Issues in Information Systems
Volume 26, Issue 4, pp. 118-126, 2025

DOI: https://doi.org/10.48009/4_iis_2025_111

Business applications of AI and generative AI: A brief introduction

Sam Nataraj, Morehead State University, *s.nataraj@moreheadstate.edu*

Abstract

AI seems to have taken over everything recently. AI, or Artificial Intelligence, refers to the ability of computer systems to perform tasks that typically require human intelligence, such as learning, problem-solving, and decision-making. This paper will offer a brief history of AI, its growth and its use in businesses. The key aspects of AI, the popular AI tools in use today, AI adoption around the world and will be discussed. How companies are planning to invest in AI and the barriers to AI adoption will also be discussed. Examples of how Generative AI is being used in various areas of businesses like banking, customer service and law will be enumerated. .

Keywords: AI, ChatGPT, Generative AI, AI in business, GenAI

Introduction

AI seems to have taken over everything recently. Like the internet, AI is a technology that is going to change everything(Bowen & Watson, 2024). AI, or Artificial Intelligence, refers to the ability of computer systems to perform tasks that typically require human intelligence, such as learning, problem-solving, and decision-making. Essentially, it is about creating machines that can think, perceive, learn, and interact with the world like humans, according to McKinsey & Company. In simple terms, AI is about creating computer systems that can perform tasks that require human intelligence, and it encompasses a wide range of technologies and techniques that enable these systems to learn, reason, and act intelligently.

Generative AI is a groundbreaking subset of AI – the cutting edge of the cutting edge – that is able to create new content based on patterns and structures it has learned from existing data. (Marr, 2024). The search results from your phone, your interactions with Alexa and Netflix recommendations based on your view history – all of them use some form of AI. These are examples of "traditional" AI. Traditional AI systems are used to make predictions based on existing data. Generative AI goes a step further than predicting – it simulates human creativity. So, traditional AI excels at pattern recognition, while Generative AI excels at pattern creation. (Marr, 2024).

Key aspects of AI include:

- Machine Learning – learn without being programmed and improve over time
- Deep Learning – uses neural networks to analyze complex data, images and text
- Natural Language Processing (NLP) – understand, interpret and generate human language
- Computer Vision – ability to see and interpret images

History of AI development

AI research started in the 1950s with focus on expert and logical systems. Joseph Weizenbaum created Eliza, a chatbot and Large Language Model that marked the beginning of Natural Language Processing. In the 1980s Google's search algorithm that learns from your search history, helps stir a revival in machine learning as an AI strategy. In 1997 IBMs DeepBlue beats Kasparov in chess. In 2018 the first GPT LLM is created by OpenAI. DALL-E is created in 2022. GPT-4, Bard, Claude, LLaMA, and Gork are created in 2023.Table 1 below gives a more detailed chronology of AI development.

Table 1. AI development Chronology(Bowen & Watson, 2024)

Year	Development
1950s	Artificial intelligence research gets going but is focused on expert and logical systems
1959	Arthur Samuel coins the term "machine learning"
1967	Joseph Weizenbaum creates Eliza, the first significant chatbot and LLM that marked the beginning of work into natural language processing (NLP)
1980s	Google's search algorithm, which learns from your search history, helps stir a revival in machine learning as an AI strategy
1990s	Deep learning and Artificial Neural Network research begins to grow
1997	IBMs DeepBlue beats Garry Kasparov in chess
2010	DeepMind founded by Demis Hassabis, Shane Legg, and Mustafa Suleyman
2014	Ian Goodfellow proposes Generative Adversarial Networks, which lead to many types of neural networks that are both generative and able to be trained
2016	AlphaGo (a machine learning AI from DeepMind) beats world champion Lee Sedol at Go
2017	Transformers makes it possible to both decode and generate new text
2018	First GPT LLM created by OpenAI
2021	DALL-E built on GPT-3, is a machine learning model that generates images
2022	GPT-3.5 launched in November; AI apps begin to proliferate
2023	GPT-4 released in March, followed by Bard (by Google), Claude (by Anthropic), LLaMA (by Meta) and Grok (by X)

Wangsa et. al(Wangsa et al., 2024) lists a timeline of language model and chatbot development which is summarized in Table 2 below. In less than a year (from November 2022 to October 2023) AI has seen rapid growth. Many different actors like Google, Facebook, Open AI and Baidu have participated in the growth and progress of AI.

Table 2. Timeline of language model and chatbot development

Company	*Product*	*Release date*
Open AI	ChatGPT 3.5	November 2022
Google	Bard	February 2023
Facebook	Llama 1	February 2023
Open AI	ChatGPT 4.0	March 2023
Facebook	Llama 2	July 2023
Baidu	Ernie 4.0	October 2023
Google	Gemini	October 2023

IBM has done an extensive survey regarding AI and published their results titled "IBM Global AI adoption index". Table 3 listed below shows the AI adoption rates around the world as cited in the document. (*IBM Global Adoption Index, May 2022*)

Table 3. AI Adoption Rates

AI adoption rates around the world		
	Deployed AI%	***Exploring AI%***
Australia	24	44
Canada	28	48
China	58	30
France	31	44
Germany	34	44
India	57	27
Italy	42	41
Latin America	29	43
Singapore	39	46
South Korea	22	46
Spain	31	45
United Arab Emirates	38	40
United Kingdom	26	47
United States	25	43
Global	34	42

AI explosion has been worldwide and not only restricted to the United States. In fact, China with 58% deployment and India with 57% deployment are more than double the deployment in United States.

Methodology of IBM Global AI adoption index:

- Sample of 7502 business decision makers
  - 1000 in Latin American countries (Brazil, Mexico, Colombia, Argentina, Chile and Peru)
  - 500 in United States, China, India, UAE, South Korea, Australia, Singapore, Canada, UK, Italy, Spain, France and Germany
- Mix of small and large firms
  - 32% from firms with more than 1000 employees
  - 27% from firms between 251 and 1000 employees
  - 20% from firms between 51 – 250 employees
  - 21% smaller firms (50 or less employees)
- Mix of seniority
  - 25% of the sample was VP level or above
  - Mix of directors and senior-level managers

Other salient points from the survey

- AI adoption continued at a stable pace in 2022 with more than a third of companies (35%) reporting the use of AI in their business.
- Larger companies are now 100% more likely than smaller companies to have deployed AI in their organization, compared with only 69% in 2021.
- 1 in 4 companies are adopting AI because of labor or skills shortages
- 1 in 5 companies are adopting AI because of environmental pressures

- 1 in 5 cite difficulties
  - Ensuring data security
  - Ensuring data governance
  - Managing disparate data sources and formats
  - Integrating data across any cloud

As Table4 below shows, Research & Development efforts would be the field where AI would be used mostly, followed by embedding AI into the current operations, applications and processes. The next major application would be in the reskilling and workforce development. Table 5 shows that private cloud seems to be the preferred environment for AI.

Table 4. How companies are planning to invest in AI

Investment Type	Percent
Research and development	44%
Embedding AI into current applications and processes	42%
Reskilling and workforce development	39%
Building proprietary solutions	32%
Off-the-shelf AI solutions	28%
Off-the-shelf tools to build their own applications and models	26%

Table 5. What cloud environments are companies currently using

Cloud Type	Percent
Private cloud	43%
Hybrid cloud or multi-cloud	32%
Public cloud	13%
On premises	8%

Larger companies are 70% more likely to be using hybrid cloud or multi-cloud environment than smaller companies and companies that have deployed AI are 59% more likely to be using a hybrid cloud or multi-cloud environment than those that have not. It is not surprising to learn that IT professionals are most AI users as evidenced by the table below with 54% using AI. Data analysts and engineers are a close second with 35%.

Table 6. Top ten user groups of AI at organizations

User Group	Percentage
IT professionals	54%
Data engineers	35%
Developers and data scientists	29%
Security professionals	26%
Customer service professionals	25%
Marketing professionals	23%
Product managers	21%
Sales professionals	21%
HR professionals	21%
Finance professionals	21%

The survey also lists the barriers to AI adoption with expertise being the top of the list followed by prohibitive costs. The results are shown in Table 7. The next section gives a brief account of the different AI tools that are being used in the recent times

Table 7. Barriers to AI Adoption

Barrier	Percent
Limited AI skills, expertise or knowledge	34%
Price is too high	29%
Lack of tools or platforms to develop models	25%
Projects are too complex or difficult to integrate and scale	24%
Too much data complexity	24%

.

Popular AI tools

There are many AI tools that are available today. Some of the AI tools are described below.

ChatGPT:
ChatGPT (Chat Generative Pre-trained Transformer) is known as generative AI. This means that it can create new content. It is a large language model (LLM) trained on a huge dataset of text and code. It is designed to be conversational allowing it to understand and respond to questions, generate text formats like poems, code, scripts, musical pieces, email, letters etc. It uses natural language processing techniques to understand user input. It can be used for a wide range of tasks from answering questions to composing code.

Grammarly:
Grammarly is an AI powered writing assistant that helps users improve their grammar, spelling, punctuation and style. It uses AI and machine learning algorithms to understand and analyze rules of English grammar and writing style. It is available as a browser extension, a desktop app and an online editor. It also integrates with Gmail, Google Docs, and Microsoft Office.

DALL-E:
DALL-E is an AI system that can generate images from text descriptions. It can create images in realistic, abstract and artistic styles. It can handle complex and detailed text prompts allowing for more nuanced and creative image generation.

Perplexity:
Perplexity is an AI powered search engine and chatbot that uses LLMs to provide comprehensive and up-to-date answers to queries. Answers are typically accompanied by links to the sources. It can handle image and file uploads, allowing users to search within documents and images.

Perplexity vs ChatGPT:
Perplexity AI is generally considered better for research and accurate information retrieval due to its real-time web search while ChatGPT is stronger in conversational capabilities and creative writing tasks.

Blackboard Design Assistant:
Blackboard Design Assistant is a tool integrated within Blackboard Learn Ultra that leverages AI to streamline course creation and organization for instructors. It can suggest a course structure, module titles,

descriptions and even images based on course content. It can generate rubrics ensuring consistent and fair evaluation of student work. It can suggest assignment prompts to encourage higher order thinking.

Otteri.ai:
Otteri.ai is an AI powered transcription and note taking app that converts spoken words into searchable, sharable notes. It integrates with popular platforms like Zoom, Microsoft Teams, and Google Meet allowing for automatic transcription of online meetings.

Miro:
Miro is an online collaborative whiteboard and visual workspace that helps teams ideate, plan and collaborate on various projects. It incorporates AI features to help with tasks like summarizing ideas, extracting key takeaways and generating presentations. It integrates with Microsoft Teams, Slack and Zoom enabling users to streamline their workflows.

GenAI will change how we work, how we shop, how we consume content, how we experience healthcare, how we learn (at school and otherwise), how we play video games, and even potentially how we date(Marr, 2024). Listed below are examples of how AI and Generative AI is being used currently in the various industries.

- Advertising
  - Coca Cola uses generative AI in art and advertising (Marr, n.d.-b).
  - Netflix uses AI to personalize content (SA, 2023).
- Banking/Financial Services
  - Morgan Stanley is training GPT to help its financial advisors (*How Morgan Stanley Is Training GPT To Help Financial Advisors*, n.d.)
- Computer Science
  - Coding time reduced from 9 weeks to just a few days by using Generative AI (Nolan, n.d.)
- Customer Service
  - Generative AI is transforming customer service (*How Generative AI Is Already Transforming Customer Service*, 2023).
  - Mercedes-Benz is using ChatGPT to improve in-car voice control (Group, 2023). .
  - Sephora, Ray-Ban, Bailey Nielson, Baume & Mercier, Nike, Wacoal and L'Oreal are using virtual try-ons which uses AI to increase sales (*7 Brands Using Virtual Try-On Tech to Boost Sales*, n.d.).
  - Ebay uses AI to generate product listings from photos (*EBay's New AI Tool Generates Product Listings from Photos | Retail Dive*, n.d.).
- Education
  - Quizlet is using AI to make studying easier – with personalized tutoring, automatic flashcards, and even songs (Fore, n.d.)
  - More and more teachers are using Generative AI in schools (Johnson, n.d.)
- Gaming
  - AI is transforming the gaming landscape (Śmietana, n.d.)
  - A video game was created by using ChatGPT and AI tools (*Video Game Created Entirely With ChatGPT, DALL-E 3, and Midjourney | Tom's Hardware*, n.d.)
  - The studio behind anime game Halcyon Zero will launch generative AI tools for content creation (Nelson, 2023)
- Law
  - Generative AI was used to fight miscarriages of justice at the California Innocence Project (Marr, n.d.-a)

    - Law firms will start using Generative AI increasingly in future (*60% of In-House Counsel Expect Law Firms to Use Generative AI | Legal Dive*, n.d.)
- Media, Entertainment
    - News articles will be written by AI in the future (Mullin & Grant, 2023).
    - News Corp using AI to produce 3000 Australian local news articles a week (Meade, 2023)
    - An AI written novella almost won a literary prize (*An AI-Written Novella Almost Won a Literary Prize*, n.d.).
    - Big companies use AI-generated ads because they are cheap (David, 2023)

Use of Generative AI in healthcare

In healthcare alone ChatGPT could save between $200 billion and $360 billion(Iskowitz, 2023). In the area of mental healthcare the ability of ChatGPT and other AI-based chatbots to generate human-quality responses can provide companionship, support, and therapy for people who have problems with accessibility and affordability in terms of time, distance and finances(Singh, 2023). ChatGPT integration in clinical management and medical education has the potential to completely transform healthcare sector. Medical practitioners can gain access to a variety of information from ChatGPT that will enable them to make better decisions and treat their patients more effectively(Tariq & Tariq, 2023). For example AI can be used to help forecast viral outbreaks (*An AI Tool That Can Help Forecast Viral Variants | Harvard Medical School*, 2023) and Generative AI is used for drug discovery (*AIDDISON™, AI-Powered Drug Discovery Software | Merck KGaA, Darmstadt, Germany*, n.d.) Use of AI seems to be growing exponentially in the last year and would cause many changes both positive and negative in the business world. This growth is not only national but international in nature with many countries adapting AI technology.

Conclusion

AI is here to stay as is evidenced by the use of AI in every area of human interaction – from business to medicine to education to research. The use of AI will increase exponentially in the coming years. There is a lot of speculation about how the use of AI will affect the job market – the kind of jobs that will be lost vs the kind of jobs that will grow. It might take another three or four years to understand the exact impact of the use of AI will become apparent to us. Just like any other disruptive technology AI will cause some disruptions in business practices. Though we can be sure about this, it remains to be seen what the disruption will be and how pervasive it is going to be. There are some sectors of the business that will be affected more than the others. A detailed study of how AI has transformed the business entity will be a worthwhile study in about three years time.

References

Anonymous. (2010). *AI powered drug discovery software Merck KGaa, Darmstadt, Germany* (n.d.) Retrieved on April 21, 2025, from http ://www.emdgroup.com:443/en/research/science-space/envisioning-tomorrow/future-of-scientific-work/aiddison.html

Bamberger, S., Clark, N., Ramachandran, S., & Sokolova, V. (2023). *How generative AI is already transforming customer service, Boston Consulting Group, July 06, 2023*

Bowen J.A., & Watson, C.E. (2024).*Teaching with AI: A practical guide to a new era of human learning.* John Hopkins University Press.

Caurso, C., (2023). *An AI Tool That Can Help Forecast Viral Variants,* Harvard Medical School Oct 11, 2023. Retrieved on Apr 19, 2025 from https://hms.harvard.edu/news/ai-tool-can-help-forecast-viral-outbreaks

David, E., (2023). *Big companies use AI-generated ads because they're cheap*. The Verge. Retrieved on April 18, 2025 from https://www.theverge.com/2023/8/18/23837273/generative-ai-advertising-oreos-cadbury-watermarking

Davenport, T., (2023). How Morgan Stanley is Training GPT to Help Financial Advisers. Forbes, March 20, 2023

Fore, P. & Suarez J (2023.). *Quizlet is using AI to make studying easier—With personalized tutoring, automatic flashcards, and even songs*. Fortune, Oct 17, 2023.

Group, M.-B. (2023, June 16). Mercedes-Benz takes in-car voice control to a new level with ChatGPT. Mercedes-Benz Group. Retrieved on Apr 18, 2025 from https://group.mercedes benz.com/innovation/digitalisation/connectivity/car-voice-control-with-chatgpt.html

Hellberg, K., (May 23, 2022), *7 Brands Using Virtual Try-On Tech to Boost Sales.* Retrieved on April 18, 2025 from https://www.threekit.com/blog/7-brands-using-virtual-try-on-boost-sales

IBM Global Adoption Index, May 2022 retrieved on Apr 1, 2025 from https://www.snowdropsolution.com/pdf/IBM%20Global%20AI%20Adoption%20Index%202022.pdf

Iskowitz, M. (2023). Who's Afraid of ChatGPT? Medical Marketing and Media, 58(2), 40–41

Johnson, K. (n.d.). Teachers Are Going All In on Generative AI. Wired. Retrieved on April 19, 2025,from https://www.wired.com/story/teachers-are-going-all-in-on-generative-ai

Lewis, D., (2016), *A short novel co-written by humans and AI passed the first round of a Japaneseliterary contest,* Smithsonian, Mar 28, 2016. Retrieved on April 18, 2025 from https://www.smithsonianmag.com/smart-news/ai-written-novella-almost-won-literary-prize180958577

Marr, B. (2023). *How Generative AI Is Used To Fight Miscarriages Of Justice At The California Innocence Project.* Forbes. Oct 23, 2023

Marr, B. (2023). *The Amazing Ways Coca-Cola Uses Generative AI In Art And Advertising*, Forbes, Sep 8, 2023.

Marr, B. (2024). Generative AI in practice: 100+ amazing ways generative artificial intelligence is changing business and society. John Wiley & Sons, Inc.

Meade, A. (2023, July 31). News Corp using AI to produce 3,000 Australian local news stories a week. The Guardian. Retrieved on Apr 25, 2025 from https://www.theguardian.com/media/2023/aug/01/news-corp-ai-chat-gpt-stories

Moran, L.,(2023). 60% of in-house counsel expect law firms to use generative AI | Legal Dive. (n.d.) Aug 25, 2023

Mullin, B., & Grant, N. (2023, July 20). Google Tests A.I. Tool That Is Able to Write News Articles. The New York Times.

Nelson, D. / J. (2023, September 11). Pahdo Labs Raises $15M to Let Players Make Anime Games With AI Tools. Decrypt. Retrieved on Apr 25, 2025 from https://decrypt.co/155895/pahdo-labs-raises-15-million-players-make-anime-games-ai-tools

Nolan, B. (n.d.). Software company CEO says using ChatGPT cuts the time it takes to complete coding tasks from around 9 weeks to just a few days. Business Insider. Retrieved on April 21, 2025, from https://www.businessinsider.com/chatgpt-coding-openai-ceo-save-time-ai-jobs-software-2023-5

Pires, F., (2023), Video Game Created Entirely With ChatGPT, DALL-E 3, and Midjourney | Tom's Hardware. (n.d.). Retrieved on April 21, 2025, from https://www.tomshardware.com/software/video-game-created-entirely-with-chatgpt-dall-e-3-and midjourney

SA. (2023, October 7). Case Study: How Netflix Uses AI to Personalize Content Recommendations and Improve Digital Medium. Retrieved on Apr 25, 2025 from https://medium.com/@shizk/case study-how-netflix-uses-ai-to-personalize-content-recommendations-and-improve-digital b253d08352fd

Sidharthan, D. C. (2023, October 8). Is generative AI the future of rapid and accurate chest radiograph interpretation in the ER? News-Medical. Retrieved on Apr 25, 2025 from https://www.news-medical.net/news/20231008/Is-generative-AI-the-future-of-rapid-and-accurate-chest-radiograph-interpretation-in-the-ER.aspx

Singh, O. P. (2023). Artificial intelligence in the era of ChatGPT - Opportunities and challenges in mental health care. Indian Journal of Psychiatry, 65(3), 297–298. https://doi.org/10.4103/indianjpsychiatry.indianjpsychiatry_112_23

Śmietana, J. (n.d.). AI is Transforming the Gaming Landscape. Software Mind. Retrieved on April 21, 2025, from https://softwaremind.com/blog/ai-is-transforming-the-gaming-landscape

Tariq, S., & Tariq, S. (2023). Revolutionizing Healthcare with AI: The Role of ChatGPT. Journal of University Medical & Dental College, 14(2), v–v. https://doi.org/10.37723/jumdc.v14i2.850

Walk-Morris, T., (2023) EBay's new AI tool generates product listings from photos | Retail Dive. (n.d.). Retrieved on April 18, 2025, from https://www.retaildive.com/news/ebay-ai-magical-listing product descriptions listings/693185

Wangsa, K., Karim, S., Gide, E., & Elkhodr, M. (2024). A Systematic Review and Comprehensive Analysis of Pioneering AI Chatbot Models from Education to Healthcare: ChatGPT, Bard, Llama, Ernie and Grok. Future Internet, 16(7), 219-. https://doi.org/10.3390/fi16070219