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学位論文（　　2024　年度）

論文題名

Exploring the innovation system of AI industry in China

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論 文 要 旨・Abstract

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Exploring the innovation system of AI industry in China			

China's artificial intelligence (AI) industries have undergone a significant transformation, shifting from a government-driven innovation model to a market-driven approach led by enterprises. This paper examines the development trajectories of key Chinese AI companies to illustrate the role of government support in the foundational layer and the growing dominance of enterprises in technological advancement and application development. While state policies, funding, and resource integration have been instrumental in fostering early-stage innovation and ensuring technological self-sufficiency, the rapid evolution of AI technologies and market competition have positioned enterprises as the primary drivers of innovation.

Overall, the findings challenge the conventional perception that China's technological advancements are solely government-led. Instead, they reveal a hybrid model where the state ensures foundational support while enterprises spearhead technological breakthroughs and commercialization. This transition underscores China's evolving AI ecosystems, positioning them for sustainable growth and heightened global competitiveness.

Content

1. **Introduction**

The emergence of ChatGPT has sparked a new wave of enthusiasm for artificial intelligence (AI), garnering significant attention from both public discourse and investors.

According to data from IT Juzi, as of December 17, 2024, a total of 644 AI-related investment and financing events had taken place, surpassing the 633 recorded in the entire year of 2023. The total investment amount reached 82.129 billion RMB, significantly exceeding the 63.676 billion RMB of 2023.

At the same time, the Chinese government has placed great emphasis on the comprehensive and secure development of the AI industry chain. The Central Economic Work Conference explicitly stated: "Implement the 'AI+' initiative to foster future industries." In 2024, the National Cybersecurity Standardization Technical Committee publicly released the *Artificial Intelligence Security Governance Framework (Version 1.0)*, while the Ministry of Industry and Information Technology, along with three other departments, issued the *Guidelines for the National Artificial Intelligence Industry Comprehensive Standardization System (2024 Edition)*. These policies underscore the government's firm commitment to supporting the growth of the AI industry.

Meanwhile, the *2024 Report on the Development of Generative AI Applications*, published by the China Internet Network Information Center (CNNIC), revealed that by the end of 2023, China's core AI industry had grown to nearly 600 billion RMB, with over 4,500 AI enterprises. According to estimates from China International Capital Corporation (CICC), the market demand for China's AI industry is projected to reach 5.6 trillion RMB by 2030.

In January 2025, the Chinese startup DeepSeek released its large-scale AI model, DeepSeek R1, which quickly rose to the top of the U.S. App Store rankings within just one week, surpassing OpenAI's ChatGPT. Its performance rivals that of leading closed-source models such as o1, yet its cost is only 1/27 of o1. The launch of DeepSeek triggered panic within the U.S. tech industry, as its combination of low cost and high performance posed a direct challenge to NVIDIA's market dominance, leading to a short-term stock price drop of over 17% and a market value loss of more than $30 billion.

These developments indicate that China's AI industry has established a unique competitive edge in technological research and development, commercialization, and policy support, making it a key force driving global AI advancement.

However, behind this rapid rise lies an important question: How has China managed to achieve such remarkable industrial development and innovation? As one of the most promising AI markets in the world, China has demonstrated a distinctive approach in areas such as technological R&D, policy guidance, capital investment, and market-driven mechanisms. Through an in-depth analysis of these different aspects, this paper will examine how the government and enterprises work collaboratively to drive AI industry development within the framework of the national innovation system. In particular, it will explore how innovation and breakthroughs are achieved across different segments of the AI industry chain—upstream, midstream, and downstream—providing valuable insights and references for global technological progress.

2. Research Background

2.1 The Development of Artificial Intelligence

Since its inception in 1956, artificial intelligence (AI) has undergone a tumultuous journey marked by several cycles of breakthroughs and stagnation**[1]**. The academic community holds diverse perspectives on how best to describe this evolution. However, the overall development of AI can be categorized into six distinct phases:

Initial Development Phase (1956–1960s):

The Dartmouth Conference in 1956 first introduced the concept of "artificial intelligence," marking the beginning of research into machine-based human intelligence and establishing AI as an independent discipline. During this period, researchers achieved several groundbreaking milestones, including Newell and Simon's Logic Theorist, Arthur Samuel's checkers program, and the General Problem Solver (GPS). John McCarthy's development of the LISP programming language provided essential tools for AI research. Despite limitations in computing power and theoretical frameworks, symbolic logic methods and interdisciplinary collaboration led to early breakthroughs in logical reasoning and problem-solving. These achievements not only ignited the first wave of AI enthusiasm but also laid the foundation for future theoretical and practical advancements.

Period of Reevaluation (1960s–Early 1970s):

Early breakthroughs in AI research raised high expectations, leading researchers to pursue more ambitious tasks and set overly optimistic goals. However, repeated failures and unmet expectations—such as the inability to prove fundamental mathematical theorems using AI and the poor performance of machine translation systems—led to widespread skepticism and declining interest in AI research. This period marked AI's first downturn.

Application Development Phase (Early 1970s–1980s):

The emergence of expert systems in the 1970s marked a significant shift from theoretical research to practical applications. These systems, designed to simulate human experts' knowledge and decision-making processes, represented a major breakthrough by applying specialized domain knowledge rather than relying solely on general reasoning strategies. Expert systems achieved notable success in medicine, chemistry, geology, and other fields, ushering in a new wave of AI-driven applications.

Period of Decline (Mid-1980s–Mid-1990s):

As AI applications expanded, limitations of expert systems became increasingly apparent. Issues such as narrow application domains, lack of common-sense reasoning, difficulties in knowledge acquisition, simplistic inference mechanisms, lack of distributed functionality, and poor

compatibility with existing databases hindered further development. These challenges contributed to a second major downturn in AI research.

Steady Development Phase (Mid-1990s–2010):

The rapid advancement of network technology, particularly the internet, accelerated AI innovation and facilitated the transition of AI technologies from experimental research to real-world applications. Landmark events during this period included IBM's Deep Blue defeating world chess champion Garry Kasparov in 1997 and IBM's introduction of the "Smarter Planet" initiative in 2008. These developments highlighted AI's growing practical potential.

Era of Rapid Growth (2011–Present):

The rapid progress in information technologies such as big data, cloud computing, and the Internet of Things (IoT) has fueled exponential advancements in AI. Deep neural networks, in particular, have enabled significant breakthroughs, bridging the long-standing gap between scientific research and practical applications. AI has achieved transformative improvements in image classification, speech recognition, question-answering systems, strategic gameplay, and autonomous driving, transitioning from being "unusable" or "impractical" to "highly functional," leading to explosive growth in adoption.

The launch of OpenAI's ChatGPT and DALL·E marked a milestone in AI-generated content (AIGC). Large language models such as GPT-3 and

GPT-4 have demonstrated exceptional capabilities in natural language understanding and generation, enabling applications such as automated content creation, question answering, and language translation. In image generation, models like DALL·E and Stable Diffusion leverage deep learning and convolutional neural networks to generate high-quality images based on textual descriptions, extending AIGC's capabilities beyond text to visual content creation. Additionally, advancements in multimodal AI have further enhanced creative capabilities, allowing AI to integrate text, images, and other data types to generate comprehensive and diverse content.

These breakthroughs have significantly expanded AI's industrial applications, creating new opportunities across various sectors. However, integrating AI into industries in a cost-effective and efficient manner—optimizing enterprise management and driving business growth—remains a long-term challenge. Effectively aligning AI's advanced capabilities with industry needs to ensure seamless adoption and sustained value creation not only tests corporate innovation but also requires systematic research and exploration in technology, management, and business practices. This integration process is crucial for the mutual evolution of AI and industry, shaping the future trajectory of technological and economic development.

2.2 AI Industry Chain Structure

The AI industry chain can be broadly divided into three major segments: the infrastructure layer, technology layer, and application layer. These layers work collaboratively, forming a closed-loop system that drives technological innovation and commercial implementation**[5]**.

Foundational Layer

The foundational layer serves as the foundation of the AI industry chain, primarily providing computing power and data, which are essential for the development of AI technologies. AI chips constitute the core components of this layer, including GPUs, FPGAs, and ASICs, each offering distinct advantages in terms of performance, flexibility, and specialization. GPUs remain dominant in cloud-based AI training due to their powerful parallel computing capabilities, while FPGAs, known for their flexibility and low power consumption, are becoming increasingly important for edge inference applications. Additionally, ASIC chips, designed for specific AI tasks, offer superior computational efficiency and energy savings, making them a key focus for leading enterprises.

In terms of infrastructure, cloud computing, supercomputing centers, and dedicated AI servers provide robust computational support for AI algorithms. The AI infrastructure market in China has maintained rapid

growth in recent years, reaching $1.318 billion in 2018, a 132% year-over-year increase.

Moreover, big data services play a critical role in AI development by enabling data collection, annotation, and processing. High-quality data inputs are indispensable for training AI models, making big data an integral part of the AI industry chain.

Technical Layer

The technical layer represents the core of the AI industry chain, focusing on algorithm development, model training, and technical implementation. Deep learning algorithms, such as Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), and Deep Neural Networks (DNNs), have been the primary drivers of AI advancements. As fundamental algorithms become more mature, engineering optimization has become a key priority, leading to the development of various AI software frameworks. While TensorFlow and PyTorch dominate the global AI development landscape, Chinese companies have also introduced their own platforms, such as Baidu's PaddlePaddle and Tencent's Angel, in an effort to build a domestic AI ecosystem.

In core AI technologies, speech recognition, natural language processing (NLP), computer vision, and knowledge graphs have made significant

progress. For instance, in speech recognition, China's iFlytek has achieved world-class performance. In computer vision, companies such as SenseTime and Megvii have developed cutting-edge algorithms and solutions that are widely used in security surveillance and smart city applications.

Application Layer

The application layer is the key driver of AI commercialization and the most dynamic part of the industry chain. As the world's second-largest consumer market, China offers vast opportunities for AI deployment. According to the National Bureau of Statistics, China's total retail sales of consumer goods reached ¥47 trillion in 2023. This massive market has fostered rapid product iteration and diverse application scenarios, creating a strong demand for AI-driven innovations.

Additionally, China is the only country in the world that possesses all industrial categories defined by the United Nations Industrial Classification. Among over 500 major industrial products, China ranks first in global production output for more than 220 of them. This comprehensive industrial ecosystem provides ample opportunities for AI integration, enabling AI technologies to deeply embed into industrial development and drive best practices across various sectors.

3. Theoretical Framework: National Innovation System

The National Innovation System (NIS) theory, proposed by scholars such as Freeman (1987) and Lundvall (1992), aims to explain how a country enhances its innovation capacity through the synergistic interaction of institutions, policies, and various innovation actors such as government, enterprises, and research institutions. This theory underscores the critical role of government in shaping an innovation-friendly environment while highlighting the importance of enterprises in driving technological and application innovations through market mechanisms.

This paper adopts the NIS framework to analyze the evolving roles of government and enterprises in China's AI industry across the upstream (chip & infrastructure), midstream (model development), and downstream (application scenarios) innovation processes.

According to NIS theory, the operation of an innovation system requires a dynamic synergy between government policies, market forces, and innovation actors. In China's AI industry, the varying innovation demands and technological complexities across different stages result in differentiated roles for government and enterprises:

- Foundational Layer (Chip & Infrastructure): AI chip development and high-performance computing (HPC) infrastructure require high

capital investment, long R&D cycles, and high technological risks, making it difficult for private enterprises to bear innovation costs alone. As a result, the government plays a dominant role in this phase by formulating policies, providing financial support, and guiding resource allocation.

- Technical Layer (Model Development): As AI technology matures, enterprises gradually take the lead in developing AI models, with market competition becoming the primary driver of innovation. This phase relies more on enterprises' R&D capabilities and technological expertise.
- Application Layer (Application Scenarios): AI applications in sectors such as healthcare, education, and finance demonstrate how market demand fuels innovation. At this stage, enterprises respond swiftly to market needs, becoming the main force in the innovation ecosystem through commercialization efforts.

Analytical Framework: Government vs. Enterprise-Driven Innovation

Building upon NIS theory, this paper examines the division of labor and synergistic collaboration between government and enterprises in China's AI industry chain through two primary dimensions: government-driven and enterprise-driven innovation. The framework is as follows:

- Foundational Layer (Chips & Infrastructure): The government provides financial support, industrial policies, and national technology initiatives to facilitate innovation.
- Technical Layer (Model Development): Enterprises drive market competition, where technological capability and capital investment determine innovation success.
- Application Layer (Application Scenarios): Enterprises rapidly respond to market demands, ensuring the commercialization of AI technologies.

Through this analytical framework, the paper aims to uncover how China's AI industry achieves multi-actor collaborative innovation within the dynamic evolution of its national innovation system.

While NIS theory emphasizes the synergy between government, enterprises, and market forces, China's AI industry demonstrates a shift from a "government-led" to an "enterprise-driven" model. This transition reflects not only the diverse innovation demands across different industry segments but also the gradual withdrawal of policy interventions in favor of market-driven mechanisms.

By conducting a case study of China's AI industry chain, this paper further enriches NIS theory, illustrating that the roles of government and enterprises in an innovation system are dynamic rather than static,

evolving based on industry segments and technological development stages.

4. Analysis of Innovation Models in China's AI Industry Chain

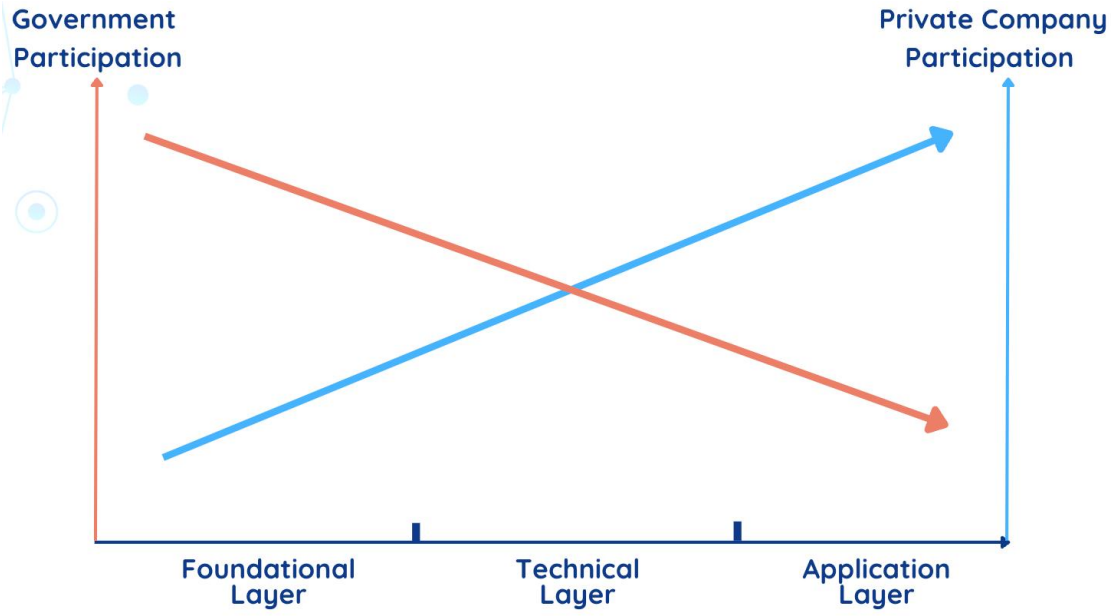
4.1 Overview

For a long time, China's technological innovation has been widely perceived as government-led, relying on policy support and state funding to drive industrial development. However, this traditional stereotype is gradually being challenged as the AI industry chain evolves.

Recent trends indicate that China’s AI industry is developing under a three-tiered innovation model:

- Foundational Layer: Government-Guided Innovation – The government plays a leading role in directing the development of fundamental AI technologies such as chips and computing infrastructure.
- Technical Layer: Market Co-Creation – Enterprises and research institutions collaborate to advance AI model development, leveraging both government support and market-driven innovation.
- Application Layer: Enterprise-Led Commercialization – Businesses drive the deployment and large-scale adoption of AI applications across various industries.

This model ensures the security and controllability of foundational AI technologies while simultaneously unleashing market competition to enhance technological breakthroughs and commercial applications. Ultimately, it fosters efficient innovation and rapid industry deployment, positioning China as a key player in the global AI landscape.



4.2 Foundational Layer

In the foundational layer of China's AI industry, the government remains the core driver of innovation. This layer primarily involves chip development, computing architecture, and data resources, all of which require long-term R&D cycles, high capital investment, and advanced technical capabilities. To ensure the autonomy and security of these critical technologies, the government actively promotes innovation through policy guidance, financial support, and resource integration.

Government-Supported Innovation Models

1. Policy Guidance

The Chinese government has implemented a range of policies to set AI development priorities. For example, the Ministry of Science and Technology, along with five other departments, issued the "Guiding Opinions on Accelerating Scenario Innovation to Promote High-Quality Development", emphasizing collaboration among key players (capital, talent, technology, data, and computing power) to deepen the integration of AI innovation and industrial chains.

2. Financial Support

The government provides special funds and subsidies to accelerate AI R&D. National and local governments have established multiple industrial investment funds that inject capital into AI startups, helping them overcome early-stage financial challenges.

3. Resource Integration

The government promotes collaboration between universities, research institutions, and enterprises to foster synergistic innovation. By establishing AI innovation platforms, it ensures that R&D resources are shared efficiently among industry players.

After analyzing the top 10 domestic integrated circuit (IC) companies, the author has identified certain commonalities in their development. Taking Unisoc (紫光展锐) and Cambricon (寒武纪) as examples, this section introduces the growth trajectories of representative Chinese IC companies and the innovation mechanisms behind them.

Case Study: UNISOC – A Leading Chinese Semiconductor Firm

The development of UNISOC, one of China's key semiconductor companies, illustrates the government-driven innovation model in the foundational layer.

1. Policy Support: Driving Semiconductor Autonomy

UNISOC's rise aligns with China's national strategy for semiconductor independence. In 2014, the State Council issued the "National Integrated Circuit Industry Development Promotion Outline", which set goals for reducing dependence on foreign chips. In 2020, the New Infrastructure Development Plan further emphasized 5G and IoT chip technologies, creating a vast market opportunity for UNISOC. As a result of these policies, UNISOC focused on 5G and IoT chips, achieving a 13% global smartphone chip market share in Q2 2024, tying with Apple and marking a major milestone for China's semiconductor industry.

2. Financial Support: Government and State-Owned Capital

National Research Institutions:

UNISOC originated from the Institute of Microelectronics at the Chinese Academy of Sciences, benefiting from state-funded R&D.

State-Owned Capital Investments:

The China Integrated Circuit Industry Investment Fund ("Big Fund"), backed by the Ministry of Finance and China Development Bank, played a critical role in financing UNISOC.

The company also received investments from Tsinghua University Education Foundation and local government funds in Shanghai and Guangzhou.

3. Resource Integration: Industry-Academia Collaboration and Market Expansion

R&D Incubation:

UNISOC leveraged China's leading research institutes to develop advanced chip design and software ecosystems.

Supply Chain Integration:

The company established close partnerships with ZTE, Honor, Xiaomi, and other domestic tech giants, ensuring widespread adoption of its chips.

Global Expansion: Supported by China's international trade policies, UNISOC penetrated the European, Southeast Asian, and South American markets, boosting the global presence of Chinese semiconductors.

Conclusion: A Government-Assisted Global Competitor

UNISOC's success story demonstrates how China's government policies,

financial backing, and resource integration strategies can foster domestic semiconductor firms to compete on a global scale.

Case Study: Cambricon – A Leading AI Chip Firm

Cambricon, one of China's top AI chip companies, has rapidly emerged as an industry leader with government-backed technological breakthroughs, capital support, and resource integration. Its growth trajectory highlights the Chinese government's pivotal role in fostering foundational AI innovation.

1. Policy Support: Advancing AI Chip Autonomy

Cambricon’s rise is closely linked to China’s national AI chip strategy.

In 2017, the State Council issued the "New Generation AI Development Plan," prioritizing AI chips and deep learning frameworks as key national technologies.

In 2023, the Ministry of Industry and Information Technology (MIIT) introduced the "AI Industry Innovation Key Task Plan", emphasizing rapid R&D for domestic AI chips and upstream-downstream industry collaboration.

Under these policies, Cambricon secured multiple government-backed projects, reinforcing its position as a leader in AI chip autonomy.

2. Financial Support: State Funds and Institutional Investment

Government Research Institutions:

15.73% of Cambricon’s shares are indirectly controlled by the Institute of Computing Technology, Chinese Academy of Sciences (ICT, CAS).

The company’s founder, Chen Tianshi, and core team members originated from CAS, providing it with a strong technological foundation.

State-Owned Financial Investment:

Over 8% of Cambricon’s shares are owned by funds established by major state-owned banks, demonstrating direct financial backing from government-affiliated institutions.

In 2020, Cambricon went public on China’s STAR Market (科创板), raising 2.8 billion RMB (~$390M) to fund cloud AI chip and intelligent computing system development.

National Semiconductor Fund ("Big Fund") Support:

The National Integrated Circuit Industry Investment Fund (Big Fund), with a total capital of 340 billion RMB (~$47B), invested in multiple rounds to support Cambricon’s AI chip R&D and commercialization.

3. Resource Integration: Industry-Academia Collaboration and Market Expansion

Cambricon epitomizes the "Industry-Academia-Research" collaboration model, leveraging CAS's research breakthroughs to develop high-performance AI chips for cloud and edge computing.

Key Industry Partnerships:

In 2017, Cambricon partnered with Huawei, supplying AI processing units (NPUs) for Kirin chips.

In 2020, Cambricon launched the MLU290 cloud AI chip, filling a gap in high-performance domestic AI computing and securing government-backed contracts in smart city and security projects.

Conclusion: A Government-Backed AI Chip Leader

Cambricon's success underscores how China's policy guidance, financial investment, and resource integration propel AI chip firms to achieve technological breakthroughs and industry leadership.

4.3 Technical Layer: Market-Driven Innovation Takes Over

As the AI industry progresses into the technical layer, market forces gradually surpass government intervention. Here, large-scale model development and algorithm optimization define competitiveness, requiring agile enterprise innovation and market-driven strategies.

Leading Chinese tech firms have made significant AI breakthroughs, including: Baidu (Ernie Bot), Alibaba (Tongyi Qianwen), ByteDance (Doubao)

Startups specializing in AI applications (e.g., medical AI, fintech AI, smart customer service) are demonstrating remarkable innovation, creating a dynamic, open AI ecosystem.

Venture capital (VC) funding is fueling this sector's rapid growth, with AI startups securing multi-billion-dollar investments—a sign of strong market confidence in AI innovation.

This shift indicates that China's AI industry has transitioned from government reliance to a true market-driven model, fostering a competitive and self-sustaining AI ecosystem.

4.4 Application Layer: Enterprise-led innovation

In the application layer of artificial intelligence, industry characteristics make market-driven and enterprise-led innovation the primary driving forces. As AI technology continues to penetrate various fields such as autonomous driving, smart manufacturing, financial risk control, medical diagnostics, and digital humans, enterprises have become the main drivers of technological innovation. These innovations are almost entirely driven by market demand rather than government-led fundamental research. Through fierce market competition, companies optimize technology and business models to meet constantly evolving market needs. For example, in the field of autonomous driving, Baidu Apollo and XPeng's intelligent driving system have continuously evolved as a result of market competition.

Additionally, AI medical companies such as Yitu Technology and Deepwise Medical have introduced market-oriented products into hospital systems, demonstrating the powerful role of enterprises in driving innovation. At this stage, market mechanisms dominate, and technological advancements occur at a pace far exceeding the government's policy-making cycle, forming a truly enterprise-driven innovation model.

The cost of innovation in the AI application domain is relatively low. Tech giants like ByteDance and Alibaba provide technical and algorithmic support, creating a favorable innovation ecosystem that enables companies to enter the market more easily and lowers industry entry barriers. At the same time, highly diverse market demands accelerate the speed and flexibility of technological innovation. This makes government-led innovation models prone to lagging behind and lacking adaptability. Therefore, enterprise-led innovation is better suited to meeting rapidly changing market demands.

The government also actively guides enterprises to play a leading role in innovation through relevant policies. For example, the Ministry of Science and Technology, together with other departments, issued the "Guiding Opinions on Accelerating Scenario Innovation to Promote High-Level AI Applications and High-Quality Economic Development,"

which explicitly emphasizes that enterprises should take the lead in industrial applications. The policy supports enterprises in scenario creation, design, development, resource sharing, and demonstration applications, aiming to drive high-quality economic development.

In summary, the characteristics of the AI application layer determine that a market- and enterprise-driven innovation model is more suitable, and government policies are also actively guiding enterprises to take the lead in innovation to drive rapid industry development.

Case Study: How does ByteDance drive AI innovation in industries?

Based on my observations during an internship at ByteDance, I will explain how tech companies interact with industries to explore specific AI application scenarios, thereby facilitating the practical implementation of AI technology across various sectors.

As the world's most valuable unicorn company, ByteDance has a market value of 1.56 trillion RMB, showcasing its leading position in the global technology industry. The company has invested 80 billion RMB in artificial intelligence, an amount comparable to the combined AI investments of Alibaba, Tencent, and Baidu. These massive investments provide strong support for ByteDance's AI development and applications. With its deep technological expertise and innovation capabilities,

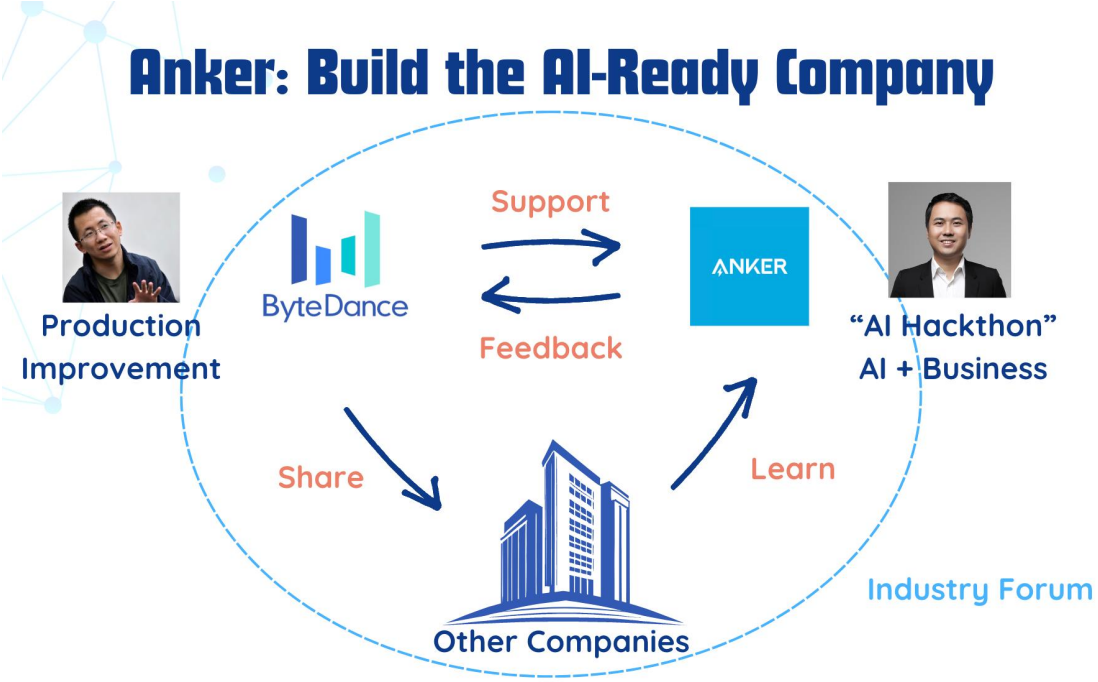
ByteDance has become a key player in the AI field. Several of its AI products have been listed in the global top 100 AI applications published by a16z, demonstrating its leadership and significant influence in AI applications. Additionally, through its enterprise collaboration tool Lark, ByteDance actively facilitates AI application exploration across industries, making its industry practices highly valuable as reference cases.

For example, in collaboration with Anker Innovations, ByteDance provided AI application tools and fundamental AI development frameworks, while Anker contributed industry needs from the manufacturing and consumer electronics sectors. Through their communication and collaboration, the two companies jointly developed efficient solutions to enhance Anker's customer success. Moreover, ByteDance regularly participates in or hosts industry exchange summits, where it showcases Anker's AI application cases. Other companies can learn from these case studies during industry discussions, facilitating the replication of solutions across different businesses.

While Anker Innovations integrates AI products, ByteDance maintains close contact and organizes AI hackathons to encourage employees to embed AI deeply into their daily work. This maximizes the value of AI and improves work efficiency. These application cases, in turn, provide

feedback to ByteDance and are shared with industry partners, enabling rapid knowledge transfer within the sector.

Through this approach, ByteDance and industry players have formed a strong co-creation ecosystem. AI enterprises and traditional industries collaborate efficiently, accelerating the industrial application of AI together.



Specifically, ByteDance offers a range of diverse solutions tailored to the characteristics and pain points of different industries.

Industry	Pain Points	Solutions
Consumer Goods	1. E-commerce platforms have massive amounts of data that need processing, with a demand for automation in data processing. 2. Sales processes involve multiple e-commerce platforms, making the situation complex and resulting in slow processing and low efficiency. 3. The digital transformation of e-commerce requires a lot of custom services, demanding high skill from programmers and high development costs. 4. The market iteration speed is fast, and competition is intense, requiring high production capacity for promotional content. 5. Going global becomes a new direction, with high demand for cross-language service capabilities.**[33][34]**	1. Implement real-time and efficient data processing through AI-based automated data handling systems. 2. Use AI to correspond to each part of the sales process, reducing costs and increasing efficiency while improving service accuracy. 3. AI can assist programmers in coding by debugging and developing the AI's own code capabilities, reducing development costs and programming learning curves. 4. Automatically process market data, and AI can synthesize content such as text and images in promotional materials, speeding up market response. 5. AI enables cross-language collaboration, eliminating language barriers in the global expansion process.
Manufacturing	1. Business systems are fragmented. In the information age, manufacturing companies have often built various systems like MES and PLM to support business development. However, in the planning process, attention is usually focused on key scenarios, neglecting inter-business connections and leading to gaps in certain scenarios and processes, resulting in incomplete digitalization of business. 2. Rising production costs.	1. Use API interfaces to integrate all data into a unified system, processed and analyzed by an AI assistant. Build AI-driven dashboards for supply chain management, providing full transparency of data. 2. AI can significantly help integrate and resolve repetitive tasks, saving labor costs. 3. AI assistants can help R&D teams quickly access firsthand data, laying a data foundation for innovation. Additionally, AI can offer

	With increased competition, manufacturing costs such as labor and raw materials continue to rise, leading to higher demands for balancing cost control and business development. Companies need to reduce costs and improve efficiency as much as possible. 3. Increased demands for technological R&D and innovation. Traditional manufacturing businesses face heightened market competition, necessitating stronger organizational innovation capabilities. Companies need to enhance their R&D capabilities to establish technological barriers and gain a competitive advantage. At the same time, better tools are needed to support the innovation demands of other departments. **[30][31][32]**	ideas and references to R&D personnel.
To B Business	1. The business involves multiple industries, requiring high levels of industry knowledge from the workforce. 2. Sales personnel management requirements are high. 3. Numerous companies are involved, requiring efficient data management.	1. Deploy an AI sales assistant that, after training, can provide quick, professional industry knowledge to sales staff based on business documents. 2. The AI sales assistant can track sales progress in real time, automatically reminding sales personnel to perform different tasks at various stages, improving the efficiency and rhythm of sales operations.

From the above content, it can be understood that in the application field, China's innovation system is no longer government-driven. Instead, the market plays a key role, with enterprises taking the lead in actively exploring industry communication and cooperation to achieve joint innovation.

5.Conclusion

Breaking the Stereotype of Government-Driven Innovation: The Rise of Market-Driven Innovation

In summary, the development path of China's AI industry has shown that relying solely on government-driven innovation models can no longer meet the rapid evolution demands of high-tech industries. Compared to the traditional government-led approach, the AI industry chain demonstrates a more flexible innovation pattern: the government provides necessary support upstream to ensure the safety and autonomy of technological foundations, but at the level of technological development and market application, enterprises are the true innovators. This shift in the innovation model marks the entry of China's technology industry into a new stage, where "the government provides foundational security, the market drives technological innovation, and enterprises lead industrial implementation."

This model not only enhances the market competitiveness of China's AI industry but also breaks the stereotype that Chinese innovation excessively depends on government support. In international competition, the improvement in enterprise innovation capabilities means that China's AI industry will be more sustainable, no longer reliant solely on policy advantages. Moreover, the market-driven innovation mechanism has

positioned Chinese AI enterprises more favorably in global competition—compared to tech companies from mature markets like the U.S., Chinese firms are no longer solely dependent on government resources but are forming technological barriers through market competition and gaining leadership in various niche areas.

In conclusion, the innovation model in China's AI industry chain is undergoing a profound transformation. The government continues to provide necessary support at the foundational technology level, but in core technology development and commercial applications, the market and enterprises have become the real engines of innovation. This change not only enhances China's AI industry's autonomous innovation capability but also provides a replicable model for the future development of the technology industry. It can be expected that with further improvement of market mechanisms, China's AI industry will occupy a more advantageous position in global competition and continue to drive technological innovation to higher levels of development.

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