

# Research on the Impact of Artificial Intelligence on Corporate Sustainable Development: A Case Study of Alibaba

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**Abstract:** China is currently transitioning from rapid economic growth to high-quality growth, with its influence in the international community continuously increasing. The new era and new environment impose higher standards and requirements for the steady development of enterprises. If companies cannot achieve relative sustainable development, it will result in a significant waste of resources and fail to fundamentally improve production efficiency. In recent years, the rapid development of the internet has accumulated vast amounts of data. Structured data, like numbers, are relatively easy to process and extract information from, but unstructured data such as voice, video, and images are difficult to handle satisfactorily using traditional methods. Artificial Intelligence (AI), as an emerging technology, is rapidly transforming business operations and management methods. This paper adopts a case study approach, using Alibaba as the research case, to explore the role and impact of AI on corporate sustainable development. The study finds that AI can significantly promote sustainable development by optimizing resource utilization, enhancing production efficiency, fostering innovation, and improving decision-making processes. However, the application of AI also brings challenges such as data privacy, security risks, and job displacement. This paper analyzes these impacts and proposes corresponding countermeasures and recommendations to provide a reference for companies in implementing AI strategies.

**Keywords:** Artificial Intelligence, Corporate Sustainability, Alibaba.

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## 1. Introduction

With the deepening globalization process and rapid technological development, the environmental and social pressures faced by enterprises are increasing. Sustainable development has become an essential strategic choice for enterprises to achieve long-term growth and enhance competitiveness [1]. In this context, companies need to succeed not only economically but also contribute to environmental protection and social responsibility. Global issues such as environmental pollution, resource shortages, and climate change are becoming increasingly severe, forcing companies to seek new development paths. In this backdrop, the rapid development of AI technology provides new opportunities for companies to achieve sustainable development goals [2]. AI, as a disruptive technology, has extensive application prospects and can significantly improve companies' production efficiency, resource utilization, and innovation capabilities [3-4]. Particularly driven by the Fourth Industrial Revolution, AI has become a crucial engine for promoting digital transformation and innovative development in enterprises, providing technical support for maintaining a leading position in a competitive market. AI refers to technologies that simulate human intelligence through computers, including machine learning, deep learning, natural language processing, and computer vision. In recent years, the advancement of deep learning technology has significantly improved AI's performance in areas such as image recognition, natural language processing, and speech recognition, enabling AI systems to handle complex data and make accurate predictions and decisions. The development of AI relies on the enhancement of big data resources and computing power [5]. The proliferation of the internet and the

Internet of Things (IoT) has brought massive amounts of data, the application of GPUs and Application-Specific Integrated Circuits (ASICs) has made large-scale parallel computing possible, and cloud computing platforms provide powerful computing support. Despite the considerable achievements of existing research in terms of the role and impact of AI on corporate sustainable development, there are still some research gaps and shortcomings [6]. Firstly, existing studies often focus on AI applications in improving production efficiency and technological innovation, while research on AI in resource optimization is relatively limited. Secondly, research on the negative impacts of AI applications, such as data privacy and security issues, job displacement, is more scattered and lacks systematic analysis [7]. Lastly, existing studies are mostly theoretical discussions, lacking concrete case studies and empirical research, making it difficult to provide practical guidance for the actual application of AI in enterprises [8-9]. Based on these research gaps, this paper analyzes in detail the application and impact of AI on corporate sustainable development through the specific case of Alibaba [10]. As a global leading technology company, Alibaba has extensive applications and profound accumulations in AI. This paper will study the following aspects: systematic analysis of Alibaba's AI application scenarios, detailed analysis of Alibaba's specific applications in resource optimization, production efficiency improvement, technological innovation, and decision support, exploring its role in promoting corporate sustainable development [11]; in-depth discussion of the challenges and response strategies in Alibaba's AI applications, analysis of data privacy and security risks, job displacement issues faced by Alibaba in AI applications, and proposing corresponding countermeasures and suggestions to help companies better cope with these

challenges [12]; case analysis and empirical research, verification of the actual effect of AI technology in promoting corporate sustainable development through specific case studies and empirical research, providing a reference for companies to apply AI technology [13]. This research has significant theoretical and practical value [8]. Theoretically, by systematically analyzing the role and impact of AI on corporate sustainable development, it enriches and perfects the theories of corporate management and sustainable development, filling existing research gaps. Practically, through the case analysis of Alibaba and specific countermeasures suggestions, it helps companies better apply AI technology to achieve sustainable development goals. Simultaneously, through specific case analysis and empirical research, it provides reference for enterprises in practical operations, enhancing their competitiveness and sustainable development capability in the global market [14].

## 2. Literature Review

In recent years, the role of AI in corporate sustainable development has received extensive attention [9]. Research shows that AI can improve the efficiency of resource utilization and reduce waste through data analysis and optimization models, promoting sustainable development. The application of AI technology can significantly enhance production efficiency and product quality, helping enterprises achieve sustainable economic benefits [15]. In terms of resource utilization, AI can reduce resource consumption and environmental pollution by optimizing production processes and energy management systems [16]. For example, intelligent manufacturing systems can adjust production parameters based on real-time data, reducing energy consumption and material waste. AI applications in smart grids can optimize the supply and demand matching of electricity, improving energy utilization efficiency and reducing carbon emissions [17]. The application of AI in the production process mainly focuses on automation and intelligence. Automated production lines and intelligent robots can greatly improve production efficiency, reduce labor costs, and lower human error rates in production processes [15]. Through big data analysis and predictive maintenance, companies can significantly reduce equipment failures and downtime, thereby improving overall production efficiency. Additionally, AI technology can optimize supply chain management, enhancing logistics efficiency and reducing inventory costs [18]. For instance, intelligent inventory management systems can automatically adjust inventory levels based on sales data and market trends, ensuring the efficient operation of supply chains. AI applications in quality control can monitor key parameters in the production process in real-time, quickly identify and correct production deviations, improving product quality and production efficiency. AI not only enhances the efficiency of existing production processes but also promotes technological innovation in enterprises. The application of deep learning and natural language processing technologies can help companies quickly obtain market information and consumer feedback, identify market demands, and develop new products and services that better meet market needs [19]. AI technology provides new tools and methods for corporate innovation, facilitating continuous upgrading and optimization of products and services [20]. In terms of technological innovation, AI provides powerful computing capabilities and data analysis tools, enabling companies to

complete technology research and development and product iteration in a shorter time [7]. For example, pharmaceutical companies can use AI for drug research and development, simulating and predicting the interactions between drug molecules and biological systems, shortening research cycles and reducing research costs. AI applications in fintech promote the innovation of financial products and services, enhancing the efficiency and transparency of financial markets. Despite the many advantages of AI in corporate sustainable development, its application also comes with challenges [13]. The widespread application of AI technology may lead to the disappearance of many traditional jobs, resulting in changes in employment structures and social issues. The application of AI also raises higher requirements for data privacy and security, necessitating companies to establish robust data protection mechanisms to prevent data breaches and misuse. Overall, existing literature indicates that AI has significant advantages in optimizing resource utilization, improving production efficiency, and promoting technological innovation, but it also faces challenges such as data privacy, security risks, and job displacement. This paper will further explore the specific impact of AI on corporate sustainable development based on existing research and propose corresponding countermeasures and recommendations. Specifically, this paper will expand existing research in the following areas: detailed analysis of AI's specific applications in resource optimization, production efficiency improvement, technological innovation, and decision support, exploring its role in promoting corporate sustainable development; in-depth discussion of data privacy and security risks, job displacement issues faced in AI technology applications, and proposing corresponding countermeasures and suggestions [21]; verification of the actual effect of AI technology in promoting corporate sustainable development through specific case studies and empirical research, providing a reference for companies to apply AI technology [22].

## 3. Analysis of the Artificial Intelligence Industry

### 3.1. Development History of Artificial Intelligence

Artificial intelligence is not a new concept. From the development process of artificial intelligence, it has gone through three waves. The first Dartmouth Conference was held in 1956, marking the birth of artificial intelligence science. With the invention of world-class algorithms, including the prototype of reinforcement learning - the Bellman formula, artificial intelligence has ushered in its first wave of development. However, at that time, the computing power was unable to meet the computing tasks, and the mathematical model also had certain flaws, causing artificial intelligence to fall into a slump; By 1980, Carnegie Mellon University had developed an expert system that could help businesses make decisions and reduce their costs by \$40 million annually [23]. This is a great case of technology implementation, which has prompted Japan and the United States to invest heavily in the development of artificial intelligence. Artificial intelligence has ushered in a second wave of development, during which many weight level inventions have emerged, such as multi-layer neural networks and back propagation algorithms [24]. In 1987, desktop computers began to develop and entered households, with

costs far lower than expert systems, leading to a second downturn in the development of artificial intelligence [25]; Since 1993, artificial intelligence has ushered in the third wave of development. In this stage, the rapid development of the Internet has made chips and computing power leap. Especially with the development of deep learning algorithms, artificial intelligence has ushered in a wave of development. Deep learning can enable machine learning to be implemented in many applications and expand the scope of artificial intelligence applications [26].

### 3.2. Driving Factors for The Development of Artificial Intelligence

The rapid development of artificial intelligence (AI) is profoundly changing various aspects of society, from enterprise management to healthcare, and then to transportation and other fields. The progress of AI is not only due to technological innovation itself, but also influenced by multiple driving factors. The main driving factors for the development of artificial intelligence are mainly divided into the following six aspects. Firstly, technological progress [27]. Technological progress is one of the core driving forces for the development of artificial intelligence. Since the 1950s, AI technology has undergone multiple leaps from rule-based expert systems to machine learning based on statistical models, and now to neural network technology represented by deep learning. Especially in recent years, the development of deep learning technology has significantly improved the performance of artificial intelligence in fields such as image recognition, natural language processing, and speech recognition. The continuous optimization of models such as Convolutional Neural Networks (CNN) and Recurrent Neural Networks (RNN) enables AI systems to process more complex data and make more accurate predictions and decisions. In addition, the improvement of algorithms has greatly improved the efficiency and scalability of AI. For example, the optimization of gradient descent algorithm and backpropagation algorithm has significantly improved the training speed and effectiveness of neural networks. Secondly, data resources. Data is hailed as the "fuel" of artificial intelligence. The performance of AI systems largely depends on a large amount of high-quality data. With the popularity of the Internet, the Internet of Things and mobile Internet, the global data volume has shown explosive growth. According to statistics, the amount of data generated globally each year is increasing exponentially, providing rich materials for the training of AI models. Social media, e-commerce platforms, smart devices, and other data sources provide extensive data support for the application and optimization of AI technology. In addition, the rise of open-source datasets and data sharing platforms has also promoted the rapid iteration of AI technology. For example, the public release of large datasets such as ImageNet provides an important foundation for research in the field of computer vision and promotes the development of related technologies [17]. Thirdly, computing power. The improvement of computing power is an important driving factor for the development of AI technology. The training and inference process of AI models usually requires a large amount of computing resources. In recent years, the development of computing hardware has significantly improved the computing power of AI, especially the application of graphics processing units (GPUs) and specialized integrated circuits (ASICs), making large-scale parallel computing possible. The high parallel processing

capability of GPUs greatly shortens the training time of neural networks, while ASICs provide more efficient computational solutions for specific AI tasks. In addition, the development of cloud computing platforms has provided strong computing support for the widespread application of AI. Enterprises and research institutions can obtain on-demand allocation of computing resources through cloud computing platforms, reducing the threshold and cost of AI applications. Fourth, policy support. Policy support is an important external factor in promoting the development of AI technology. Governments of various countries have introduced policies and plans to encourage and support the research and application of AI technology [28]. Taking China as an example, the State Council issued the "New Generation Artificial Intelligence Development Plan" in 2017, which clarified the strategic goals and implementation paths of AI development and proposed to become a global AI innovation center by 2030 [29]. Countries and regions such as the United States, the European Union, and Japan have also successively launched AI development strategies and set up special funds to support the research and development and industrialization of AI technology. These policy measures not only provide financial and resource support for the development of AI technology, but also create a good environment for the cultivation of AI talents and the transformation of scientific and technological achievements. Fifth, industrial demand [30]. Industrial demand is the direct driving force for the application and development of AI technology. The demand of various industries to improve production efficiency, reduce operating costs, and improve service quality has promoted the widespread application of AI technology. Manufacturing, finance, medical care, transportation, education and other fields have introduced AI technology to achieve intelligent transformation. For example, in the manufacturing industry, AI technology is used to optimize production processes, predict equipment failures, and improve product quality [1]; in the financial field, AI is used in risk assessment, fraud detection, and smart investment advisors; in the medical field, AI technology is used in disease diagnosis, drug development, and personalized treatment [7]. The huge demand for AI technology in the industry not only provides a broad market for the application of AI technology, but also provides a strong driving force for the further development of technology. Sixth, talent training the development of AI technology is inseparable from a high-quality talent team. With the rapid development of AI technology, the training of AI professionals has become a focus of attention in various countries. Colleges and universities and research institutions have set up AI-related majors and courses to cultivate AI talents with a deep theoretical foundation and practical ability [3]. At the same time, various training institutions and online education platforms have also launched a large number of AI courses to help employees improve their skills and adapt to the needs of technological development [6]. In addition, enterprises actively participate in the training and selection of AI talents through industry-university-research cooperation, the establishment of scientific research funds, and the holding of competitions, so as to reserve and attract outstanding talents for the development of AI technology. In summary, the development of artificial intelligence technology is the result of the joint action of multiple factors. Technological progress, data resources, computing power, policy support, industry demand and talent training have mutually promoted the rapid development of AI technology. In the future, as these driving

factors are further strengthened, artificial intelligence will continue to demonstrate its huge potential and value in more fields and promote the overall progress and development of society.

## **4. Alibaba Case Study**

### **4.1. Company Introduction**

Founded in 1999, Alibaba Group is a leading global technology company headquartered in Hangzhou, China. Alibaba's business covers a wide range of areas including e-commerce, cloud computing, digital media and entertainment, and innovative businesses. As China's largest e-commerce company, Alibaba's main platforms include Taobao, Tmall, and Alibaba Cloud. Alibaba's mission is to make it easy to do business in the world by providing a range of technologies and services to help small and medium-sized enterprises compete and succeed in the global market.

### **4.2. Foundations of the Case Company's Strategic Transformation**

Alibaba's strategic transformation began in 2010 when the company realized that it had to transform from a pure e-commerce company to a technology-driven company in response to increasingly fierce market competition and rapidly changing consumer needs. Alibaba began to invest heavily in cloud computing, big data, and artificial intelligence technologies, aiming to enhance the company's core competitiveness and promote sustainable business development through technological innovation. Based on the strategic transformation, Alibaba has established a strong technology R&D team and established multiple R&D centers around the world. These investments have enabled Alibaba to make significant progress in the fields of artificial intelligence and big data, providing a solid foundation for the continued growth and innovation of its business.

### **4.3. Application of Artificial Intelligence in Case Companies**

Alibaba has widely applied artificial intelligence technology in multiple business areas to improve operational efficiency, optimize user experience and promote technological innovation. The following are several major cases of Alibaba's application of artificial intelligence: The first is intelligent customer service. Alibaba has achieved automated customer service by developing an intelligent customer service robot "Ali Xiaomi". Ali Xiaomi can handle a large number of customer inquiries and complaints, greatly improving customer service efficiency and reducing the workload of manual customer service. The second is the recommendation system. Alibaba uses artificial intelligence technology to analyze users' shopping behaviors and preferences and develops a personalized recommendation system [12]. The system can recommend the most suitable goods and services to users based on users' historical data and real-time behaviors, improving users' shopping experience and conversion rate. The third is intelligent logistics. In the field of logistics, Alibaba optimizes delivery routes and warehouse management by applying artificial intelligence technology. The intelligent scheduling system can analyze and predict order volumes in real time, optimize delivery routes, reduce delivery time and costs, and improve logistics efficiency. The fourth is image recognition and natural language processing: Alibaba has also made significant

progress in image recognition and natural language processing. Through these technologies, Alibaba can automatically process a large amount of product images and text information, and improve the efficiency of product review and listing.

### **4.4. Analysis of the impact of artificial intelligence on Alibaba's sustainable development**

Alibaba has optimized resource utilization efficiency through artificial intelligence technology. In the field of logistics, it optimizes delivery routes through intelligent scheduling systems, reduces energy consumption and carbon emissions during transportation, and optimizes warehouse layout and inventory management through intelligent warehouse management systems, reducing space waste. Artificial intelligence has significantly improved operational efficiency. For example, the intelligent customer service robot Ali Xiaomi has greatly improved customer service efficiency, and the recommendation system has improved user shopping experience and conversion rate [14]. Alibaba's investment and research and development in artificial intelligence technology has promoted the company's technological innovation in many fields. For example, it has automated the processing of product information through image recognition and natural language processing technology, improving the efficiency of product review and listing, and at the same time, it has improved its technological competitiveness through intelligent risk control and intelligent investment advisors in the field of financial technology. Artificial intelligence technology also provides the company with accurate market insights and decision-making support through big data analysis and intelligent algorithms, improving the scientificity and accuracy of decision-making. However, data privacy and security issues remain important challenges. Alibaba ensures data security through encryption technology and access control measures, and actively participates in the formulation of laws and regulations. At the same time, the application of artificial intelligence has an impact on the employment structure [16]. Alibaba helps employees adapt to new technological changes, improve their skills and competitiveness through training and re-education programs, and encourages them to participate in technological research and innovation to promote the comprehensive development of talents [16]. Overall, the application of artificial intelligence technology in Alibaba has a significant role in promoting its sustainable development, but it also needs to continue to pay attention to and solve related challenges [15].

## **5. Conclusions and Implications**

### **5.1. Conclusions**

First, through a case analysis of Alibaba, this article finds that artificial intelligence technology has shown significant advantages in optimizing resource utilization. Especially in the field of logistics and warehousing management, through intelligent dispatching systems and intelligent warehousing management systems, Alibaba has achieved optimization of distribution routes and efficient use of warehousing space, improving resource utilization efficiency.

Secondly, Alibaba has extensively applied artificial intelligence technology in areas such as intelligent customer service, recommendation systems, image recognition, and

natural language processing, which has greatly improved operational efficiency. At the same time, the application of image recognition and natural language processing technology in product review and listing has accelerated the iteration and optimization of products and services, and significantly improved technological innovation capabilities.

Finally, the analysis found that Alibaba can quickly adjust market strategies and operational plans through big data analysis and intelligent algorithms to improve the scientificity and accuracy of the company's decision-making. This not only helps Alibaba maintain its leading position in a highly competitive market, but also provides strong support for the company's sustainable development.

## 5.2. Implications

First, companies should recognize the importance of strategic transformation and technology investment, especially in the field of artificial intelligence. By establishing a strong technology R&D team and global R&D center, enterprises can gain advantages in technological competition and achieve sustainable development.

Secondly, strengthen data privacy and security management. In the process of applying artificial intelligence technology, enterprises must attach great importance to data privacy and security issues. Use advanced encryption technology and access control measures to ensure data security and privacy. In addition, enterprises should actively participate in the formulation and implementation of relevant laws and regulations to promote the standardized development of the industry.

Finally, focus on employee training and career transformation. The application of artificial intelligence technology may have an impact on the employment structure, and companies should help employees improve their skills and adapt to changes brought about by new technologies through training and re-education programs. At the same time, employees are encouraged to participate in technology research and development and innovation, promote the comprehensive development of talents, and ensure that enterprises gain sustained competitiveness in technological changes.

## 5.3. Limitations

Digitalization and intelligence are a new development trend, and the development foundations and application fields of various industries may also be different. Therefore, it is necessary to build a framework for digital and intelligent transformation based on basic logic; at the same time, the era of digital economy and Compared with the past, great changes have taken place. Many theories, such as strategic management theory, are not applicable to the current stage; the theory needs to be innovated; this article also has many shortcomings. In this study, artificial intelligence is only one aspect. With this technology, it is difficult to say that the improvement of the overall performance of the enterprise is due to artificial intelligence. Therefore, it is difficult and basically impossible to separate the part directly brought about by artificial intelligence from the performance. Therefore, the analysis in this article may not be rigorous.

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