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The Moderating Role of Consumer Digital Trust in the Relationship Between AI Anchors and the Intention to Purchase Agricultural Products

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Abstract: The widespread application of artificial intelligence technology in the e-commerce field has brought new development opportunities for agricultural product e-commerce through AI digital anchors, but it has also inevitably led to "trust" issues due to the characteristics of the products. Based on the Technology Acceptance Model and trust theory, this paper proposes a theoretical framework with perceived usefulness and perceived ease of use as independent variables, intention to purchase as the dependent variable, and digital trust as the moderating variable. Empirical analysis results show that the perceived usefulness and perceived ease of use of AI anchors have a significant positive effect on consumers' purchase intention for agricultural products. The level of consumers' digital trust exerts a positive moderating effect on the relationship between perceived usefulness and purchase intention. The higher the level of digital trust, the more prominent the effect of perceived usefulness on purchase intention. Similarly, the level of digital trust also has a positive moderating effect on the relationship between perceived ease of use and purchase intention. Therefore, establishing consumers' digital trust in agricultural product live-streaming e-commerce can turn the technological advantages of AI anchors into actual purchasing behavior, which has theoretical and managerial significance.

Keywords: AI Anchors; Digital Trust; Intention to Purchase; Technology Acceptance Model; Agricultural Product E-commerce

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Introduction

In recent years, the convergence of the digital economy and artificial intelligence technology has prompted AI digital anchors to enter the e-commerce live-streaming industry, injecting new vitality into traditional agricultural product e-commerce [1]. Compared with traditional human anchors, AI anchors have the advantages of working day and night without fatigue, maintaining a unified image, transmitting accurate product information, and being replicable in different platforms. These characteristics make the time and space constraints of agricultural product sales markets disappear, and the sales channels for agricultural products are further extended. However, agricultural products are typical experiential products. Customers have high requirements for the quality, safety, and authenticity of the origin of agricultural products. It is difficult for customers to directly perceive agricultural products in virtual live-streaming e-commerce, and consumer trust is the most important factor limiting consumers' purchasing behavior.

This paper constructs a research framework combining Technology Acceptance Model and trust theory, and explores whether there will be a positive effect when the degree of digital trust enhances the positive effects of advantages of AI anchors on consumers' purchase intentions in online live-streaming sales of agricultural products? Or there will be mitigate the negative impact caused by the limitations of technology.

1.Theoretical Foundations

1.1 Technology Acceptance Model

Technology Acceptance Model (TAM) is an important theoretical basis for explaining that users will use new technologies. In this model, perceived usefulness and perceived ease of use are important factors that affect users' intentions. In the case of AI anchors, perceived usefulness means that customers believe that AI anchors can help improve efficiency and decision-making quality, enrich the shopping experience and select agricultural products. For example, AI anchors can provide customers with round-the-clock product consultation services, provide customers with personalized nutritional recommendations based on big data, and accurately display product inspection reports, etc., to enhance customers' perception of the usefulness of AI anchors. Perceived ease of use refers to customers' perception of ease of use in the process of communicating and collecting information from AI anchors and completing transactions. An AI anchor with an intuitive interface, high degree of voice recognition and fast response speed can reduce users' training costs and operating difficulties, and increase the probability of use.

1.2 Trust Theory and Its Dimensions

Trust is generally defined as positive expectations and reliance that one party holds toward the other in the face of risk. In the case of e-commerce, customer trust includes the following dimensions. According to the characteristics of AI anchors, consumer online trust can be divided into three parts:

(1) Competence Trust: It is the level of trust that consumers have in the professional knowledge, skills and performance of AI anchors. In the live streaming of agricultural products, this is manifested in the ability of AI anchors to answer professional questions about origin, variety, growth cycle, cooking methods and nutritional values of agricultural products, as well as the logic and truth of recommendations.

(2) Integrity Trust: It is the trust that consumers have in the AI anchors and operators to keep their promises, be honest, and provide true and unbiased information. In the sale of agricultural products, this is manifested in the authenticity of product descriptions and presentation, the accuracy of prices, and the fulfillment of promotional statements. Regarding the integrity trust, because the program controls AI, consumers will suspect that the information is "programmed" by the merchant to cover up the shortcomings. Therefore, establishing integrity trust is very important.

(3) Benevolence Trust: It is the belief that customers hold that AI anchors and their affiliated companies care about consumer rights and will assist consumers when problems occur. For example, when consumers ask questions, can the AI anchor be patient and empathetic? Or after the sales of agricultural products, whether the after-sales service terms are clear and advantageous to consumers? Although AI does not have feelings, it can also be designed to show care and empathy, so as to establish benevolence trust.

1.3 The Moderating Role of Digital Trust

In an environment with high digital trust, consumers are more likely to perceive the information conveyed by AI anchors as credible and to view the convenient operational experience as considerate service, which can facilitate the occurrence of purchasing behavior. Conversely, in a low digital trust scenario, even if the AI anchor is highly functional and easy to use, consumers may still distrust the provided information or worry about the lack of after-sales service guarantees, thereby hindering the formation of purchase intentions. Therefore, digital trust is not merely a simple antecedent factor but plays a role in enhancing or diminishing the impact of technological features on purchase intentions [2-3].

2.Research Hypotheses

Based on the above theoretical basis, this paper proposes the following four research hypotheses to establish the logical relationships between the characteristics of AI anchors, digital trust and purchase intention.

According to the Technology Acceptance Model, if users believe that a technology can help improve work performance, their intention to use that technology will be enhanced. Taking AI anchors as an example, perceived usefulness is manifested in three aspects. First, the depth and breadth of information [4]. AI anchors can use vast databases to quickly answer consumers' complex questions about the origin tracing, organic certification, nutritional value, and storage methods of agricultural products, providing more professional information than ordinary anchors can master, thereby reducing the cost for customers to obtain information. Second, intelligent decision-making assistance. For example, based on the consumers' health conditions or family situations, recommend the most appropriate kinds and quantities of agricultural products, achieve the combination of customization and optimization, and assist in decision-making.

Third, rationality and reliability of service. AI anchors will not be emotionally excited or depressed. They can always answer questions logically and deliver high-quality information. Especially when consumers buy agricultural products in a rush, the quality of agricultural products is very important. At this time, AI anchors can always provide fair and consistent consulting services. Therefore, the more practical benefits customers get from AI anchors when buying agricultural products, the more likely they will buy.

Based on the above analysis, the following research hypothesis is proposed.

H1: The perceived usefulness of AI positively affects consumers' intention to buy agricultural products.

Perceived ease of use refers to the ease of using technology, which is extremely important for the consumers of agricultural products of all ages. Simplify the operation process. As mentioned above, there must be a natural interaction interface. If the AI anchor can realize the smooth voice communication and image recognition function, such as "scan this fruit and then know its freshness," and answer the questions based on local pronunciation, it can reduce the operation process of users. Second, the information architecture must be clear. It is decisive for consumers whether the information they need to browse the product directly to the product details and then place an order are simple and clear. If the process is complicated and the instructions are unclear, it will make users confused and then abandon the order. In addition, the ability to respond quickly and solve the problem is also the important content of perceived ease of use. It is very important whether the AI customer service can quickly find out the reason and give clear answers to users doubts in the payment process or the order. An AI anchor platform with high easiness of use allows consumers to focus on the product without thinking about the process of operation, so as to make the shopping process more focused and promote the increase of purchase intention.

Based on the above analysis, the following research hypothesis is proposed.

H2: The perceived ease of use of AI anchors positively influences consumers intention to purchase agricultural products.

In order for perceived usefulness to be converted into purchasing behavior, the prerequisite is that consumers "trust" that this useful information is true and reliable. If consumers are in a situation of high digital trust: when AI anchors provide useful information such as "This apple is produced in the 37°N latitude golden zone and is rich in anthocyanins" (high perceived usefulness), consumers, based on their trust in the familiar degree of AI (agricultural knowledge) and integrity (truth of information), will accept this information without reservation and treat it as a strong purchase reason to buy, so as to significantly enhance the intention to buy. Conversely, in a low digital trust scenario: even if AI anchors provide equally detailed and professional information (high perceived usefulness), consumers may suspect that this is "marketing jargon" written by merchants, and the data may be fabricated, thus triggering a psychological defense mechanism that greatly reduces the persuasiveness of the useful information and severely weakens its positive impact on purchase intention. Therefore, digital trust determines the strength of the "useful information" credit endorsement and regulates the efficiency of its conversion into behavior.

Based on the above analysis, the following research hypothesis is proposed:

H3: Consumer digital trust plays a positive moderating role in the relationship between perceived usefulness and purchase intention. That is, the higher the level of digital trust, the stronger the positive impact of perceived usefulness on purchase intention [5-6].

An easy-to-use system can bring a sense of pleasure, but whether this pleasure can lead to a transaction is also subject to trust constraints. In a high digital trust scenario, smooth interaction and the convenience of one-click ordering (high perceived

ease of use) will be interpreted by consumers as "thoughtful and efficient service design." They will confidently entrust their personal information and payment security to this system, and thus the convenience directly translates into purchasing power. They believe that even with a simple process, after-sales service and rights protection are guaranteed (high benevolence trust). In a low digital trust scenario, however: an overly simple operational process may instead trigger consumers' insecurity and doubts. For example, "It was so quick to buy? Are there any hidden terms?" "It's so easy to get my address, is my information secure?" At this time, the convenience brought by ease of use is overshadowed by the perceived risks generated by distrust. Consumers may deliberately slow down the process, double-check, or even abandon the transaction due to distrust. Therefore, digital trust provides a psychological safety cushion for the "easy-to-use experience." Only when consumers trust the entity behind the system can the convenience of operation be seamlessly translated into the convenience of purchasing.

Based on the above analysis, the following research hypothesis is proposed:

H4: Consumer digital trust plays a positive moderating role in the relationship between perceived ease of use and purchase intention. That is, the higher the level of digital trust, the stronger the positive impact of perceived ease of use on purchase intention.

3.Empirical Analysis and Hypothesis Testing

3.1 Variable Selection

The core variables involved in this study include independent variables (perceived usefulness, perceived ease of use), dependent variable (purchase intention), moderating variable (digital trust), and control variables. All constructs are measured using established scales, which are appropriately adjusted to fit the context of this study (AI anchors, agricultural products) to form the final survey questionnaire. The questionnaire employs a 5-point Likert scale for measurement, where 1 represents "strongly disagree" and 5 represents "strongly agree."

Independent Variable 1: Perceived Usefulness. Referring to Davis's Technology Acceptance Model scale, four items are set, such as "I believe that using AI anchors to select agricultural products can help me understand product information more quickly" and "AI anchors can provide me with valuable suggestions for selecting agricultural products."

Independent Variable 2: Perceived Ease of Use. Similarly, referring to the Technology Acceptance Model scale, four items are set, such as "I believe that interacting with AI anchors is clear and easy to understand" and "It is easy for me to learn how to ask questions to AI anchors."

Moderating Variable: Digital Trust. Drawing on McKnight et al.'s trust scale and combining it with the AI context, six items are set to measure digital trust from three dimensions: ability, integrity, and benevolence. For example, "I believe that this AI anchor has rich professional knowledge of agricultural products (ability)," "I believe that the information provided by this AI anchor is true and reliable (integrity)," and "I believe that this AI anchor and its platform will protect my consumer rights (benevolence)."

The dependent variable is purchase intention. Referring to the purchase intention scale designed by Dodds et al., three items are set, such as "If I learn about agricultural product information through AI anchors, I am very likely to make a purchase decision" and "I tend to choose agricultural products recommended by AI anchors first."

To control for other potential factors, the gender, age, monthly income, and live-stream shopping frequency of the respondents are included as control variables in the model.

3.2 Reliability and Validity Testing

The purpose of reliability analysis is to examine the consistency and stability of the scale. This study selects Cronbach's α coefficient and composite reliability (CR) as evaluation indicators. Generally speaking, when the Cronbach›s α coefficient and CR value exceed 0.7, it indicates that the scale has good reliability. This analysis was conducted using SPSS 26.0 and AMOS 26.0 software, and Table 1 presents the results of the reliability and validity testing. The Cronbach's α coefficients of each latent variable range from 0.841 to 0.892, and the CR values range from 0.843 to 0.894, all of which are above the standard of 0.7, indicating that the measurement tools used in this study have high internal consistency and reliability.

Table 1:Results of Reliability and Validity Tests

Variables	Number of Items	Cronbach's α	Composite Reliability (CR)	Average Variance Extracted (AVE)
Perceived Usefulness (PU)	4	0.867	0.869	0.629
Perceived Ease of Use (PEOU)	4	0.841	0.843	0.574
Digital Trust (DT)	6	0.892	0.894	0.586
Purchase Intention (BI)	3	0.854	0.856	0.523

3.3 Hypothesis Testing

3.3.1 Main Effect Test

First, the control variables (gender, age, monthly income, and frequency of live-stream shopping) were included in the regression model (Model 1). Subsequently, the two independent variables (Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)) were added to the model (Model 2). The regression results are shown in Table 2, with N=389, *p<0.05, **p<0.01, ***p<0.001. Model 2 indicates that, after controlling for demographic variables, Perceived Usefulness (β=0.328, p<0.001) and Perceived Ease of Use (β=0.271, p<0.001) both have significant positive effects on purchase intention. Therefore, Hypotheses H1 and H2 are supported by the data.

Table 2:Regression Results

Variables	Model 1 (Control Model)	Model 2 (Main Effect Model)
Control Variables	-	-
Gender	-0.042	-0.035
Age	0.068	0.051
Monthly Income	0.095	0.062
Frequency of Live-Stream Shopping	0.183**	0.121*
Independent Variables	-	-
Perceived Usefulness (PU)	-	0.328***
Perceived Ease of Use (PEOU)	-	0.271***
Model Statistics	-	-
R^2	0.048	0.337
Adjusted R^2	0.038	0.326
ΔR^2	-	0.289***
F value	4.792**	32.874***

3.3.2 Moderating Effect Test

To test the moderating role of digital trust (DT), based on Model 2, the moderating variable digital trust was first introduced (Model 3), followed by the interaction terms "PU×DT" and "PEOU×DT" (Model 4). Table 3 presents the hierarchical regression analysis results for the moderating effect of digital trust. It can be observed that the regression coefficient of the interaction term "PU×DT" is 0.152, which is significant at the p<0.01 level. Hence, digital trust has a significant positive moderating effect on the relationship between perceived usefulness and purchase intention. That is, when consumers digital trust level is high, the positive impact of perceived usefulness on purchase intention is stronger. Therefore, Hypothesis H3 is supported. The regression coefficient of interaction term "PEOU×DT" is 0.118, which is significant at the p<0.05 level. It also indicates that digital trust has a significant positive moderating effect on the relationship between perceived ease of use

and purchase intention. That is, when consumers digital trust level is high, the positive impact of perceived ease of use on purchase intention is stronger. Therefore, Hypothesis H4 is supported.

Table 3 Results of Hierarchical Regression Analysis for the Moderating Effect of Digital Trust

Variables	Model 2 (Main Effect)	Model 3 (Adding Moderator)	Model 4 (Interaction Effect)
Control Variables	-	-	-
Gender	-0.035	-0.029	-0.031
Age	0.051	0.037	0.033
Monthly Income	0.062	0.045	0.041
Frequency of Live-Stream Shopping	0.121*	0.098	0.094
Independent Variables	-	-	-
Perceived Usefulness (PU)	0.328***	0.265***	0.251***
Perceived Ease of Use (PEOU)	0.271***	0.221***	0.210***
Model Statistics	-	-	-
Digital Trust (DT)	-	0.348***	0.335***
Interaction Terms	-	-	-
PU×DT	-	-	0.152**
PEOU×DT	-	-	0.118*
Model Statistics	-	-	-
R^2	0.337	0.431	0.462
Adjusted R^2	0.326	0.421	0.450
ΔR^2	-	0.094***	0.031**
F value	32.874***	43.561***	38.922***

4.Conclusion

Based on Technology Acceptance Model and trust theory, this study empirically studies the relationships between the perceived usefulness and ease of use of AI anchors, consumer digital trust and intention to purchase agricultural products. The main conclusions are as follows.

(1) Technical features of AI anchors are basic factors that stimulate consumers to generate purchase intentions. Perceived usefulness and ease of use have a positive effect on consumers' purchase intention of agricultural products. Thus, it is recommended that agricultural product sellers enhance the information communication function, advisory function, and smoothness of interaction of AI anchors to stimulate consumers' shopping desires.

(2) Digital trust not only directly strengthens the effect of perceived usefulness on purchase intention, but also improves the effectiveness of digital trust converting the convenience achieved from perceived ease of use into consumers' purchasing behavior. That is, in the context of agricultural products, which has relatively high perceived risks, technical superiority without support of digital trust is not stable and effective. The level of consumers' trust in the ability, integrity, and benevolence of AI anchors constitutes the psychological security threshold for accepting technological recommendations and completing transactions.

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Conflict of Interests

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

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