

**ИССЛЕДОВАНИЕ РОЛИ И СТРАТЕГИИ НАУКИ О БОЛЬШИХ  
ДАННЫХ В ИНТЕЛЛЕКТУАЛЬНОЙ ТРАНСФОРМАЦИИ  
УПРАВЛЕНИЯ ПРЕДПРИЯТИЕМ**

**Аннотация:** С быстрым развитием информационных технологий интеллектуальная трансформация управления предприятиями становится ключевым фактором повышения конкурентоспособности. Наука о больших данных, являясь основным движущим фактором, предоставляет предприятиям поддержку данных для оптимизации процессов принятия решений, бизнес-процессов, инноваций в продуктах и трансформации бизнес-моделей. Цель данного исследования – изучить роль и стратегии науки о больших данных в интеллектуальной трансформации, предоставляя теоретическое руководство для практической деятельности предприятий. Посредством сочетания теоретического анализа и практических приложений исследование рассматривает соответствующие теории науки о больших данных и анализирует ее механизмы в интеллектуальной трансформации, включая принятие решений на основе данных, оптимизацию процессов, инновации в продуктах и услугах, а также трансформацию бизнес-модели. На основе проведенного анализа предложены четыре ключевые стратегии: стратегическое планирование данных, разработка платформы данных, подготовка специалистов по работе с данными и управление безопасностью данных, что позволяет предложить предприятиям практические рекомендации. Исследование показывает, что наука о больших данных не только повышает эффективность управления предприятиями, но и способствует инновациям в управленческих моделях, играя важную роль в интеллектуальной трансформации. Новизна исследования заключается в систематическом анализе

механизмов науки о больших данных и построении стратегической модели трансформации, что позволяет предоставить предприятиям практическое руководство. В будущем исследования могут быть расширены за счет изучения интеграции нескольких технологий и адаптации к отраслевым особенностям, что будет способствовать дальнейшему углублению интеллектуальной трансформации предприятий.

**Ключевые слова:** наука о больших данных, управление предприятием, интеллектуальная трансформация, принятие решений на основе данных, оптимизация бизнес-процессов, инновация бизнес-моделей.

**Yang Na**

DBA

Kazakh State University

Almaty, Kazakhstan

### **Research on the Role and Strategy of Big Data Science in the Intelligent Transformation of Enterprise Management**

**Abstract:** With the rapid development of information technology, the intelligent transformation of enterprise management has become a key factor in enhancing competitiveness. As a core driving force, big data science provides enterprises with data support to optimize decision-making, business processes, product innovation, and business model transformation. This study aims to explore the role and strategies of big data science in intelligent transformation, providing theoretical guidance for enterprise practices. By combining theoretical analysis with practical applications, this research reviews relevant theories of big data science and analyzes its mechanisms in intelligent transformation, including data-driven decision-making, process optimization, product and service innovation, and business model transformation. Based on this analysis, four key strategies are proposed: data strategic planning, data platform development, data talent cultivation, and data security management, offering feasible recommendations for enterprises. The study demonstrates that big data science not only improves enterprise management efficiency but also promotes management model innovation, playing a crucial role in

intelligent transformation. The novelty of this research lies in systematically analyzing the mechanisms of big data science and constructing a transformation strategy framework to provide practical guidance for enterprises. Future research can further explore the integration of multiple technologies and industry adaptability to drive the deep development of enterprise intelligent transformation.

**Keywords:** Big Data Science, Enterprise Management, Intelligent Transformation, Data-Driven Decision-Making, Business Process Optimization, Business Model Innovation

### **Introduction**

With the rapid development of information technology and intensified global competition, the intelligent transformation of enterprise management has become an irreversible trend. Intelligent transformation is not only a crucial means for enterprises to improve operational efficiency and reduce costs but also a key factor in maintaining competitiveness in a complex and ever-changing market environment. [1] In this context, big data science, as the core driving force of next-generation information technology, has gradually become an essential support for enterprises to achieve intelligent transformation. By collecting, storing, analyzing, and applying massive amounts of data, big data science helps enterprises extract value from data, optimize decision-making processes, and drive business innovation, thereby enabling the transition from traditional to intelligent management models.

This study aims to explore the role and strategies of big data science in the intelligent transformation of enterprise management to provide theoretical guidance and practical references for enterprises. Specifically, the research objectives include: (1) analyzing the core mechanisms of big data science in the intelligent transformation of enterprise management; (2) proposing a strategic framework for intelligent transformation based on big data science; and (3) offering actionable recommendations for enterprises to effectively utilize big data science in intelligent transformation. This research not only enriches the theoretical framework of intelligent enterprise management transformation but also provides a scientific basis

for enterprises to apply big data science in practice, demonstrating significant theoretical and practical value.

To achieve these research objectives, this study adopts a combination of theoretical analysis and logical reasoning. By reviewing relevant theories on intelligent enterprise management transformation and big data science, a theoretical framework is constructed. This is followed by an analysis of the specific mechanisms through which big data science facilitates intelligent transformation in enterprise management. Finally, based on theoretical analysis and practical summaries, strategic recommendations for big data-driven intelligent transformation are proposed. The research approach transitions from theoretical exploration to practical application, striving to establish a close connection between theory and practice to provide feasible solutions for enterprise intelligent transformation. Through this study, we aim to offer new perspectives and tools for enterprise managers, helping them take more solid steps on the path to intelligent transformation.

### **Mechanisms of Big Data Science in the Intelligent Transformation of Enterprise Management**

Big data science plays a central role in the intelligent transformation of enterprise management. Its mechanisms primarily manifest in four aspects: data-driven decision-making, business process optimization, product and service innovation, and business model transformation. These mechanisms collectively form the technological foundation and practical pathway for intelligent transformation, providing enterprises with strong momentum for efficient operations and continuous innovation.

One of the core functions of big data science in enterprise intelligent transformation is data-driven decision-making. Traditional enterprise decision-making often relies on managerial experience and intuition, whereas big data science enables enterprises to collect, analyze, and extract insights from vast amounts of data, thereby providing more scientific and precise decision support. For example, in supply chain management, enterprises can analyze historical sales data, market trends, and supplier data to forecast future demand and optimize inventory

management, reducing operational costs while improving customer satisfaction. In marketing, enterprises can leverage big data to analyze user behavior and precisely target customer segments, formulating personalized marketing strategies to enhance marketing effectiveness.[2] Data-driven decision-making not only enhances the scientific accuracy of decision-making but also significantly improves market responsiveness and competitiveness.

Big data science also plays a crucial role in optimizing business processes. Enterprises often face issues such as process redundancy and inefficiency, which big data can address through real-time monitoring and analysis of business process data. For instance, in the manufacturing sector, real-time data collection and analysis of production lines can identify bottlenecks and optimize production planning, thereby improving efficiency. In the financial sector, banks can use big data analytics to monitor customer transactions in real time, identifying anomalous transactions and enhancing risk control. By leveraging big data-driven business process optimization, enterprises can significantly improve operational efficiency, reduce costs, and deliver higher-quality services to customers.

In a highly competitive market, enterprises need continuous innovation to meet customer demands. Big data science facilitates in-depth understanding of customer needs, driving iterative upgrades of products and services.[3] For example, in the retail industry, enterprises can analyze consumer purchasing behavior data to identify potential market demands and develop new or improved products accordingly. In the internet sector, companies can leverage big data to analyze user preferences and behaviors, offering personalized recommendations to enhance user experience. Big data-driven product and service innovation enables enterprises to gain a competitive edge, strengthen customer loyalty, and create long-term value.

Big data science also fosters business model transformation. Traditional business models often struggle to adapt to rapidly changing market environments, whereas big data provides new business opportunities and competitive advantages. In the sharing economy, for example, companies use big data to achieve precise resource matching and efficient utilization, constructing entirely new business models. In intelligent

manufacturing, enterprises leverage big data analytics to enable intelligent production and personalized customization, facilitating the transition from traditional manufacturing to service-oriented manufacturing. Big data-driven business model innovation not only creates new revenue streams but also reshapes industry competition, establishing sustainable competitive advantages for enterprises.

In summary, big data science comprehensively promotes the intelligent transformation of enterprise management through the mechanisms of data-driven decision-making, business process optimization, product and service innovation and business model change. These mechanisms are interrelated and mutually reinforcing, and together constitute the core driving force of enterprise intelligent transformation. In the future, with the continuous development of big data technology and the expansion of application scenarios, its role in the intelligent transformation of enterprise management will be further deepened, creating greater value for enterprises.

### **Strategies for Big Data-Driven Intelligent Transformation in Enterprise Management**

Big data science plays a pivotal role in driving the intelligent transformation of enterprise management. To maximize the value of data and achieve intelligent transformation objectives, enterprises need to formulate scientifically sound strategies. These strategies mainly include data strategic planning, data platform development, data talent cultivation, and data security and privacy protection. These interrelated strategies collectively form the implementation framework for enterprise intelligent transformation.

Data strategic planning serves as the foundation for intelligent transformation. Enterprises must formulate data strategies aligned with their overall business strategies, clearly defining the central role of data in business development and embedding data-driven concepts into corporate culture and operational processes. [4] The core of data strategic planning lies in establishing a comprehensive data governance system that ensures data accuracy, consistency, and usability. For example, enterprises can enhance overall data value by standardizing data processes,

defining data ownership and responsibilities, and implementing data quality management mechanisms. Only through rigorous data strategic planning can enterprises lay a solid foundation for intelligent transformation and ensure the effective application of data in decision-making, operations, and innovation.

Data platform development is a critical step in realizing the value of data. Enterprises must build unified data platforms to eliminate data silos, facilitating data integration and sharing. A unified data platform not only enhances data accessibility and usability but also enables real-time data analysis and decision-making support. In terms of technology selection, enterprises should choose appropriate big data technologies and tools based on their business needs, such as distributed storage systems (e.g., Hadoop), real-time data processing frameworks (e.g., Spark), and data visualization tools (e.g., Tableau). By establishing a robust data platform, enterprises can achieve efficient data management and deep data mining, thus providing technical support for intelligent transformation.

Data talent cultivation is the core driving force behind enterprise intelligent transformation. The application of big data science requires professionals with data literacy and analytical capabilities. Enterprises should cultivate and retain data talent through internal training, external recruitment, and industry-academia collaborations. For instance, businesses can offer data analytics courses to enhance employees' data skills, while simultaneously establishing talent incentive mechanisms through performance evaluations, career development pathways, and reward systems to motivate data professionals. Data talent not only serves as users of technical tools but also as discoverers and innovators of data value. Their capabilities directly determine the depth and breadth of enterprise intelligent transformation.[5] Data security and privacy protection are indispensable aspects of enterprise intelligent transformation. As data value increases, so do data security and privacy risks. Enterprises must establish comprehensive data security management systems that define data usage permissions and processes to prevent data breaches and misuse. Additionally, businesses should strengthen data security measures by adopting encryption technologies, access controls, and security audits to ensure data security. Moreover,

enterprises must comply with relevant laws and regulations, respecting user privacy and adhering to legal and regulatory principles during data collection and usage. Only by ensuring data security and privacy can enterprises gain user trust and achieve sustainable data utilization.

In summary, the strategies for big data-driven intelligent transformation in enterprise management encompass data strategic planning, data platform development, data talent cultivation, and data security and privacy protection. These strategies complement each other and collectively form the implementation pathway for intelligent transformation. Through scientific strategic planning and effective resource allocation, enterprises can fully leverage the value of big data science, driving management innovation and enhancing business capabilities, ultimately achieving sustainable development in intelligent transformation.

### **Conclusion**

This study explores the role and strategies of big data science in the intelligent transformation of enterprise management, systematically analyzing the core mechanisms of big data science, including data-driven decision-making, business process optimization, product and service innovation, and business model transformation. Furthermore, it proposes key strategies such as data strategic planning, data platform development, data talent cultivation, and data security and privacy protection. The findings indicate that big data science is not only a technological enabler of enterprise intelligent transformation but also a core driving force for management innovation and business upgrading. By leveraging data-driven decision-making, enterprises can enhance the scientific accuracy and precision of their decisions; by optimizing business processes, enterprises can significantly improve operational efficiency; by fostering product and service innovation, enterprises can better meet customer demands; and by transforming business models, enterprises can establish new competitive advantages. These research findings provide both theoretical foundations and practical guidance for enterprise intelligent transformation, demonstrating significant theoretical and practical value.

However, this study has certain limitations. First, it is primarily based on theoretical analysis and logical reasoning, lacking large-scale empirical data support. Future research could further validate the universality of the study's conclusions through case studies or empirical analysis. Second, this study focuses mainly on the application of big data science in enterprise management without fully considering the synergy between big data science and emerging technologies such as artificial intelligence and the Internet of Things. Future research could explore the impact of multi-technology integration on enterprise intelligent transformation. Additionally, this study does not delve into the differentiated needs of enterprises of varying industries and scales in their intelligent transformation processes. Future research could incorporate industry characteristics and enterprise scale to propose more targeted strategic recommendations.

Looking ahead, the application of big data science in enterprise intelligent transformation will become more extensive and in-depth. With continuous advancements in data collection, storage, and analysis technologies, enterprises will be able to extract data value more efficiently, driving sustained innovation in management models. Meanwhile, as data security and privacy protection technologies mature, enterprises will be able to further unlock the potential of data while ensuring security compliance.

Future research could focus on the following areas:

1. Exploring the integration of big data science with emerging technologies such as artificial intelligence and blockchain.
2. Investigating data-driven corporate culture transformation and organizational structure optimization.
3. Analyzing the pathways and risk control strategies for enterprise intelligent transformation in a globalized context. Through continuous research advancements, hope to provide more comprehensive and in-depth theoretical guidance for enterprise intelligent transformation, assisting enterprises in achieving high-quality development in the digital era.

## References

1. Eboigbe, E. O., Farayola, O. A., Olatoye, F. O., et al. Business intelligence transformation through AI and data analytics // Engineering Science Technology Journal. — 2023. — Vol. 4, No. 5. — P. 285-307.
2. Udeh, C. A., Orieno, O. H., Daraojimba, O. D., et al. Big data analytics: a review of its transformative role in modern business intelligence // Computer Science IT Research Journal. — 2024. — Vol. 5, No. 1. — P. 219-236.
3. Antwi, B. O., Avickson, E. K. Integrating SAP, AI, and Data Analytics for Advanced Enterprise Management // International Journal of Research Publication and Reviews. — 2024. — Vol. 5, No. 10. — P. 621-636.
4. Paramesha, M., Rane, N. L., Rane, J. Big data analytics, artificial intelligence, machine learning, internet of things, and blockchain for enhanced business intelligence // Partners Universal Multidisciplinary Research Journal. — 2024. — Vol. 1, No. 2. — P. 110-133.
5. Sahoo, S. Big data analytics in manufacturing: a bibliometric analysis of research in the field of business management // International Journal of Production Research. — 2022. — Vol. 60, No. 22. — P. 6793-6821.