

Artificial Intelligence Impact on Businesses: AI-driven Innovation and Research to Market Deployment and Upcoming Business Model Shifts

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Abstract

This study looks at how Artificial Intelligence (AI) is changing businesses through research and innovation, market adoption, and changes to organizational structures. The use of AI by well-known companies and start-ups to improve growth, efficiency, and customer engagement is examined in this report along with its integration into strategic operations. The analysis is guided by a three-dimensional framework focused on AI research and innovation, automation-driven organizational changes, and AI-impacted business environments. Significant changes in business models are being brought about by the development of AI, such as the rise of AI-driven personalized services, the automation of necessary processes, and the emergence of new revenue streams like AI-as-a-Service platforms. To stay competitive in an AI-driven market, these changes require businesses to reassess value creation, customer relationships, and operational strategies. The study evaluates global trends, sector-specific impacts, financing dynamics, and the regional distribution of AI development using secondary data from 2023–2024. According to research, artificial intelligence (AI) simultaneously poses issues like algorithmic bias, transparency concerns, and geographic disparities in access, even though it also significantly boosts productivity and market innovation. According to the study, equitable and long-term progress in AI depends on inclusive policies, moral standards, and education.

Keywords: - Artificial intelligence (AI), business value, digital transformation, impact, business strategy.

Introduction

The ways that people live, work, and enjoy entertainment are changing as a result of new technologies like the internet of things (IoT), data science, big data, cloud computing, artificial intelligence (AI), and blockchain. Further advancements in these technologies could help create hyper-automation and hyper-connection, which would usher in the Fourth Industrial Revolution, or Industry 4.0. First and foremost, the advancement of Industry 4.0 and the enhanced functionality of all other technologies are propelled by the development of artificial intelligence. This technological advancement, which could be attributed to artificial intelligence, would facilitate human interaction with machines and change the rationale of business models, and alter people's lifestyles and living standards simultaneously [1-5]. The application of artificial intelligence is creating a more creative and intelligent world. Numerous examples exist where technological advancements in artificial intelligence are making our lives easier. Examples include Google Maps' ability to map routes and traffic, Uber and Lyft's ability to estimate trip costs, Facebook's recommendation of friends' tags,

email spam filters, online shopping suggestions, and disease detection. Businesses are being forced to compete with one another in order to turn their organization into an AI firm due to the speed at which artificial intelligence is permeating every industry [6].

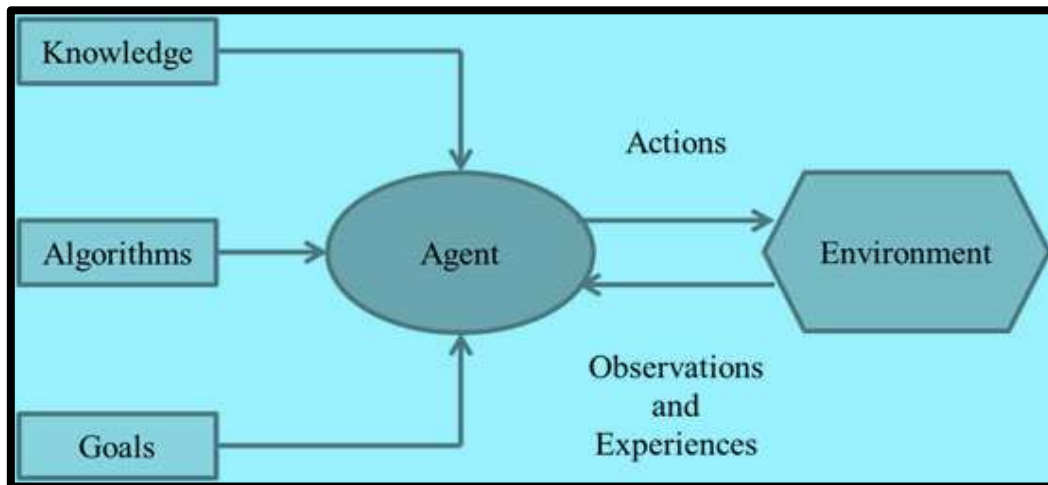


Fig. 1 Basic block diagram

As a result, in order to create new strategies and sources of commercial value, businesspeople, strategists, pioneers, entrepreneurs, and investigators are being forced to use artificial intelligence. This claim was made in 2017 at the Stanford MSx (Master of Science in Management for Experienced Leaders) Program by Andrew Ng, an adjunct professor at Stanford University, a co-founder of Google Brain, a former vice president and chief scientist of Baidu, and a co-chairman and co-founder of Coursera [7-10]. "Just like electricity revolutionised nearly every industry a century ago, I'm finding it difficult to imagine a sector that AI won't shake up in the coming years." Professor Ng is not only a well-known computer scientist and AI entrepreneur, but he is also one of the six most prominent thinkers in the domains of machine learning and artificial intelligence. The far-reaching effects that artificial intelligence will have on nations, communities, businesses, and individuals must therefore be carefully considered. The objective of this article is to examine how artificial intelligence has impacted the global market, organizational strategy goals, and the way corporate environments are changing. Additionally, advancements in artificial intelligence and academic accomplishments will be taken into account [11-15]

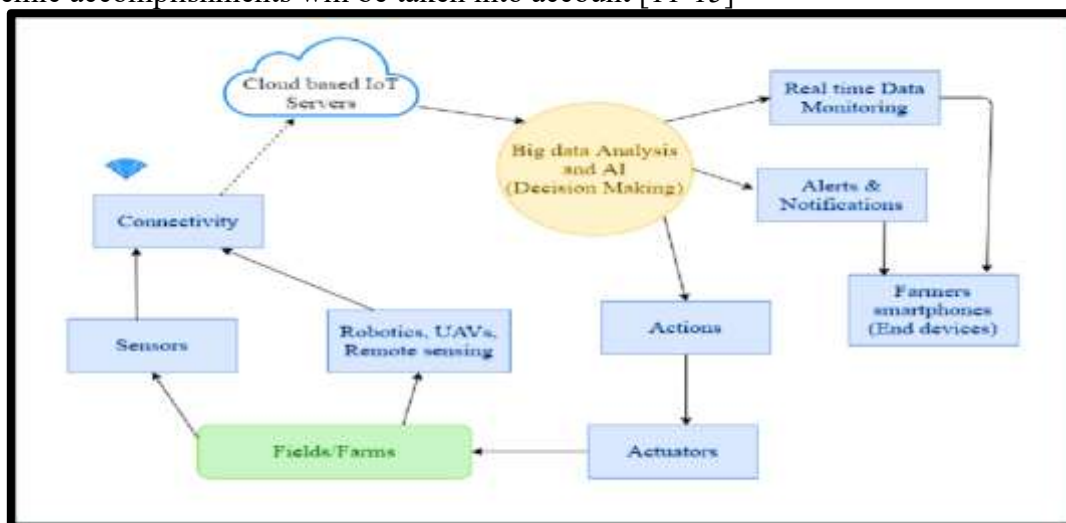


Fig. 2 Big data analysis and AI

Research is becoming increasingly significant in the creation of new technologies and discoveries. By promoting the creation of new markets and the enhancement of already-existing ones, research and innovation contribute to economic growth. Three main factors drive the economy's dynamics: innovation, knowledge, and entrepreneurialism, according to Neo-Schumpeterian Economics, a recent school of thought in growth economics [16]. Neo-Schumpeterian economics is distinguished by its emphasis on novelty and uncertainty, of which innovation is a prime illustration. This is among the features of economic theory that set it apart. Thus, the main factor influencing the dynamics of the economy is innovation, particularly technological innovation.

Neo Schumpeterian Economics is predicated on the notion that learning and experimental research in constantly shifting contexts serve as its foundation, given that information—more especially, scientific knowledge—is thought to be the second most significant driving force of economic dynamics. The function of an entrepreneur, who is characterized as an economic operator who introduces innovations to spur economic advancement, has been given significant weight. According to Neo-Schumpeterian Economics, innovation propels the development of new industries, knowledge supports them, and entrepreneurial activity tests them. Thus, according to Neo-Schumpeterian Economics, the three main forces behind economic dynamics are innovation, knowledge, and entrepreneurial activity. The foundation of Neo-Schumpeter Economics is experimental learning and exploration in dynamic contexts. Information, particularly scientific knowledge, is the reason for this. considered to be the second most significant factor influencing economic dynamics. The role of the entrepreneur, who is described as an economic actor who initiates economic growth by introducing innovations, has received a lot of attention. Neo-Schumpeterian economics holds that invention, supported by knowledge and experimentation through entrepreneurship are the sources of new industries [16]. According to Neo-Schumpeterian economics, the three fundamental forces driving economic dynamics are innovation, knowledge, and entrepreneurial activity. We have decided to make the theory and algorithms underlying AI-driven systems the main focus of our investigation. To do this, we required knowledge of current advancements in learning algorithms, effective uses of artificial intelligence, and data processing and production. We combed through a significant number of research articles published in respectable journals and conferences during the previous fifteen years (2003-2018) in order to gather this data [17].

We also looked into different datasets and the companies that offer them, and we discovered smart devices and services that are currently for sale. All across the market, a technological revolution is occurring as a result of the success and buzz created by AI algorithms. This shift is forcing many established businesses to embrace AI while also spawning a plethora of AI-based start-ups. Consequently, we were able to identify the second-dimension AI-driven strategic goals of large corporations, enabling them to use state-of-the-art AI technology to grow more quickly. We examined the financial standing of the leading companies in the artificial intelligence (AI) space, such as IBM, Microsoft, Apple, Amazon, and Google. Over the past four decades, all of these companies—aside from IBM—have become industry leaders. We broadened our research to include top AI start-ups in 2023 and 2024 in order to better understand how AI will impact businesses. We searched through a vast array of research blogs, recent credible conferences, their sponsors, AI start-up acquisitions, market intelligence reports, stock market websites, corporate websites, and official blogs in order to select the aforementioned AI firms (and start-ups) and conduct their investigation. The business environment changes as a result of

the integration of artificial intelligence technology into business operations. Consequently, we looked into the third dimension of how AI affects business contexts. The required information was gathered from a variety of sources, including research papers published by market intelligence firms like Gartner, Forrester, and IDC, as well as corporate news releases, annual reports from the companies, and studies of innovation trends. Our investigation's conclusions indicate that the deployment of AI-driven systems has a major impact on three business contexts. These contexts are, respectively, employee skill set, sales platform, and customer interaction [18].

Research Methodology

- **Information Gathering**

To ensure validity and dependability, this study used secondary data from 2023–2024 from a range of trustworthy and current sources.

Table 1. Overview of AI technology

S. No.	Products postulated	Abilities proposed	Today's Reality
1.	Automatic language translator	"A language translation tool that can accurately translate written information from one language to another, whether it is academic or business-related."	Google Translator, Bing Microsoft Translator
2.	Automatic identification system	"Automated method of identifying a person using biometric data (fingerprints, voice, face, etc.)"	Apple Face ID, Mastercard Identity Check with NuData Security.
3.	Automatic diagnostician	"A medical diagnostic system that can evaluate biological tests, ask the patient questions, and provide an interactive or automated diagnosis based on all of this information."	Qualcomm Tricorder, Medtronic Sugar. IQ Cognitive App in collaboration with IBM Watson.
4.	Industrial robots	"An industrial robot that can work independently in an automated setting, use its vision and manipulation abilities to check and assemble products."	Kiva warehouse robots, FANUC intelligent robots, Mitsubishi Robots
5.	Robot chauffeur	"Automated vehicles equipped with optical sensors that can navigate typical urban and rural roadways"	Google Waymo, MercedesBenz E-Class, Volvo XC60
6.	Universal game player	The ability to manage the system's degree of expertise in a variety of games, including chess, checkers, go, bridge, scrabble, monopoly, and more."	AlphaGo, Deep Blue

Studies conducted by Google, Amazon, Microsoft, IBM, and Tesla exposed the strategic application of AI. Peer-reviewed research publications from IEEE, ACM, Nature AI, and Elsevier offered scholarly depth. Current events were covered by tech news websites such as TechCrunch, Forbes Tech, Wired, and MIT Technology Review. Publications from Gartner, McKinsey, PwC, and Statista looked at investment trends and market dynamics. The AI policies and funding initiatives of the US, China, India, UK, and Canada were examined.

Expert discussions and technical white papers from GitHub, Reddit AI, and Kaggle were added to company announcements, news releases, and business performance data from Bloomberg, Nasdaq, and other sources [19].

- **Present-Day AI: Algorithms, Datasets, and Products**

John McCarthy, a former computer science professor at Stanford University who had since resigned, founded the field of "Artificial intelligence" [15] in 1956. He was the impetus behind the now-famous Dartmouth conference, which took place at Dartmouth College in Hanover during the early days of artificial intelligence (AI). He believed that certain processes would lead to the development of intelligence comparable to that of humans. According to Firschein and Coles [16], advancements in artificial intelligence could lead to the introduction of twenty-one distinct items by the 1990s. A few of the products they had anticipated have already been produced; these are listed in Table 1. This table shows you how far artificial intelligence has come over the past 48 years [20].

Table 2. Summary of Deep learning

Broad areas	Description	Applications	Deep learning algorithm
Computer Vision	speech-to-text translation A voice search and phone call	Recognition of faces, reconstruction of images, computer-assisted diagnosis (CADx), tally of people, identification of gestures and iris patterns, detection of product defects	Convolutional Neural Networks (CNNs)
Text Analysis	Extracting useful knowledge from text data is the main emphasis here.	Data mining, Responding to questions (Q/A), Platforms for online search, Processing of Queries, Service Suggestion/Customization, Personality assessment, Synopsis of documents, Prevention of fraud, Forecasting demand, Positioning in product search results, Translation	Gated-Recurrent Neural Networks (RNNs) (both Long Short-Term Memory (LSTM) and Gated Recurrent Unit (GRU))
Speech Recognition	Machines that can understand and carry out spoken commands are the focus of this field.	text-to-speech conversion Dialling and voice search	CNNs, RNNs, and their combination
Game playing	Machines that can compete in games against both humans and other AIs are the focus of this field.	Go, Chess, Atari	Policy Gradient Reinforcement Learning, Deep Autoencoder, Deep QNetworks.

Result Analysis

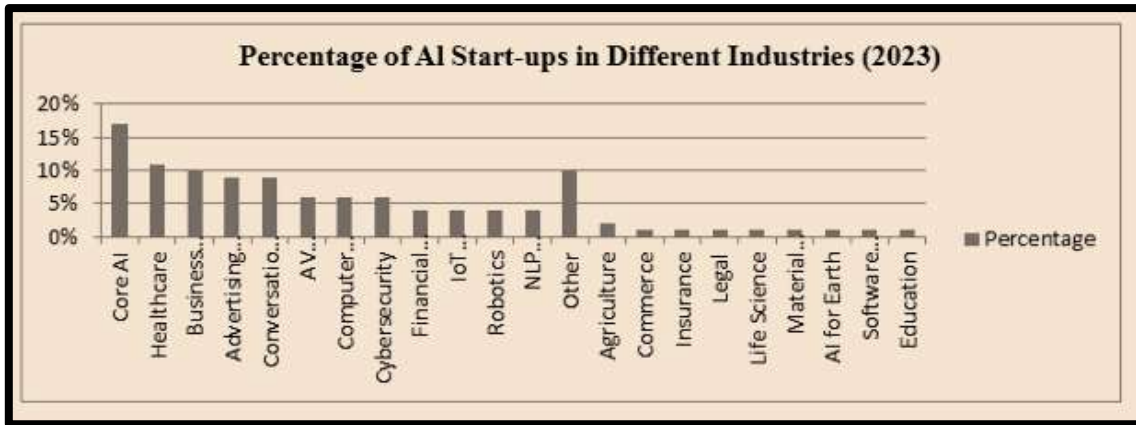


Fig. 3 Analysis-1

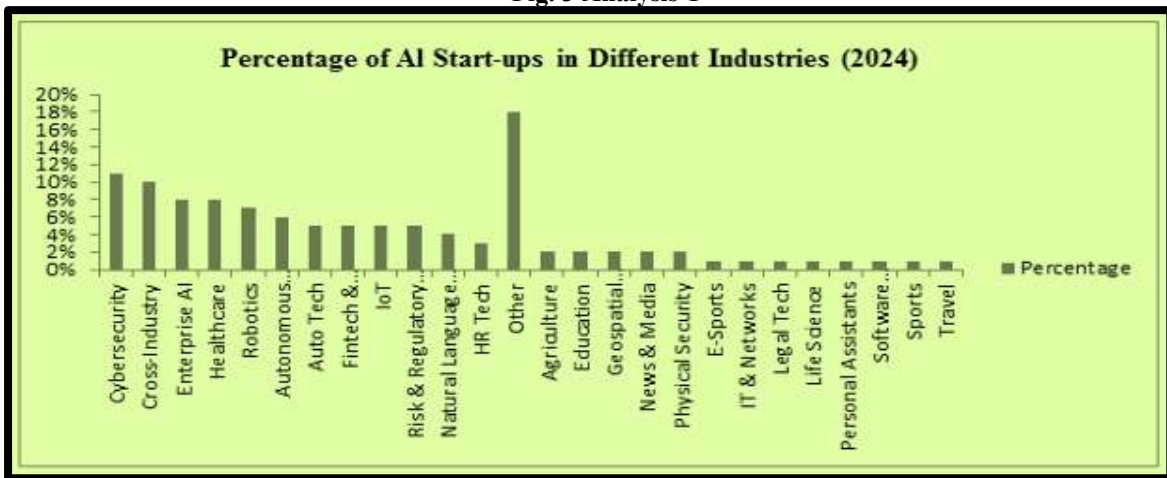


Fig. 4 Analysis-2

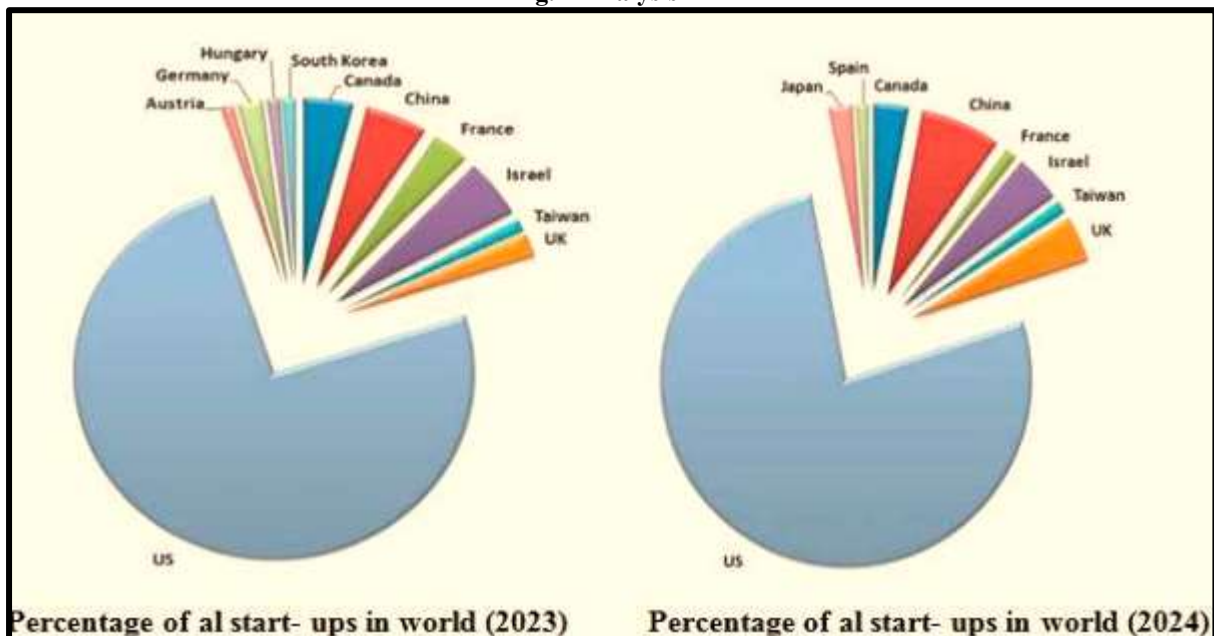


Fig. 5 Analysis-3

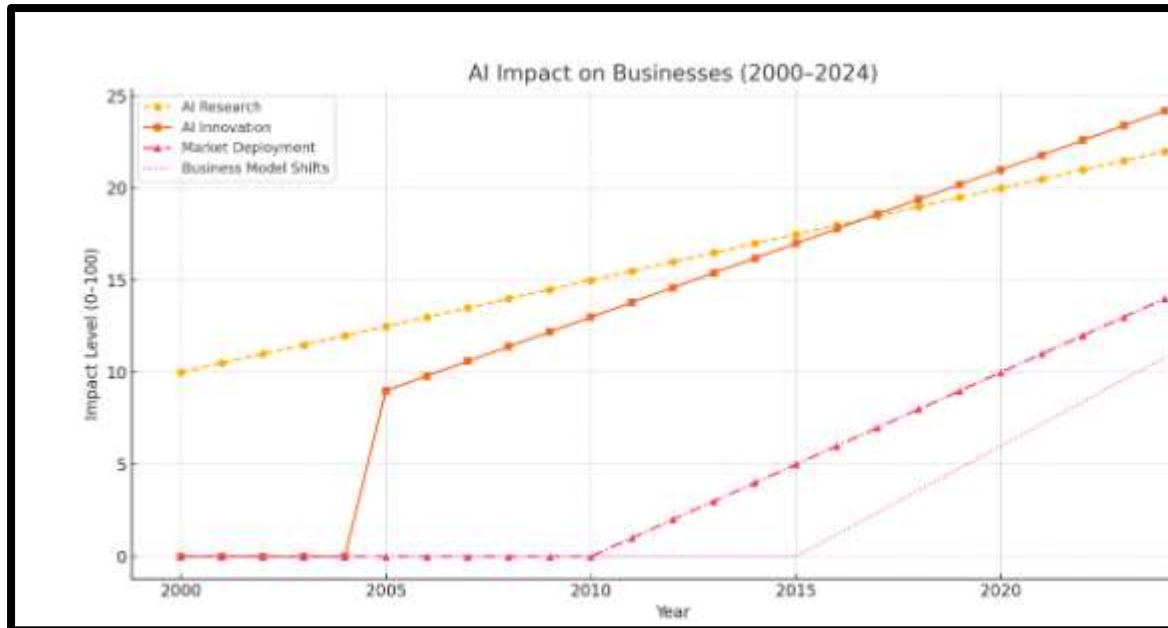


Fig.6 Overall analysis

Highlighting significant turning points and technological advancements along the way, this study charts the evolution of artificial intelligence (AI) from its early days as a collection of theoretical ideas to its current status as a commercially viable technology. The exponential growth of AI has mostly been driven by two enabling factors: the availability of advanced processing units like GPUs and TPUs and the volume of massive data. Four main areas of deep learning—computer vision, natural language processing, voice recognition, and reinforcement/game learning—have developed into game-changing domains that frequently surpass human accuracy with the aid of well-chosen algorithms and real-world applications. The study also provides a carefully chosen selection of open access datasets, which helps to democratize AI research and development. The causal relationship between cutting-edge AI research and its impact on global marketplaces is illustrated by an analysis of the 200 most well-known AI start-ups. These projects demonstrate the sharp rise in investment in AI solutions over the past six years. Healthcare, business intelligence, cybersecurity, core AI infrastructure, sales and marketing, and core AI infrastructure are some of the key areas where opportunities and threats are most prevalent. Businesses are experiencing tangible advantages like higher productivity, faster decision-making, reduced expenses, and improved customer satisfaction through the use of data analytics, cognitive technologies, and AI-powered automation. The study also highlights important issues. The current regional concentration of AI development has given rise to a phenomenon known as the "AI divide," which, like the digital divide before it, poses a threat to highlight the socioeconomic and cultural divide that already exists. The most widely used AI systems are software-based, which raises concerns about reliability and trust. Despite their remarkable potential, deep learning models aren't always reproducible, transparent, or interpretable, which could lead to unexpected outcomes and systemic flaws. It's difficult enough to implement AI systems responsibly and securely, let alone deal with algorithmic bias, ethical issues, and the global shortage of qualified AI specialists.

Conclusion

This study aims to shed light on how Artificial Intelligence (AI) will transform business operations, innovation cycles, and future business model concepts. It clarifies how AI-powered technologies are revolutionizing industries by boosting productivity, streamlining procedures, and improving customer interaction. These technologies are changing traditional business strategies and creating new revenue streams. The study's conclusions show that artificial intelligence plays a key role in the emerging digital economy. The examination of international trends, investment trends, and sector-specific developments demonstrates this. However, the problems of algorithmic bias, unequal access, and lack of transparency must be addressed if its benefits are to be fully realized. This can be achieved through the application of ethical frameworks, inclusive policies, and continual education.

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