The 3-Ellipse Model: A Lens for Understanding Generative AI's Impact on Organisations

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Abstract— The rapid proliferation of Generative Artificial Intelligence (GenAI) is ushering in significant change and transformation across many sectors, prompting a re-evaluation of organisational structures, processes, and the skills required of the workforce along different time horizons. As organisations increasingly adopt and integrate GenAI tools, understanding the multifaceted impact of this technology becomes crucial. A robust analytical framework is required to comprehend the unfolding trajectory of this change fully. This idea paper proposes one such framework comprising three GenAI agency modes for integration into organisational change, combined with an extant problem oriented model of the organisation as a socio-technical system. The paper argues how the framework could apply to analyse organisational change driven by GenAI, providing an early indication of the potential benefits of further developing and applying such a framework.

Keywords-generative AI; organisational change; 3-ellipse model; agency modes; socio-technical systems; problem orientation.

I. INTRODUCTION

Recent studies highlight Generative Artificial Intelligence (GenAI)'s dual role as a productivity accelerator and a disruptive force [1][2], prompting organisations to rethink workforce strategies and operational structures. Some of the business implications of AI have been analysed [3][4], especially in relation to its capacity for automating a wide range of work activities and roles. For example, a significant area of discussion revolves around the impact of AI, including GenAI, on employee skills and the future of work [2][5]–[9], with studies indicating that many tasks and associated skills of a significant portion of the workforce could be substantially replaced by AI [5][10]. Although this perspective often equates AI adoption with job replacement by AI [10]–[12] also posit that GenAI could be an enabler, helping to streamline repetitive tasks, thus allowing employees to devote more time to innovation and problem solving or becoming more productive [12].

Speculations on imminent organisational change are based on observing and extrapolating from current, albeit early-stage, trends in GenAI adoption. For example, [13] acknowledges the fact that GenAI holds potential to reshape organisational structures as a result of its incremental adoption in various functions and departments, changing the relationships between different levels of the organisation, such as strategic leadership and operations. For instance, if GenAI is being used to automate specific customer service interactions (social to technical shift) [14], one might speculate on the potential for restructuring customer service departments in the near future. This might lead to a decentralisation of decision-making and potentially flatter organisational hierarchies as information becomes more readily accessible across different levels.

Within this very young field of study, we still lack sound analytical tools that can help us understand and predict the wider ramifications of GenAI adoption on organisation change, including its influence on organisational change processes both in the short and long-term.

We argue for an integrated framework which can be applied in dissecting current GenAI-induced organisational shifts and providing a structured lens through which to examine current changes, anticipate near-future changes, and speculate on potential long-term GenAI-enabled transformation mechanisms. This idea paper proposes one such framework based on the 3-ellipse model for socio-technical systems of [15], in combination with three GenAI agency modes we define for organisational transformation. This work builds on the existing knowledge base of organisational change as problem solving [16]–[18] while contributing to socio-technical systems analysis and development

In Section 2, we introduce the the 3-ellipse model as the theoretical foundation of our framework, which we then use in Section 3 to articulate three GenAI agency modes (reactive, responsive, and driving) for organisational change. Section 4 offers some conclusions and directions for future research.
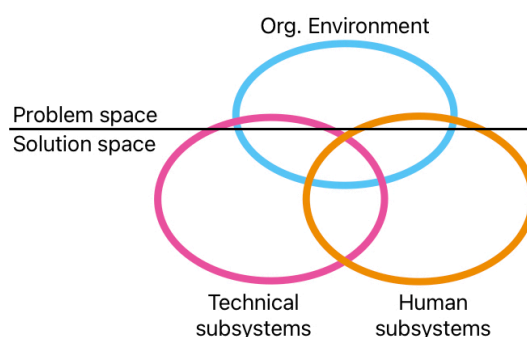

Figure 1. The 3-ellipse model of the organisation [15].

II. THE 3-ELLIPSE MODEL OF THE ORGANISATION

The 3-ellipse model ([15], Figure 1) sees an organisation as the interaction of three key elements: the environment forms the *problem space*, where needs exist that the organisation must satisfy, for example consumers' needs for products or services, or societal needs for education or health care. The human and technical subsystems together form a socio-technical system in the *solution space*: these are the systems through which

the organisation meets needs in the problem space. Problem solving is through the sharing of real-world *phenomena* across boundaries, including the organisation's products and services, and data. More precisely:

a) The environment: contains stakeholder(s) external to the organisation, their context(s), perceived needs, and their validation criteria, and establishes boundaries for feasible solutions giving the organisation its *raison d'être*.

b) The human subsystems: include the people within the organisation and the protocols, processes, and interactions, skills, knowledge, collaborations, *etc*, through which they interact and that govern their work.

c) The technical subsystems: include all technology and infrastructure used by the organisation.

As with the whole organisation, it is also possible to see problem-solving relationships *within* the organisation through the 3-ellipse model, in particular between leadership and their problem-solving delegation to ops and management, with further delegation possible within those smaller structures, right down to the individual; see Figure 2.
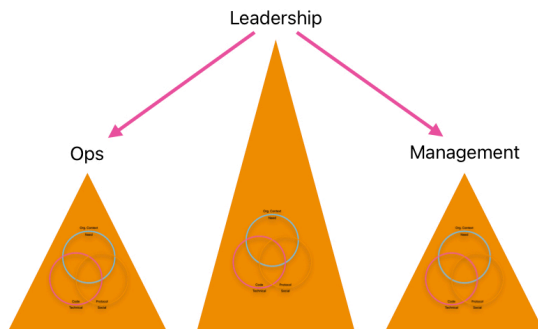

Figure 2. Organisational problem-solving delegation occurs across and down the organisation. (Interaction between pyramids is also possible but is not shown.)

III. GenAI-driven organisational change

By examining the interplay between the organisational environment and the human and technical systems used by the organisation, the 3-ellipse model can be used as a vehicle for organisational change [18]: emerging needs in the environment lead to new problems requiring change in the socio-technical solution system, including changes in its structures, relations and behaviours. In this section, we use the model to tease out characteristics of GenAI-driven organisational change.

As observed in Section I, organisations are primarily experimenting with GenAI to expand the functionality of their technical subsystems, often with concomitant shrinking of the human subsystems. However, the *organisational change space* should also be a target for the adoption of GenAI, but much less is known about its application here.

Therefore, this paper proposes three agency modes to understand the multifaceted nature of organisational change driven by GenAI, including how it may affect the organisational change space.

a) Reactive agency: concentrates on augmenting current human teams with GenAI for solution exploration in organisational change resulting from the integration of GenAI. The primary focus within this phase is to understand how AI is currently altering organisational dynamics, particularly, the evolving relationship between people and AI, that is at the interface between human and technical subsystems. The key question here is how AI is currently changing the organisation?

Such transformation should be contrasted with those that allow the organisation to do more, i.e., those that have transformative application in the problem space. For this, we identify two other agency modes.

b) Responsive agency: focusses on replacing human teams with GenAI for solution exploration in organisational change. It involves analysing the interplay between the social and technical components within organisations, as well as the organisation's evolving relationships with customers and the external environment, the latter being at the interface between problem and solution spaces. A significant aspect of near-term change is the potential for organisational restructuring stemming from the integration of GenAI at various levels, leading to shifts in relationships between strategic leadership and operational functions.

c) Driving agency: uses GenAI agents as tools for the generation and evaluation of change scenarios, a model we call *pre-cog* GenAI (a call-out to Spielberg's 'Minority Report'). Here, GenAI is tasked with proactively identifying and assessing potential changes within the organisation before the fact, and speculatively exploring potential changes in environment and need, with some accompanying exploration of the solution space and implementation paths. This is reminiscent of traditional *SWOT* (Strengths, Weaknesses, Opportunities, and Threats) and *PEST* (Political, Economic, Social, and Technical) analyses [19][20], but with GenAI generating and reviewing scenarios for organisational change, and evaluating their potential impact and viability, to be presented to human stakeholders for further consideration and decision-making. By shifting from analysing the present and past to proactively predicting future scenarios, organisations can become more forward-looking, data-driven, and comprehensive in their strategic planning. This approach ensures that strategies align with the organisation's long-term development goals while providing a substantial advantage in navigating future challenges. Additionally, the insights provided by GenAI can lead to more informed decision making processes, fostering innovation and optimising resource allocation, ultimately driving higher productivity and business growth.

IV. Conclusion and future work

This idea paper suggests three GenAI agency modes for organisational change informed by the 3-ellipse model. While still theoretical, the framework may provide practical tools for GenAI-driven organisational transformations in both problem and solution spaces. We will develop and evaluate the framework in future real-world case studies.

REFERENCES

[1] J. Rudolph, F. M. Mohamed Ismail and S. Popenici, 'Higher education's generative artificial intelligence paradox: The meaning of chatbot mania', *Journal of University Teaching and Learning Practice*, vol. 21, no. 6, 2024.

[2] A. Manresa, A. Sammour, M. Mas-Machuca, W. Chen and D. Botchie, 'Humanizing GenAI at work: Bridging the gap between technological innovation and employee engagement', *Journal of Managerial Psychology*, 2024.

[3] I.-F. Anica-Popa, M. Vrîncianu, L.-E. Anica-Popa, I.-D. Cimau and C.-G. Tudor, 'Framework for integrating Generative AI in developing competencies for accounting and audit professionals', *Electronics*, vol. 13, no. 13, 2024.

[4] T. Clear et al., 'AI integration in the IT professional workplace: A scoping review and interview study with implications for education and professional competencies', in *2024 Working Group Reports on Innovation and Technology in Computer Science Education*, ACM, 2024, pp. 34–67.

[5] M. Cazzaniga et al., *Gen-AI: Artificial Intelligence and the Future of Work*. International Monetary Fund, 2024.

[6] V. Corvello, 'Generative AI and the future of innovation management: A human centered perspective and an agenda for future research', *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 11, no. 1, 2025.

[7] O. Sahin and D. Karayel, 'Generative Artificial Intelligence (GenAI) in Business: A Systematic Review on the Threshold of Transformation', *Journal of Smart Systems Research*, vol. 5, no. 2, pp. 156–175, 2024. DOI: 10.58769/joinssr.1597110.

[8] S. Chowdhury, P. Budhwar and G. Wood, 'Generative artificial intelligence in business: Towards a strategic human resource management framework', *British Journal of Management*, vol. 35, no. 4, pp. 1680–1691, 2024, ISSN: 1467-8551. DOI: 10.1111/1467-8551.12824.

[9] C. Kobiella, Y. S. Flores López, F. Waltenberger, F. Draxler and A. Schmidt, '"If the Machine Is As Good As Me, Then What Use Am I?" – how the use of chatgpt changes young professionals' perception of productivity and accomplishment', in *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI '24)*, Association for Computing Machinery, 2024.

[10] P. Mukherjee and S. Dutta, 'When generative artificial intelligence enhances the quality of human output: Workplace implications', *SSRN Electron. J.*, 2025.

[11] A. Bick, A. Blandin and D. J. Deming, 'The rapid adoption of Generative AI', National Bureau of Economic Research, Tech. Rep., 2024.

[12] S. Joshi, 'Retraining US workforce in the age of agentic GenAI: Role of prompt engineering and up-skilling initiatives', *International Journal of Advanced Research in Science, Communication and Technology*, pp. 543–557, 2025.

[13] F. Li and H. Lewis, 'Transforming organisations through AI: Emerging strategies for navigating the future of business', *Journal of Financial Transformation*, vol. 60, pp. 66–75, 2025.

[14] M.-H. Huang and R. T. Rust, 'The caring machine: Feeling AI for customer care', *Journal of Marketing*, vol. 88, no. 5, pp. 1–23, 2024.

[15] J. G. Hall and L. Rapanotti, 'A design theory for software engineering', *Information and Software Technology*, vol. 87, pp. 46–61, 2017.

[16] J. Brier, L. Rapanotti and J. G. Hall, 'Problem based analysis of organisational change: A real-world example', in *International Workshop on Advances and Applications of Problem Frames*, J. G. Hall, L. Rapanotti, K. Cox and Z. Jin, Eds., ACM, 2006.

[17] A. Nkwocha, J. G. Hall and L. Rapanotti, 'Design rationale capture for process improvement in the globalised enterprise: An industrial study', *Journal of Software and Systems Modeling*, vol. 12, no. 4, pp. 825–845, 2013.

[18] G. Markov, J. G. Hall and L. Rapanotti, 'POE-Δ: A framework for change engineering', *Systems Engineering*, 2025, Submitted to Wiley's Systems Engineering.

[19] F. J. Aguilar, *Scanning the business environment*. New York, NY: Macmillan, 1967.

[20] G. Panagiotou, 'Bringing SWOT into focus', *Business Strategy Review*, vol. 14, no. 2, pp. 8–10, 2003.