AIRSI2025

The Metaverse Conference

Proceedings Book

Zaragoza University, Spain

9 - 11 June 2025

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From promises to practice: unraveling users' mental models about the role and implications of large language models (LLMs) for individuals and society

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Type of manuscript: Extended abstract

Keywords: Large Language Models (LLMs); mental models; AI-enabled services; societal impact; Critical Incident Technique (CIT)

Extended abstract

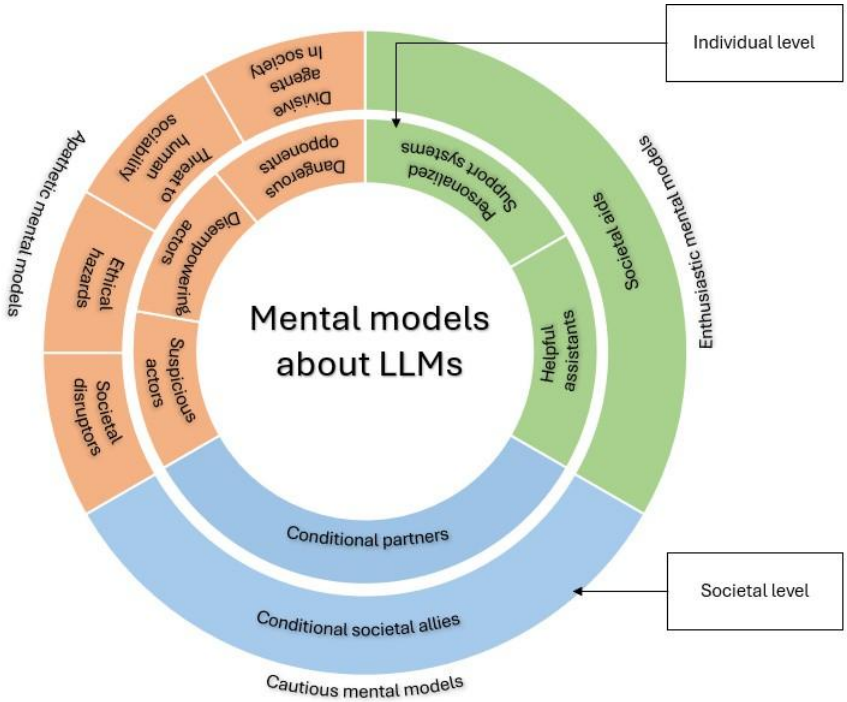
Artificial intelligence (AI) has rapidly evolved with the emergence of Generative AI (Gen AI), especially following the release of ChatGPT (Lim *et al*., 2023). Gen AI systems generate content across various formats without direct human intervention (Mondal *et al*., 2023), with large language models (LLMs) like ChatGPT, Google Gemini, and Microsoft Copilot standing out for their ability to produce human-like text (Van Dis *et al*., 2023). Surpassing previous AI capabilities (Maslej *et al*., 2023) and disrupting both human-technology interactions and business operations (Messner *et al*., 2025), these models have captured the interest of early adopters and are being explored across sectors to enhance user engagement and organizational efficiency (Alita, 2025; Dwivedi *et al*., 2023a, 2023b). Academic research, so far, has largely focused on LLMs' capacity for coherent text generation (Omizo, 2024), their role in fields like education and business (Celiktutan *et al*., 2024), and their applications in decision-making, research data generation and data analysis (e.g., Arora et al., 2025; Imschloss *et al*., 2025; Wong *et al*., 2023).

Despite these developments, there is a notable lack of empirical research on the underlying mental models – users' beliefs and assumptions – about LLMs (Blocker & Barrios, 2015; Davenport *et al*., 2020; Zeithaml *et al*., 2020). These cognitive frameworks significantly influence user behavior and interactions (Argyris & Schon, 1992; Vink *et al*., 2019), yet remain underexplored. Ignoring these mental models may result in misaligned AI systems, ethical issues, and reduced satisfaction due to a lack of user-centered design (Garibay et al., 2023; Williamson & Prybutok, 2024). Moreover, understanding how interactions with LLMs (re)shape these mental models is critical, given the growing societal integration of AI technologies (Chiarello *et al*., 2024; Korneeva *et al*., 2023). Such insights can also enhance technology adoption research by revealing the cognitive and motivational factors shaping user attitudes – dimensions often overlooked in existing models (Camilleri, 2024; Mogaji *et al*., 2024).

This research addresses this gap by examining users' mental models of LLMs to better understand their psychological and behavioral responses to AI. It contributes to the literature in several ways: by advancing our understanding of how mental models shape user perceptions and behaviors, thusby revealing how AI interactions influence autonomy and self-concept (Puntoni & Wertenbroch, 2024), by offering a psychological lens to theorize AI adoption, and by informing both organizational strategies and policy frameworks in a context where regulation struggles to keep pace with innovation (Camilleri, 2024).

To examine this phenomenon, this study employs a qualitative research design using the critical incident technique (CIT) with participants from the UK. Based on responses to an open-ended questionnaire administered via Prolific, the findings reveal that users' mental models of LLMs are deeply ambivalent and multifaceted. The analysis of users' mental models reveals a multidimensional understanding of LLMs, highlighting the complexity and ambivalence that characterizes their integration in everyday life. Moving beyond a simple dichotomy of positive versus negative perceptions, this study categorizes, as shown in Figure 1, users' mental models into three overarching dimensions: enthusiastic mental models, conditional mental models, and apathetic mental models, providing a more granular view of conditional mental models, and apathetic mental models, providing a more granular view of how individuals interpret the role and implications of LLMs. At the individual level, enthusiastic mental models reflect users' mental models who view LLMs as *helpful assistants* that save time, streamline tasks, enhance productivity, and inspire creativity, as well as *personalized support systems* that provide personalized, emotionally engaging, and human- like interactions.

Figure 1: Mental models about roles and implications of LLMs



Note: The inner circle represents mental models linked to individuals and the outer circle mental models linked to society

represents enthusiastic mental models | represents cautious mental models | represents apathetic mental models

Conditional mental models include users' mental models who recognize the utility of LLMs but with caveats – seeing them as *conditional partners* whose effectiveness is dependent on user intervention, mindfulness, and context-specific relevance. Apathetic mental models represent users' mental models who approach LLMs with skepticism, concern, or resistance. These include comprehension of LLMs as *suspicious actors* (e.g., raising trust and privacy concerns), *disempowering actors* (e.g., diminishing users' sense of authenticity and skill), and *dangerous opponents* (e.g., generating fear of misuse, overdependence, dehumanization, and job displacement). At the societal level, enthusiastic mental models depict LLMs as *societal aids*, contributing to enhanced productivity, knowledge dissemination, and broader societal relevance and empowerment. Conditional mental models capture views of LLMs as *conditional societal allies*, offering societal benefits that are perceived to come with trade-offs or contextual limitations. Apathetic mental models frame LLMs as

societal disruptors, *ethical hazards*, *threats to human sociability*, and *divisive agents in society*, with concerns ranging from increasing inequality and diminishing human connection to ethical misuse and destabilization of social norms.

By adopting this tripartite lens, the study offers a more comprehensive understanding of how users conceptualize LLMs across personal and societal spheres. It highlights that users do not simply embrace or reject these technologies; rather, their mental models reflect varying degrees of enthusiasm, conditional acceptance, and detachment shaped by their experiences, values, and expectations. This multidimensional perspective contributes to a deeper theoretical grounding of users' relationships with AI-enabled initiatives and calls for AI development and policy frameworks that are sensitive to these nuanced interpretations.

This study advances understanding of LLMs by exploring users' mental models of their individual and societal implications – an area often overlooked in prior research focused on capabilities and adoption intentions (e.g., Arora *et al*., 2025; Camilleri, 2024; Li *et al*., 2024). By centering user perspectives, the study contributes to marketing's theoretical development and addresses calls for practical relevance in research (Hollmann, 2023; Zeithaml et al., 2020). It also provides rare empirical insight into how users cognitively and emotionally navigate the dual-use nature of LLMs, balancing perceived opportunities and risks (Grinbaum & Adomaitis, 2024). This helps ground abstract ethical debates in users' lived experiences. Furthermore, the study adds to growing calls for incorporating diverse stakeholder voices in AI discourse (Sartori & Theodorou, 2022), enriching the human- centered AI literature by showing how users' interpretations reflect or challenge dominant narratives (Garibay et al., 2023). It challenges traditional technology adoption models by revealing that user engagement with LLMs goes beyond functional concerns to include broader psychological and societal dimensions (Mogaji et al., 2024). In doing so, it positions mental models as a more nuanced and context-sensitive lens. Finally, the research contributes to discussions on the ethical design of AI by showing how users evaluate whether AI initiatives align with or undermine societal values (Williamson & Prybutok, 2024).

This study provides practical implications for managers and policymakers seeking to ensure the responsible development and integration of LLMs. For managers, understanding users' diverse mental models offers a pathway to better align AI design, communication, and governance with user expectations and concerns. Enthusiastic mental models, such as viewing LLMs as helpful assistants or companions, suggest that enhancing features like task support, creativity, personalization, and transparency can foster trust and improve user experiences. Conversely, cautious or apathetic mental models point to the need for clear communication around limitations, privacy, and control, alongside greater user empowerment through customizable settings. On a broader scale, societal-level mental models highlight opportunities for inclusive innovation while emphasizing the importance of fairness, explainability, and AI literacy to mitigate concerns around exclusion, bias, or disempowerment. For policymakers, the findings underline the urgency of creating regulatory frameworks that promote algorithmic transparency, accountability, and ethical standards in line with United Nations Sustainable Development Goals (UN SDGs). Addressing risks such as job displacement, inequality, and data misuse requires interventions like retraining programs, ethical AI incentives, and stronger data protection laws. Such actions can help ensure that the societal benefits of LLMs are distributed fairly, while protecting citizens from potential harms.

References

Alita, L. (2025). Enhancing citizen engagement in urban greening: The potential of large language models in value co-creation. *Technological Forecasting and Social Change*, *216*, 124134.

Argyris, C., & Schon, D. A. (1992). *Theory in practice: Increasing professional effectiveness*. San Francisco, California: Jossey-Bass Inc.

Arora, N., Chakraborty, I., & Nishimura, Y. (2025). AI–Human Hybrids for Marketing Research: Leveraging Large Language Models (LLMs) as Collaborators. *Journal of Marketing*, *89*(2), 43-70.

Blocker, C. P., & Barrios, A. (2015). The Transformative Value of a Service Experience.
Journal of Service Research, 18(3), 265-283. doi:10.1177/1094670515583064

Camilleri, M. A. (2024). Factors affecting performance expectancy and intentions to use ChatGPT: Using SmartPLS to advance an information technology acceptance framework. *Technological Forecasting and Social Change, 201*, 123247.

Celiktutan, B., Klesse, A.-K., & Tuk, M. A. (2024). Acceptability lies in the eye of the beholder: Self-other biases in GenAI collaborations. *International Journal of Research in Marketing*.

Chiarello, F., Giordano, V., Spada, I., Barandoni, S., & Fantoni, G. (2024). Future applications of generative large language models: A data-driven case study on ChatGPT. *Technovation, 133*, 103002.
doi:https://doi.org/10.1016/j.technovation.2024.103002

Davenport, T., Guha, A., Grewal, D., & Bressgott, T. (2020). How artificial intelligence will change the future of marketing. *Journal of the Academy of Marketing Science, 48*(1), 24-42. doi:10.1007/s11747-019-00696-0

Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., Ahuja, M.
(2023a). "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management, 71*, 102642.

Dwivedi, Y. K., Pandey, N., Currie, W., & Micu, A. (2023b). Leveraging ChatGPT and other generative artificial intelligence (AI)-based applications in the hospitality and tourism industry: practices, challenges and research agenda. *International Journal of Contemporary Hospitality Management*.

Garibay, O. O., Winslow, B., Andolina, S., Antona, M., Bodenschatz, A., Coursaris, C., . . . Xu, W. (2023). Six Human-Centered Artificial Intelligence Grand Challenges. *International Journal of Human–Computer Interaction, 39*(3), 391-437.
doi:10.1080/10447318.2022.2153320

Grinbaum, A., & Adomaitis, L. (2024). Dual use concerns of generative AI and large language models. *Journal of Responsible Innovation, 11*(1), 2304381.

Hollmann, T. (2023). Commentary:"Back to the future" or "trapped in the future"? The future of services practice and research. *Journal of Services Marketing*.

Imschloss, M., Sarstedt, M., Adler, S. J., & Cheah, J. H. (2025). Using LLMs in sensory service research: initial insights and perspectives. *The Service Industries Journal*, 1– 22.

Korneeva, E., Salge, T. O., Teubner, T., & Antons, D. (2023). Tracing the legitimacy of Artificial Intelligence: A longitudinal analysis of media discourse. *Technological Forecasting and Social Change, 192*, 122467.

Li, P., Castelo, N., Katona, Z., & Sarvary, M. (2024). Frontiers: Determining the validity of large language models for automated perceptual analysis. *Marketing Science, 43*(2), 254-266.

Lim, W. M., Gunasekara, A., Pallant, J. L., Pallant, J. I., & Pechenkina, E. (2023). Generative AI and the future of education: Ragnarök or reformation? A paradoxical perspective from management educators. *The International Journal of Management Education, 21*(2), 100790. doi:https://doi.org/10.1016/j.ijme.2023.100790

Maslej, N., Fattorini, L., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., . . . Parli, V. (2023). Artificial intelligence index report 2023. *arXiv preprint arXiv:2310.03715*.

Messner, W., Greene, T., & Matalone, J. (2025). From Bytes to Biases: Investigating the Cultural Self-Perception of Large Language Models. *Journal of Public Policy & Marketing*, *0*(0).

Mogaji, E., Viglia, G., Srivastava, P., & Dwivedi, Y. K. (2024). Is it the end of the technology acceptance model in the era of generative artificial intelligence? *International Journal of Contemporary Hospitality Management*.

Mondal, S., Das, S., & Vrana, V. G. (2023). How to Bell the Cat? A Theoretical Review of Generative Artificial Intelligence towards Digital Disruption in All Walks of Life. *Technologies, 11*(2), 44.

Omizo, R. M. (2024). Automating Research in Business and Technical Communication: Large Language Models as Qualitative Coders. *Journal of Business and Technical Communication*, 10506519241239927.

Puntoni, S., & Wertenbroch, K. (2024). Being Human in the Age of AI. *Journal of the Association for Consumer Research, 9*(3), 000-000.

Sartori, L., & Theodorou, A. (2022). A sociotechnical perspective for the future of AI: narratives, inequalities, and human control. *Ethics and Information Technology, 24*(1), 4. doi:10.1007/s10676-022-09624-3

Van Dis, E. A., Bollen, J., Zuidema, W., Van Rooij, R., & Bockting, C. L. (2023). ChatGPT: five priorities for research. *Nature, 614*(7947), 224-226.

Vink, J., Edvardsson, B., Wetter-Edman, K., & Tronvoll, B. (2019). Reshaping mental models–enabling innovation through service design. *Journal of Service Management, 30*(1), 75-104.

Williamson, S. M., & Prybutok, V. (2024). The Era of Artificial Intelligence Deception: Unraveling the Complexities of False Realities and Emerging Threats of Misinformation. *Information, 15*(6), 299.

Wong, I. A., Lian, Q. L., & Sun, D. (2023). Autonomous travel decision-making: An early glimpse into ChatGPT and generative AI. *Journal of Hospitality and Tourism Management, 56*, 253-263.

Zeithaml, V. A., Jaworski, B. J., Kohli, A. K., Tuli, K. R., Ulaga, W., & Zaltman, G. (2020). A theories-in-use approach to building marketing theory. *Journal of Marketing, 84*(1), 32-51.