APCNCS2026: Asia-Pacific Conference on Networks and Complex Systems
Focus Session: Complexity of AI
10-12 June 2026, Nanyang Technological University, Singapore

Generative AI as a Complex Adaptive System: Adoption Dynamics and Emergent Entrepreneurial Practices in Finland

Mahdi Sayyadi
[1]Faculty of Social Sciences, Business and Economics, Åbo Akademi University, Turku, Finland

Generative AI; Entrepreneurship; Technology Adoption; Diffusion of Innovations; Complex Adaptive Systems

Extended Abstract

Motivation:

Beyond its role as a productivity-enhancing tool, GenAI fundamentally reshapes entrepreneurial ecosystems by introducing non-linear, adaptive, and interdependent dynamics. Rather than being adopted in a linear or isolated manner, GenAI usage emerges through interactions between entrepreneurs, technologies, and networks, resembling a complex adaptive system. Understanding these dynamics is essential to explain how AI reshapes innovation processes, competitive behavior, and ecosystem evolution.

This study addresses the following research questions:
(1) What benefits and barriers influence entrepreneurs' adoption of GenAI?
(2) What are the dominant use cases of GenAI in entrepreneurial contexts?
(3) How does adoption vary across sectors, venture stages, and founder characteristics?

Beyond these questions, the study is motivated by the need to understand GenAI not only as a tool, but as a complex adaptive system that reshapes entrepreneurial ecosystems through emergent practices and non-linear diffusion patterns. Answering these questions is important for informing policy, guiding venture investments, and supporting ecosystem-level innovation.

Approach and Methodology:

The study adopts a mixed-methods design combining qualitative and quantitative approaches.

First, a qualitative phase was conducted using 18 semi-structured interviews with entrepreneurs across different industries, venture stages, and backgrounds in Finland. Interviews were analyzed using a hybrid deductive–inductive thematic approach supported by NVivo. Deductive coding was guided by TAM and DOI constructs, while inductive coding captured emergent GenAI-specific practices and challenges.

Second, a survey instrument was developed based on qualitative findings to ensure strong contextual validity. The survey is being distributed through Finnish entrepreneurial networks (e.g., Boost Turku, Aaltoes, Kiuas) to collect a large dataset for statistical analysis. Quantitative analysis will include descriptive mapping of adoption patterns and inferential testing of relationships aligned with TAM–DOI constructs.

This methodological approach enables both in-depth understanding and generalizable insights, while capturing the dynamic and evolving nature of GenAI adoption.

Results:

Preliminary findings indicate that GenAI adoption does not follow linear or uniform patterns, but instead exhibits emergent and path-dependent dynamics. Entrepreneurs engage in iterative experimentation, where local decisions (e.g., initial use cases) influence subsequent behaviors and spread through networks via imitation and learning.

These interactions generate feedback loops, where perceived benefits reinforce continued adoption, while concerns related to trust and accuracy constrain diffusion. As a result, the ecosystem displays heterogeneous adoption clusters, suggesting that GenAI diffusion evolves through non-linear and context-dependent trajectories rather than predictable stages.

Conclusions and Outlook:

The findings suggest that GenAI adoption among entrepreneurs exhibits key properties of complex adaptive systems, including emergence, feedback-driven adaptation, and path dependency. This shifts the understanding of AI adoption from a static decision process to a dynamic system-level phenomenon, where individual behaviors and ecosystem structures co-evolve.

References:

Bilgram, V., and Laarmann, F., 2023. Accelerating innovation with generative AI: AI-augmented digital prototyping and innovation methods. IEEE Engineering Management Review, 51(2), pp.18-25.

Chalmers, D., MacKenzie, N.G., and Carter, S., 2021. “AI and entrepreneurship: implications for venture creation in the fourth industrial revolution.” Entrepreneurship Theory and Practice, 45(5), pp.1028-1053.

Davis, F.D., 1989. Technology acceptance model: TAM. Al-Suqri, MN, Al-Aufi, AS: Information Seeking Behavior and Technology Adoption, 205(219), p.5.

European Investment Bank (EIB), 2025. Finland leads Europe in generative AI adoption, new EIB survey shows. Retrieved 28.1.2026 at https://www.eib.org/en/press/all/2025-502-finland-leads-europe-in-generative-ai-adoption-new-eib-survey-shows

Finnish National Board on Research Integrity TENK, The Ethical Principles of Research with Human Participants and Ethical Review in the Human Sciences in Finland. Finnish National Board on Research Integrity TENK Guidelines 2019 (2nd edn, Finnish National Board on Research Integrity TENK 2019).

Gupta, V. and Yang, H., 2024. Generative artificial intelligence (AI) technology adoption model for entrepreneurs: case of ChatGPT. Internet Reference Services Quarterly, 28(2), pp.223-242.

Iansiti, M., and Lakhani, K., 2020. Competing in the Age of AI: Strategy and Leadership when Algorithms and Networks Run the World. Harvard Business Review Press, Boston, MA.

Korzynski, P., Mazurek, G., Altmann, A., Ejdys, J., Kazlauskaite, R., Paliszkiewicz, J., Wach, K. and Ziemba, E., 2023. Generative artificial intelligence as a new context for management theories: analysis of ChatGPT. Central European Management Journal, 31(1), pp.3-13.

Olson, R.S., Sipper, M., Cava, W.L., Tartarone, S., Vitale, S., Fu, W., Orzechowski, P., Urbanowicz, R.J., Holmes, J.H., and Moore, J.H., 2018. A system for accessible artificial intelligence. In Genetic programming theory and practice XV (pp. 121-134). Springer International Publishing.

Rogers, E.M., Singhal, A. and Quinlan, M.M., 2014. Diffusion of innovations. In An integrated approach to communication theory and research (pp. 432-448). Routledge.

Susarla, A., Gopal, R., Thatcher, J.B. and Sarker, S., 2023. The Janus effect of generative AI: Charting the path for responsible conduct of scholarly activities in information systems. Information Systems Research, 34(2), pp.399-408.

Tran, H., and Murphy, P.J., 2023. Generative artificial intelligence and entrepreneurial performance. Journal of Small Business and Enterprise Development, 30(5), pp.853-856.