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Article

A Discussion on How Scaled Enterprises Can Effectively Develop Artificial Intelligence in the Context of Industry 4.0

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Abstract: Artificial intelligence (AI) is the main driving force of a new round of scientific and technological revolution; as a cross-product of computer science, advanced mathematics, cognitive psychology, and other disciplines, artificial intelligence has a milestone significance, which has a far-reaching impact on the economy, society, and culture, especially on large scale industry and international enterprises. Under its substantial spillover and radiation effect, it can effectively empower the covered departments and enterprises, accelerate the growth rate and development efficiency, and thus enhance the core competitiveness of enterprises. However, in the current landscape, despite the widespread adoption of artificial intelligence, notable gaps persist in its specific performance metrics, The data reveals a notable upward trend in the number of business failures in China over the last decade. Numerous enterprises have struggled to stay abreast of current trends, hindered by outdated facilities, products, and sluggish institutional updates, compounded by the repercussions of the global economic downturn. Amidst the backdrop of Industry 4.0, the instructive value of past experiences has diminished, intensifying the survival pressures faced by these enterprises. Thus, based on the current situation of AI development and application, this paper makes an analysis and discussion and provides instructions for the development of enterprises.

Keywords: Artificial intelligence, Enterprise development, Management strategy

1. Introduction

At the present stage, Artificial Intelligence (AI) is commonly defined as machines carrying out cognitive functions that have traditionally been attributed to human minds, encompassing learning, interaction, and problem-solving (Belhadi et al., 2021). It embodies the philosophical ideal of machines thinking, behaving, and performing tasks either identically or similarly to humans. Based on its design philosophy and functionality, AI typically encompasses a broad spectrum of responsive and self-learning techniques, empowering machines to think, react, and behave rationally. The pivotal role of scientific and technological advancements, along with the utilization of auxiliary tools, in the evolution of human society underscores the paramount importance accorded to their development. AI distinguishes itself from standard software by facilitating higher computation, advanced algorithms, and leveraging substantial amounts of high-quality data, thereby thriving as a burgeoning sector that has profoundly influenced every aspect of life. It has garnered remarkable success not only within the realm of science and technology but has also deeply penetrated various industries, including education, healthcare, and transportation, among others. The extensive data system serves as the foundational cornerstone, undergoing continual refinement and enhancement, while the intelligent decision-making system demonstrates a consistent pattern of iterative improvements. These advancements lay a solid groundwork for a multitude of AI-powered services, which are either enhanced

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or enabled by the utilization of AI. Among international corporations operating at a substantial scale, the application of AI technologies holds particular significance. This is because the operational logic of a large enterprise is far more intricate than that of an individual, necessitating a more profound application of AI than conventional AI tools. This prominence arises from the complexity of their organizational structures and the vast scope of their operational and management endeavors. The introduction of AI brings efficiency, enabling organizations to combine personnel, procedures, and machinery to offer innovative advantages at a reduced cost, thereby determining their competitive edge (Bankar & Shukla, 2023). In pursuit of stable growth, a key strategy employed by international corporations involves leveraging AI to mitigate inefficiencies stemming from vast systems, extensive coverage, and diverse personnel compositions. This, in turn, yields benefit such as acquiring scarce knowledge to make better decisions, optimizing operations, and reducing headcount through automation.

The disparity in AI utilization between individual users and corporate environments stems from these groups' differing needs and capabilities. Individual users typically access AI through applications that do not require customized data storage and analysis, allowing a single AI system to serve multiple users efficiently. This is mainly due to the limited scope and scale of data that individual users interact with daily (Gerlich, 2023). In contrast, enterprises, especially international companies, handle vast amounts of data and complex information. This necessitates developing and training unique AI models tailored to specific domains or confidential requirements. These customized AI systems enable enterprises to process and analyze large datasets, make informed decisions, and maintain competitive advantages.

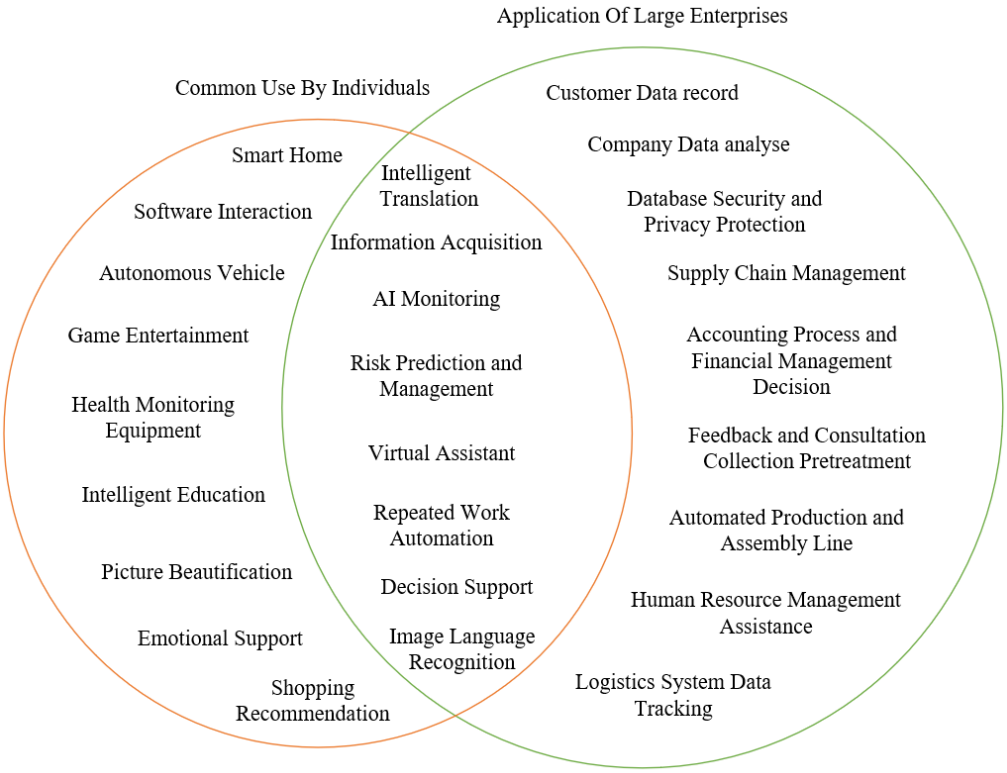

Figure 1. The explanation of intersection and difference of artificial intelligence implementations across enterprise-grade and personal-use applications.

However, this also requires significant investments in advanced information technology infrastructure and specialized research and development personnel, which can be a considerable financial burden. The competitive nature of AI research and development

in industries further drives companies to invest heavily to stay ahead. This competition ensures continuous improvement and innovation in AI technologies and highlights the economic disparities between large and small to medium-sized enterprises (SMEs). For instance, while large enterprises can afford to build and maintain their own AI platforms, SMEs often rely on AI services provided by cloud service providers due to financial constraints. These constraints could be in the form of limited R&D budgets or the inability to attract top AI talent (Barann et al., 2019). Recent trends indicate that SMEs have begun leveraging these cloud-based AI services to build their applications, especially following the popularization of information technology platforms. However, the benefits of AI for SMEs are only sometimes straightforward due to the varying impacts of economic cycles and the specific challenges faced by different industries and regions. These challenges could include data privacy concerns, the need for specialized AI expertise, and the potential for AI to disrupt existing business models.

2. Background

The world is currently undergoing in-depth development and exploration of Industry 4.0. Following the eras of steam power, electrical automation, and electronic information, the concept of the intelligent era representing Industry 4.0 was first introduced in 2013, marking the gradual maturation and implementation of advanced technologies such as the Internet of Things (IoT), big data, cloud computing, and artificial intelligence (Lasi et al., 2014). This has enabled the achievement of goals such as controllability, networking, and flexibility in management and control processes, also known as the Fourth Industrial Revolution. In the context of Industry 4.0, many global enterprises have initiated a comprehensive transformation and upgrading journey, laying the groundwork for automated and digitalized manufacturing alongside personalized and agile service delivery. Nonetheless, amid the effects of economic cycles and intricate international political landscapes, global economic growth has decelerated, resulting in numerous global enterprises encountering challenges such as constrained financing avenues, intensified market rivalry, geo-trade protectionist measures, and various other obstacles. These challenges have exerted significant pressure on enterprises that have either completed or are undergoing a transformation in Industry 4.0, as their investments and returns need to align proportionately (Geissbauer et al., 2016). Furthermore, since the inception of Industry 4.0, issues such as design flaws in intelligent modules, lagging talent development, excessively high investment costs, and data security risks have inevitably posed additional challenges to enterprise development. According to the data displayed on the Supreme People's Court official website and ITJUZI enterprise query websites, from 2014 to 2023, the number of recorded bankruptcies among formal companies in China has been on an overall upward trend, which encompasses numerous technology enterprises, from a data-driven perspective, the advancement of technology does not necessarily confer benefits upon all enterprises or facilitate their overall development.

3. Impact of AI on Enterprise Development

In the early stages of transforming to artificial intelligence, enterprises often make significant capital investments, in addition the integration of novel technology often leads to a paradigm shift in operational philosophy and necessitates the modernization of existing business processes. Consequently, during the incubation phase, various challenges may emerge, necessitating adjustments and the execution of technical integration strategies to ensure seamless compatibility. This approach ensures that the new technology harmoniously aligns with existing systems, fostering efficient operations and maximizing its potential benefits. Therefore, these investments may not yield immediate value and could negatively impact short-term business performance and earnings, however, as time progresses and AI systems accumulate data and undergo training, the probability of enterprises achieving breakthroughs and reaping benefits increases. Research by Brynjolfsson

and McAfee (2014) indicates that initial AI investments lead to significant advancements and efficiencies over time. In terms of details, some AI systems have a short pre-arrangement period, which may provide a basis for quick profitability, such as introducing an intelligent quality inspection system enables enterprises to automatically detect and correct product quality issues, enhancing product stability and consistency. This improvement in quality can enhance market recognition and added value of products, thereby boosting short-term profits and sales. According to a study by Dwivedi et al. (2021), AI-driven quality control systems have significantly enhanced product quality and operational efficiency, leading to improved market performance. Due to the broader range of data sources available, as well as more comprehensive real-time insights and understanding, artificial intelligence's capabilities in big data processing and predictive modeling are more efficient compared to human analysts. AI can leverage extensive data analysis and forecasting technologies to predict market trends, providing more accurate guidance for product innovation and research and development. This optimization of production processes can improve product performance and quality, thereby enhancing brand influence and market competitiveness in the long term. Research by Müller et al. (2018) supports this view, highlighting how AI and big data analytics drive long-term strategic benefits and innovation.

Compared with traditional management models, AI has significant advantages in task automation, intelligent decision-making, and process optimization. Although it takes time for AI to integrate with the companies that adopt it, the efficiency gains it brings are worth the effort for enterprises to try. This aligns with findings by Lu (2017), which show that AI-driven digital transformation significantly enhances long-term operational efficiency and strategic flexibility, and illustrate that AI can enhance the digitalization levels of enterprises and support their long-term development. The digital transformation process, where AI is used to enhance or replace traditional business processes, improves operational efficiency and management levels, optimizing management and organizational structures. According to the above situation, we make the first set of hypotheses.

4. Directions and suggestions of enterprise development

The promotion of artificial intelligence in enterprise development is conditional. For enterprises with varying operating strategies and developmental statuses, the role of AI can be diverse, ranging from being a significant assistance, a minor aid, to potentially even a waste of investment. So, the efficacy of artificial intelligence application is contingent upon the management and operational ideologies of enterprises, particularly their decisions and attitudes towards AI modules. Specifically, only enterprises with suitable management policies are more prone to reap the benefits of AI application, yet adopting AI strategies alone will not definitely guarantee the profitability for the enterprise. Certainly, from an academic standpoint, enterprises engaged in international business or multinational chains confront a notably intricate and rigorous competitive landscape within the realm of market globalization. This global context has prompted corporations worldwide to embark on ambitious market expansion endeavors, transcending national borders in pursuit of growth opportunities. In the midst of the current economic downturn, these enterprises should adopt a strategic approach that prioritizes forward-looking investments, cultivates a culture of innovative thinking, and necessitates proactive adjustments to their operational models. Such a strategy is imperative for them to accumulate competitive advantages and ultimately secure sustainable returns.

4.1. Strengthen technology research and development

4.1.1. Strengthen the Research and Development of Key Technologies at the Basic Level

In the dynamic global economic landscape, technological advancements are occurring at an unprecedented pace, necessitating a relentless commitment from international enterprises towards research and development (R&D) investments. This strategic endeavor is paramount in navigating market shifts, aligning with evolving consumer pref-

erences, and bolstering brand equity alongside fostering sustainable development capabilities rooted in core technological competencies. By continuously investing in R&D, firms can not only adapt to but also shape market trends, ensuring their long-term competitiveness and resilience within the global value chain. Within the context, if the utilization of the AI module is restricted to the domain of managerial decision-making systems, then the introduced of intelligent robots and automation equipment emerges could be a pivotal intervention to elevate production efficiency. By fostering a symbiotic relationship between these technological advancements and the AI system, a paradigm shift towards uninterrupted repetitive work operations becomes feasible. This integration not only ensures continuity in production processes but also augments the accuracy in tackling intricate manufacturing challenges, thereby enhancing overall product quality. Furthermore, the real-time monitoring capabilities, facilitated by this integrated system, enable the immediate capture and documentation of defects, expediting the discovery and subsequent rectification of issues. This proactive approach to quality control underscores the potential for continuous improvement within the manufacturing landscape. Moreover, the application of data analytics techniques to the wealth of operational data generated by this integrated setup presents an opportunity for the optimization of the production process. Through insightful analysis, strategic adjustments can be made to minimize material waste and energy consumption, aligning with the principles of sustainable manufacturing. Under certain circumstances, if the company has a high demand for performance and efficiency, investing substantial resources in the development like artificial intelligence chips can enhance the stability of the supply chain, allow for continuous hardware upgrades, and improve collaborative and parallel computing capabilities. For example, edge computing technology can enable end-to-end edge computing, reducing data transmission burdens and enhancing the "end-to-end - edge cloud" product system (Zhang et al., 2020). This strategy not only enhances operational efficiency but also positions enterprises at the forefront of technological advancements. Strengthening the research and development of sensors is essential for laying the theoretical and technical foundation for industrial vision algorithms. Advanced sensor technology can significantly improve the accuracy and efficiency of automated systems, thereby reducing production costs and the dependency on imported hardware. This, in turn, alleviates the risks associated with external environmental changes affecting international enterprises.

For the innovative products involved, corporates can safeguard the innovation outcomes by pursuing patent applications, thereby bolstering market competitiveness, enhancing economic returns, and refining market positioning. As per the statistics disclosed by the China National Intellectual Property Administration, in 2023, the share of enterprise-originated invention patents among valid ones has climbed to 70%, underscoring a nascent trajectory in corporate competition. For multinational enterprises, given their extensive business operations and market coverage, developing AI-related patent projects and integrating them into core businesses represents a viable and strategic approach. This often necessitates the establishment of a professional team with multidisciplinary backgrounds in technology, law, and marketing. Such a team is tasked with conducting thorough research on market demands and industry dynamics, ensuring the forward-thinking and targeted nature of the patent strategy. This enables the enterprise to formulate a specific AI patent strategy that clarifies the patent layout and portfolio structure. During the development process, enterprises must foster close collaboration and consistency across departments, ensuring that the patent strategy and the overall business strategy mutually support and advance in unison. In the follow-up process, it is essential to ensure flexibility in adjusting patent maintenance and operation strategies, swiftly responding to market changes, and ultimately achieving sustainable development, aiming to secure a leading position in global competition.

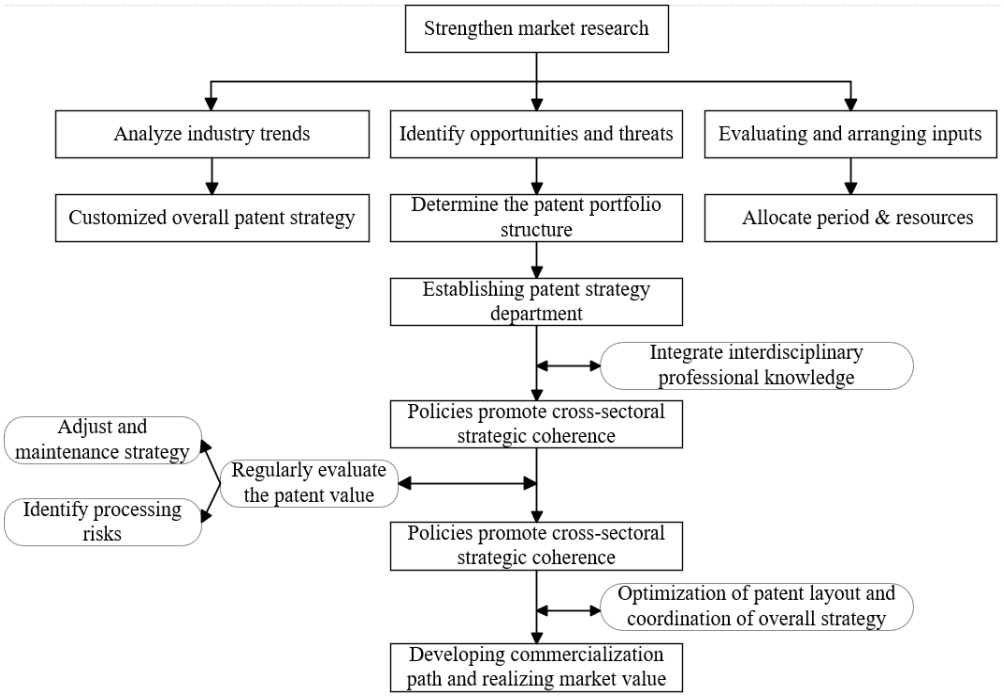

Figure 2. Common patent strategy flow chart.

4.1.2. Improve the Platform of Deep Learning Algorithms

On the basis of the existing system, in order to improve data processing and analysis capabilities, accelerate product iteration and innovation, and promote cross-departmental collaboration and data sharing, the continuous improvement of deep learning algorithm platforms is crucial for the sustained advancement and competitive edge of international enterprises in artificial intelligence. Enhancing these platforms not only promotes continuous technological innovation but also effectively reduces development costs and time. Key measures include:

Investment in Core Technology Systems: Increasing investment in core technology systems, particularly those supported by robust computing power, is essential. This investment can help enterprises strengthen their algorithmic capabilities and ensure their technological leadership. Research indicates that advanced algorithmic systems and computing infrastructure are critical for enabling high-performance deep learning applications (Goodfellow, Bengio, & Courville, 2016; LeCun, Bengio, & Hinton, 2015).

Attracting Basic Researchers: Attracting more foundational researchers to develop new algorithms and computational models is vital. Collaborating with academic institutions and research organizations can provide access to cutting-edge research and innovation. Such collaborations help consolidate the advantages of technological platforms and improve the efficiency of transforming research into practical applications (Jordan & Mitchell, 2015).

Strengthening Industry-University-Research Cooperation: Strengthening technical cooperation with institutions of higher learning and research institutions enhances the industry-university-research ecosystem. This cooperation fosters the integration of theoretical research with practical applications, thereby accelerating technological advancements and innovation. Studies have shown that effective collaboration between academia and industry leads to significant advancements in AI and machine learning technologies (Etzkowitz & Leydesdorff, 2000).

4.2. Strengthen the Promotion of Products and Services

4.2.1. Build Industry Knowledge Map:

In the context of artificial intelligence, the complexity and diversity of vertical industries require AI to evolve from "intelligent perception" to "intelligent cognition." This evolution involves integrating business rules and expert experience into practical applications, which can be facilitated by developing an industry knowledge map. The industry knowledge map can express the concepts, events and processes within the enterprise through entities, attributes, relationships and other elements. This knowledge representation method is helpful to explain the key technologies, products, services, trends and competitive situations in the industry. An industry knowledge map combines AI iteration with actual product knowledge, business rules, and expert experience to provide stakeholders with comprehensive business instructions, promoting the effective use of underlying technology and enhancing core competitiveness (Chen et al., 2019). Thereby improving data quality and accelerating model training.

4.2.2. Build Product Efficiency Improvement Platform:

One of the reasons for the company's loss is the lack of a system that can control the product life cycle, which makes the R&D and production process heavily dependent on the experience of leaders. In addition, the poor coordination between departments has become a hidden danger for the company's development. An integrated product efficiency enhancement platform facilitates a comprehensive suite of services encompassing quality assurance, research testing, and the entire development lifecycle. This encompasses pivotal stages such as algorithm validation, performance benchmarking, and functional verification. The platform offers sophisticated tools tailored for orchestrating the product development process, empowering developers and product managers with the capability to meticulously analyze data and generate multi-faceted data visualizations. These visualizations serve as insightful tools for performance evaluation, quality assurance, and strategic product positioning analyses, thereby fostering data-driven decision-making and enhancing overall product efficacy. Automated tools on the platform can improve R&D efficiency, reduce research time and resources, shorten product development cycles, and lower development costs (Huang et al., 2020).

4.2.3. Adjust the Proportion of Standardized Functions:

To bolster competitiveness and operational efficiency, enterprises worth to embark on a strategic initiative centered on establishing a centralized model. This model fosters the development and maintenance of reusable AI general functions, encompassing foundational algorithms and datasets, which comprehensively empower both business units and R&D teams. Such an approach facilitates efficient knowledge sharing and optimal resource allocation, thereby alleviating the burden of repetitive tasks, and focus on existing industries, vertically integrating every link of the supply side to efficiently deliver products and services to consumers, forming a complete industrial and commercial closed loop (Bengio et al., 2021). Furthermore, enterprises must invest in enhancing the automation capabilities of deep learning platforms, particularly in modeling analysis, data mining, logical reasoning, and decision support. By leveraging intelligent tools to mitigate reliance on manual algorithms, enterprises expedite decision-making processes, enhancing overall operational agility and efficiency. Consequently, these measures contribute to enterprises' sustained growth and competitive edge within the rapidly evolving market landscape.

4.2.4. Develop Product Platform Strategies:

The absence of a product platform strategy in technology and product R&D significantly undermines a cohesive and iterative approach, this isolation of systems impedes

continuous technological updating, ultimately leading to product obsolescence and diminished competitiveness. Effective product platform strategies focus on collecting service needs and technical requirements from users, providing reliable feedback for product and service improvements, and facilitating accurate sales and promotional activities (Gawer & Cusumano, 2014). The strategic significance of a product platform lies not only in facilitating iterative advancements and comprehensive promotional & transactional services but also in seamlessly bridging the gap between R&D and market entry. By expanding target market boundaries, it creates a broader stage for product and service display, thereby enhancing market penetration and brand awareness. International enterprises leveraging these platforms transcend geographical barriers, significantly enhancing their global market influence and accelerating the internationalization of their products. Furthermore, the platform-driven optimization of trading processes significantly boosts transaction success rates and efficiency, fostering substantial economic gains, driving corporate growth, and sustaining long-term competitive advantage.

4.3. Strengthen the Ecological Construction of the Platform

4.3.1. Build Open Algorithm Platform:

Driven by the imperative to safeguard core technologies and confidential business information, enterprises often limit the dissemination of data and access within a secure perimeter, preserving their competitive edge and thwarting competitors' attempts to obtain sensitive details. Undoubtedly, this strategy mitigates external threats such as cyberattacks and data breaches. Nevertheless, prolonged adherence to this approach might foster an extreme protectionist mindset and a rigid corporate culture, entrapping the enterprise within a closed-off management bubble. For global corporations, maintaining a delicate equilibrium is paramount. Failing to find the right balance between openness and secrecy can stifle innovative collaborations, lead to duplicative investments, and cause financial waste. Consequently, this imbalance elevates operational expenses, dampens employee morale, and potentially causes the enterprise to miss out on valuable market opportunities. To excel in the intense market competition, international enterprises must actively establish an open and collaborative external ecosystem. Initially, bolstering fundamental and widely applicable technologies is crucial. Persistent research, development, and innovation efforts enhance core technological prowess, laying a firm groundwork for sustained growth. Secondly, providing access to training data attracts partners for joint data exploration, driving intelligent enterprise transformation. Finally, centering on their technological frameworks, companies should forge an industrial ecosystem that seamlessly integrates research, development, innovation, and cooperation. This approach pools diverse resources, catalyzes industry advancement, and ignites technological breakthroughs. Adopting these measures allows enterprises to sustain their competitive edge, shape industry trends, and unlock greater business value. Such an approach enables the intelligent, large-scale, and automated production of models, reducing the threshold for industrial intelligence and transitioning from closed independent R&D to more open collaboration (Zhang et al., 2020), so as to adapt to market changes, promote innovation and reduce risks.

4.3.2. Integration of Upstream and Downstream Resources:

In the process of constructing their own ecosystems, international enterprises, through integrating vertical customer resources, can gain deeper insights into the needs and bottlenecks of each link in the supply chain, thereby precisely optimizing resource allocation and enhancing operational efficiency. The close cooperation between upstream and downstream entities not only contributes to cost reduction and efficiency improvement, but also underscores the advantages of collaboration: through resource sharing and risk sharing, enterprises can jointly address market challenges, achieve win-win outcomes,

and solidify their market positions. This collaborative model further facilitates the discovery of new business opportunities and innovation points, catering to the differentiated needs of customers at various stages. Additionally, the information sharing mechanism between upstream and downstream parties significantly elevates the enterprise's responsiveness to market shifts, broadens sales channels, reinforces and expands brand influence, ultimately occupying a favorable position in the fierce market competition. By building a sub-industry ecosystem, enterprises can define industry cognition, business models, construction standards, and use scenarios for AI technology, establishing a competitive advantage. Providing services to leading enterprise users can accumulate reusable technology platforms, create standardized products and services, and enhance technological capabilities in the post-market phase (Teece, 2007). In the process of integrating upstream and downstream resources, enterprises gain the unique opportunity to forge a sub-industry ecosystem with themselves at the helm. This comprehensive ecosystem encompasses a diverse range of key players, such as suppliers, distributors, technology providers, research institutions, and governmental bodies. As a way of making interdependencies more explicit, has gained prominence in both business strategy and practice, these approaches have focused on understanding coordination among partners in exchange networks that are characterized by simultaneous cooperation and competition (Adner & Kapoor, 2010). By operating within this ecosystem, enterprises are empowered to collaborate seamlessly with these stakeholders, thereby shaping industry paradigms, pioneering innovative business models, establishing authoritative industry standards, and advancing the implementation of artificial intelligence across various industrial landscapes. Consequently, this strategic approach not only cements the enterprise's prominent position within the industry but also catalyzes progressive innovation and sustained development throughout the entire sector.

4.4. Strengthen Policy Guidance

4.4.1. Apply Government Support

In order to foster technological innovation and industrial upgrading, numerous local governments have introduced supportive policies aimed at corporate technology projects and research and development activities. However, due to the limited resources available to the government, enterprises are often required to self-declare their projects and undergo a rigorous selection process for approval. This approach not only ensures effective allocation of resources but also assists the government in gaining a more comprehensive understanding of the actual operational status and development needs of enterprises. Given that the intensity and focus of government support for enterprise technology vary across different regions, it is imperative for enterprises to clearly define their own development goals and needs, conduct thorough analyses of the policy environment, and actively seek out support policies that align with their corporate development strategies. Furthermore, enterprises should establish robust communication mechanisms with government departments, regularly report on development trends, emphasize their contributions to fulfilling social responsibilities, and thereby enhance government recognition and support for their initiatives. Additionally, enterprises should leverage the influence of industry organizations and associations to collaboratively promote the formulation and implementation of favorable policies, ultimately creating a more conducive environment for technological innovation and sustainable development of enterprises. Additionally, by actively engaging in international cooperation projects, joining international organizations, and leveraging other relevant avenues, enterprises can effectively strengthen their collaboration and exchanges with foreign businesses. This approach not only offers a valuable platform for drawing upon international advanced experience but also creates feasible pathways for enterprises to seek international support and secure essential resources, fostering international cooperation can enhance the exchange and sharing of AI technology, strengthening overall scientific and technological competitiveness (Mazzucato, 2018).

4.4.2. Enterprise Initiatives

Lastly, from the overall management perspective of the company, a comprehensive set of policies is still requisite in the realm of management policy direction, aimed at fostering a conducive environment for scientific research projects and ensuring high-quality treatment for talents. In terms of institutional frameworks, enterprises must provide greater assistance to researchers by establishing special funds dedicated to the research and application of AI technology, attempt to effectively use of redundant resources, timely internal communication, and tailored competitive strategies based on enterprise scale can further promote growth and development (Pisano, 2015). Furthermore, it is imperative to create an evaluation mechanism for scientific research projects, formulate rigorous evaluation standards and processes, encourage close collaboration between enterprises and universities as well as research institutions, harness research partnerships effectively, gather diverse viewpoints, and ultimately accelerate the transformation and application of research outcomes. In regard to talent policy, it is imperative to enhance the treatment of talents at all levels, leverage salary and performance-based reward mechanisms, provide researchers with ample opportunities for feedback and communication, and cultivate a positive and conducive work atmosphere. Additionally, from the vantage point of indirect support policies, the company must prioritize the enhancement of internal data sharing, mitigate the emergence of internal barriers, actively encourage employees to engage in technological innovation and patent applications, refine the intellectual property management system, and establish a flexible organizational structure and decision-making mechanism. Exploring avenues such as flat management and cross-departmental collaboration can significantly enhance response speed and innovation capability, ultimately providing holistic lateral support for scientific research projects.

5. Summaries

In summary, scaled enterprises exhibit varying degrees of improvement in different terms of growth and development, it is imperative for these enterprises to comprehend that maintaining a steadfast focus and investment in their management systems, market environments, and personnel training is absolutely crucial for successfully integrating AI. Pursuing the development of AI technology without adequate preparation may not only fail to yield additional advantages but may also exacerbate and expose more of the existing issues within the enterprise. Therefore, we should accord great importance to harnessing the potential of artificial intelligence technology, reinforcing technology research and development, particularly in the realm of patent research and development. It is essential to excel in product and service promotion, construct ecological platforms, establish resource closure, strengthen policy guidance, and execute impeccable operation management. By adopting differentiated development paths and models, international enterprises can consistently enhance their core competitiveness. Additionally, enterprises must prioritize the cultivation of a skilled workforce and robust team development, ensuring an adequate talent pool to support the continuous innovation and application of AI technology, ultimately securing a leading position in the global market.

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