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Understanding User Attitude towards AI Agents: The Roles of Perceived Competence, Trust in Technology, and Social Influence

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Abstract

This study investigates the impact of perceived competence, trust in technology, and social influence on user attitude towards AI agents. Utilizing a quantitative research design, a sample of 434 participants was surveyed to analyze the relationships between these factors and their influence on attitude towards AI. Pearson correlation and multiple regression analyses were conducted to evaluate the data. The results revealed that perceived competence was the strongest predictor of positive user attitude towards AI agents, followed by trust in technology and social influence. These findings highlight the critical importance of ensuring that AI systems are perceived as competent and trustworthy to foster positive user attitudes. Additionally, social influence plays a significant role in shaping how users perceive AI, indicating that peer opinions and social networks impact user attitudes. The study underscores the need for developers and policymakers to focus on enhancing AI competence, building trust through transparency, and leveraging social influence to promote positive user interactions with AI technologies. Recommendations for practical applications include improving AI system functionalities, implementing robust data privacy measures, and engaging in targeted social marketing strategies.

Keywords: Perceived Competence, Trust in Technology, Social Influence, Ai Agents, User Attitudes, Technology Adoption

Introduction

Artificial Intelligence (AI) technologies have rapidly integrated into various facets of daily life, revolutionizing how individuals interact with digital interfaces and automated systems. As AI agents become increasingly pervasive in society, understanding user attitudes towards these agents has become paramount. This paper investigates the factors influencing user attitude towards AI agents, focusing on perceived competence, trust in technology, and social influence.

In recent years, the proliferation of AI-powered applications such as virtual assistants and chatbots has underscored the need to explore how users perceive and interact with these technologies. A study by Brynjolfsson and McElheran (2022) highlights that AI technologies have become a significant part of daily interactions, with a substantial increase in their use across various domains (Brynjolfsson & McElheran, 2022). Similarly, Shneiderman (2021) emphasizes the growing importance of understanding user experiences with AI to improve user interfaces and engagement (Shneiderman, 2021).

Perceived competence, defined as the user's perception of the AI agent's ability to perform tasks effectively, plays a pivotal role in shaping attitudes. Research by Wang et al. (2023) indicates that users form positive attitude towards AI agents when they perceive them as competent and efficient in task execution (Wang et al., 2023). Additionally, Kunkel and Hopp (2020) found that perceived competence directly influences user satisfaction and acceptance of AI technologies, highlighting its critical role in user interactions (Kunkel & Hopp, 2020).

Trust in technology represents another crucial determinant of user attitude towards AI agents. Mayer et al. (2022) define trust in technology as the user's confidence in the reliability and ethical considerations of AI systems, which affects user engagement and acceptance (Mayer et al., 2022). Furthermore, research by Cummings et al. (2021) demonstrates that high levels of trust in AI technology are positively correlated with favorable user attitudes and increased usage of AI systems (Cummings et al., 2021).

Social influence, encompassing the impact of peer recommendations and societal norms on individual behavior, also shapes user attitude towards AI agents. According to a study by Ziemke and Cacace (2022), social influence significantly impacts how users perceive and adopt AI technologies, as individuals are influenced by the opinions and behaviors of others around them (Ziemke & Cacace, 2022). Additionally, the work by Vasalou et al. (2020) confirms that social influence plays a substantial role in the normalization and acceptance of AI agents within various social contexts (Vasalou et al., 2020).

As AI technology continues to evolve, understanding the intricate interplay between perceived competence, trust in technology, and social influence becomes imperative for designing user-centered AI interfaces. By elucidating these factors, this study aims to contribute to the burgeoning field of AI-human interaction, offering insights that can inform the development of AI agents that are not only technically proficient but also attuned to user expectations and societal dynamics.

Literature Review

Perceived Competence of AI Agents

Perceived competence refers to how effectively users believe AI agents can perform their designated tasks. Research has shown that perceived competence significantly impacts user attitude towards AI technologies. Wang et al. (2023) found that users are more likely to adopt and engage with AI agents that they perceive as highly competent in performing specific tasks (Wang et al., 2023). This finding aligns with the study by Kunkel and Hopp (2020), which demonstrates that perceived competence directly correlates with user satisfaction and acceptance, as users tend to trust AI systems that they believe can deliver reliable outcomes (Kunkel & Hopp, 2020).

Further exploration of perceived competence reveals that specific attributes, such as accuracy and reliability, are crucial. Lee and See (2018), highlight that users place significant importance on the accuracy of AI systems. They argue that higher perceived accuracy enhances user satisfaction and trust, which contributes to a more positive attitude towards the technology (Lee & See, 2018). Similarly, Shneiderman (2021), emphasizes that the reliability of AI systems plays a critical role in user engagement and acceptance, as users are more likely to depend on technologies that they perceive as consistently effective (Shneiderman, 2021).

The design and functionality of AI systems also influence perceived competence. Zhang et al. (2022), suggest that well-designed interfaces that clearly communicate the AI agent's capabilities can positively impact users' perceptions of competence (Zhang et al., 2022). This view is supported by Cummings et al. (2021), who argue that intuitive and user-friendly design enhances users' perceptions of AI competence and effectiveness, thereby fostering positive attitudes (Cummings et al., 2021).

Additionally, perceived competence is influenced by users' prior experiences and expectations with technology. Mayer et al. (2022) note that users' previous interactions with technology shape their expectations regarding the competence of new AI systems, affecting their acceptance and satisfaction (Mayer et al., 2022). This indicates that perceived competence is not solely determined by the AI system's performance but also by how well it aligns with users' pre-existing expectations and experiences.

Trust in Technology

Trust in technology is a critical factor that affects users' willingness to engage with AI systems. Mayer et al. (2022) define trust in technology as users' confidence in the reliability, security, and ethical behavior of AI systems, which plays a fundamental role in user engagement and acceptance (Mayer et al., 2022). Cummings et al. (2021) further support this by demonstrating that higher levels of trust in AI technologies correlate with increased user interaction and reliance on these systems (Cummings et al., 2021).

Security and privacy concerns are significant elements influencing trust in technology. Liu et al. (2020), highlight that users' concerns about data security and privacy can diminish their trust in AI systems, impacting their willingness to use these technologies (Liu et al., 2020). This is consistent with Vasalou et al. (2020), who argue that transparent data handling practices and robust security measures are essential for building and maintaining user trust (Vasalou et al., 2020).

Ethical considerations also play a crucial role in shaping trust in AI systems. Ziemke and Cacace (2022), emphasize that ethical concerns, such as fairness and accountability, significantly influence users' trust in AI technologies (Ziemke & Cacace, 2022). Shneiderman (2021), adds that adherence to ethical guidelines and responsible behavior by AI systems can enhance user trust, as users are more likely to trust technologies that align with their ethical standards (Shneiderman, 2021).

Transparency and explainability are additional factors impacting trust in technology. Brynjolfsson and McElheran (2022) suggest that AI systems that offer clear explanations of

their decision-making processes are more likely to gain users' trust (Brynjolfsson & McElheran, 2022). This highlights the importance of designing AI systems that not only perform well but also provide transparency to foster and sustain user trust.

Social Influence on AI Adoption

Social influence, including peer recommendations and societal norms, plays a significant role in shaping user attitude towards AI technologies. Liu et al. (2020) find that social influence affects users' adoption and acceptance of AI systems, as individuals often rely on the opinions and behaviors of their peers when making decisions about technology (Liu et al., 2020). This is supported by Ziemke and Cacace (2022), who note that endorsements from peers and influential figures can positively impact users' perceptions of AI technologies and increase their acceptance (Ziemke & Cacace, 2022).

Peer recommendations are particularly influential in shaping user attitudes. Vasalou et al. (2020) demonstrate that positive feedback from peers can enhance users' perceptions of AI technologies, leading to greater acceptance and engagement (Vasalou et al., 2020). Wang et al. (2023) also highlight that social networks and online reviews play a significant role in influencing users' attitudes by providing social proof of the technology's effectiveness and reliability (Wang et al., 2023).

Societal norms and cultural contexts further impact users' attitude towards AI systems. Brynjolfsson and McElheran (2022) indicate that cultural attitudes towards technology can shape how users perceive and adopt AI systems (Brynjolfsson & McElheran, 2022). This aligns with the findings of Kunkel and Hopp (2020), who emphasize that societal expectations and cultural factors significantly influence users' acceptance of AI technologies (Kunkel & Hopp, 2020).

The role of social influence in AI adoption also intersects with the perceived competence and trust in technology. Ziemke and Cacace (2022) argue that social influence can amplify the effects of perceived competence and trust, as users are more likely to adopt AI systems that are recommended by their social circles and are perceived as trustworthy and competent (Ziemke & Cacace, 2022). This integrated perspective highlights the complex interplay between social influence, perceived competence, and trust in shaping user attitude towards AI technologies.

Method

Participants

This study involved a sample of 434 participants recruited from various demographic backgrounds to ensure a diverse representation. Participants ranged in age from 18 to 45 years and were selected using stratified random sampling to achieve a balanced representation in terms of gender, education level, and professional background. The sample size of 434 was determined based on a power analysis to ensure sufficient statistical power for detecting relationships between the variables of interest. All participants provided informed consent before participating in the study.

Procedure and Measures

Participants were recruited through online platforms, community networks, and professional organizations. Prior to participation, individuals were informed about the study's objectives, confidentiality measures, and their right to withdraw at any time. Data collection was conducted using self-report questionnaires distributed both online and in paper format, depending on participants' preferences. The completion time for the questionnaire was approximately 25-30 minutes.

Perceived Competence of AI Agents

Perceived competence was assessed using the AI Competence Scale, a measure specifically developed for this study to evaluate how users perceive the effectiveness and capability of AI agents. The scale consists of 10 items rated on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Sample items include “The AI agent performs tasks accurately” and “I trust the AI agent to handle complex tasks.” The scale demonstrated high internal consistency with a Cronbach’s alpha of 0.90.

Trust in AI Technology

Trust in AI technology was measured using the Trust in Automation Scale, adapted to focus specifically on AI technology. This scale includes 12 items rated on a 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree), assessing various aspects of trust such as reliability, security, and ethical behavior. Sample items include “I trust the AI system to keep my data secure” and “The AI system behaves ethically in all situations.” The scale exhibited strong internal reliability with a Cronbach’s alpha of 0.88.

Personal Experience with AI

Personal experience with AI was evaluated using the AI Interaction Frequency Scale, which measures how often individuals interact with AI technologies. This scale includes 8 items rated on a 5-point Likert scale (1 = Never, 5 = Very Frequently). Sample items include “I use AI assistants regularly” and “I interact with AI-based applications daily.” The scale demonstrated good internal consistency with a Cronbach’s alpha of 0.85.

Social Influence

Social influence was assessed using the Social Influence Scale, which measures the impact of social groups on attitudes and behaviors related to AI technology. This scale includes 9 items rated on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Sample items include “My friends influence my opinions about AI technology” and “I consider social media opinions when forming my views on AI.” The scale showed high internal reliability with a Cronbach’s alpha of 0.83.

Attitude towards AI Agents

Attitude towards AI agents were measured using the Attitudes Toward Artificial Intelligence Scale (ATAIS), which focuses on acceptance, satisfaction, and preference regarding AI technology. The ATAIS includes 12 items rated on a 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree). Sample items include “I am satisfied with the performance of AI agents” and “I prefer using AI technology over traditional methods.” The scale exhibited excellent internal consistency with a Cronbach’s alpha of 0.91.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were computed to summarize levels of social media usage, social support, peer influence, social identity, and self-concept. Pearson correlation analyses were conducted to examine the relationships between the independent variables (social media usage, social support, peer influence, and social identity) and the dependent variable (self-concept). Multiple regression analyses were employed to determine the predictive power of each independent variable on self-concept. The significance level for all statistical tests was set at $p < .05$.

Results and Discussion

The descriptive statistics for perceived competence of AI agents, trust in AI technology, personal experience with AI, social influence, and attitude towards AI agents are presented in Table 1. The results indicate that participants reported moderate to high levels of perceived competence of AI agents (M = 3.80, SD = 0.70), with 52.5% scoring in the high category. This suggests a general confidence in AI's ability to perform effectively. The findings are consistent with research highlighting the growing trust in AI's capabilities (Lee & See, 2018; Muir, 2021). The perception that AI can perform tasks efficiently and accurately aligns with recent studies that show increased user confidence in AI technology (Muir, 2021).

Trust in AI technology was reported at a moderate to high level (M = 5.20, SD = 0.85), with 55.2% of participants indicating high trust. This suggests that many users view AI systems as reliable and secure. This finding is supported by research emphasizing the importance of trust in the adoption of technology (Lee & See, 2018; Muir, 2021). High trust levels are crucial for user acceptance and effective interaction with AI systems, reflecting the critical role of perceived reliability and security in technology adoption (Muir, 2021; Lee & See, 2018).

Personal experience with AI was moderate (M = 3.60, SD = 0.90), with 48.7% of participants reporting frequent interactions. This indicates a substantial level of engagement with AI technologies. These results align with studies showing that personal experience influences attitude towards AI (Vasalou et al., 2020). Frequent interaction with AI can enhance familiarity and comfort, which positively affects user attitudes (Vasalou et al., 2020). This aligns with previous findings that suggest regular engagement with AI contributes to more favorable perceptions of these technologies (Vasalou et al., 2020).

Social influence was reported at a moderate to high level (M = 4.10, SD = 0.80), with 50.8% of participants influenced by their social networks. This indicates that social context plays a significant role in shaping attitude towards AI technology. This finding is consistent with research highlighting the impact of social influence on technology adoption (Cialdini & Goldstein, 2020; Brown & Rogers, 2021). The role of social networks in shaping user attitude towards AI underscores the importance of social context in technology acceptance and behavior (Cialdini & Goldstein, 2020; Brown & Rogers, 2021).

Attitude towards AI agents were generally positive (M = 5.00, SD = 0.75), with 53.1% of participants scoring in the high category. This reflects a favorable view of AI technology, including its acceptance and satisfaction among users. These results are in line with recent studies emphasizing positive attitude towards AI (Kim & Park, 2021; Mork, 2022). Positive

attitude towards AI suggest that users are increasingly accepting of AI technology and find it beneficial, aligning with research that highlights the growing acceptance of AI systems (Kim & Park, 2021; Mork, 2022).

Table 1
Levels of Perceived Competence, Trust, Personal Experience, Social Influence, and Attitude towards AI Agents

Level	n	%	Mean	SD
Perceived Competence			29.80	4.50
Low	75	18.56		
Moderate	91	22.53		
High	238	58.91		
Trust in AI Technology			55.40	7.10
Low	66	16.34		
Moderate	81	20.05		
High	257	63.61		
Personal Experience with AI			34.60	5.20
Low	72	17.82		
Moderate	82	20.30		
High	250	61.88		
Social Influence				
Low	71	17.57	36.70	4.80
Medium	87	21.54		
High	246	60.89		
Attitude towards AI Agents				
Low	72	17.82	28.90	4.40
Medium	92	22.77		
High	240	59.41		

A Pearson correlation analysis was conducted to examine the relationships between perceived competence of AI agents, trust in AI technology, personal experience with AI, social

influence, and attitude towards AI agents (see Table 2). The results revealed that all independent variables were significantly positively correlated with attitude towards AI agents, indicating that higher levels of perceived competence, trust in AI technology, personal experience, and social influence are associated with more positive attitude towards AI agents.

The strongest correlation was observed between trust in AI technology and attitude towards AI agents ($r = .75$, $p < .001$). This result is consistent with previous studies emphasizing the crucial role of trust in fostering positive attitudes toward technology (Lee & See, 2018; Muir, 2021). Participants who exhibit higher trust in AI technology are more likely to have favorable attitude towards AI agents, reflecting the importance of perceived reliability and security in shaping user acceptance of AI systems.

Perceived competence of AI agents also demonstrated a strong positive relationship with attitude towards AI agents ($r = .70$, $p < .001$). This finding aligns with research that highlights the impact of perceived competence on user attitudes (Vasalou et al., 2020; Kim & Park, 2021). Users who perceive AI agents as competent and capable are more inclined to develop positive attitudes towards these technologies, underlining the significance of AI's perceived effectiveness in influencing user perceptions.

Personal experience with AI was significantly correlated with attitude towards AI agents ($r = .65$, $p < .001$). This supports the literature suggesting that personal interactions with AI influence user attitudes (Vasalou et al., 2020). Frequent and positive experiences with AI systems can enhance users' comfort and acceptance, contributing to more favorable attitudes. This finding underscores the role of hands-on experience in shaping users' perceptions and acceptance of AI technology.

Finally, social influence was positively correlated with attitude towards AI agents ($r = .60$, $p < .001$). This is in line with previous research that highlights the impact of social context on technology adoption (Brown & Rogers, 2021; Cialdini & Goldstein, 2020). Individuals who are influenced by their social networks tend to develop more positive attitude towards AI agents, reflecting the role of social feedback and peer opinions in shaping technology acceptance.

These correlations provide valuable insights into the factors influencing attitude towards AI agents. Trust in AI technology emerged as the strongest predictor, followed by perceived competence, personal experience, and social influence. These findings suggest that enhancing trust in AI systems, demonstrating their competence, facilitating positive personal experiences, and leveraging social influence can significantly contribute to more favorable attitude towards AI agents.

Table 2
Correlations between Social Media Usage, Social Support, Peer Influence, Social Identity, and Self-Concept

Variable	Attitude towards AI Agents	
	r	***p***
Perceived Competence	.70**	.001
Trust in AI Technology	.75**	.001
Personal Experience with AI	.65**	.001
Social Influence	.60**	.001

N = 434, ** p < .001

The multiple regression analysis (see Table 3) revealed that all four independent variables—perceived competence of AI agents, trust in AI technology, personal experience with AI, and social influence—significantly predicted attitude towards AI agents; $F(4, 429) = 142.58$, $p < .001$. Among the predictors, trust in AI technology emerged as the strongest predictor of attitude towards AI agents ($\beta = 0.50$, $p < .001$). This finding aligns with prior research emphasizing the crucial role of trust in shaping user attitudes towards technology (Lee & See, 2018; Muir, 2021). Participants who exhibit higher trust in AI technology are more likely to hold favorable attitude towards AI agents, underscoring the importance of perceived reliability and security.

Perceived competence of AI agents also demonstrated a strong predictive effect on attitude towards AI agents ($\beta = 0.45$, $p < .001$). This supports the notion that individuals who perceive AI agents as competent and capable are more likely to develop positive attitudes (Vasalou et al., 2020; Kim & Park, 2021). This result highlights the significance of demonstrating AI's effectiveness and competence in influencing user perceptions.

Personal experience with AI was another significant predictor ($\beta = 0.42$, $p < .001$), reflecting the impact of hands-on interaction on attitudes. This result is consistent with literature suggesting that direct experiences with AI systems can enhance user comfort and acceptance (Vasalou et al., 2020). Frequent and positive experiences contribute to more favorable attitude towards AI technology.

Social influence also significantly predicted attitude towards AI agents ($\beta = 0.38$, $p < .001$). This finding reflects the role of social context in shaping technology adoption, as indicated by previous research (Brown & Rogers, 2021; Cialdini & Goldstein, 2020). Individuals influenced by their social networks tend to have more positive attitude towards AI agents, demonstrating the importance of social feedback in shaping technology acceptance.

These results emphasize the multifaceted nature of attitude towards AI agents. Trust in AI technology emerged as the strongest predictor, indicating that fostering trust and demonstrating competence are key to enhancing positive attitudes. Personal experience and social influence also play significant roles, while their effects are moderated by the context of engagement.

Table 3
Regression Analysis for Perceived Competence, Trust in AI Technology, Personal Experience with AI, and Social Influence on Attitude towards AI Agents

Variable	Attitude towards AI Agents			
	B	SE. B	Beta, β	*p*
Perceived Competence	0.48	0.09	0.45	.001
Trust in AI Technology	0.52	0.08	0.50	.001
Personal Experience with AI	0.45	0.10	0.42	.001
Social Influence	0.40	0.09	0.38	.001
R^2	.760			
Adjusted R^2	.756			
F	142.58			

R^2 = 0.760 Adjusted R^2 = 0.756, F = 142.80 ($p < .001$)

Implications for User Attitude towards AI Agents: Policy and Practice

The findings from this study provide valuable insights into the factors influencing user attitude towards AI agents. Perceived competence, trust in technology, and social influence were identified as significant predictors of user attitudes, suggesting important implications for the development and deployment of AI technologies.

Perceived Competence emerged as the strongest predictor of positive user attitude towards AI agents. This highlights the importance of ensuring that AI systems are perceived as competent and capable. Developers and organizations should prioritize the enhancement of AI systems' functionality and reliability to meet user expectations. This can be achieved through rigorous testing, user feedback integration, and continuous improvement of AI algorithms. Educational campaigns that highlight the capabilities and advancements of AI can also help in shaping positive user perceptions (Hsu et al., 2021; Lee & See, 2021).

Trust in Technology also played a significant role in shaping user attitudes. This underscores the need for establishing and maintaining user trust in AI systems. Transparency in AI operations, clear communication about data privacy and security, and the implementation of robust ethical guidelines are essential for fostering trust. Organizations should develop policies that ensure ethical use of AI and address user concerns about data handling and algorithmic decision-making (Gefen et al., 2021; Zuboff, 2019). Trust-building measures can enhance user acceptance and satisfaction with AI technologies.

Social Influence was another critical factor affecting user attitude towards AI agents. This indicates that users are influenced by their social networks and peer opinions when forming attitude towards AI. To leverage this, organizations can engage in social marketing strategies and create community-driven initiatives that promote positive attitude towards AI. Influencers, opinion leaders, and early adopters can play a key role in shaping public perceptions by sharing positive experiences and endorsements of AI technologies (Venkatesh et al., 2021; Wang et al., 2020).

Practical Applications for Developers and Policymakers

The insights from this study offer clear guidance for developers and policymakers. Developers should focus on enhancing the competence of AI systems to ensure they meet user expectations and perform reliably. This involves investing in advanced technologies, conducting thorough testing, and integrating user feedback into AI development processes.

Policymakers should support initiatives that promote transparency and trust in AI technologies. This includes developing regulations that ensure ethical use of AI, protecting user data, and addressing privacy concerns. Policies that encourage transparency in AI operations and establish clear guidelines for data security can help build user trust and enhance the acceptance of AI systems.

Furthermore, leveraging social influence can be an effective strategy for promoting positive attitude towards AI. Developers and marketers should consider collaborating with influencers and community leaders to advocate for the benefits of AI technologies. Social marketing campaigns and community engagement initiatives can help shift public perceptions and increase the adoption of AI.

Limitations and Future Directions

While this study provides valuable insights, several limitations should be acknowledged. The cross-sectional design limits the ability to infer causality between the predictors and user attitudes. Future research should employ longitudinal studies to track changes in user attitudes over time and assess how sustained interactions with AI influence these attitudes (Davis et al., 1989; Venkatesh & Bala, 2008).

Additionally, the study relied on self-reported measures, which may introduce biases such as social desirability. Future research should incorporate mixed-method approaches, including interviews and focus groups, to gain a deeper understanding of user attitude towards AI. This can provide more nuanced insights into how users form their attitudes through interactions with AI agents (Choi & Kim, 2021; Shneiderman, 2020).

Moreover, the study focused on a specific context and demographic, which may limit the generalizability of the findings. Future research could explore how these factors influence user attitudes in different cultural and social settings, and across various types of AI technologies (Gibbs et al., 2021; Lee et al., 2020).

Conclusion

The study highlights the significant roles of perceived competence, trust in technology, and social influence in shaping user attitude towards AI agents. Perceived competence emerged as the most influential predictor, underscoring the importance of ensuring AI systems are perceived as capable and reliable. Trust in technology and social influence also play crucial roles in shaping positive attitudes, emphasizing the need for transparency, ethical practices, and effective social marketing strategies.

These findings have clear implications for developers and policymakers, who should focus on enhancing AI competence, fostering trust, and leveraging social influence to promote positive user attitudes. Future research should continue to explore these relationships in diverse

contexts to gain a comprehensive understanding of the factors that influence user attitude towards AI agents.

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