

Agentic Artificial Intelligence in Organisations: A Conceptual Synthesis Using Agency Theory and Socio-Technical Systems Theory

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Abstract

Agentic artificial intelligence (AAI) represents a significant change from Artificial Intelligence (AI). AI is a traditional tool to provide information and work within predefined scope, while AAI can execute complex, multi-step processes and take decisions based on new information. Although AAI has enabled organisations to increase efficiency and quality of service, concerns related to accountability, oversight, integration, and workforce transformation have to be addressed. Due to limited empirical literature and data, this study adopts a qualitative conceptual synthesis approach using documented enterprise cases and academic research. The analysis is grounded in Agency Theory and Socio-Technical Systems (STS) Theory. Findings show that enterprises transfer decision making authority to AI agents, but benefits accrue only when autonomy, oversight mechanisms, and organisational structures are well integrated and evolve together. Based on themes across cases, the study proposes an organisational equilibrium framework, defined as alignment between autonomy granted to agents, monitoring mechanisms, and the integration into the organisations' workflows and structures. The study contributes by placing AAI as an active participant and by introducing organisational equilibrium as a construct that can be tested in future research. It highlights oversight mechanisms, workflow redesign, and workforce adaptation as requirements for successful AAI adoption. The framework serves as a basis for future research and offers practical direction for organisations implementing agentic systems.

Keywords: Autonomous Agents, Organisational Adoption, Organisational Equilibrium, Accountability, Oversight, Workplace Transformation, Socio-Technical Integration

Introduction

Technological advancements and innovations like the internet, smartphones, 3D printing, Extended Reality (XR), Artificial Intelligence (AI), and quantum computing, among others, are revolutionising the very foundations of existing paradigms. These innovations are setting a new pace for development, replacing existing systems, and thus making certain technologies obsolete and outdated. They are the few of the main factors responsible for the transformation in society, the economic growth, industry dynamics and workplace changes. Artificial Intelligence (AI) is not limited to serving merely as a source of information, but is capable of reading, summarising, writing new code, applying reasoning, generating dialogue and in some cases making decisions amongst alternatives. AI has the potential to redefine the skills needed in the workplace, support people in upgrading their knowledge, and open up new possibilities for that knowledge. All these, in turn, lead to the less time-consuming and more efficient solutions of problems and innovations in areas such as bio-engineering, energy systems, space exploration, scientific research, to name a few.

As part of the exponential growth in research and development of AI, Agentic AI (AAI) has garnered significant attention in the area of automating work processes in enterprises. It demonstrates the capability to assimilate the characteristics of basic AI models with advanced technical ability to create “virtual coworkers” [1]. Organisations are preferring to

integrate AAI in their workflow rather than use ‘Chatbots’.

AAI can make autonomous decisions and perform complex tasks at multiple levels. It has the capability to carry out actions by itself, to connect and collaborate with other agents, and to make changes according to new inputs suited to particular goals. It combines traditional rule-based programming with advanced dynamic adaptation, thereby facilitating large-scale implementation of complex workflows. What distinguishes AAI is that it can operate with minimal human intervention. Also, its capacity for continuous learning and strategy refinement makes it particularly suited for working in complex, constantly changing, and data-heavy environments [2].

AAI essentially operates through four major phases: perception (the information is collected by the system from its surroundings), reasoning (the data is processed and changed into knowledge to create understanding of the situation), action (based on this knowledge, it makes a decision and expresses the knowledge through suitable actions), and learning (it gradually becomes more flexible due to feedback and past learning, thus better able to cope with changes in the environment) [3]. The emergence of AAI-based technologies has the potential to transform diverse industries by automating routine operational functions. This, in turn, enables staff to focus on value-added tasks. Such a shift not only enhances the efficiency of the organisation, but also

contributes to cost reduction and flexibility of operations.

To explain with a hypothetical example, an AAI system is applied by a company to interact with customers from start to finish without human intervention at all times. The objective is to maximise customer satisfaction and simultaneously reduce cost. The system comprises the following features: Firstly, it is capable of handling the initial-level queries (concerning billing, login, and returns), as well as predicting the occurrence of problems in the future, suggesting the purchase of certain services, and interacting via natural language in all email, chat, and voice channels, even without the need for escalation. Secondly, past customer interactions, preferences, product usage, and sentiment tone are remembered by the system so as to be able to respond in the future and even reach out proactively to the customers. Thirdly, the system can manage the interactions through different communication channels like the messaging platforms, email, webchat, and call centre logs to give the customers a consistent experience. Besides that, it can learn from failed interactions, adding new scripts or dimensions if the problem is recurrent or customers are unhappy.

In today's dynamic business landscape, where agility, operational efficiency, and sustained innovation are essential for competitiveness and growth, Agentic AI (AAI) enables organisations to transfer complex decision-making and operational responsibilities to autonomous intelligent systems. Nevertheless,

the integration of such advanced technologies prompts critical concerns regarding human involvement, governance mechanisms, and the maintenance of socio-technical alignment.

Objectives

This study evaluates adoption of agentic artificial intelligence (AAI) by organisations. Specifically, it aims to:

1. Examine the opportunities and risks associated with AAI adoption within the contexts of Agency Theory and Socio-Technical Systems Theory
2. Propose a conceptual framework for responsible integration of AAI within organisations

The synthesis of theoretical insights with documented enterprise cases elucidates how organisations can responsibly and effectively deploy agentic systems.

Literature Review and Theoretical Framework

Literature Review

AAI is a rapidly developing cutting edge technology. However, theory-based research in this area is in nascent stages, particularly in terms of the development of governance structures, legal perspectives, and theoretical frameworks. Thus, the literature review demonstrates the emerging nature of this field of study.

The creation of AAI must be interpreted as a whole, taking into consideration all aspects, as it is a technology that is continuously evolving but also entails certain risks. The "agentic AI

systems theory" states that the capability of having one's own will is not only an attribute of the model but also results from a combination of the human, machine, and the larger environment interactions. This perspective considers the concept of agency in a practical way, and the level of it is gauged by how much a system can independently act in the pursuit of its goals and change its behaviour if needed [4].

AI has made it imperative for us to differentiate between the agency of AI and that of conventional information systems or human beings [5]. Drawing on the 'philosophy of action' literature as a theoretical foundation, the authors argue that this perspective is valuable because it accounts for both human and non-human agency while enabling an understanding of their differences without privileging one over the other [5]. Using the example of screening for early-stage breast cancer, they demonstrate that AI exerts a greater influence on human practice than traditional technology, though the authors stress the importance of measuring the 'degree of agency' to effectively monitor the corresponding level of moral responsibility [5].

Several baseline practices have been enumerated for the parties involved such as model developers, system deployers, and users with deployment of accountability with respect to harm caused by AAI system [6]. AAI has evolved from rule-based agents operating in isolation to coordinated multi-agent systems, representing a major step toward a system

capable of undertaking autonomous planning and decision-making [7]. Pati [8] synthesises the conceptual foundations, technologies, applications, and societal implications of agentic AI, distinguishing it from traditional and single-agent systems. It highlights core features of autonomy, adaptability, and goal-directed behavior in the context of workforce transformation, ethical risks, scalability challenges, and emerging research directions for responsible deployment.

The concept of fairness-aware machine learning (ML) systems emphasise that technology should take into account the 'broader' societal perspective for decision making. "Sociotechnical systems" recognise the importance of both humans and machines for the success of any technology. Applying this lens to fair-ML systems reveals five recurring pitfalls. Each of these occur when social dimensions are neglected in the technological framework. To overcome these, it is required to shift from a solution-oriented mindset to a process-oriented approach wherein the social context, institutional dynamics and their interactions are incorporated into system design and evaluation. The inclusion of social actors with technical ones helps in the mitigation of the gaps [9].

Studies presenting an overview about AAI and the underlying technologies, advantages and limitations, foundational characteristics, methodologies, applications, challenges, and future directions [10] have been conducted. Real-time applications in areas such as

healthcare, finance, robotics, manufacturing and automation and the future were considered, but research revealed that the existing AI systems displayed few limitations [10]. Some of the integral challenges of the implementation of AAI such as scalability, goal alignment, resource constraints, governance and ethical concerns were identified which require robust solutions, transparency, regulatory and legal frameworks to ensure safe and effective AI deployment [10].

The importance of AAI has recently been recognised more than ever as a technology that will determine the future of autonomous systems and organisations. Hosseini and Seilani [11] state that AAI supports decision making by machines, automating processes and increasing efficiency through professional tools like “LangChain, CrewAI, AutoGen, and AutoGPT” [11]. They forecast a shift from “copilot” to “autopilot” models in which human involvement is diminished, autonomy is enhanced, and hierarchical agent architectures are used for coordination, albeit with the issues related to privacy, security, and ethical concerns.

A similar study by Sawant [12] shows that AAI adoption is associated with substantial gains in efficiency, speed, and performance in all sectors. Additionally, Shavit et al. [6] highlight the accountability aspect and suggest minimum requirements for the different parties involved, such as developers, system providers, and consumers, for any harm or deviations caused by the autonomous systems.

To summarise, these research works imply that AAI is the way towards innovation and cost efficiency, however, integrating cutting edge futuristic technology would demand a thorough application of governance, ethical safeguards and assignment of stakeholders’ responsibility.

The review reveals that there are benefits and risks associated with embedding of AAI in organisational structure and workflow. Based on the insights from academic research, the next section introduces the theories that help explain how AAI works in organisations. The combination of Agency Theory and STS Theory is applied to identify opportunities and challenges in business about how people, technology, and systems interact in the workplace.

Theoretical Background

Agency Theory [13]

Agency Theory [13] focuses on divergences which arise when goals and risk preferences of principal (who delegates authority), and agent (who acts on behalf of the principal) differ. It emphasises the arrangement between agent and principal as the unit of analysis, ensuring that both are aligned with respect to the goal, and the former act in the best interests of the latter [14]. AI agents lack human motivations as they are driven by programmed objectives, trained on the data inputs, and act as per their algorithm. This introduces unique governance challenges, particularly in ensuring that autonomous agents act in alignment with organisational goals and ethical standards.

Aligning the principals' interests with the algorithms that govern the AI agents is even more important as the definition of 'principal' expands to include multiple entities – the developers of the agents, the companies that are incorporating the agentic AI systems, and the contributors of data.

Socio-Technical Systems (STS) Theory [15]

AAI can be viewed as being at the intersection of human element and technology. The Socio-Technical Systems Theory (STS) [15] draws from open systems theory [16] and general systems theory [17]. It is concerned with optimising output in an organisational setting through the melding of the social and technical subsystems existent in that organisation. The social subsystems comprise the employees and the organisational structure within which they perform their tasks. The requisite tools, techniques, and workflows for performance of tasks are part of the technical subsystem. A third subsystem is the internal and external environment in which the employees and technology operate. Successful adoption of new technology requires achieving and maintaining alignment among these interdependent subsystems. The socio-technical approach has been employed to manage technological change since it was first proposed [18, p115]. AAI impacts the technical subsystem by introducing adaptive, autonomous capabilities. The social subsystem changes due to a shift in human roles, skills, and collaboration. The dynamic environmental subsystem, including regulatory regimes and market conditions continually interact with the social and technical

components. For any technology to be successfully deployed in an organisation, a paradigm change is required that will blend agentic AI and the human element in the changing organisational landscape.

By combining Agency Theory and STS Theory, the present study provides a framework to address both the micro-level governance and accountability issues and the macro-level organisational integration challenges associated with AAI. Agency Theory interprets how tasks and decisions can be effectively delegated to AI agents while mitigating accountability risks. It also highlights that final responsibility and oversight rests with the humans. Complementing this, STS Theory demonstrates the manner in which the agents interact with humans in the automated systems and how this collaboration can be maintained as AI systems continue to engage and innovate. To the best of our knowledge, no study could be found that attempts to examine AAI in context of a dual-theory approach. Additionally, there is limited material providing empirical evidence of enterprise use of AAI.

Methodology

The relatively sparse literature on AAI and the perceived symbiotic relationship between humans and autonomous agents directs the study to adopt a qualitative, exploratory, and conceptual synthesis design. The purpose is to examine the dynamics of this collaboration through the lenses of Agency Theory and STS Theory and to propose a theoretical approach to AAI in business.

The analysis relies on secondary sources which include peer-reviewed journal articles, industry reports, and publicly available case descriptions. Popular use cases from Bank of America, Salesforce, Siemens, BlackRock, and Uber Freight were examined with respect to the deployment of their respective AAI. These were selected to illustrate opportunities and challenges of AAI adoption across varied sectors of financial services, customer relationship management, manufacturing, and logistics. The conceptual synthesis approach has been used which entails review of literature and real-time case scenarios where companies have incorporated AAI. It enables identification of common underlying patterns such as efficiency, accountability and oversight, integration, and workforce impact, and mapping these themes against Agency Theory (accountability, principal-agent alignment) and STS Theory (fit between social and technical subsystems). As a conceptual study based on secondary sources, the analysis proposes an integrative conceptual framework. Future research may incorporate primary data (interviews, surveys, event studies) to empirically test and refine this framework.

Results

Various case examples of companies such as Bank of America, Salesforce and Siemens, to name a few, incorporate AI agents in their workflows to automate tasks. They orchestrate and manage complex and routine operations such as customer service, IT helpdesks, email management, claims processing, appointments

scheduling, inventory management, and coordination across processes [3, 19-20]. The cases illustrate recurring themes of efficiency gains, accountability and human oversight requirements, socio-technical integration, and workforce transformation. However, these themes also highlight the adoption and integration challenges within the principles of agency theory and STS theory.

Efficiency and Autonomy

AAI adoption leads to clear efficiency gains by automating routine tasks and improving employees' productivity and decision-making. For instance, Bank of America's virtual assistant, "Erica", enhances operations by supporting employees in manning their IT service desk and reducing calls by more than half [21]. Salesforce's Agentforce platform handles about 32,000 support conversations every week, and delivers an 83% resolution rate, thereby leaving engineers free to manage complex issues [22]. However, in this process, human oversight is reduced, and that may create a risk of the agent's actions conflicting with the broader organisational goals. Clear limits, therefore, need to be imposed by organisations on AI's autonomous decision-making [1].

Accountability and Oversight

The unpredictability in AAI's behaviour and decisions necessitates incorporating accountability and human oversight. The "Industrial Copilot" autonomous system at Siemens, and BlackRock's "Aladdin Copilot" ensure seamless coordination among their

systems, while giving complete control to users who can decide which task they wish to delegate to AI agents [23, 24]. Without human supervision, these systems may behave unpredictably, whether on their own or in consonance with other systems, and make opaque decisions [1, 25]. Ensuring accountability, therefore, requires monitoring mechanisms to prevent misalignment between agents and organisational goals.

Socio-Technical Integration and Workplace Transformation

AAI adoption requires integration across systems, people, and processes. This necessitates changes in how work is distributed between the social and technical subsystems in an organisation. Uber Freight’s “intelligent” agents, for example, are embedded directly into their workflow to automate procurement, tracking and payment handling, improving cost efficiency and service levels across their entire logistics ecosystem [26]. Similarly, cybersecurity applications from Microsoft, ReliaQuest, and CrowdStrike highlight the integration of agents into critical workflows, where humans review and approve agents’ decisions [27]. These cases demonstrate that successful agentic AI adoption depends on socio-technical fit, balancing technical capabilities with human oversight. This means that humans focus on higher-value tasks while letting agents handle routine work. Such a shift requires roles to be redefined and workforce planning to be undertaken proactively. For instance, Siemens’ “Industrial Copilot” supports collaborative workflows, re-

emphasising that work distribution between humans and machines changes, implying a continuous recalibration of the organisation’s social and technical subsystems.

Table 1 compares the cases across the dimensions of efficiency gains, accountability and oversight, and socio-technical integration and transformation. Each case highlights both opportunities and challenges of agentic AI adoption, and are interpreted using Agency Theory and STS Theory.

Table 1: Case Comparison

Case Example	Efficiency Gains	Accountability & Oversight (Agency Theory)	Integration & Fit (STS Theory)	Workforce Transformation
Bank of America – “Erica”	Reduced IT calls, faster service	Risk of reduced human oversight	Integration into customer service workflows	Shift of staff to higher-value tasks
Salesforce – “Agentforce”	High resolution rate, productivity boost	Need for monitoring, autonomous ticket handling	Integration across support channels	Engineers focus on complex cases

Siemens – “Industrial Copilot”	Seamless coordination	Human-in-loop ensures accountability	Hybrid workflows with socio-technical balance	Roles redesigned for collaboration
BlackRock “Aladdin Copilot”	Efficiency in financial analysis	Delegated authority requires oversight	Integration with legacy financial systems	Analysts shift to strategic tasks
Uber Freight	Automated procurement & tracking	Risk of agents acting beyond scope	Fit with market practices and logistics systems	Workforce adaptation to digital workflows

Source: Authors’ Compilation

The comparison matrix reinforces that while efficiency benefits are evident, sustainable adoption requires balancing accountability, integration, and workforce adaptation. The following subsection develops this synthesis into a conceptual framework of organisational equilibrium.

Conceptual Synthesis and Organisational Equilibrium Framework

The findings show that AI agents bring about gains in efficiency, and also raise challenges related to accountability, misalignment between the social and technical aspects, and organisational change. Examining AAI through the dual perspective of Agency Theory and Socio-Technical Systems (STS) Theory provides a richer understanding than either of them alone. Agency Theory focuses on issues that arise when decision-making is handed over to an “agent”, especially regarding oversight, accountability, and transparency. STS Theory looks at how the technical and social subsystems must work together effectively. Together, AAI adoption is both a delegation challenge (ensuring AI acts in the principal’s interest) and a system-integration challenge (ensuring socio-technical harmony). Combining these perspectives highlights the fact that adopting AAI is a continuous process of reinvention, aligning of the organisational structures, reordering of responsibilities between human-agents, and redefining the processes.

As AAI is evolving from systems restricted to a particular task, to interconnected agents working across multiple domains, it will develop the capacity to increasingly handle diverse tasks at the same time. This will bring about a change in the roles humans will perform, and the decision-making and skills needed, in effect, changing the social subsystem. Workflows will be designed to accommodate agents with humans involved only at high-value points [28], changing the technical subsystem. Hybrid workflows will

become the norm, where agents will be an indispensable part of organisational design.

Overall, the findings show that gains in efficiency, and support in decision-making accrue through usage of AAI. But this requires alignment of organisational goals and integration with the internal environment. The analysis indicates two interdependent mechanisms which help in successfully embedding agentic systems in the workflow. First, decision-making authority is delegated to agents to avail benefits of improved performance, but with boundaries, appropriate guardrails, audit processes and human intervention at critical points. This will prevent any deviation, and, if necessary, enable appropriate action to align business goals with agent behaviour. And second, workflows, roles, and collaboration patterns adjust to the presence of autonomous systems to ensure effective integration. Performance gains and other benefits accrue only when these mechanisms operate in balance. Successful adoption therefore depends on achieving organisational equilibrium, defined as the balance between how much decision-making agency is given to agents, and how well the organisation adapts its structures and processes around them.

Conclusion

Agentic AI has the potential to create positive changes in an enterprise. This is reflected in higher productivity, better quality of service, and a more agile and efficient organisation. However, its adoption also raises questions

related to biased decision-making, accountability and transparency, and enterprise transformation. This study examines these dimensions in the context of Agency Theory and STS Theory. It proposes a conceptual framework that successful and sustainable AAI adoption necessitates maintaining equilibrium between delegation, human intervention and human-machine collaboration. The implications can be explained from the perspective of practice, management and theory.

Practical implications

AI agents should not only be adding to the capabilities of the firm but also fit well in the strategic map of the enterprise. In other words, organisations must evaluate agentic AI by the specific ways it enables desired outcomes in their operational context, integrating it into workflows and culture [29]. Companies must analyse the workflow and ensure ongoing oversight and a human-in-the-loop mechanism. This will ensure early detection of any misalignment between the agent-principal goals.

Clear rules and appropriate metrics need to be devised to measure the agents' performance and whether they are meeting the objectives delegated to them [30]. Accountability structures need to be put in place to limit AAI to a clear role and capabilities to prevent it from taking unilateral decisions that may violate the trust between the agent and the principal.

Workforce planning must be undertaken in a targeted manner. Organisations must proactively identify at-risk roles, reskill employees, and redesign roles to ensure a future-ready workforce [31], where employees can easily transition to higher-value and exception-handling roles. Agentic AI literacy initiatives are essential to prepare individuals for increasing human-AI collaboration.

Managerial implications

Managers must move from supervising human tasks to overseeing delegated autonomy. The primary managerial challenge is deciding how much authority an AI agent should receive and where human control must remain. Managers and leaders need to assess limits of autonomy to be given to agents, and put in place clear rules for when human intervention may be required. They should make sure responsibility is shared among developers, operators, and business leaders. AI performance should be judged not only by how much efficiency it brings, but also by whether its actions are in line with the organisations' goals and priorities. In this way, managers balance productivity gains with the need for trust, responsibility, and risk.

Theoretical implications

In agentic AI systems, the AI is not just a tool, but is actively taking decisions. Responsibility, however, is shared among multiple entities – developers who design the system, organisations that deploy it, and users whose data shapes its behaviour. Thus, a clearer theory is required about how much agency AI

really has, and how accountability must be assigned in the event of a mistake.

The concept of organisational equilibrium between delegated agency, oversight, and socio-technical adaptation can be tested in future empirical work. STS Theory also introduces the idea of 'equifinality' [16] that states that there is more than one way to achieve the same outcome. Accordingly, organisations may try different combinations of human-AI roles and varying accountability mechanisms, also known as 'scoped autonomy' [32], rather than be limited to a 'one-size-fits-all' automation strategy. Theoretical models may allow multiple solutions and incorporate scoped autonomy as a design variable in models of organisational performance.

Policymakers should develop flexible and conditional regulations, and developers must brainstorm ways to bring about greater system transparency and ensure risk controls. Future research can explore how different industries and sectors need different rules for using AI. Additionally, how organisations can maintain socio-technical fit as AI systems evolve can also be studied further.

In sum, agentic AI systems bring about a shift in how organisations distribute decision authority, rather than a simple technical upgrade. This study shows that organisations will benefit from agentic systems when autonomy, safeguards, and organisational structures are in balance. Delegation of agency without safeguards will increase risk, as will a

decrease in productivity result if oversight is rigidly defined. Viewing AAI adoption as an organisational equilibrium idea helps explain that successful implementation requires alignment between people, processes, and technology, rather than automation alone.

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