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From Generative to Agentic: How AI Shapes the Future of Work

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Introduction

Artificial intelligence has developed from basic automation into more complex systems which demonstrate creativity and autonomous capabilities in recent years. The three most popular AI developments include Generative AI, AI Agents, and Agentic AI, which represent distinct levels of intelligence, autonomy, and functionality. The terms Generative AI, AI Agents, and Agentic AI represent separate concepts within AI despite being classified under the same category (Sakhare et al., 2025; Sapkota et al., 2025). Users and researchers, together with professionals and decision-makers, need to understand these distinctions because they determine the appropriate AI capabilities for their specific requirements. The three AI models serve distinct functions in industries through their ability to generate text, automate tasks, and achieve complex goals independently. The analysis includes simple definitions and explanations, together with comparative applications to differentiate between the three fast-emerging AI models.

The transition from traditional AI systems to modern agentic frameworks represents a major transformation in computer thinking capabilities. The development of multi-agent systems and expert systems established fundamental principles which led to new concepts about distributed intelligence and social action between independent agents. These initial systems operated mainly through predefined rules and symbolic reasoning methods. Modern AI systems lack the learning-driven and context-aware features that these early systems did not possess. Large language models introduced significant changes to this field. Modern systems have progressed beyond basic reactions because they now possess advanced reasoning and planning capabilities. The technological evolution resulted in multiple AI systems with varying

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degrees of autonomy and decision-making capabilities. The implementation of these systems requires careful consideration regarding their appropriate deployment locations and methods (Sapkota et al., 2025).

1- Generative AI

Definition:
A type of artificial intelligence focused on creating new content, such as text, images, audio, or code, based on user input and learned patterns from training data (Muth & Nufer, 2024). Generative AI can be viewed as an accessible entry point for exploring other sophisticated and further advanced AI versions. This type of AI serves as a gateway to understanding broader AI applications.

Explanation:
Generative AI does not "understand" the goal beyond the input prompt. It operates reactively rather than proactively. It's highly useful for ideation, content creation, and visualisation, but lacks awareness of broader objectives or next steps (Chong, 2024).

2- AI Agent

Definition:
An AI system designed to perform specific tasks by interacting with its environment using rules or tools, often with limited autonomy. AI agents have the ability to learn from experience, adapt their behaviour, and collaborate with other agents or humans to carry out complex problems.

Explanation:
An AI Agent is task-oriented, utilising inputs from sensors or data streams to achieve defined objectives. It can handle automation, carry out steps independently within a narrow scope, and respond dynamically. However, it usually requires clear instructions and doesn't set its own goals (Bharti, 2025).

3- Agentic AI

Definition:
A highly autonomous AI system capable of setting goals, planning tasks, executing actions, and learning from outcomes to improve performance. Furthermore, it incorporates memory and contextual perception, allowing it to function constantly and upgrade through feedback. This type of system can operate in mixed domains, making it specifically effective for complex problem-solving and adaptive automation.

Explanation:
Agentic AI mimics reasoning and decision-making, breaking down complex objectives into smaller tasks, delegating them efficiently, and adjusting strategies

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over time. It embodies a more intelligent, self-directed form of AI, similar to a digital employee (Mukherjee & Chang, 2025; Borghoff et al., 2025).

Table 1: A Comparison Table

Aspect	Generative AI	AI Agent	Agentic AI
Primary Function	Content generation	Task execution with tools	Goal-driven planning and autonomous execution
Decision-Making Ability	None – reactive only	Limited – within given tasks	Advanced – self-initiated and adaptive
Autonomy Level	Low	Medium	High
Input Requirement	Prompt-based (one-time)	Goal or task description	General goal or objective
Tool Usage	Often standalone (e.g. text/image only)	Uses tools/scripts within scope	Combines multiple tools and systems
Learning and Feedback	Does not learn from output	Limited or no feedback loop	Learns from actions and adapts over time
Examples	ChatGPT, Midjourney, Copilot	Zapier AI, Rewind AI, Notion AI	AutoGPT, Devin (Cognition Labs), Operator (OpenAI)
Best Use Cases	Writing, designing, translating	Automating emails, task reminders, and file sorting	Managing full workflows, problem-solving projects
Planning Capabilities	None	Executes defined steps	Plans and sequences tasks independently
Human Intervention Needed	High user must guide every output	Moderate – needs initial setup	Low – can operate with minimal supervision

Utilising AI in Renewable Energy for Sustainability

Artificial Intelligence (AI) has emerged as a transformative force in advancing renewable energy systems and accelerating the global transition toward sustainability. AI incorporation has appeared as a critical stimulant for improving productivity, cutting costs, and addressing complex difficulties in sustainable energy applications (International Energy Agency, 2024; ScienceDirect, 2024).

AI's most significant contributions lie in optimising energy grid operations and enhancing renewable resource integration. AI-powered predictive tools are helping

anticipate and mitigate grid disruptions caused by extreme weather or cyberattacks, improving resilience and ensuring a consistent power supply (U.S. Department of Energy, 2024). The technology enables more accurate forecasting of renewable energy output, allowing for better market participation and grid stability management.

The AI-based energy efficiency solutions and smart grid systems will create $1.3 trillion in economic value through 2030 while reducing global greenhouse gas emissions by 5-10% (International Energy Agency, 2024).

The quick data analysis and predictive maintenance capabilities of machine learning algorithms enable optimal energy storage management and smart grid control. The implementation of AI system capabilities helps grid operators identify power delivery problems and accelerate the development of clean energy materials for advanced batteries and solar technology enhancements (ScienceDirect, 2024).

The renewable energy sector mainly employs AI Agents and Agentic AI systems instead of Generative AI systems for its operations. The main reason behind this choice exists as follows (U.S. Department of Energy, 2024).

AI Agents in Renewable Energy

The renewable energy applications utilise AI agents, which serve as intelligent systems that detect their environment and execute actions to achieve specific targets. The predictive tools powered by AI technology help prevent power grid breakdowns. Meanwhile, AI systems detect power delivery problems and respond to them. Additionally, smart grid management systems perform automated energy distribution optimisation, and predictive maintenance systems track equipment status for scheduled maintenance (World Economic Forum, 2025).

Agentic AI In Renewable Energy

The majority of renewable energy AI systems function autonomously to reach their predefined targets. The AI systems enhance demand optimisation and expand power supply diversity while strengthening grid stability. The system also uses autonomous energy trading capabilities to participate in wholesale market bidding (ScienceDirect, 2024).

The system uses self-optimising wind turbine controllers to modify blade positions through wind condition monitoring. The system uses automated battery management to optimise charging and discharging operations. The operational control of renewable energy systems depends more on AI agents than on Generative AI. The renewable energy sector requires operational AI agents for control and optimisation tasks more than content generation capabilities of Generative AI systems, thus AI agents and agentic systems lead these applications (International Energy Agency, 2024).

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Studying Different Sectors of Work:

1. AI in Health Centres

In our health centres, AI is poised to fundamentally transform patient care, moving beyond just diagnostics and into real-world operational efficiency. In the NHS, for example, the focus is on easing the immense pressure on staff and improving outcomes, primarily in primary care and emergency services.
AI-powered triage and booking systems are now being implemented to assess patient symptoms online, accurately prioritise cases, and direct patients to the right professional, whether that's a GP, nurse, or pharmacist (NHS Confederation, 2024). This ensures that those with urgent needs are seen promptly, while routine queries are handled efficiently.
For diagnosis, ML algorithms are being trained on vast amounts of medical imaging data, such as X-rays and CT scans, to detect subtle signs of conditions like cancer or heart disease with remarkable speed and accuracy, often matching or even exceeding the performance of human specialists (Marr, B., 2024). Beyond diagnosis, the NHS is also utilising predictive analytics to identify patients at risk of becoming high-intensity users of A&E services, allowing staff to proactively offer preventative, community-based support. This early intervention approach not only improves individual patient wellbeing but also significantly reduces the strain on already stretched hospital resources (NHS England, 2024). The entire system becomes smarter, more predictive, and ultimately, more patient-centric.
Based on the given examples, we can use the full spectrum of AI in the Health Centre.

Table 2: Full AI Spectrum in Health Centre.

Example from Text	Description	Type of AI
AI-powered triage and booking systems	Interacts with patients, assesses symptoms, prioritises cases, and directs patients to the right professional	**AI Agent**
ML algorithms analysing medical imaging (X-rays, CT scans)	Detects subtle signs of conditions like cancer or heart disease, producing diagnostic outputs	**Generative AI**
Predictive analytics for A&E risk profiling	Identifies patients likely to become high-intensity users and triggers preventative interventions	**Agentic AI**

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2. Utilising AI in Human Resources:

The future of AI in Human Resources (HR) lies in augmentation, not wholesale replacement, with the technology expected to drive a significant shift in the function's strategic focus.

AI's Future in Human Resources

The utilisation of AI in HR is rapidly expanding across the entire employee lifecycle, moving from an experimental phase to core business strategy (Gartner, 2025). The implications are transformative, primarily through two channels:

* Automation of Transactional Tasks: AI algorithms, including Generative AI, are now adept at automating repetitive, high-volume tasks. These include initial resume screening and candidate filtering, scheduling interviews, drafting job descriptions, and managing routine employee queries via chatbots (McKinsey, 2023). This automation drastically reduces the time-to-hire and cuts administrative costs.

* Enhancing Strategic Decisions: AI-powered People Analytics uses machine learning to analyse vast datasets to predict crucial workforce trends. This allows HR professionals to forecast future skills gaps, identify employees at high risk of leaving (flight risk), and personalise learning and development pathways to boost retention and performance (Verlinden, 2024).

This shift effectively frees up HR staff from transactional duties, allowing them to focus on high-value, human-centric tasks that require emotional intelligence, complex problem-solving, and ethical judgment.

The table below shows the full spectrum of AI usage in the field of Human Resources.

Table 3: Full AI Spectrum in Human Resources.

Example from Text	Description	Type of AI
Automating resume screening, candidate filtering, interview scheduling, drafting job descriptions	Handles repetitive, high-volume tasks, sometimes generating text or responses (e.g., job descriptions, chatbot replies)	**Generative AI**
Chatbots for managing routine employee queries	Interacts with staff, answers questions, and routes issues appropriately	**AI Agent**
People Analytics predicting skills gaps, employee flight risk, and personalised learning	Uses predictive models to anticipate workforce needs and trigger	**Agentic AI**

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	proactive HR interventions	

3. Substitution of the Human Brain and Work

AI is not substituting the human brain in the sense of conscious, empathetic, or creative work; rather, it is substituting routine clerical work. While AI can perform specific cognitive tasks faster and with more accuracy, such as classifying candidates based on predefined criteria, it lacks the essential human qualities required for core HR functions.

The irreplaceable human element includes:

- Empathy and Conflict Resolution: Handling sensitive employee relations, mediation, and complex disciplinary matters requires a nuanced understanding and emotional intelligence that AI cannot replicate (Rashid et.al, 2024).
- Strategic Vision and Ethical Oversight: Formulating long-term workforce strategy, navigating complex labour laws, and ensuring fairness in the use of AI systems itself requires human judgment and ethical leadership (Ncube et al., 2025).

The consensus is that the future involves a harmonious collaboration where AI augments human capabilities, acting as a highly efficient co-pilot rather than a replacement.

Worrying About Jobs in the Future

While there will certainly be job displacement in roles defined primarily by routine, repetitive data processing, experts generally predict the net impact on jobs will be neutral or positive in the long term (Gartner, 2025).

The primary concern shouldn't be losing jobs, but rather the urgent need for reskilling. As AI automates up to 30% of existing work tasks, new roles will emerge, such as AI ethicists, data scientists, and "human-machine collaboration managers" that require a blend of digital literacy, creativity, and uniquely human communication skills (McKinsey, 2025). Therefore, professionals who embrace AI tools and pivot towards more strategic, human-interaction-focused roles are likely to thrive.

Summary and Conclusion

The transition from generative AI to agentic AI represents a significant advancement in artificial intelligence capabilities, as it transforms reactive content generation into proactive problem-solving and autonomous decision-making. The two types of AI systems fulfil different functions while providing specific benefits based on application needs and levels of human involvement.

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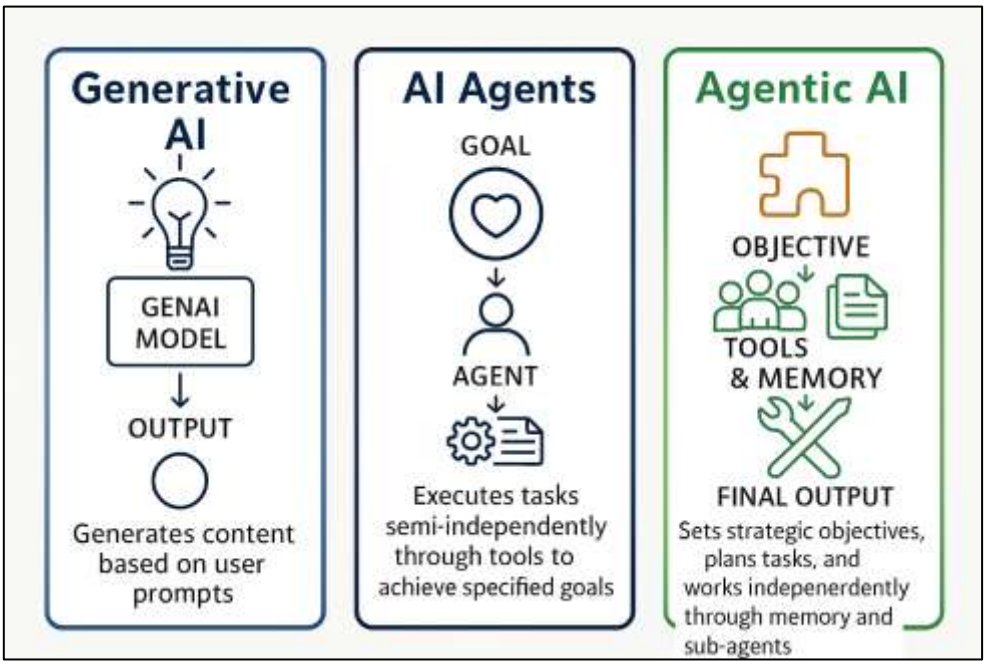

Artificial intelligence represents a pivotal technology for achieving sustainable energy goals, with its applications extending far beyond simple automation. The renewable energy sector's reliance on AI Agents and Agentic AI systems demonstrates the practical value of autonomous, goal-oriented intelligence over content generation capabilities. As these technologies mature, their ability to process complex data patterns, predict system behaviours, and autonomously optimise operations will become increasingly sophisticated. The projected economic benefits of $1.3 trillion by 2030, coupled with significant emission reductions, underscore AI's transformative potential. However, successful implementation requires careful consideration of system integration, cybersecurity, and the ongoing development of robust, reliable algorithms that can operate effectively in the dynamic renewable energy landscape.

AI is reshaping both healthcare and human resources by enhancing efficiency, accuracy, and strategic focus. In health centres, AI agents streamline triage and booking, generative AI supports advanced diagnostics, and agentic AI enables predictive interventions, making care more proactive and patient-centric. In HR, generative AI automates routine tasks such as resume screening, agents manage employee queries, and agentic AI drives people analytics to forecast skills gaps and retention risks. Crucially, AI complements rather than replaces the human brain: empathy, ethics, and strategic vision remain irreplaceable. The real challenge lies in reskilling, ensuring humans thrive alongside intelligent, adaptive systems.

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