

## **Exploring AI-Driven Approaches to Assess and Boost Corporate Innovation Capability: A Research Perspective**

Dong Yang

Innovation College of North-Chiang Mai University, Chiang Mai 50230 Thailand

*branypite@126.com*

**Abstract.** With the rapid development of AI technology, its application in the enterprise field is becoming more and more widespread, which has a profound impact on enterprise innovation capability. This study aims to delve into how AI drives enterprise innovation and propose targeted assessment and enhancement strategies to promote enterprises to adapt to the innovation challenges of the new era. This paper describes the assessment system and model construction of enterprise innovation capability driven by AI, and deeply explores the role of AI technology in enhancing enterprise innovation capability at different levels, followed by proposing strategies to enhance enterprise innovation capability based on AI, covering technological innovation, talent cultivation, organizational structure optimization, as well as cooperation and open innovation. Finally, the effectiveness of the proposed strategies is verified through empirical analysis and case studies, and the future development direction of AI and enterprise innovation is envisioned. The significance of this study is to deeply analyze the influence mechanism of AI on enterprise innovation ability, provide scientific basis for enterprises to formulate effective enhancement strategies, and promote enterprises to step into the era of intelligent innovation.

**Keywords:** Artificial Intelligence; Enterprise Innovation Capability; Assessment; Enhancement Strategy; Empirical Analysis

## **1. Introduction**

In the era of digitalization, artificial intelligence continues to penetrate into all aspects of enterprise operations, becoming a key technology for enterprise data processing, decision-making and product innovation. AI technology is not only able to quickly process massive amounts of data and extract valuable information, but also discover patterns and predict the future through deep learning and other methods (Ranga et al., 2008). As a result, AI technology has become a powerful tool to enhance the innovation ability of enterprises. Enterprise innovation ability is one of the core competitiveness of enterprises. Innovation ability covers many aspects such as technological innovation, management innovation, product innovation, etc., and it affects the market position, profitability and sustainable development of enterprises (Pavlović et al., 2022). With the continuous development of science and technology, enterprises need to constantly update their innovation ability and adapt to the changes in market demand in order to be invincible in the fierce market competition.

In the current fast-changing business environment, companies are facing unprecedented challenges and opportunities. Globally, factors such as technological innovation, digital transformation, and globalized competition have driven the reshaping of the competitive landscape of enterprises (Kovačić et al., 2022). In the context of this era of change, enterprise innovation capability has become the core element that determines the survival and development of enterprises. With the continuous progress of science and technology, the emergence of new technologies has not only changed the industrial landscape, but also reshaped the business model of enterprises. Emerging technologies such as artificial intelligence, big data analytics, and the Internet of Things are becoming key factors in driving enterprise innovation. Enterprises must continue to introduce, apply and innovate these technologies in order to stand out in the competitive marketplace (Yang, 2012). Data has been hailed as the oil of the 21st century, and having an abundance of data means that organizations can better understand market demand, user preferences, and product performance. Through data analytics, companies can make smarter decisions, optimize product design, improve operational efficiency, and in turn enhance their ability to innovate. With globalization, companies are no longer limited to the domestic market, but face broader and more intense international competition (Zhou, 2020). To be invincible globally, companies must have a strong ability to innovate and constantly push the boundaries of what is possible and adapt to the market demands of different countries and regions. Modern consumers' demands for products and services are increasingly diversified and personalized. Enterprises need to constantly innovate to meet the diverse needs of consumers. Only by constantly innovating and improving the quality of their products and services can companies win consumers' trust and market share. As society's concern for sustainable development increases, environmental protection and social responsibility have become important directions for corporate innovation (Hunjet & Turcin, 2020). Through innovation, companies can provide more environmentally friendly and sustainable products and solutions to meet the market demand for sustainability. As technology continues to advance, the application of new technologies requires companies to have people with the appropriate skills. In order to continue to innovate, companies need to continuously improve the skills and knowledge of their employees, and recruit and retain high-quality talent. In such a diverse, complex and fast-changing business environment, the innovation ability of enterprises has become the key to their sustainable development (Dervitsiotis, 2010). Only by continuously improving its innovation ability and adapting to market changes can it be invincible in the fierce competition.

In today's global business arena, Artificial Intelligence (AI) has become a revolutionary force in the field of business operations with its groundbreaking technology and potentially wide range of applications. The rise of AI is profoundly changing the way businesses produce, operate, manage and make decisions, providing unprecedented opportunities for innovation and growth (Badica et al., 2022). In recent years, AI technology has made great progress, especially in the fields of deep learning, natural language processing, and computer vision. Deep learning technology has become the core of AI with its excellent pattern recognition ability and efficient processing of large-scale data (Dadfar et al., 2013).

These technological breakthroughs have driven the rapid development and wide application of artificial intelligence. Artificial intelligence technology can be applied to all aspects of business operations, from manufacturing to marketing, from supply chain management to customer service, the application of artificial intelligence can bring great benefits, as shown in Figure 1. For example, AI can help companies better understand market demand, optimize production plans, and reduce inventory costs through predictive analytics; in terms of customer service, automated answers can be achieved through intelligent customer service systems to enhance customer experience (Hashim et al., 2023). Artificial intelligence has brought about a multifaceted impact on business operations. First, it improves operational efficiency and accuracy. Through automation and intelligent processes, companies can complete tasks more quickly and accurately, reducing human error (Al-Turjman & Ivanović, 2022). Second, it reduces operational costs. Automating operational processes reduces labor inputs and lowers operational costs for businesses. Most importantly, it creates new business models and opportunities. The application of artificial intelligence not only improves the efficiency of traditional business, but also provides a new way for enterprises to innovate and develop new products, services and businesses based on AI technology (Hwang et al., 2020). With the rapid development and wide application of AI, enterprise innovation capabilities are facing new challenges and opportunities. Enterprises need to continuously update their knowledge structure, technical capabilities and management mode to adapt to the requirements of the AI era. This includes cultivating talents with AI knowledge and skills, building an organizational structure adapted to the development of AI, and promoting the transformation of traditional industries to intelligence and digitalization (Sun, 2022). The application of AI is also closely related to the SDGs. Through AI technology, enterprises can optimize the use of resources, reduce waste, and improve energy efficiency, thereby reducing the burden of the environment on the enterprise. Artificial intelligence can also provide solutions for sustainable development areas, such as smart city planning and clean energy utilization, to drive businesses toward more sustainable development, as shown in Figure 2. In summary, AI, as a forward-looking technology, is profoundly impacting and changing every aspect of business operations. Understanding the latest development and application of AI is crucial for enterprises, which can help them fully utilize the advantages of AI, improve their operational efficiency, promote innovation, adapt to the changing market environment, and meet the challenges of the future.

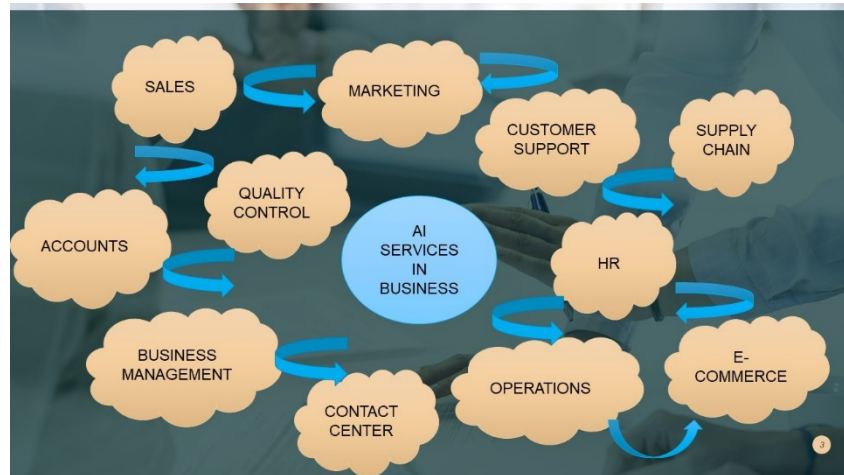


Fig.1: Business Applications of Artificial Intelligence



Fig.2: How has Artificial Intelligence helped in Sustainable Development Goals?

The study of artificial intelligence-driven enterprise innovation capability assessment and enhancement strategy is a cutting-edge and multidisciplinary field that involves multiple disciplines such as artificial intelligence, innovation management, business strategy, and organizational behavior (Protić et al., 2019). In recent years, China has made great progress in the field of artificial intelligence and become an important force in global artificial intelligence research and application (Anđelić et al., 2022). In terms of artificial intelligence and enterprise innovation capability, domestic scholars have conducted a large number of in-depth studies. The research direction mainly includes the application of AI in enterprise innovation, AI-driven innovation model, and the impact of AI on enterprise innovation capability. The research results cover a wide range of fields (Liu & Jiang, 2021). First, the researchers explored the application of AI technology in enterprise innovation, including intelligent manufacturing, intelligent marketing, and intelligent decision-making. Second, regarding AI-driven innovation models, researchers have proposed a series of new innovation models, such as open innovation model and crowdsourcing model. In addition, there are also many studies focusing on the impact of AI on the innovation capability of enterprises, emphasizing the positive role of AI technology in enhancing innovation efficiency and expanding innovation space.

Foreign research on the assessment and enhancement strategies of AI-driven enterprise innovation capability has also made significant progress. In foreign countries, researchers' attention is mainly focused on the application of AI technology in enterprise innovation, the impact of AI on enterprise innovation mode, and the impact of AI on enterprise innovation strategy (Le et al., 2020). Firstly, foreign scholars focus on the specific application of AI technology in enterprise innovation, such as in new product development, marketing, supply chain management, etc., which provides new possibilities for enterprises to improve innovation efficiency and expand innovation fields. Secondly, regarding the impact of AI on enterprise innovation mode, researchers emphasize the profound impact of AI technology on open innovation, user-driven innovation and other modes (Jiang, 2020). In addition, foreign scholars also pay attention to the impact of AI on enterprise innovation strategy, especially on enterprise strategy, organizational innovation strategy and other aspects. In summary, scholars at home and abroad have conducted extensive and in-depth research on the assessment and enhancement strategies of AI-driven enterprise innovation capability (Perunović et al., 2016). The focus of the research covers a variety of aspects such as the application of AI technology, the change of innovation mode, and the optimization of innovation strategy (Kovačić et al., 2022). These studies provide important theoretical and practical references for enterprises to effectively improve their innovation capability in

the era of artificial intelligence. However, it is also important to point out that there are still some problems and challenges in the current research, such as the lack of systematic assessment models and the applicability of innovation strategies in different industries, which need to be further explored and solved by future research.

The main purpose of this study is to deeply explore the assessment and enhancement strategy of enterprise innovation ability driven by artificial intelligence. Through systematic research on the application of AI technology in enterprise innovation, the change of innovation mode and the optimization of innovation strategy, it aims to provide scientific theoretical guidance and practical support for enterprises to actively respond to the challenges, enhance their innovation capability and achieve sustainable development in the era of artificial intelligence (Zhang et al., 2015). The content of this research will be centered on the enterprise innovation capability driven by artificial intelligence, which mainly includes the following aspects: first, this paper will deeply study the specific application of artificial intelligence technology in the enterprise innovation process. This includes intelligent manufacturing, intelligent product design, intelligent marketing, intelligent supply chain management and other aspects. Through case studies and the integration of existing research results, this paper will explore the current status of the application of AI technology in different fields, as well as the advantages and shortcomings of the application. Secondly, this paper will focus on the impact of AI on enterprise innovation mode. Traditional innovation models may no longer be adapted to the requirements of the AI era, and new innovation models may be emerging. In this paper, this paper will explore the changes and innovations of open innovation, user-driven innovation, collaborative innovation and other innovation modes in the age of artificial intelligence. Finally, this paper will examine the impact of AI on corporate innovation strategies. This covers strategy formulation, organizational innovation, talent cultivation, and other aspects. This paper will analyze the adjustment of AI technology on enterprise strategy and the impact on personnel structure, as well as how to make enterprises give full play to the advantages of AI technology and improve the efficiency of innovation by reasonably formulating innovation strategies. The significance of this study lies in the following: firstly, the new round of scientific and technological revolution represented by artificial intelligence is accelerating, and its impact on the innovation ability of enterprises cannot be ignored. Through in-depth study of AI-driven enterprise innovation capability, it can better guide enterprises on how to cope with technological change, optimize the innovation process, and then improve competitiveness. Secondly, the wide application of AI technology is reshaping the business model and operation mode of enterprises. Understanding the current status of the application of AI technology in different fields can provide enterprises with innovative ideas, expand the field of innovation and promote industrial upgrading. Finally, this study can provide scientific references and decision-making basis for enterprises and policymakers. Enterprises can adjust their strategies based on the results of the study, formulate innovation strategies that are more in line with the characteristics of the times, and enhance their innovation ability and competitiveness.

## **2. Method**

Enterprise innovation capability refers to the general term for the ability of an enterprise to utilize its own resources and technological capabilities in the changing internal and external environment, and to realize changes and updates in products, technology, management and strategy through innovative activities, so as to adapt to market demand and improve its competitiveness and sustainable development capability. It is the foundation and guarantee for enterprises to realize their sustainable development. Enterprise innovation ability is a multi-dimensional concept, covering product innovation, technological innovation, management innovation, marketing innovation and other aspects. Enterprises need to have innovation ability in these aspects in order to comprehensively improve their own innovation level. Enterprise innovation capability is dynamic, changing with the market environment, technological progress, and changes in the competitive landscape. Enterprises need to constantly adjust and update their innovation strategies to maintain their sensitivity and adaptability to the market.

Enterprise innovation ability is not determined by the ability of a single individual, but by the overall innovation ability of all levels and departments within the enterprise together. It requires the participation of all staff to form collective wisdom. Enterprise innovation capability should be consistent with enterprise strategy. The enterprise's innovation direction and innovation activities should be in line with the strategic positioning and competitive advantages of the enterprise to ensure the effective play of innovation capability. Enterprise innovation capability needs to absorb external innovation resources and carry out cooperative innovation. The open innovation model enables enterprises to continuously acquire external innovations and promote internal innovation. Enterprise innovation ability is a continuous development ability. It requires not only short-term innovation breakthroughs, but also long-term innovation accumulation to form sustainable innovation power. Enterprise innovation capability requires continuous self-assessment and feedback mechanism. Enterprises should correct and optimize their innovation strategies according to the effects of their innovation activities to form a virtuous innovation cycle. Taken together, the enterprise innovation capability is a multi-dimensional, dynamic, collectivized, strategy-consistent, open, continuous and feedback capability of the enterprise, which is the key to achieve sustainable development and competitive advantage.

With the rapid development of science and technology, artificial intelligence (AI), as an important part of modern information technology, is gradually penetrating into various fields. Among them, the application of AI in the assessment of enterprise innovation capability is of great significance. AI can analyze a large amount of data, mine the laws behind the data, and identify the potential patterns and correlates of enterprise innovation. Based on historical data, AI can predict future innovation trends and directions, providing a scientific basis for enterprises to formulate innovation strategies. AI technology can simulate the human innovation thinking process, and optimize the innovation process through algorithmic models for idea generation and screening. It can automate the generation of innovative ideas, improve the efficiency of innovation, and screen them according to different evaluation indexes to ensure that the direction of innovation is in line with corporate strategy. Artificial Intelligence can intelligently analyze the distribution of resources inside and outside the enterprise, including personnel, capital, technology, etc., so as to reasonably allocate resources to support innovation activities. AI algorithms can optimize the allocation of resources, so as to enable the enterprise to obtain the maximum innovation output with limited resources. AI can quantitatively evaluate the innovation performance of the enterprise based on the set evaluation indexes and weights. It can evaluate innovation results in a multi-dimensional and dynamic way, provide decision-making references for enterprise leaders, and help enterprises realize the enhancement of innovation capability. By analyzing information such as the cultural atmosphere, employee communication, and cooperation mode within the enterprise, AI can quantify the construction of innovation culture for the enterprise and make suggestions for improvement. This helps enterprises to build an innovative culture and stimulate the innovative vitality of their employees.

AI can process massive data and discover patterns and associations hidden in them, and compared with traditional manual assessment, AI's assessment is more accurate and objective. AI can process a large amount of data in a very short period of time for rapid assessment and prediction, greatly improving the efficiency of the assessment and saving time and cost. AI can mimic the intelligence of human beings and continuously improve its assessment by learning and adapting to it, and it can adapt to the characteristics of different enterprises and industries to achieve personalized assessment. AI technology can realize the automation of the assessment process, from data collection, processing, analysis to the output of the results, the whole process is completed automatically, reducing human intervention and improving the objectivity of the assessment. Artificial intelligence, as an important part of modern information technology, provides a brand new solution for enterprise innovation ability assessment. Its high accuracy, high efficiency, intelligence and automation make it have a broad application prospect in enterprise innovation ability assessment. Enterprises should actively apply AI technology to continuously improve their innovation capability to adapt to the rapidly changing market and

technological environment.

The neural network model can be used to measure the comprehensive innovation capability of enterprises in multiple dimensions, including product innovation, technological innovation, business model innovation, etc., so as to realize quantitative and visualized innovation capability assessment. The specific modeling and analysis process is as follows: Construct the neural network model. Select the evaluation indicators of innovation input and output as model inputs, and the indicators of comprehensive innovation capability as outputs, and construct a three-layer feed-forward neural network model. Establish sample data. Collect a large number of enterprises' innovation activity data as the training and testing samples of the model. These sample data should be multi-dimensional, including quantitative indicators such as R&D investment, new product revenue, process optimization benefits, etc., as well as qualitative indicators such as enterprise innovation culture, talent quality, management mode and other indicators. Train and test the model. Use the gradient descent algorithm and back propagation algorithm to train the network model, optimize the model parameters including weights and thresholds, and improve the accuracy of output prediction. Multiple rounds of training are performed until the error reaches an ideal level. Validate the model using test samples. The test samples are used to examine the predictive ability of the model on new data sets. If the error is too large, it means that the model is overfitting the training data set. At this point, the complexity of the model should be reduced until it has good generalization ability. Apply the model to assess innovation capability. Input the evaluation index data of the enterprise into the model to obtain the comprehensive innovation ability score of the enterprise. The output results can be visualized through graphs, radar charts, etc. Dynamic optimization of the model. Collect feedback from the application and continuously train and optimize the model with the changes in innovation to achieve an adaptive and dynamic assessment system. New data can be incrementally added to the sample set to enhance model learning without losing previously learned knowledge. The self-learning and training optimization function of neural network can help overcome the constraints of the traditional assessment model and realize a more intelligent and dynamic enterprise innovation ability measurement. It transforms the static evaluation system into a "living" system that evolves over time. In addition, multiple neural network models can be established for different industries, regions and enterprise sizes. By selecting the appropriate reference group for comparison, enterprises can realize personalized and customized evaluations. The application of neural network model makes the evaluation more intelligent and forward-looking. It enables enterprises to timely grasp their own innovation status and potential opportunities and continuously improve innovation capabilities.

Enterprise innovation ability is one of the core competitiveness of enterprise development. In order to comprehensively understand and assess the innovation capacity of enterprises, it is crucial to construct a scientific and reasonable assessment index system. The evaluation index system of enterprise innovation ability consists of three parts: technological innovation ability, market innovation ability and management innovation ability, as shown in Figure 3. These three parts will be explained in detail below. Technological innovation capability: R&D Expenditure Ratio: It indicates how much money an enterprise invests in R&D activities, which directly reflects the degree of importance the enterprise attaches to technological innovation. Quantity and Quality of Innovation Projects: Reflects the quantity and level of an enterprise's innovation activities, including the quantity and quality of innovation projects such as new products and new technologies. Structure and ability of R&D personnel: describes the composition structure of an enterprise's R&D team and the technical ability of its members, including the proportion of senior researchers, academic structure, skill level, etc. Market innovation capability: Market Share: the proportion of an enterprise's share in a specific market, an important indicator of an enterprise's market competitiveness. Market Response Time: Reflecting the sensitivity and quick response ability of the enterprise to market changes, including the time of new product launching and service updating cycle. Customer Satisfaction: Reflects the degree of customer satisfaction of the enterprise's products or services, and is an important indicator of the success of market innovation. Management innovation ability: the degree of soundness of the innovation management system:

including innovation strategy, innovation organization, innovation process, innovation culture and other management indicators, reflecting the level of enterprise innovation management. Innovation risk management capability: describes the enterprise's ability to identify, assess and respond to risks in the innovation process, including risk control measures, crisis management capability, etc. Knowledge management and innovation transformation capability: reflecting the enterprise's capability of knowledge management, innovation transformation and application, including knowledge base construction, knowledge sharing, transformation rate of innovation projects, etc.

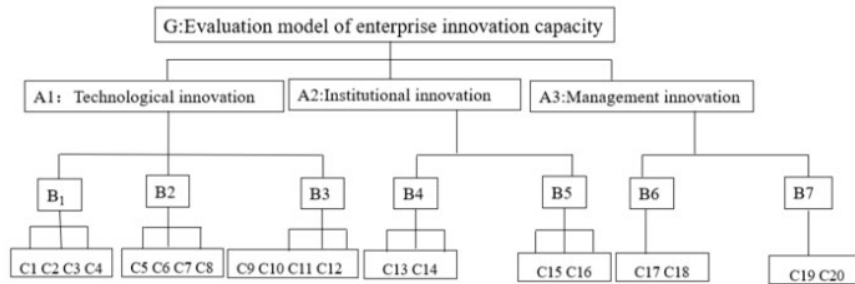


Fig.3: Evaluation model of enterprise innovation ability

An assessment model of an enterprise's innovation capacity is an important tool for judging the enterprise's innovation level, capacity and potential. Such a model should be scientific, practical and operational, and be able to comprehensively, objectively and accurately measure an enterprise's innovative capacity. The innovation capability assessment model should comprehensively consider the capabilities of technology, market and management. This paper adopts the hierarchical analysis method (AHP) to construct the model framework, which is divided into three levels: upper level objectives, middle level guidelines and lower level indicators, in order to reflect the degree of contribution of indicators at different levels to innovation capability. Upper-level objective: innovation capability assessment. Middle-level criteria: technological innovation capability, market innovation capability, management innovation capability. Lower-level indicators: specific indicators under technological innovation capability, specific indicators under market innovation capability, specific indicators under management innovation capability. The assessment indicators consist of technological innovation capacity indicators, market innovation capacity indicators and management innovation capacity indicators. Indicator of technological innovation capability: R&D Expenditure Ratio (R&D Expenditure Ratio): the ratio of R&D investment of an enterprise to its total operating income. Number and quality of innovation projects: the number and quality of innovation projects such as new products and new technologies. R&D personnel structure and capability: proportion of senior researchers, academic structure, skill level, etc. Indicators of market innovation capability: Market Share: the proportion of an enterprise's share in a specific market. Market Response Time: time to market for new products, service update cycle, etc. Customer Satisfaction: the degree of satisfaction of products or services to customers. Management Innovation Capability Indicator: The degree of soundness of the innovation management system: innovation strategy, innovation organization, innovation process, innovation culture and other management indicators. Innovation Risk Management Capability: the ability to identify, assess and respond to innovation risks. Knowledge management and innovation transformation capability: knowledge base construction, knowledge sharing, transformation rate of innovation projects, etc. The hierarchical analysis method (AHP) is used to assign indicator weights. The relative weights of the indicators at each level are obtained through expert assessment or questionnaire survey in order to construct the weight matrix.

A weighted summation method was used to obtain a composite score for each aspect of innovativeness:

### *Innovativeness Score*

$$\begin{aligned}
 &= w_t \times \text{Technological Innovation Capability Score} \\
 &+ w_m \times \text{Market Innovation Capability Score} \\
 &+ w_m \times \text{Management Innovation Capability Score}
 \end{aligned}$$

Among them,  $w_t$   $w_m$   $w_m$  are the weights of technological innovation, market innovation and management innovation, respectively.

Based on the innovation capability assessment model established above, a multi-level assessment system is further constructed, which can measure the innovation capability of enterprises from different dimensions. The first level: innovation input Capability: reflecting the resources invested by the enterprise in innovation activities, the more investment usually means the stronger innovation capability. The second level: innovation output Capability: reflects the direct output results obtained by enterprises from innovation activities, and the more output means the stronger innovation transformation capability. The third level: Comprehensive Innovation Capability: Combining the two dimensions of innovation inputs and outputs, it provides a comprehensive measurement of an enterprise's innovation capability to reflect the overall level of the enterprise's innovation activities. By establishing a multi-level assessment system, it can make the assessment of innovation capability more three-dimensional, systematic and refined, and provide enterprises with differentiated and personalized assessment results. This helps enterprises to judge their innovation status more accurately and formulate innovation strategies on this basis.

The neural network model can be used to measure the comprehensive innovation capability of enterprises in multiple dimensions, including product innovation, technological innovation, business model innovation, etc., so as to realize quantitative and visualized innovation capability assessment. The specific modeling and analysis process is as follows: construct the neural network model. Select the evaluation indicators of innovation input and output as model inputs, and the indicators of comprehensive innovation capability as outputs, and construct a three-layer feed-forward neural network model. Establish sample data. Collect a large number of enterprises' innovation activity data as the training and testing samples of the model. Train and test the model. Use the gradient descent algorithm to train the network model, optimize the model parameters, and improve the accuracy of output prediction. Validate the model using test samples. Apply the model to assess innovation capability. Input the evaluation index data of the enterprise into the model to obtain the comprehensive innovation ability score of the enterprise. Dynamic optimization of the model. Collect feedback from the application and continuously train and optimize the model with the changes in innovation to achieve an adaptive and dynamic assessment system. The self-learning and training optimization function of neural network can help overcome the constraints of the traditional assessment model and realize a more intelligent and dynamic enterprise innovation ability measurement.

## **3. Analysis and Results**

### **3.1.Application of Artificial Intelligence in Enterprise Innovation Capability**

With the rapid development of artificial intelligence technology, its application in the field of product innovation is becoming increasingly widespread. Artificial intelligence brings new possibilities for product innovation, from design, manufacturing to marketing, which presents unprecedented potential, as shown in Figure 4. This section will focus on the application of AI in product innovation, including product design optimization, intelligent manufacturing, personalized customization, and marketing. Artificial intelligence technology can help companies achieve better optimization in the product design stage. By analyzing large amounts of data and user feedback, AI can provide valuable insights about product features, appearance, performance, and more. Using machine learning and deep learning, predictive models can be constructed to forecast the impact of product-specific designs on the market, so that adjustments and optimizations can be made accordingly. Artificial Intelligence has brought about

an intelligent shift in manufacturing. Smart manufacturing is based on AI technology, which improves production efficiency and quality by monitoring, analyzing and optimizing data from the production process in real time. For example, intelligent robots can assist humans on the production line, intelligent sensors can monitor the status of equipment in real time, and AI algorithms can optimize production scheduling to achieve intelligent manufacturing. With the help of AI, enterprises are able to personalize their products. AI can customize products for each customer by analyzing information such as consumer preferences and historical purchase records. This personalization not only improves customer satisfaction, but also increases sales and market competitiveness. Artificial intelligence technology can make marketing more targeted and efficient. AI can identify potential customer groups through big data analysis and formulate precise marketing strategies. Intelligent recommendation system can recommend products based on users' interests and behaviors, increasing the purchase conversion rate.



Fig.4: Artificial Intelligence for Product Development

With the rapid development of artificial intelligence technology, its application in process optimization is becoming increasingly widespread. Artificial intelligence can analyze, optimize and automate internal and external processes through deep learning, natural language processing, machine learning and other technologies. With the rapid development of artificial intelligence technology, its application in process optimization is increasingly widespread. Artificial intelligence can analyze, optimize, and automate internal and external processes through deep learning, natural language processing, machine learning, and other technologies. Artificial intelligence can automate processes, leaving tedious and repetitive tasks to AI to reduce the burden of labor and improve work efficiency. For example, automated approval processes, reimbursement processes, procurement processes, etc., can be intelligently automated and managed by AI for faster and more accurate processing. Artificial intelligence technology can monitor the execution of enterprise processes in real time, and when the process is abnormal or deviated, AI can immediately issue an alert and suggest adjustments. This real-time monitoring enables enterprises to make dynamic adjustments to their processes, keeping them efficient and accurate. AI can provide intelligent support for decision-making based on the rules and goals set by the enterprise. By analyzing historical data and real-time information, AI can make reasonable suggestions and solutions for process optimization, assisting decision makers in making smarter decisions.

The popularity and deepening of AI technology provides more possibilities for enterprises to play a role at multiple levels inside and outside the organization, including strategy formulation, business operations, talent management, etc. AI technology can analyze a large amount of internal and external data to provide strategy formulation and decision-making support. Through data mining and predictive analytics, AI can help companies predict market trends, competitor movements, consumer demand, etc., thus guiding them to develop more forward-looking strategies. AI can optimize an enterprise's business processes through automation and intelligence. For example, AI can be applied in customer service to improve customer satisfaction and service efficiency by automatically answering customer questions through intelligent robots; AI can also be applied in supply chain management to optimize logistics, inventory and order processing and reduce enterprise operating costs. AI can assist enterprises in talent recruitment and management. By analyzing candidates' resumes and interview performance through intelligent algorithms, AI can help enterprises quickly screen out suitable talents. In addition, AI can analyze employee performance data, make employee development suggestions, and assist HR departments in talent cultivation and promotion planning. AI can provide an efficient organizational communication and collaboration platform. Through natural language processing technology, AI can build intelligent assistants to assist employees in daily work communication, file sharing, task assignment, etc., improving work efficiency and team synergy. AI can personalize the design of employee training courses, recommending suitable training content based on employees' learning and interests, and improving training effectiveness. At the same time, AI can also analyze employees' learning data to provide companies with employee potential assessment and career development advice.

Artificial Intelligence (AI) technology is changing the marketing landscape, providing more efficient, intelligent and personalized solutions for marketing campaigns. AI can analyze a large amount of customer data to unearth customer behavioral patterns, preferences, and needs, enabling accurate customer profiling. Based on this data, AI can personalize product recommendations, ad content, and marketing campaigns for each customer, improving the accuracy and efficiency of marketing. AI technology can automate the marketing process. Through the AI platform, companies can set up automated marketing rules, such as automatically responding to customer inquiries, automatically sending marketing emails, automatically posting social media content, etc., thus reducing labor costs and improving marketing efficiency. AI can analyze social media, news, and customer feedback to understand consumers' emotional tendencies and attitudes by using natural language processing technology. These sentiment analyses can help companies keep abreast of market dynamics, adjust their marketing strategies, and improve their products or services. AI can analyze users' browsing records, search records, etc., through big data, to predict users' purchasing intentions, which can help companies place ads more accurately. This precise placement not only improves the click rate of advertisements, but also reduces the cost of advertisement placement. AI technology can build virtual sales assistants, which can interact with customers through natural language processing, answer customers' questions, provide product information, and assist customers in completing their purchases. The virtual sales assistant can be available 24/7 to provide customers with a better shopping experience.

### **3.2. Case study**

This paper adopts a mixed research methodology, combining qualitative and quantitative research, in order to provide a comprehensive and multidimensional understanding of the assessment and enhancement strategies of enterprise innovation capabilities driven by artificial intelligence. For quantitative research, this paper utilizes a large-scale enterprise questionnaire and data analysis. Through extensive collection of enterprise data, including innovation inputs, innovation outputs, AI applications, and other multifaceted indicators, in order to establish a quantitative assessment model. Statistical analysis methods, such as regression analysis and correlation analysis, were used to explore the extent of AI's impact on innovation capability, key influencing factors, and so on. For qualitative research, this paper conducted in-depth interviews, case studies, and expert interviews. Through in-

depth understanding of the internal operation mechanism, innovation culture, and specifics of AI application, etc., this paper analyzed them in conjunction with quantitative data in order to obtain more comprehensive research results.

In this paper, two representative enterprises were selected for case studies to demonstrate the empirical evidence of enterprise innovation capability driven by artificial intelligence. Enterprise A: Industry: Technology and Software Development. Size: Medium-sized enterprise. Artificial Intelligence Application: Natural Language Processing, Intelligent Recommender System. Innovation capability assessment: innovation investment, new product development speed, market share and other indicators. Enterprise B: Industry: Manufacturing. Size: Large enterprise. Artificial Intelligence Applications: Smart Manufacturing, Predictive Maintenance. Innovation Capability Assessment: Development of new product lines, productivity improvement, customer satisfaction and other indicators.

Table 1. Enterprise A innovation capacity assessment

| Indicators of innovative capacity | 2019      | 2020        | 2021        |
|-----------------------------------|-----------|-------------|-------------|
| Innovative inputs                 | 2 million | 2.2 million | 2.3 million |
| Speed of new product development  | 8 months  | 7 months    | 6 months    |
| market share                      | 15%       | 18%         | 20%         |

As can be seen from Table 1, Enterprise A increases its investment in innovation year by year, especially in 2021, there is a significant increase. This indicates that the enterprise realizes the importance of innovation for the enterprise and is willing to invest more resources in innovation activities, which may include R&D, talent training, technology procurement and other aspects. The speed of new product development continues to be optimized, dropping from 8 months to 6 months. This may be attributed to the enterprises' application of artificial intelligence technology to optimize the R&D process through data analysis and forecasting, which improves the speed of new product development. The year-on-year increase in market share indicates that the company's innovation capability translates into increased market competitiveness. It may be that the launch of new products or product optimization has led to an increase in market acceptance of the enterprise, which has resulted in more market share. Firm A's investment in innovation increases year by year, which reflects the importance the firm places on innovation. While investing more resources, the firm also optimizes its R&D process, resulting in a significant increase in the speed of new product development. This combination of innovation investment and efficiency has strengthened the enterprise's competitiveness in the market, and its market share has increased year after year.

Table 2. Enterprise A innovation capacity assessment

| Indicators of innovative capacity | 2019    | 2020    | 2021    |
|-----------------------------------|---------|---------|---------|
| Development of new product lines  | 2 lines | 3 lines | 4 lines |
| Productivity Improvement          | 12%     | 15%     | 18%     |
| Customer Satisfaction             | 85%     | 88%     | 90%     |

As shown in Table 2, Firm B keeps expanding its product range by developing new product lines, increasing from 2 to 4. This shows that the firm attaches importance to product innovation and is willing to keep trying new product lines to expand the market. Firm B has made significant progress in terms of productivity, increasing year on year, from 12% to 18%. This may be attributed to the popularity and application of AI technology, which has improved production efficiency by optimizing the production process through smart manufacturing and other means. Customer satisfaction continues to improve, increasing year on year. This indicates that enterprises have gained customer recognition and satisfaction

through innovative applications that help improve product quality and service experience. Enterprise B has continued to enrich its product range in terms of innovation by formulating new product lines to meet the needs of different customer groups. At the same time, the firm has also achieved significant improvements in productivity, which may be attributed to the popularization and application of AI technology. The increase in customer satisfaction suggests that the application of innovation has had a positive effect on the customer experience and the reputation of the firm.

This paper adopts a mixed research methodology, combining qualitative and quantitative research, in order to provide a comprehensive and multidimensional understanding of the assessment and enhancement strategies of enterprise innovation capabilities driven by artificial intelligence. For quantitative research, this paper utilizes a large-scale enterprise questionnaire and data analysis. Through extensive collection of enterprise data, including innovation inputs, innovation outputs, AI applications, and other multifaceted indicators, in order to establish a quantitative assessment model. Statistical analysis methods, such as regression analysis and correlation analysis, were used to explore the extent of AI's impact on innovation capability, key influencing factors, and so on. For qualitative research, this paper conducted in-depth interviews, case studies, and expert interviews. Through in-depth understanding of the internal operation mechanism, innovation culture, and specifics of AI application, etc., this paper analyzed them in conjunction with quantitative data in order to obtain more comprehensive research results. The specific implementation is as follows: Questionnaire survey: Conduct a questionnaire survey of hundreds of enterprises to collect first-hand data on corporate innovation activities and AI technology applications. The questionnaire set multidimensional indicators to measure innovation in a all-round way. In-depth interviews: In-depth interviews were conducted with business executives, R&D personnel, and related experts to gain an intuitive understanding of corporate innovation practices and AI technology applications. Capture soft information that is difficult to quantify. Case study: Select typical enterprises from different industries and scales, conduct case studies from multiple dimensions such as input, output, mechanism, etc., so as to explore the manifestation of AI-driven innovation capability. In this paper, two representative enterprises were selected for case studies to demonstrate the empirical evidence of enterprise innovation capability driven by artificial intelligence.

Enterprise A: Industry: Technology and Software Development; Size: Medium-sized enterprise; Artificial Intelligence Application: Natural Language Processing, Intelligent Recommender System; Innovation capability assessment: innovation investment, new product development speed, market share and other indicators. Enterprise B: Industry: Manufacturing; Size: Large enterprise; Artificial Intelligence Applications: Smart Manufacturing, Predictive Maintenance; Innovation Capability Assessment: Development of new product lines, productivity improvement, customer satisfaction and other indicators. The specific analysis is as follows: For Enterprise A, this paper analyzes its innovation inputs, innovation outputs and competitiveness improvement driven by the application of AI technology. The inputs include capital investment, talent introduction, and technology research and development. The outputs include the launch of new products/services, process optimization results, etc. The final manifestation is the improvement of market competitiveness. For Enterprise B, this paper focuses on the AI technology empowering the optimization of the production process, including reducing downtime losses, improving production efficiency, reducing defects and other aspects. At the same time, it also examines the enterprise's enrichment of product lines, enhancement of customer experience driven by AI applications from multiple dimensions. In addition, the two companies' practices in talent training, organizational restructuring, corporate culture building and other aspects driven by AI applications are also studied. Compare the similarities and differences between the two companies in the process of intelligent innovation. Through case observation and comparative analysis, this paper reveals the manifestation of enterprise innovation capability improvement driven by AI, and summarizes the typical characteristics and commonness behind different innovation paths. Provide demonstrative cases for enterprises' intelligent innovation practices. The case studies select companies of different sizes in the technology industry and manufacturing industry, which has a certain representation and reference value.

By combining innovation investment, innovation output, competitiveness enhancement and other dimensions, the case studies demonstrate the positive role of AI applications in boosting corporate innovation capabilities. The research discovers the intrinsic law behind the intelligent innovation practices of enterprises through case comparisons. Expert evaluation: Invite experts in related fields to conduct evaluation and analysis on the data and results, provide professional opinions, and complement the research findings. By combining quantitative analysis and qualitative research, this paper builds a comprehensive analytical framework to assess and analyze AI-driven enterprise innovation capabilities, making the research system more scientific, objective and convincing. The combination of quantitative and qualitative research can offset their shortcomings and make rational use of data analysis while fully respecting the complexity and diversity of innovation practices.

With the continuous development and application of AI technology, it will play a more far-reaching impact in the field of enterprise innovation, leading the direction and mode of future innovation. The following is an outlook on the future development of AI and enterprise innovation: intelligent decision-making and prediction will be strengthened. Artificial intelligence will not just be used for data analysis and decision support, but will increasingly involve the construction of intelligent decision-making systems. This will enable organizations to make strategic decisions more accurately and quickly, increasing the level of intelligence in decision-making. AI-driven innovation will accelerate the launch of new products and services. Through automated and intelligent processes, companies can transform new ideas into actual products and services faster. AI technology can accelerate the product development cycle and make companies more competitive. Enterprises will strengthen the combination of AI technology and human intelligence. In the future, AI will be combined with human intelligence more often to take advantage of their respective strengths. Humans have creativity, emotions and moral judgment, while AI has efficient data processing and pattern recognition capabilities. The combination of the two will produce more innovative and socially valuable results. Cross-industry collaboration will drive innovation. In the future, enterprise innovation will not be limited to internal enterprises, and cross-industry cooperation will become more common. Artificial intelligence technology will be the catalyst for such cross-industry cooperation, prompting enterprises in different fields to jointly explore new innovative directions and solutions. Finally, AI ethics and social responsibility will become an important factor in innovation. With the wide application of AI, issues such as ethics, privacy and security will become increasingly prominent. Future innovations will pay more attention to social responsibility, pursue sustainable development, and ensure that the application of AI technology complies with ethical and social norms. Artificial intelligence will play an increasingly important role in enterprise innovation, changing the mode, speed and depth of innovation. Enterprises should actively grasp the opportunities for the development of artificial intelligence and reasonably apply the technology in order to promote the continuous enhancement of enterprise innovation capability and realize sustainable development.

#### **4. Conclusion**

This study aims to explore the strategies for assessing and improving the innovation capability of enterprises driven by artificial intelligence. Through case studies of different enterprises and detailed data analysis, a number of conclusions and insights are drawn, which are summarized as follows: First, AI technology has become an important driver of enterprise innovation. Through the introduction of AI technology, enterprises can optimize their innovation inputs and increase the speed of new product development, thus effectively improving the efficiency and quality of innovation. Secondly, the combination of innovation input and efficiency plays a crucial role in the innovation capability of enterprises. Appropriately increasing innovation investment and improving innovation efficiency through the use of AI technology can achieve twice the result with half the effort. Third, innovation is not only at the product level, but also includes optimization of production processes, innovation in customer service and many other aspects. Enterprises should consider innovation in an all-round way, and realize the comprehensive improvement of innovation ability through technological innovation,

process innovation and service innovation and other efforts. Fourth, enterprises need to fully consider the uncertainty of technology and the cultivation of talents when applying AI technology. Enterprises should strengthen cooperation with scientific research institutions, universities and other institutions to jointly research and solve the problems in the application of AI technology, and at the same time, increase the strength of talent cultivation to ensure that enterprises have sufficient technical strength to meet the challenges of innovation. In summary, artificial intelligence technology has a positive role in promoting the enhancement of enterprise innovation ability. However, in the application process, enterprises need to comprehensively consider factors such as input, efficiency, multifaceted innovation, and technological uncertainty, and formulate scientific and reasonable innovation strategies to realize the sustainable improvement of innovation capability. It is hoped that this study can provide useful references for enterprises' innovation practice in the era of artificial intelligence.

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