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How do we trust AI service? Exploring the trust mechanism in AI service

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1. INTRODUCTION AND RESEARCH QUESTIONS

With the sustained development of artificial intelligence (AI) technology, AI service have been integrated various industries such as tourism, medical and home [1]. And it is more and more common in daily life [2,3], including smart speaker, intelligent voice assistant and other products. According to the “Global Semi-annual Artificial Intelligence Tracking Report” by IDC, the business scale of the global AI service market in 2021 reached \$24 billion, with a year-on-year growth of 22.4% compared to 2020, and it is expected that the CAGR will maintain a high level in the next five years [4]. The use of AI to carry out service innovation has become prevailing trend. In a user survey on smart speaker conducted by Strategy Analytics, a market research agency, nearly 60% of users believed that they trusted smart speaker and became dependent on them. Hence, Trust is a key factor influence continued use of AI services. Previous studies have extensively discussed platform trust and interpersonal trust, and it has been proved that service quality, consumer attitude and external environment can affect user trust [5,6]. However, the process of trust formation in AI services is different. On the one hand, AI service products can timely update the service form according to the specific demand of users, and possess the characteristics of intelligent interaction and anthropomorphism [7]. On the other hand, during the interaction, people may develop the affective empathy towards the AI service. Therefore, trust in AI services is not the same as trust between humans and machines, or interpersonal trust. In order to further extend the theoretical perspective of trust in AI services, the research question of this study is: what the factors influence user trust in AI services?

2. THEORY AND RESEARCH FRAMEWORK

This research is divided into two studies. In Study 1, we undertake an in-depth study of the AI service trust antecedent (AISTA). Considering these antecedents may have difference influence on AI service trust and then impact users’ continuous use, we combine two different types of trust to build an AI service trust mechanism model to examine it in Study 2.

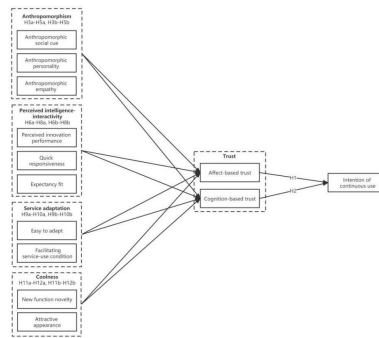


Figure 1. Research framework

Study 1 adopts the grounded theory method, which is suitable for discovering rules from phenomena and sorting out data. In this part, we formulate the coding scheme, which include the concepts that may be related to the trust antecedents and the characteristics of AI services. Then, we encode the user comments of AI service products in three layers, refining multilevel AISTA. The data comes from 427 pages of text data with a total of 14,688 real user comments of AI service products on seven well-known shopping and information sharing platforms from November 2021 to October 2022.

In Study 2, to explore trust in AI service, we integrate previous framework with continuous use intention using affect-cognition-behavior framework [8]. Following the discussion of AISTA above, the trust mechanism model are

developed and tested by structural equation modeling (Figure 1). Because smart speakers are currently the most representative products of AI services and have become indispensable for many users' lives [1], we collect the data for this study from smart speaker users. After excluding invalid answers, a total of 403 valid questionnaires are obtained.

3. RESULTS AND MAJOR FINDINGS

This paper investigates the AISTA based on grounded theory and empirically develops the trust mechanism in AI services. It is found that, for different trust antecedents, cognition-based trust and affect-based trust produce varying degrees of influence on the users' intention to use AI services. A few interesting findings appeared within our studies. First, we conclude that applying the grounded theory generates a better understanding of trust in the context of the AI service. Second, the four types of trust antecedents extracted play different roles in trust. AI service products show more coolness and perceived intelligence-interactivity, resulting in a higher sense of trust, while anthropomorphism contributes less to user trust. Moreover, service adaptation has no influence on affect-based trust. Third, under the framework of trust mechanism, we prove that affect-based trust and cognition-based trust have significant and positive effects on the intention to continuously use AI services. In other words, the process of trust and human-computer interaction in AI services is different from that in traditional IS fields, and user willingness to use AI products may be more complicated.

4. CONTRIBUTIONS

This study integrated the characteristics of the AI service to construct the multilevel dimensions of AISTA by adopting the grounded theory, including four second-order constructs and ten first-order constructs. Moreover, We also developed a trust mechanism model using structural equation modeling technique. In terms of theoretical contribution, our research introduces trust to the AI service area, revealing the black box of trust mechanism. In practice, the results of this study can help AI service enterprises more accurately grasp the relationship between service trust and user behavior, which is conducive to product optimization and business innovation.

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