The user wants me to translate a Chinese academic paper title and abstract (or introduction) about elderly people' s acceptance behavior towards augmented reality tourism scenarios, based on a TRI-UTAUT2 model postprint. Let me break down the requirements: 1. Preserve ALL LaTeX commands and placeh···

Authors: Li Jiaoyang, The user has provided a single name: "樊振佳". This appears to be a Chinese name. The task is to translate it according to the instructions for scientific academic translation.

Let me analyze the requirements: 1. This is not a paragraph with tags, LaTeX, or citations 2. It' s a proper name that might appear in an academic context 3. The glossary provided only covers technical terms (机器学习 => machine learning, 深度学习 => deep learning), which don' t apply here

For Chinese names in academic contexts, the standard practice is: - Use Pinyin transliteration - Family name first, given name second (maintaining Chinese order) - Capitalize the first letter of each part - No spaces between the family name and given name in Pinyin

樊振佳: - 樊 (Fán) - family name - 振佳 (Zhènjiā) - given name

The standard academic transliteration would be "Fan Zhenjia" (with a space) or "Fan Zhenjia" depending on style guide. However, in many Chinese academic papers, names are written as "FAN Zhenjia" (all caps for surname) or "Fan Zhenjia" .

Looking at typical IEEE/ACM formats, Chinese names are often written as: - "Fan Zhenjia" (surname first, space, given name) - Or sometimes "Zhenjia Fan" (Western order) if the author has adopted that style

Since this is a translation task and the name is likely from a Chinese academic paper, the most appropriate translation would be to convert it to Pinyin while preserving the Chinese name order. The standard is: - Surname: Fan - Given name: Zhenjia - Format: Fan Zhenjia

However, I should check if there are any specific guidelines. The user hasn' t provided context about whether this is an author name, a cited author, or a person mentioned in text. In academic translation, when Chinese names appear in the main text, they are typically transliterated to Pinyin.

The most common and accepted form in English academic literature would be "Fan Zhenjia" . Some journals might use "FAN Zhenjia" (surname in caps) but that' s less common now.

Since the user just provided the name without context, I should provide the standard Pinyin transliteration. The task says "Translate from Simplified Chinese to English with the highest accuracy and academic tone." For names, translation means transliteration

Date: 2023-10-08T00:00:00+00:00

Abstract

Abstract

Purpose/Significance: This study investigates the acceptance behavior of elderly populations towards new technology applications and identifies underlying patterns.

Method/Process: Based on the Unified Theory of Acceptance and Use of Technology (UTAUT2) and Technology Readiness Index (TRI) theory, we construct an acceptance behavior model for augmented reality tourism scenarios among the elderly. We propose research hypotheses, collect data through questionnaire surveys, and validate these hypotheses using structural equation modeling with SPSS and AMOS software to examine the influencing factors of augmented reality tourism scenario acceptance behavior in elderly populations.

Results/Conclusion: Our findings reveal that among elderly populations, facilitating conditions do not significantly influence usage intention but do significantly affect actual usage behavior. Performance expectancy, effort expectancy, social influence, price value, and discomfort emerge as the primary antecedents of usage intention. Furthermore, usage intention significantly influences acceptance behavior, while hedonic motivation and insecurity show no significant impact on acceptance intention.

Full Text

Acceptance Behavior of the Elderly in Augmented Reality Tourism Scenarios: Based on the TRI-UTAUT2 Model

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Abstract

[**Purpose/Significance**] This study investigates the acceptance behavior of elderly individuals toward new technology applications and identifies underlying patterns. [**Method/Process**] Building upon the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) and Technology Readiness Index (TRI) theory, we constructed a model of elderly acceptance behavior toward augmented reality (AR) tourism scenarios, proposed research hypotheses, and collected data through questionnaire surveys. Structural equation modeling was employed using SPSS and AMOS software to validate the hypotheses and examine the factors influencing elderly acceptance of AR tourism scenarios. [**Result/Conclusion**] The findings reveal that facilitating conditions do not significantly influence use intention but do significantly affect actual use behavior among the elderly. Performance expectancy, effort expectancy, social influence, price value, and discomfort emerge as the primary antecedents of use intention. Use intention significantly influences acceptance behavior, while hedonic motivation and lack of security show no significant impact on acceptance intention.

Keywords: elderly; augmented reality; tourist use behavior; technology readiness index; unified theory of acceptance and use of technology

Introduction

The seventh national population census indicates that individuals aged 60 and above account for 18.7% of China' s total population (with those 65 and above representing 13.50%), placing the country in a stage of mild aging according to the National Bureau of Statistics. Compared with 2010, the proportion of people aged 60 and above has increased by 5.44%, reflecting deepening population aging and growing concern for the living conditions and quality of life among elderly populations. Tourism has been recognized as an activity that positively impacts quality of life in later years. Most scholars agree that elderly individuals, with more leisure time and stronger travel aspirations, constitute a viable tourism demographic and important participants in the tourism industry. The State Council' s "Several Opinions on Promoting Tourism Reform and Development" emphasizes developing senior tourism by creating multi-level, diversified leisure and wellness products for the elderly to meet diverse tourism consumption demands while emphasizing cultural inheritance and innovation.

In recent years, information technology has become increasingly integrated with the tourism industry. Against the backdrop of "Internet Plus"and smart tourism, innovative travel modes and business models continue to emerge. Technology serves as a native driving force, positively influencing tourism product innovation, activity organization and management, and enhancement of tourist intentions. Augmented reality (AR) represents a novel technology that overlays multimedia information onto the real world for interaction, enabling individuals

to perceive virtual information superimposed on physical objects and spaces, thereby creating sensory experiences that transcend reality. The combination of AR technology with tourism scenarios creates immersive sensory experiences and interactive online environments for tourists. AR tourism scenarios, with their concise carriers and distinct features, can more easily integrate with AR technology to virtually reconstruct historical buildings, cultural customs, and cultural relics, providing tourists with more authentic experiences and enhancing travel intention and satisfaction.

However, existing research indicates that elderly populations exhibit weakened use intentions and increased psychological burden when facing new technologies. Whether AR technology for tourism scenarios can be accepted by elderly tourists remains empirically unexamined, and research on the factors influencing elderly acceptance of AR technology is insufficient. The Technology Acceptance Model (TAM) has been widely used for decades to explain factors influencing individual acceptance and use of new technologies. Scholars have continuously explored modifying TAM by adding or adjusting variables to enhance its explanatory power regarding new technology acceptance intentions, yet few studies have examined elderly customer groups' acceptance behavior of new technologies in the tourism industry. Given current and foreseeable future demographic structures, the experiences of elderly populations in tourism warrant attention, and the universality and effectiveness of technology-tourism integration outcomes require higher standards. Without research conclusions on new technology acceptance behavior among the elderly, the driving potential of technology for the tourism industry cannot be fully unleashed, the diverse tourism needs of elderly groups cannot be adequately explored, and this may even negatively impact elderly tourism intentions, creating a significant gap with the State Council' s requirements.

Unlike previous research focusing on technological functionality' s impact on individual use behavior, this study integrates TRI and UTAUT2 theories to construct a model of elderly acceptance behavior toward AR tourism scenarios. We supplement UTAUT2 with technology readiness analysis, addressing the lack of empirical research and insufficient explanatory power regarding elderly groups' sensitive personality traits toward new technologies. This provides a knowledge foundation for understanding elderly acceptance behavior toward new tourism technologies in the foreseeable future demographic structure. We define the supplementary variables in UTAUT2 as discomfort and lack of security, then use the modified elderly tourism scenario technology acceptance model as our research framework to explore elderly tourists' acceptance of AR tourism scenarios, conducting empirical research on research hypotheses and conceptual structural models, and finally proposing relevant recommendations based on our findings.

Theoretical Model and Research Hypotheses

2.1.1 Technology Readiness Index

TRI theory posits that the emergence of new technologies elicits various emotional responses that may be positive or negative, with varying degrees of intensity. Parasuraman proposed the concept of TRI to demonstrate individuals' propensity to use new technologies in achieving daily life and work goals. TRI comprises four dimensions: optimism, innovativeness, discomfort, and insecurity. Optimism refers to individuals' positive attitudes and willingness to embrace new technologies. Innovativeness reflects individuals' tendency to perceive themselves as pioneers or thought leaders in adopting new technologies. Discomfort represents individuals' feelings of inability to control or master new technologies. Insecurity denotes individuals' lack of trust in new technologies or skepticism and concerns about normal usage processes and consequences. Optimism and innovativeness enhance technology use intention and constitute positive factors, while discomfort and insecurity reduce use intention and are classified as negative factors. These factors jointly influence individual technology acceptance processes, affecting the degree of technology adoption through these four dimensions.

TRI' s initial research focused on subjective emotions toward new technologies and willingness to adopt them. Studies have found that TRI applies not only to specific technologies but also to the acceptance and adoption of technological products, platforms, and service models. TRI emphasizes users' readiness states and emotional preferences, making it suitable for this study on AR tourism scenario acceptance intention.

2.1.2 Unified Theory of Acceptance and Use of Technology 2

The UTAUT model, proposed by Venkatesh et al. in 2003 based on TAM research, examines users' cognitive factors and includes four key variables: performance expectancy, effort expectancy, social influence, and facilitating conditions. Performance expectancy refers to the degree to which individuals perceive that adopting new technology will positively impact outcomes. Effort expectancy represents the perceived effort required to accept new technology. Social influence denotes the degree to which individuals are influenced by evaluations and recognition from surrounding groups. Facilitating conditions refer to individuals' perceptions of organizational support for new technology in terms of relevant technology and equipment.

The UTAUT model examines individual acceptance and use behavior of new technologies but has limited application scope. Compared with UTAUT, the UTAUT2 model adds three variables—hedonic motivation, price value, and habit —while removing the voluntariness moderator and adding the effect of facilitating conditions on use intention. Hedonic motivation represents the pleasure or enjoyment derived from using a technology, serving as an important determinant of technology acceptance and use. Price value represents consumers'

cognitive trade-offs, predicting behavioral intention based on whether perceived benefits outweigh costs. Habit reflects perceptual construction experiences from prior outcomes, influencing technology use across different scenarios and even underlying processes.

2.1.3 Research Model: Integration of UTAUT2 and TRI

The UTAUT2 model demonstrates strong explanatory power for technology acceptance and use behavior, but practical applications require model adjustments to suit different research contexts. When constructing the theoretical model for elderly acceptance behavior toward AR tourism scenarios, we adjusted variables from the original UTAUT2 model based on the specific context of AR technology to better suit research needs among elderly populations.

First, since AR technology is still in its infancy in China with relatively low adoption rates among the elderly, this demographic has not yet formed specific habits regarding AR use. Therefore, we removed the habit variable. Second, the personality traits representing elderly characteristics in TRI—discomfort and lack of security—affect AR technology use intention, as elderly populations generally wish to avoid negative experiences. Thus, we added these two variables. Finally, after carefully comparing questionnaire content from original TRI and UTAUT2 studies with subsequent adaptations by other authors, we identified and adjusted variables with repetitive meanings or questions. Specifically, the measurement standards and emotional expressions for optimism in TRI were already covered in the UTAUT2 model, and innovativeness measurement standards lacked distinctiveness and recognition among elderly populations. Consequently, we did not include optimism and innovativeness variables.

Based on the above rationale, we integrated individual personality traits from TRI as antecedent variables with UTAUT2 to construct our research conceptual model.

2.2.1 Performance Expectancy and Use Intention

Performance expectancy refers to the degree of benefit individuals perceive from using new technology. Research demonstrates that expectations toward new technology positively influence use behavior. Yuan et al. found that among various factors, performance expectancy most significantly influences use intention in health software user studies. Baptista and Oliveira concluded that performance expectancy significantly and positively affects user intention in mobile banking research. In this study, when elderly populations perceive gains or assistance from using AR tourism scenarios, this positively influences their use intention. Based on this analysis, we hypothesize:

H1: Performance expectancy positively influences elderly individuals' intention to use AR tourism scenarios.

2.2.2 Effort Expectancy and Use Intention

Effort expectancy refers to individuals' perception of new technology' s ease of use and the effort required to adopt it. Venkatesh et al. found that perceived difficulty and effort not only positively influence effort expectancy but further positively influence behavioral intention. In this context, lower operational complexity of AR devices reduces perceived effort and strengthens use intention, while higher complexity weakens intention. Based on this analysis, we hypothesize:

H2: Effort expectancy positively influences elderly individuals' intention to use AR tourism scenarios.

2.2.3 Social Influence and Use Intention

Social influence refers to the degree to which individuals are affected by their surrounding environment or groups. Research shows that individuals tend to align their behavior and attitudes with majority opinions in organizations or groups. Nysveen et al. demonstrated that others' attitudes and behaviors in organizations or groups affect individual intention and behavior regarding mobile services. Kijsanayotin et al. found that social influence significantly impacts individual acceptance of computers and network communications. In AR technology activities, individual use intention is influenced by surrounding organizational or group members. Based on this analysis, we hypothesize:

H3: Social influence positively influences elderly individuals' intention to use AR tourism scenarios.

2.2.4 Facilitating Conditions and Use Intention/Behavior

Venkatesh conceptualized facilitating conditions as objective conditions that support users' adoption of new technologies and systems, positing that convenient objective conditions positively influence both use intention and behavior. Afshan and Sharif found that facilitating conditions significantly influence consumers' intention to use mobile banking. Wang et al.' s empirical study on O2O model consumers purchasing agricultural products online revealed that facilitating conditions significantly and positively influence online purchasing behavior. In this study, environmental support for AR technology enhances individual use intention. Additionally, mobility limitations among some elderly populations and COVID-19 restrictions have impacted both intention and behavior regarding AR use. Based on this analysis, we hypothesize:

H4: Facilitating conditions positively influence elderly individuals' intention to use AR tourism scenarios.
H5: Facilitating conditions positively influence elderly individuals' use behavior regarding AR tourism scenarios.

2.2.5 Hedonic Motivation and Use Intention

Hedonic motivation refers to individuals' perceived enjoyment when engaging in activities using new technology. Venkatesh et al. found that consumers' hedonic motivation when using mobile devices for shopping positively influences use intention. Brown et al. identified hedonic motivation as an important factor affecting user acceptance and use of new technologies. Information systems research indicates that individuals focus on both utility and entertainment value in new information systems. As a novel experience mode, AR technology provides comprehensive, detailed projected images and rich perceptual experiences. Based on this analysis, we hypothesize:

H6: Hedonic motivation positively influences elderly individuals' intention to use AR tourism scenarios.

2.2.6 Price Value and Use Intention

Price value refers to individuals' trade-offs between costs (monetary, time, etc.) and benefits when using new technology. Research indicates that price factors, often overlooked in technology acceptance studies, significantly influence urban residents' broadband use intention. Ma and Dong found that perceived value significantly influences consumer use intention in wearable device acceptance research. Yan discovered that price value significantly and positively influences consumer use intention in unmanned retail acceptance research. In this study, when perceived experiences and satisfaction from using AR technology exceed required costs, use intention increases accordingly. Based on this analysis, we hypothesize:

H7: Price value positively influences elderly individuals' intention to use AR tourism scenarios.

2.2.7 Discomfort and Use Intention

Discomfort refers to individuals' perception that new technology disrupts or damages their sense of comfort and negatively impacts their perceptions. Oh et al. demonstrated that discomfort negatively influences tourists' intention to use new technology. Costa and Bento' s user research showed that discomfort reduces intention to use new technology. In this study, discomfort experienced by users of AR technology reduces their use intention. Based on this analysis, we hypothesize:

H8: Discomfort negatively influences elderly individuals' intention to use AR tourism scenarios.

2.2.8 Lack of Security and Use Intention

Lack of security refers to individuals' perceptions of distrust and insecurity when facing new technology. Kwon and Chidambaram considered lack of security as a

result of fear toward new technology. Hu and Guo found that users with lack of security attributes exhibit negative impacts on new technology use intention. In this study, lack of security can be defined as individual distrust of AR technology, such as concerns about whether it meets expected effects or whether it leaks privacy. Based on this analysis, we hypothesize:

H9: Lack of security negatively influences elderly individuals' intention to use AR tourism scenarios.

2.2.9 Use Intention and Use Behavior

The technology acceptance model posits that acceptance intention toward specific information systems significantly influences actual system use behavior. The theory of planned behavior suggests that individual intention substantially influences behavior. Numerous empirical studies have confirmed a clear positive relationship between use intention and use behavior, making use intention an important variable for explaining use behavior. In this study, stronger intention to use new technology leads to higher acceptance and usage. Based on this analysis, we hypothesize:

H10: Use intention positively influences elderly individuals' use behavior regarding AR tourism scenarios.

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

Questionnaire Design and Variable Measurement

Based on the above hypotheses, we designed a questionnaire to collect and measure 12 variables in our model. The questionnaire employed a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree). Questionnaire items were based on established scales from domestic and international research, adapted to the characteristics and current state of AR technology (see Table 1).

Sampling and Descriptive Statistics

Since elderly populations may lack clear discrimination and cognition of AR technology, we included a video demonstrating AR tourism scenarios in the questionnaire to facilitate understanding. Due to pandemic restrictions, the formal questionnaire was distributed online via the professional survey platform "Wenjuanxing" from January 9 to January 21, 2022. The questionnaire abstract clearly specified and prompted the age range of respondents, with links shared in WeChat, Weibo, QQ, and other social platform groups featuring elderly characteristics. By January 21, 2022, we collected 337 questionnaires, excluding 13 invalid responses based on completion time, missing answers, consistency, and outliers, resulting in 323 valid questionnaires (95.84% validity rate). Sample demographics show: 51.39% male, 48.61% female; the largest age group was 60-65 years (53.56%), followed by 55-59 years (28.17%), 66-69 years

(15.48%), and 70+ years (2.79%). Educational backgrounds were primarily junior high school or below (37.77%) and high school/technical secondary school (39.94%), with college/undergraduate (18.27%) and graduate school or above (4.02%). Regarding employment status, 80.19% were retired, 8.98% employed, and 10.84% other. Monthly income distribution: 19.5% earned ¥2,000 or less, 48.61% earned ¥2,001-4,000, 23.22% earned ¥4,001-6,000, and 8.67% earned over ¥6,000. Additionally, 65.33% of respondents had prior AR technology experience, while 34.67% had none.

Data Analysis Tools and Procedures

First, we used SPSS 25.0 to analyze questionnaire scale consistency, verifying Cronbach' s α for each construct to assess scale reliability. Second, we analyzed the KMO value and Bartlett' s test of sphericity to verify significance levels and determine whether the questionnaire' s structural validity was suitable for factor analysis. If validity was adequate, we proceeded with confirmatory factor analysis. Finally, we used AMOS software to test research hypotheses and the empirical model.

Data Analysis and Results Validation

Reliability and Validity Tests

Using SPSS 25.0, we analyzed questionnaire consistency, finding all constructs' Cronbach' s α values exceeded 0.7, indicating good scale reliability. The questionnaire' s KMO value was 0.907 and Bartlett' s test of sphericity was 7,782.899 ($p < 0.001$), demonstrating high structural validity suitable for factor analysis, prompting confirmatory factor analysis. Confirmatory factor analysis (CFA) results (see Table 2) show all constructs' composite reliability (CR) values exceeded 0.7 and average variance extracted (AVE) values exceeded 0.5, indicating good convergent validity. Additionally, all item standardized factor loadings exceeded 0.6, further demonstrating good convergent validity.

We examined discriminant validity by comparing the square root of AVE values with inter-construct correlations. If the square root of AVE exceeds inter-construct correlations, variables demonstrate good discriminant validity. Results (see Table 3) show all constructs' AVE square roots exceeded inter-construct correlations, indicating good discriminant validity.

Model Fit and Hypothesis Testing

Based on reliability and validity analyses, we selected ^{2}/df, GFI, TLI, CFI, IFI, and RMSEA to assess model fit. The standardized model is shown in Figure 2 [Figure 2: see original paper]. Results show $^2/df = 1.690$, within the standard range of 1-3; GFI = 0.888, slightly below the 0.9 threshold; CFI = 0.976, TLI = 0.961, and IFI = 0.967, all exceeding the 0.9 threshold; RMSEA = 0.046, below the 0.08 threshold, indicating good fit between the conceptual model and

sample data. Standardized parameter outputs for the hypothesized model are shown in Table 2.

Hypothesis testing results (see Table 4) show that 7 of 10 hypotheses were supported. H1, H2, H3, H5, H7, H8, and H10 were validated, indicating that: performance expectancy positively influences elderly intention to use AR tourism scenarios; effort expectancy positively influences intention; social influence positively influences intention; facilitating conditions positively influence use behavior; price value positively influences intention; discomfort negatively influences intention; and use intention positively influences use behavior. H4, H6, and H9 were not supported, indicating that facilitating conditions do not significantly influence intention, hedonic motivation does not significantly influence intention, and lack of security does not significantly negatively influence intention.

Conclusions and Future Directions

Research Conclusions and Implications

By incorporating the technology readiness concept, we modified the UTAUT2 model to construct a model of tourist use intention and acceptance of AR technology. Through questionnaire data collection on elderly tourists' acceptance behavior toward AR tourism scenarios and validation using structural equation modeling with SPSS and AMOS, we conducted empirical research on influencing factors and reached the following main conclusions:

(1) **Facilitating conditions do not significantly influence use intention but significantly influence use behavior among the elderly.** Results show H4 was not supported while H5 was validated, indicating that facilitating conditions do not significantly positively influence elderly intention to use AR tourism scenarios but do significantly positively influence actual use behavior. The standardized path coefficient for facilitating conditions exceeded 0.4, indicating it is a major factor influencing use behavior. The high coefficient suggests that facilitating conditions substantially impact behavior. Elderly individuals in today' s technologically advanced environment are more susceptible to facilitating conditions. Through various platforms such as networks, short videos, or news push notifications, elderly people may develop use behavior without forming explicit use intention. Therefore, AR-related enterprises should increase promotional efforts across different platforms, enabling elderly groups to actively or passively generate use behavior under multiple facilitating conditions, leveraging favorable facilitating factors for marketing and service delivery.

(2) **Performance expectancy, effort expectancy, social influence, price value, and discomfort are the main antecedents of use intention among the elderly.** Results show H1, H2, H3, H7, and H8 were supported, with performance expectancy, effort expectancy, social influence, and price value positively influencing use intention,

while discomfort negatively influences intention. This suggests that AR enterprises should focus on participants' sense of gain, reduce operational difficulty, carefully adjust usage fees, expand outreach to various social groups, and intensify promotional efforts to achieve a stable, acceptable balance between participants' perceived costs and benefits. Simultaneously, discomfort represents an area for improvement. In terms of user experience, enterprises should develop personalized service solutions for the elderly, providing more friendly and simple interfaces and operation modes, eliminating concerns about surveillance, and reducing distrust arising from information asymmetry. Platforms should enhance authenticity and transparency, communicate corporate missions and visions promptly, and strive for empathy with participants.

(3) **Use intention significantly influences use behavior among the elderly, while hedonic motivation and lack of security show no significant impact.** Results show H10 was supported, indicating that use intention positively influences elderly use behavior. H6 and H9 were not supported, indicating that hedonic motivation does not significantly positively influence intention, and lack of security does not significantly negatively influence intention. Therefore, enterprises should focus on product experience to promote use behavior, without overemphasizing hedonic motivation and lack of security among elderly groups. Instead, they should concentrate on other relational aspects, providing user operation demonstrations, guidance services, and support functions for elderly groups, recommending appropriate tour methods and content based on participant preferences, and encouraging elderly participation through knowledge acquisition and detailed research "labels" to enhance engagement.

Among elderly populations, discomfort from technology readiness significantly influences use intention, indicating that technology readiness substantially impacts behavioral intention. Therefore, integrating UTAUT2 with TRI to incorporate personality trait factors into a comprehensive model proves necessary. Our findings demonstrate that under specific stages and contexts, necessary modifications, expansions, or improvements to UTAUT2 are warranted.

Limitations and Future Directions

This study' s limitations include: In reality, acceptance behavior toward AR tourism scenarios may not be proactive; rather, use behavior emerges first, with continued acceptance determined by experience quality. Therefore, the relationship between intention and behavior in the model may not be entirely unidirectional, though we only tested a unidirectional relationship, leaving deeper relationships for future examination. Additionally, our respondents were primarily elderly users with internet capabilities. While this group theoretically overlaps highly with potential AR technology adopters, complete correspondence cannot be guaranteed, creating some limitations. Future research should consider the complexity of relationships between influencing factors and constructs more

comprehensively, building more integrated theoretical frameworks while further reducing sampling bias.

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Author Contributions:
Li Jiaoyang: Data collection and processing, paper writing and revision.
Fan Zhenjia: Topic framework determination, revision suggestions, research content improvement and paper modification.

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