

A Preliminary Study on the Impacts and Prospects of AI Deployment in Business Operations - From the Perspective of Corporate Functions

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ABSTRACT: *With the advent of the Fourth Industrial Revolution, the AI industry is developing at a rapid pace. Companies will face intense global competition over the next few years. Those that can accurately master both AI technologies and AI applications will emerge as major winners. All repetitive and standardized tasks are expected to be handled by AI. Will this trend gradually edge toward the Uncanny Valley or slowly move toward the Canny Valley?*

Accordingly, the primary purpose of this study is to conduct a preliminary exploration of the impacts and prospects of AI deployment in business operations. This study adopts a qualitative research method, specifically secondary literature analysis from the perspective of various corporate functions. The findings of this study indicate that: (1) Whilst AI can take over repetitive and standardized tasks, it can never completely replace humans. The ultimate control still sits with human intelligence and the “delivery of emotions from the mind.” Therefore, AI is unlikely to fully reach the trough of the Uncanny Valley; (2) Conversely, AI is also unlikely to fully reach the peak of the Canny Valley; (3) Platforms such as ChatGPT and Cursor AI are becoming the mainstream now; (4) In summary of (1), (2) and (3), the results indicate that the technology front and the application front of AI resemble the Logistic Model of the human mind.

Looking into the future, (1) Robots (in the context of the Uncanny Valley Effect) will become affordable and price-friendly and replace both low-end and high-end labor, particularly in the service industry; (2) As AI will take over repetitive tasks, it is advisable to act early to gain first-mover advantages (by learning about advanced AI technologies, development and applications before its widespread adoption); (3) It is recommended not to focus solely on AI technologies. Small and medium-sized enterprises (SMEs) able to deploy AI applications may become more competitive than medium and large corporates that only emphasize AI technologies; (4) Medium and large corporates are advised to establish their distinctive AI-driven business models and pursue cutting-edge technological innovation.

KEY WORD: *Artificial Intelligence, Uncanny Valley, Canny Valley, Corporate Functions, Logistic Model*

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I. Research Motivation and Purposes

Motivation

As the Fourth Industrial Revolution progresses, AI technologies are developing at a rapid pace. Companies will face intense global competition over the next few years. Those that can accurately master both AI technologies and AI applications will emerge as major winners. All repetitive and standardized tasks are expected to be handled by AI. For example, AI-powered products today (such as robots, autonomous driving, and drones delivering food) will replace humans. Will this gradually move toward the Uncanny Valley? On the contrary, will the corporate adoption of AI tools in operational management creates a Canny Valley for companies, in the form of reduced production costs and enhanced production yields?

Purposes

Accordingly, the primary purpose of this study is to conduct a preliminary exploration of the impacts and prospects of AI deployment in business operations. This study adopts a qualitative research method, specifically secondary literature analysis from the perspective of various corporate functions. This is explained and summarized as follows:

(1) Whilst AI can take over repetitive and standardized tasks, can it ever replace humans completely? As the ultimate control still sits with human intelligence, human mind and emotions, AI is unlikely to fully reach the trough of the Uncanny Valley; (2) Conversely, is AI also unlikely to fully reach the peak of the Canny Valley? (3) Are platforms such as ChatGPT and Cursor AI becoming the mainstream now? (4) Do the technology front and the application front of AI resemble the Logistic Model of the human mind?

In sum, the primary purpose of this study is to conduct a preliminary exploration of the impacts and prospects of AI deployment in business operations. This study adopts a qualitative research method, specifically secondary literature analysis from the perspective of various corporate functions.

II. Literature review

(1) Definition of AI

This study defines AI as computer science with a focus on the creation of smart machines for execution of tasks such as learning, inference, and problem-solving that typically require human intelligence to complete. AI can be divided into two aspects: technologies and applications.

(2) Uncanny Valley Theory

The Uncanny Valley theory, proposed in 1970 by the robotics expert Masahiro Mori, suggests that as humanoid robots look increasingly similar to humans, people's affinity toward them rises gradually. However, when similarity reaches approximately 75%, affinity drops sharply. As similarity continues to increase beyond that point, affinity rises again.

In other words, the Uncanny Valley refers to the phenomenon where human affinity suddenly declines into a sense of unease or aversion when robots become "almost human". Humanoid figures in motion tend to produce stronger fluctuations in perception than static ones. Mori's hypothesis suggests that because robots resemble humans in both appearance and movement, humans initially respond positively. However, beyond a certain threshold, reactions can abruptly turn highly negative.

(3) Canny Valley Theory

The Canny Valley Theory is often a misinterpretation of the Uncanny Valley theory. In terms of its psychological curve, as the degree of human likeness in objects (such as robots, dolls, or CGI characters) increases, human affinity also rises. However, when the likeness approaches near-perfect realism but remains slightly imperfect (i.e., the Canny Valley), affinity drops sharply, forming a "valley" (the Uncanny Valley), and only recovers once full realism is achieved.

(4) Definition of Enterprises

This study defines medium and large enterprises as those with over 200 employees and small-and-medium enterprises (SMEs) as those with less than 200 employees.

(5) Literature on AI and Corporate Functions

A. AI and Production Management

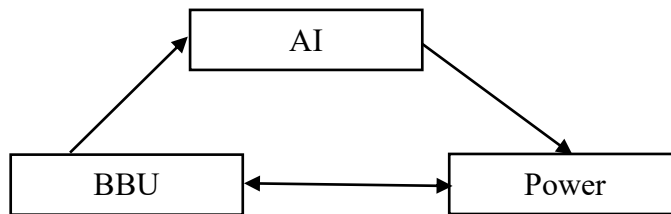
An autoloader is an automated system used in modern large-caliber artillery (such as tanks and self-propelled guns), designed to replace manual loading, reduce labor, and increase firing rates. Such systems typically include ammunition storage and automated transfer mechanisms, enabling rapid loading of shells. Some systems can even perform automated and reverse loading.

The working of AI requires semiconductor chips (the smaller nanometer, the better), AI servers, specialized large-scale databases, and high-performance, high-precise computing power, as well as the development of business models and integration with AI infrastructure. Also, AI consumes a lot of electricity. This is why the functioning of AI technologies must rely on professional engineering and technological innovation. In addition, platforms such as ChatGPT and Cursor AI serve as supporting tools accessible to any users for problem-solving. In particular, Cursor AI has recently gained popularity as an AI development tool, featuring capabilities such as auto-completion, natural language instructions, and agency functionality to complete projects.

Applications such as automated assembly systems, rice-harvesting robots, autonomous buses, and drones also rely on chips and specialized software programming to function. In addition, Cursor AI is an AI-powered code editor built on VS Code, enabling developers to collaborate with AI by using natural language. It supports rapid code generation, debugging, refactoring, codebase understanding, and even executing terminal commands. Its goal is to significantly enhance development efficiency through AI, allowing even beginners to get started easily and achieve a "vibe coding" experience—coding intuitively and freely.

B. AI and Marketing Management

With respect to inventory arrangements for distributors and the relationship between AI and the supply chain, there is the concept of the “three AI pillars”: AI, Power, and BBUs (Battery Backup Units). Among these, the function of BBU is to ensure a stable power supply. Cloud service providers have the greatest demand for BBUs. The increasing adoption of AI servers drives growth in demand for BBUs, as shown in Figure 2.1 (YouTube, 2026).



2.1 Interrelationship Among the Three AI Pillars

C. AI and Human Resource Management

Currently, technical and medical talent databases, facial recognition systems, and use of ChatGPT are all enhancing talent recruitment and cultivation. AI-driven decision-making is elevating career development. AI and human resource management capabilities are becoming increasingly widespread.

The study by Chang (2025) aims to explore the current applications, collaboration models, ethical and regulatory considerations of artificial intelligence (AI) in human resource management (HRM) and examine the impact on corporate strategic transformation and the evolving role of HR. Given the rapid advancement of AI technologies and the widespread adoption of generative AI tools, enterprises are facing unprecedented challenges in human–machine collaboration and the need to reshape decision-making processes. As a key driver of organizational digital transformation, HR departments are also reconstructing in their roles and capabilities.

The findings indicate that AI has found its way to HR processes such as administrative automation, preliminary recruitment screening, internal customer service, and employee training and has significantly improved efficiency and data utilization. However, in practice, human–AI collaborative decision-making is not yet commonplace, and most AI use cases remain at a supportive level. Enterprises generally place high importance on ethical risks and regulatory compliance associated with AI applications and manage these risks through content filtering, internal reviews, and usage policies. Quantitative results further show that companies emphasizing ethical governance are more proactive in HR strategic transformation, and that both AI adoption and attention to ethical considerations have a significant and positive impact on strategic adjustments. That study seeks to consolidate empirical research in Taiwan on the current status of integration of AI and HR so as to contribute to effective use of AI in the field of human resources.

D. AI and R&D

Development and Application of AI Technologies

Since its inception, artificial intelligence technology has undergone several waves of breakthroughs and innovations, evolving from symbolic logic and expert systems in the early days to deep learning and generative AI during recent years. Its scope of application has expanded from research domains to various industries, such as chip innovation, medical databases, and AI-assisted diagnostic systems. AI has been flourishing and innovating in different sectors. Moreover, AI technologies have not only reshaped the models of information processing and knowledge management but also substantially influenced the workflows, operational processes and organizational landscapes such as manufacturing, production, marketing, human resources, and decision-making in the corporate world (Google, 2026).

To understand how AI technologies create tangible value within enterprises, it is necessary to first review their development trajectory and technological evolution, and then further explore the use cases and potential in business operations. The process is divided into two parts. First, a review is conducted on the development history and theoretical foundations of AI technologies. This is followed by an examination of their diversity of use cases, scenarios and the practical outcomes in the modern corporate settings. The findings serve as a theoretical foundation for subsequent case analysis and discussion.

When it comes to exploration of the process and impact of AI adoption in enterprises, qualitative research methods are particularly suitable for uncovering interviewees’ behavioral motivations, user experiences, and potential challenges.

Braun and Clarke (2006) proposed Thematic Analysis, a systematic qualitative data analysis strategy that organizes interview data into meaningful themes and patterns through six structured steps. This method has been widely deployed in the fields of organizational behavior, information systems, and change management (Chen, 2025).

E. AI and Information Management

As discussed earlier, AI technology has not only reshaped the fields of information processing and knowledge management, but has also gradually expanded from research domains into workflows and organizational landscapes in different industries. In particular, AI computing centers require not only advanced AI technologies and database construction, but also extremely powerful computational capabilities.

*Secure Access Service Edge (SASE)

To support cloud-first enterprises in achieving digital transformation, a major corporation has collaborated with a leading global SASE operator to provide integrated solutions to customers. These solutions combine the SD-WAN security framework with comprehensive cloud security services, including Zero Trust Network Access (ZTNA), Firewall-as-a-Service (FWaaS), Cloud Access Security Broker (CASB), and Secure Web Gateway (SWG). This approach addresses a large variety of security needs from clients and elevates network security to a new level.

F. AI and Financial Management

Effective financial planning and control systems enable enterprises to increase earnings per share (EPS) or price-to-earnings (P/E) ratios. Ultimately, reducing production costs and improving productivity are key to achieving competitive advantage.

According to Tsai (2024), artificial intelligence can process large volumes of data within a short time and make relatively fast and accurate decisions based on such data. This gives AI significant potential in forecasting corporate financial performance. By training relevant models, enterprises can use AI to obtain more precise and timely financial forecasts and analyses. The study utilized Weka (Waikato Environment for Knowledge Analysis), an open-source machine learning software developed by the University of Waikato in New Zealand. Weka provides a suite of data mining and machine learning algorithms that can be directly applied to datasets, supporting functions such as data preprocessing, classification, regression, clustering, association rule learning, and visualization.

The dataset features used in the study include company size, total assets, net profit margin after tax, debt-to-assets ratio, return on equity (ROE), revenue growth rate, earnings per share (EPS), return on assets (ROA), and risk management. The study uses Weka to develop a model capable of predicting corporate financial performance and further identifying the key factors influencing such performance.

Meanwhile, Hsieh (2024) noted that in recent years, countries around the world have increasingly emphasized emerging technologies, incorporating startups into key national policies and strategies. For example, in May 2023, the White House of the United States released policies related to industrial innovation and economic development and proposed a national strategy for standards in critical and emerging technologies. Furthermore, generative AI such as the chatbot ChatGPT and the video generation model Sora has undoubtedly become the center of attention from media, the public and the society during recent years. In fact, the developer behind these technologies, OpenAI, once faced challenges such as insufficient funding and talent attrition. That study adopts a qualitative approach and conducts case studies, entrepreneurial model analysis, SWOT analysis, and co-opetition analysis to examine and summarize the successful business strategies of OpenAI. In addition to analyzing three key entrepreneurial elements—resources, team, and opportunity—the entrepreneurial model analysis also explores the distinctive personality traits of OpenAI's leader, Sam Altman.

The SWOT matrix analyzes both the non-profit entity OpenAI Inc. and the for-profit entity OpenAI LP, and employs a TOWS matrix to conduct cross-analysis in order to identify the key turning points behind its successful business strategies. The co-opetition analysis examines the relationships among the case company OpenAI, its competitor Google, its partner Microsoft, and Anthropic, the company founded by the former OpenAI technical team.

Furthermore, the study employs three business analysis methods to explore the business strategies of OpenAI. In addition, it draws insights from the case company to better understand the entrepreneurial environment of Silicon Valley in the United States. For a startup to survive and even become a unicorn with a valuation exceeding USD 1 billion, both external environments and internal resources are essential to its success.

III. Research Method

(1) Research Framework

Based on the abovementioned research motivation, purposes and literature review, this study develops the following research framework (as shown in Figure 3.1).

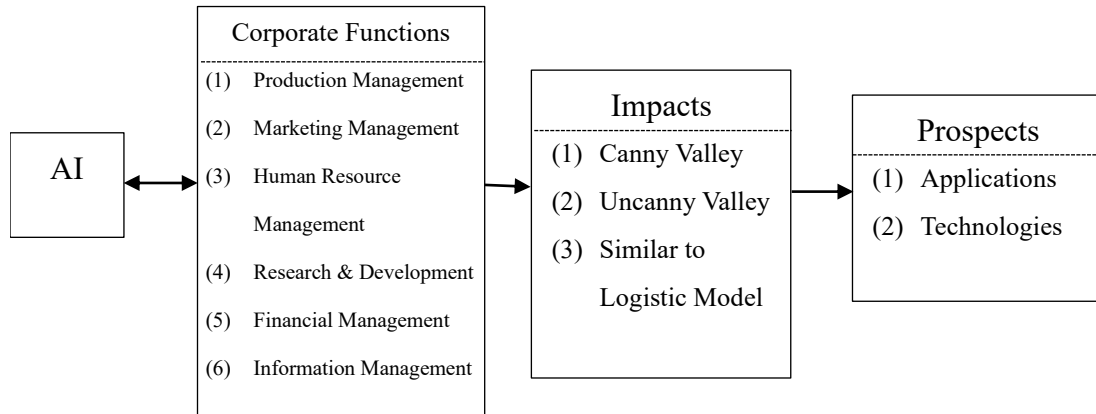


Figure 3.1 Research Framework

Note : Logistic Model a probability model based on the logistic distribution, used to determine the likelihood of achieving a certain outcome, with outputs constrained between 0 and 1. It can be expressed mathematically as $g(x) = 1 / (1 + e^{(-z)})$, where z is a linear function of explanatory variables.

(2) Qualitative Research Method - Secondary Literature Analysis

The AI industry is developing rapidly. A review of the existing management literature shows that research methods are typically selected based on the research topic to address specific research issues—for example, the McKinsey 7S framework or simple descriptive statistical analysis. This study adopts a qualitative research approach and relies mainly on secondary literature analysis for a preliminary exploration of the research topic from the perspective of corporate functions.

IV. Results & Analyses

The above literature review suggests that the impact of AI deployment in business operations is closely related to corporate functions. More often than not, a company may experience significant disruptions in overall marketing or supply chain due to inadequacy in cutting-edge technologies essential for production, insufficient R&D talent, or serious external cybersecurity issues. This eventually leads to a financial crisis or even bankruptcy. At this juncture, internal morale deteriorates, and the organization may quickly sink into the status close to an Uncanny Valley, as illustrated by Points B and D in Figure 4-12.

Conversely, when a company possesses strong financial resources, world-class R&D capabilities and management talent, it can stay on top of the global AI trends, take full consideration of working of its corporate functions, and ultimately master the core technologies of global AI development. This will push up earnings per share (EPS) time and again and boost the morale of all employees. In this instance, the company may quickly move towards a Canny Valley, as illustrated by Points A and C in Figure 4-12.

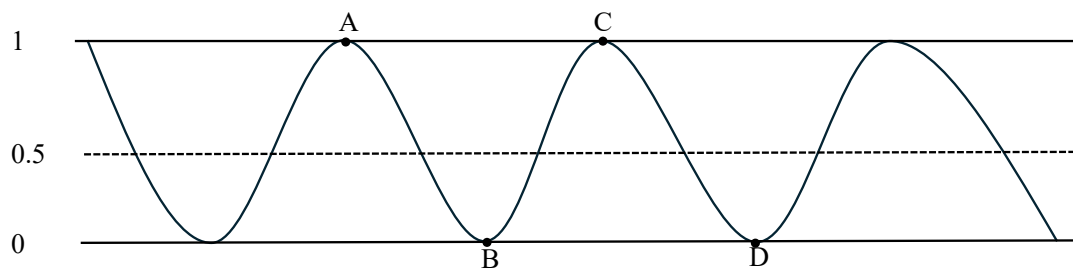


Figure 4.1 Logistic Model

Note: Points A and C indicate the Canny Valley; Points B and D indicate the Uncanny Valley.

As shown in Figure 4.1, the closer the level of AI approaches 1, the more positive all the company's employees feel, indicating movement toward the Canny Valley. On the contrary, the closer the level of AI approaches 0, the more negative all the company's employees feel —indicating movement toward the Uncanny Valley. The midpoint of 0.5 serves as a boundary, and this model resembles the Logistic Model.

According to the research findings, (1) Whilst AI can take over repetitive and standardized tasks, it can never completely replace humans. The ultimate control still sits with human intelligence and therefore, AI is unlikely to fully reach the trough of the Uncanny Valley; (2) Conversely, AI is also unlikely to fully reach the peak of the Canny Valley; (3) In summary of (1) and (2), the results indicate that the technology front and the application front of AI resemble the Logistic Model.

V. Conclusions & Recommendations

The following conclusions are drawn from the abovementioned research findings and analysis:

(1) Conclusions

- A. Whilst AI can take over repetitive and standardized tasks, it can never completely replace humans. The ultimate control still sits with human intelligence and feelings; therefore, AI is unlikely to fully reach the trough of the Uncanny Valley;
- B. Conversely, AI is also unlikely to fully reach the peak of the Canny Valley;
- C. The physical tools of Chat GPT will become mainstream of the future;
- D. In summary of (1), (2) and (3), the results indicate that the technology front and the application front of AI resemble the Logistic Model.

(2) Future Prospects

- 1) Price-friendly robots (in the context of the Uncanny Valley Effect) will become replace both low-end and high-end labor, particularly in the service industry (YouTube 2026);
- 2) As AI will take over repetitive tasks, it is advisable to act early to gain first-mover advantages (by learning about advanced AI technologies, development and applications before its widespread adoption);
- 3) It is recommended not to focus solely on AI technologies. Small and medium-sized enterprises (SMEs) able to deploy AI applications may become more competitive than large corporates that only emphasize AI technologies;
- 4) Medium and large corporates are advised to establish their distinctive AI-driven business models and cutting-edge technological innovation.
 - A. Price-friendly robots (in the context of the Uncanny Valley Effect) will become replace both low-end and high-end labor, particularly in the service industry;
 - B. As previously mentioned, AI will take over repetitive tasks and hence it is advisable to act early to gain first-mover advantages (by learning about advanced AI technologies, development and applications before its widespread adoption);
 - C. It is recommended not to focus solely on AI technologies. Small and medium-sized enterprises (SMEs) able to deploy AI applications may become more competitive than large corporates that only emphasize AI technologies;
 - D. Large corporates must to establish their distinctive AI-driven business models and cutting-edge technological innovation.
 - E. As Jensen Huang puts it, the Chat GPT moment of physical AI is here.

In sum, this study is only a preliminary exploration on the impacts and the prospects of AI deployment in business operations from the perspective of corporate functions. Follow-up researchers are recommended to use quantitative methods for further studies. Looking into the future, (1) Price-friendly robots (in the context of the Uncanny Valley Effect) will become replace both low-end and high-end labor, particularly in the service industry; (2) As AI will take over repetitive tasks, it is advisable to act early to gain first-mover advantages (by learning about advanced AI technologies, development and applications before its widespread adoption). AI will also gradually become widely adopted in different industries; (3) It is recommended not to focus solely on AI technologies. Small and medium-sized enterprises (SMEs) able to deploy AI applications may become more competitive than medium and large corporates that merely emphasize AI technologies; (4) Medium and large corporates are advised to establish their distinctive AI-driven business models and cutting-edge technological innovation. A word of caution here: the booming AI development will greatly affect some companies. It is necessary to adjust the pace in order to stand undefeated.

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