyment and technological facilitation can significantly influence perceived usefulness. This indicates that the entertainment attributes (such as media content generation, prediction and divination, etc.) and technological improvements (such as multi-round dialogue, natural language, intelligent interaction, etc.) brought by intelligent search engines play an important role in their promotion. Moreover, technological facilitation can significantly influence perceived ease of use, suggesting that, on the whole, the functional expansion of intelligent search engines compared to traditional search engines provides users with a more convenient usage experience.

At the same time, subjective norms can directly influence the intention to use intelligent search engines, indicating that in the popularization process of intelligent search engines in China, group behavior patterns and collective cultural atmosphere have a significant impact on individual usage. Interpersonal relationships and social atmosphere play an important role in the promotion of intelligent search engines.

REFERENCES

- [1] C. Kaiser, J. Kaiser, R. Schallner, and S. Schneider, "A new era of online search? A large-scale study of user behavior and personal preferences during practical search tasks with generative AI versus traditional search engines," *Proceedings of the Extended Abstracts of the CHI Conference on Human Factors in Computing Systems*, Yokohama, Japan, 2025, pp. 1-7, 2025.
- [2] A. Schorr, "The technology acceptance model (TAM) and its importance for digitalization research: a review," *International Symposium on Technopsychologie (TecPsy)*, N. Gerber and V. Zimmermann, Eds. 2023, pp. 55-65, 2023.
- [3] C. Or, "Understanding factors influencing AI adoption in education: insights from a meta-analytic structural equation modelling study," *Journal of Applied Learning & Teaching*, vol. 8, no. 1, pp. 102-115, 2025.
- [4] Y. Lee, K. Kozar, and K. Larsen, "The technology acceptance model: Past, present, and future," *Communications of the Association for Information Systems*, vol. 12, pp. 752-780, 2003.
- [5] X. Yu, Y. Hu, Y. Hu, and K. Li, "Exploring factors that influence graduate students' intention to use generative artificial intelligence in academic research: PLS-SEM and fsQCA methods," *Education and Information Technologies*, vol. 30, pp. 19447-19472, 2025.
- [6] M., Fishbein and I. Ajzen, *Belief, attitude, intention, and behavior: An introduction to theory and research*, Reading, MA: Addison-Wesley, 1975.
- [7] R. Li, X. Li, and X. Li, "Integration of TPB and TAM frameworks to assess driving assistance technology-mediated risky driving behaviors among young urban Chinese drivers," *Vehicles*, vol. 7, no. 3, pp. 79, 2025.
- [8] S. Sujoor Kareem, S. Siddiqui, and R. Al Rousan, "Tech-forward travels: unravelling users' adoption intention of metaverse technology for the tourism and hospitality experience," *Journal of Quality Assurance in Hospitality & Tourism*, pp. 1-43, 2025.
- [9] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quarterly*, vol. 13, no. 3, pp. 319-340, 1989.
- [10] A. Penuela, M. P. Habaña, R. M. F. Oducao, J. E. Pedroso, E. Bonzo, and K. Tamdang, "Correlates of ChatGPT use intention among freshmen health sciences students," *Journal of Education and Learning (EduLearn)*, pp. vol. 19, no. 3, pp. 1615-1622, 2025.
- [11] T. T. Linh, "Factors influencing the use of ChatGPT in student learning in Vietnam," *International Journal of Advanced and Applied Sciences*, 12, no. 7, pp. 76-86, 2025.
- [12] R. Stroud and J. S. Du, "Student acceptance of ChatGPT in higher education: a mixed-method study of attitudes, intentions, and concerns," *Journal of Applied Learning & Teaching*, vol. 8, no. 2, pp. 1-14, 2025.
- [13] F. Bouqlila, S. Megzari, and D. Dahab, "Consumer resistance to chatbot adoption," *International Journal of E-Services and Mobile Applications*, vol. 17, no. 1, pp. 1-28, 2025.
- [14] I. Ajzen, "The theory of planned behavior: frequently asked questions," *Human Behavior and Emerging Technologies*, vol. 2, no. 4, pp. 314-324, 2020.
- [15] A. Bandura, "Self-efficacy: Toward a unifying theory of behavioral change," *Advances in Behaviour Research and Therapy*, vol. 1, no. 4, pp. 139-161, 1978.
- [16] M. Yzer, "Perceived behavioral control in reasoned action theory: a dual-aspect interpretation," *The Annals of the American Academy of Political and Social Science*, vol. 640, no. 1, pp. 101-117, 2012.
- [17] A. Mehrabian and J. A. Russell, *An approach to environmental psychology*. Massachusetts: The MIT Press, 1974, pp. 40-120.
- [18] C. D. Duong and T. H. Nguyen, "How ChatGPT adoption stimulates digital entrepreneurship: A stimulus-organism-response perspective," *The International Journal of Management Education*, vol. 22, no. 3, pp. 101019, 2024.
- [19] S. A. Loutfi, S. Jose, F. Jabeen, and P. Piccardi, "A stimulus-organism-response (SOR) perspective on healthcare telemedicine usage towards sustainable development," *Management of Environmental Quality: An International Journal*, vol. 36, no. 7, pp. 1748-1870, 2023.
- [20] J. Krstić, T. Rajić, M. Kostić-Stanković, and T. Vlastelica, "Investigating female consumers' environmentally conscious apparel purchase behaviour through stimulus-organism-response framework," *Serbian Journal of Management*, vol. 20, no. 1, pp. 81-101, 2025.
- [21] D. T. M. Nguyen and K. N. Nguyen, "Behavioral tendency of students using internet banking: The integration of TAM and TPB," *Global Conference on Business and Social Sciences Proceeding*, vol. 15, no. 1, pp. 81-81, 2023.
- [22] D. Afrizal, A. Luthfi, M. Bin Wallang, H. Hildawati, & K. Ekareesakul, "Citizens' intention to use E-government services in local government by integrating UTAUT, TPB, and TAM model," *Journal of Local Government Issues*, vol. 7, no. 2, pp. 129-143, 2024.
- [23] M. Fan and C. Bussracumpakorn, "An integrated TPB-TAM-environmental behavior theory approach to agricultural by-products acceptance: A structural equation modeling analysis of sugarcane bagasse food containers," *Research on World Agricultural Economy*, vol. 6, no. 3, pp. 585-608, 2025.
- [24] E. Özer Çizer and İ. Kircova, "Electronic waste disposal behavior: A qualitative analysis in the framework of behavioral and technological factors," *Trends in Business and Economics*, vol. 39, no. 3, pp. 378-395, 2025.
- [25] F. U. Haq, N. M. Suki, M. Setini, A. Masood, and T. A. Khan, "Adopting green AI for SME sustainability: Mediating role of green investment and moderation by green servant leadership," *Sustainable Futures*, vol. 10, 2025, Art. no. 101002.
- [26] A. Zaheer, A. Sadiq, and N. Safi, "AI in service industries: effects on customer satisfaction, mediated by service quality, and moderated by customer trust," *Journal of Social Sciences and Humanities*, vol. 2, no. 3, pp. 51-73, 2025.
- [27] M. S. Rahman, M. M. Sabbir, D. J. Zhang, I. H. Moral, and G. M. S. Hossain, "Examining students' intention to use ChatGPT: Does trust matter?," *Australasian Journal of Educational Technology*, vol. 39, no. 6, pp. 51-71, 2023.
- [28] M. J. Ahn and Y.-C. Chen, "Digital transformation toward AI-augmented public administration: The perception of government employees and the willingness to use AI in government," *Government Information Quarterly*, vol. 39, no. 2, 2022, Art. no. 101664.
- [29] M. V. Ciasullo, G. Maione, C. Torre, and O. Troisi, "What about sustainability? An empirical analysis of consumers' purchasing behavior in fashion context," *Sustainability*, vol. 9, no. 9, 2017, Art. no. 1617.
- [30] A. A. N. N. Daana and F. Yeşilada, "Diffusion of cryptocurrency among Arab adopters: How are digital technostress, ethical concerns, and government regulations interconnected?," *SAGE Open*, vol. 15, no. 3, 2025, Art. no. 21582440251357552.
- [31] J.-C. Kang, C. Liang, and C.-H. Yu, "Determinants of political disinformation prevention: Taiwanese journalists and general public

- regarding safety of import food,” *Journalism Practice*, 2025, to be published. DOI: 10.1080/17512786.2025.2507087
- [32] M. Ham, M. Jeger, and A. Frajman Ivković, “The role of subjective norms in forming the intention to purchase green food,” *Economic Research-Ekonomska Istraživanja*, vol. 28, no. 1, pp. 738-748, 2015.
- [33] F. V. Hansstein and F. Echegaray, “Exploring motivations behind pollution-mask use in a sample of young adults in urban China,” *Globalization and Health*, vol. 14, no. 1, 2018, Art. no. 122.
- [34] M. W. Morris and Z. Liu, “Psychological functions of subjective norms: reference groups, moralization, adherence, and defiance,” *Journal of Cross-Cultural Psychology*, vol. 46, no. 10, pp. 1279-1287, 2015.
- [35] J. B. Rotter, “Generalized expectancies for internal versus external control of reinforcement,” *Psychological Monographs: General and Applied*, vol. 80, no. 1, pp. 1-28, 1966.
- [36] M. Berlekamp, *et al.*, “Toxic hazard?: The challenge of developing theory- and evidence-based messages for the prevention of child poisoning accidents,” *European Journal of Health Communication*, vol. 6, no. 4, pp. 25-50, 2025.
- [37] M. Karin De Moraes Oliveira, *et al.*, “Predictors of adherence to insulin therapy in type 2 diabetes mellitus: An application of the theory of planned behavior,” *Health Psychology and Behavioral Medicine*, vol. 13, no. 1, 2025, Art. no. 2525181.
- [38] F. Di Pillo, G. Palombi, and S. Strazzullo, “Does greenwashing wash away gen z’s green purchase intention?,” *Business Strategy and the Environment*, 2025, Art. no. bse.70064, to be published. DOI: 10.1002/bse.70064
- [39] J. LaMothe, “Decoding school mass shooter manifestos to predict behavior: A theory based qualitative study,” *Professional Psychology: Research and Practice*, vol. 56, no. 4, pp. 266-274, 2025.
- [40] J.-W. Hong, “I was born to love AI: The influence of social status on AI self-efficacy and intentions to use AI,” *International Journal of Communication*, vol. 16, pp. 172-191, 2022.
- [41] D., Codish and G. Ravid, “Academic course gamification: the art of perceived playfulness,” *Interdisciplinary Journal of E-Skills and Lifelong Learning*, vol. 10, pp. 131-151, 2024.
- [42] E. Barabadi, M. Elahi Shirvan, M. Shahnama, and R. T. Proyer, “Perceived functions of playfulness in adult english as a foreign language learners: An exploratory study,” *Frontiers in Psychology*, vol. 12, 2022, Art. no. 823123.
- [43] A. Nursyamsiah, M. Pradana, and A. Widodo, “Model of impulsive buying behavior in Shopee live: Study of demand, convenience, interactivity, and playfulness through perceived usefulness,” *Marginal Journal of Management Accounting General Finance and International Economic Issues*, vol. 4, no. 3, pp. 726-741, 2025.
- [44] C.-W. Lin, Y.-S. Lin, Y.-S. Xie, and J.-H. Chang, “Understanding the behavioural intention to play the Nintendo switch: An extension of the technology acceptance model,” *Applied System Innovation*, vol. 5, no. 6, 2022, Art. no. 124.
- [45] P. Sun, L. Li, M. S. Hossain, and S. Zabin, “Investigating students’ behavioral intention to use ChatGPT for educational purposes,” *Sustainable Futures*, vol. 9, 2025, Art. no. 100531.
- [46] S. Guo and X. Zhang, “Research on the influence factors of mobile O2O user information needs based on context awareness,” *Information Science*, vol. 34, no. 8, pp. 122-127+132, 2016.
- [47] M. Yang, X. Wang, M. Xiang, and J. Li, “An empirical study on the influencing factors of context information sharing behavior of mobile consumer users: Based on the perspective of information ecological factors,” *Information and Documentation Services*, no. 4, pp. 15-22, 2017.
- [48] T. Lam and C. H. Hsu, “Predicting behavioral intention of choosing a travel destination,” *Tourism Management*, vol. 27, no. 4, pp. 589-599, 2006.
- [49] C. M. Hsieh, S. H. Park, and R. McNally, “Application of the extended theory of planned behavior to intention to travel to Japan among Taiwanese youth: Investigating the moderating effect of past visit experience,” *Journal of Travel & Tourism Marketing*, vol. 33, no. 5, pp. 717-729, 2016.
- [50] L. H. Wang, S. S. Yeh, K. Y. Chen, and T. C. Huan, “Tourists’ travel intention: Revisiting the TPB model with age and perceived risk as moderator and attitude as mediator,” *Tourism Review*, vol. 77, no. 3, pp. 877-896, 2022.
- [51] S. Zhao and Y. Liu, “Revenge tourism after the lockdown: Based on the SOR framework and extended TPB model,” *Journal of Travel & Tourism Marketing*, vol. 40, no. 5, pp. 416-433, 2023.
- [52] L. Liu and Y. Hsu, “Motivating factors behind the public’s use of smart recycling systems: perceived playfulness and environmental concern,” *Humanities and Social Sciences Communications*, vol. 9, no. 1, pp. 1-13, 2022.
- [53] Y. Pang, H. Zhang, H. Song, and K. Zhang, “Influencing factors of user information interaction behavior on AIGC Q&A platforms——Empirical analysis based on SEM and fsQCA,” *Information Science*, vol. 42, no. 12, pp. 201-213, 2024.
- [54] V. Venkatesh, M. G. Morris, G. B. Davis, and F. D. Davis, “User acceptance of information technology: Toward a unified view,” *MIS Quarterly*, vol. 27, no. 3, pp. 425-478, 2003.
- [55] X. Wang, S. Li, N. Wang, and M. Yang, “Research on influencing factors of consumers’ information interaction willingness in the new media environment: an example of the automobile industry new media platform,” *Library and Information Service*, vol. 61, no. 15, pp. 15-24, 2017.
- [56] G. Zhang and X. Zhang, “Research on WeChat users’ continuance use behavior affected by implantable advertising,” *Journal of Information Systems*, no. 2, pp. 53-66, 2018.
- [57] J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, *Multivariate data analysis*. London: Pearson Education Limited, 2013.
- [58] K.-H. Yuan and P. M. Bentler, “Improving parameter tests in covariance structure analysis,” *Computational Statistics & Data Analysis*, vol. 26, no. 2, pp. 177-198, 1997.
- [59] C.-L. Hsu and H.-P. Lu, “Consumer behavior in online game communities: A motivational factor perspective,” *Computers in Human Behavior*, vol. 23, no. 3, pp. 1642-1659, 2007.
- [60] N. Suryadi, R. Zulfikar, Y. V. Prasarry, and M. F. Islam F, “AI product knowledge as moderator of trust and attitude in usage intention: a study of Indonesian postgraduates,” *Cogent Social Sciences*, vol. 11, no. 1, pp. 2526799, 2025.
- [61] D. Gaur, K. Gupta, C. K. Tiwari, and A. Pal, “AI powered gamification: the new catalyst in the arena of online investment platforms impacting behavioral intentions,” *International Journal of Human-Computer Interaction*, vol. 41, no. 22, pp. 14457-14473, 2025.
- [62] H. Zhang, B. Li, B. Hu, and P. Ai, “Exploring the role of personal innovativeness on purchase intention of artificial intelligence products: an investigation using social influence theory and value-based adoption model,” *International Journal of Human-Computer Interaction*, 2025. <https://doi.org/10.1080/10447318.2025.2513037>