



# **Development of Manufacturing Enterprises in the Age of Digital Intelligence Problems Faced by Manufacturing Enterprises and Exploration of New Models of Organizational Learning**

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## **ABSTRACT:**

In the era of rapid development of science and technology, enterprise organizational learning presents new modes, and digital intelligence plays a key role in realizing the path of exploration of new modes of organizational learning in manufacturing enterprises. Through investigation and analysis, it is found that there are many problems in the development of manufacturing enterprises in the era of digital intelligence, such as the bottleneck faced by the development of manufacturing enterprises, insufficient supply of talent matching, policy changes and technological environment caused by the impact of external problems; insufficient innovation power and infrastructure backwardness, the lack of a clear development goal, the structure of the system is more chaotic, the rights of excessive concentration and other internal problems. Based on this, we propose to build a "big data + Internet" innovative digital intelligence organizational learning model, implement a "training + cognition" digital composite talent training organizational learning model, and explore a "fusion coordination" new organizational learning model. The new organizational learning model of "integration and coordination" is explored. We hope to provide some suggestions for the development of manufacturing enterprises in the era of digital intelligence.

**Keywords:** digital intelligence era; manufacturing companies; organizational learning; model exploration

## **1. Introduction**

In February 2022, General Secretary Xi Jinping pointed out that "digital technology is comprehensively integrating into all fields and the whole process of human economic, political, cultural, social and ecological civilization construction with new concepts, new business forms and new modes, and bringing a wide and profound impact on human production and life[1]." Along with the rapid development of science and technology, artificial intelligence and big data are widely used in life, the curtain of the era of digital intellectualization is fully opened, and digital intellectualization has become a new generation of information technology application trend and inevitable choice. Digital intelligence is a new type of operation with wisdom that deeply integrates digital technology with business areas. It can combine digital technologies such as big data, artificial intelligence, cloud computing, Internet of Things, blockchain, etc., to realize intelligent applications through data acquisition, storage, processing and analysis. Digital Intelligence carries out all-round data analysis, optimization and application in different fields from multiple perspectives, such as operation, management and service, so as to comprehensively improve the efficiency and quality of enterprises, reduce costs, and endow enterprises with higher competitiveness and greater business value.

The "14th Five-Year Plan" period is a critical period for the development of China's emerging industries, and more and more digital technologies will enter the stage of large-scale industrialization and commercialization, and become an important force driving industrial change and economic and social development[2]. With the development of digital intelligence technology, "organizational learning" occupies a new important position. Professor Yang Shuoying of Sun Yat-sen University in Taiwan pointed out that "the so-called learning organization actually refers to an organic, flat organization that conforms to human nature and is established through the learning atmosphere that pervades the entire organization. This kind of organization has the ability of continuous learning and is a sustainable organization. Organizational learning is obviously different from the previous traditional organizational structure, which emphasizes "organic", "highly flexible", "flat", "humane", "flat", and "organic". humane" and "sustainable". Such organizations have the capacity for continuous learning and have a comprehensive performance that is higher than the sum of individual performance.

Enterprise organizational learning is an important way of organizational production and innovation, which can stimulate organizational vitality, explore the potential of organizational members, and enhance the core competitiveness of the organization and its unique advantages. Yu Chunhui (2014) proposed a new model for constructing China's enterprise organization: learning organization, that learning organization enriches and develops China's enterprise management theory, provides theoretical guidance for China's enterprise organization transformation and remodeling, and provides theoretical guidance and construction model for organization change and remodeling[3]. Zhou Shouliang and Wei Chunhua summarize and generalize the concept of

organizational learning from three perspectives: system and behavior, information processing, and social interaction, and based on the social interaction perspective, they propose that organizational learning is the unification of organizational members' thoughts, the achievement of consensus, and the unification of actions, and the formation of organizational memories through the solidification of knowledge, which are stored in the organization's knowledge base, and thus improve the core competitiveness of the organization. Individual-level factors such as the reputation and willingness to share of organizational members, team-level factors such as the leadership of leaders in the organization, and organizational-level factors such as the size of the organization and organizational culture all have a significant impact on organizational learning[4]. Organizational learning is the process of continuous optimization of knowledge in an enterprise. Based on the context of the times, it is a general trend to improve continuous organizational learning ability in order to continuously obtain the competitive advantage of enterprises. In conclusion, research to improve the continuous learning path of enterprise organization is conducive to the effective learning of employees and the sustainable development of enterprise organizational learning[5]. Traditional manufacturing enterprises should cultivate and strengthen the awareness of independent learning, encourage the development of acquisition learning and trial-and-error learning, and give full play to the role of the two in the transmission between digital orientation and the performance of enterprise digital transformation[6].

At present, for many domestic scholars in this field, exploring new modes of enterprise organizational learning is undoubtedly one of the important conditions for the transformation of enterprise digital intelligence, although many scholars are now aware of the importance of organizational learning and have carried out more research on it, but few experts and scholars have explored the new modes of organizational learning development from the era of digital intelligence in the context of manufacturing enterprises. This study analyzes the internal and external contextual factors of manufacturing enterprises in the era of big data as an entry point, and at the same time, looks for the existing problems of manufacturing enterprises, and proposes the direction of future improvement and development of manufacturing enterprises.

## **2. Development of Manufacturing Enterprises in the Context of the Digital Age Current Situation Analysis**

### ***2.1 Based on an external environment perspective***

In the process of exploring the new market pattern of domestic and international double cycle, the dual interaction and integration of the information technology revolution and industrial technology revolution lead to a new wave of digitalization - digital intelligence. In the era of digital intelligence, national and local governments have actively introduced relevant policies to support the construction of related digital infrastructure and promote the deep integration of the Internet, big data, artificial intelligence and the real economy, and the digital economy has become a new economic growth point. New industries, new business models, new business models continue to emerge, driven by the enterprise industry empowerment and transformation and upgrading, enterprise digital intelligence transformation has become an inevitable trend.

With the development of data intelligence technology, the proportion of digital production technology in the manufacturing industry is increasing year by year. According to the National Bureau of Statistics, in 2021, the value added of China's manufacturing industry will reach 9.8%, and the value added of the manufacturing industry will account for 27.4% of GDP, reaching \$4.23 trillion. China's manufacturing industry is increasing and accounts for a higher value of GDP, so that the manufacturing industry continues to be in an important position. Analyzing China's high-tech manufacturing value added ratio in 2016-2021, China's high-tech manufacturing industry is developing rapidly, accounting for the proportion of industrial value added above the scale is rising year by year, and the proportion in 2020 and 2021 will be more than 15%. It can be seen that at present, although the proportion of value added of high-tech manufacturing industry is increasing, its proportion is still not high enough and is still in a low position.

Rapidly increasing labor costs have led to rising manufacturing costs. In recent years, the aging of the population has become increasingly serious, with the loss of demographic dividend and serious inflation; with the increase in education, the cost of education and the quality of labor force has been improving, and the cost of labor has been rising. The National Bureau of Statistics (NBS) released the latest data, in November 2023, the national consumer price fell 0.5% year-on-year, and the same 0.5% sequentially, the biggest drop in three years. The decline in the consumer price index means that the purchasing power of residents has weakened, consumer demand has decreased, the market is overcrowded, labor costs have risen, and enterprises can't afford to consume the costs as a way to be uncompetitive in the market. China's traditional manufacturing industry to upgrade and change, explore the new mode of enterprise organizational learning is imminent.

The era of digital intelligence has come, the digital economy is surging, market competition is intensifying and upgrading, and thousands of industries are facing innovation. According to Meng Xianzhong, a professor at Antai School of Economics and Management, Shanghai Jiao Tong University, enterprises and leaders in the new era are facing unprecedented challenges, namely, the challenge of digital disruptive change and the challenge of uncertainty and brittle phenomenon. Digital talents are composite talents proficient in digital technology, business operations and change management, who not only need to be proficient in digital technology capabilities, but also need to have an in-depth understanding and familiarity with industry knowledge. In the face of the large-scale dissemination of data and information and the digital transformation of manufacturing enterprises, corporate competition is ultimately a competition for talent. However, how to grasp and make good use of digital and intellectual composite talents in the new era is the top priority for the development of manufacturing enterprises.

In the digital economy under the era of the demand for digital talents showing a blowout state, the digital talents are seriously in short supply. Moreover, the outflow of highly educated talents is very serious. According to the data, in the past ten years, China's cumulative number of students abroad up to 1.141 million, only 303,000 returnees, the cumulative return rate of only 26.5%, individual years of the return rate of only 15%. The substantial outflow

of talents and the serious talent gap further deteriorates the Chinese market, seriously causing the problem of insufficient supply of digital composite talents for enterprises.

The promotion of the concept of sustainable development, the traditional energy-consuming and polluting manufacturing enterprises have been strongly impacted. On August 15, 2005, Xi Jinping, then Secretary of Zhejiang Provincial Party Committee, for the first time put forward the important thesis that "green water and green mountains are the golden mountains" during his research in Yucun, Anji County, Zhejiang Province. With the enhancement of environmental protection awareness in recent years, the concept of green development is deeply rooted in people's hearts, while the state and governments at all levels continue to pay more attention to and continue to release the corresponding policies, the traditional manufacturing industry with high energy consumption and high pollution can no longer adapt to the development needs of the digital age. The epidemic affects the economic development of enterprises, and enterprises are in operational difficulties and have been seriously negatively impacted. At the same time, the traditional offline mode of enterprises has been strongly impacted, and the working mode and space of employees have changed dramatically, transforming into a new "online + offline" mode. Therefore, in the face of the new situation of data intelligence, manufacturing enterprises are facing new opportunities and challenges in organizational learning, and they need to explore new modes to cope with the unstable environment and policy changes, and complete the transformation of digital intelligence.

## ***2.2 Based on an in-house perspective***

Scientific and technological innovation is the first driving force for development, and if we seize scientific and technological innovation, we will seize the bull's-nose that holds the overall situation of China's development. Today's world is experiencing a big pattern that has not been seen in a hundred years, China's development is faced with profound and complex changes in the domestic and international environment, China's "14th Five-Year Plan" period as well as a longer period of development to speed up scientific and technological innovation has put forward a more urgent request. Although China's manufacturing industry is in the stage of integration with big data, but the core technology is still limited by other countries, which means that China's manufacturing industry is still in the middle and low end of the industrial chain, which will cause the "technological backwardness" of the imagination, or even out of the market arena, is very detrimental to the development of its high technology, the manufacturing industry in order to overcome the difficulties of completing the number of intellectualization. Transformation and upgrading is still a major difficulty.

Xiaofeng Zhang, Tongtong Li mentioned that digital infrastructure is the basis for transmitting data, which is a prerequisite for the digital economy. The development of technology is rapidly changing, which is one of the reasons for the problem of weak digital infrastructure in manufacturing industry[7]. Digital intelligence manufacturing enterprises involve many departments, many positions, many types, long processes, difficult technology, difficult to implement, systematic completion of the manufacturing industry, it is difficult to have their own digital system procedures and production service processes in procurement, design, R & D, production, assembly, transportation, sales and other aspects of the process, which leads to the production of its products through the form of low-end assembly line, but the lack of mature modern science and technology system, resulting in its products stagnant, unable to produce high-end products and other issues, seriously affecting its economic development. At the same time, the incomplete function of intelligent big data analysis will lead to relatively slow access to information in the manufacturing industry, unable to form a perfect big data platform, difficult to guarantee the sharing of information resources, which will produce the phenomenon of information asymmetry, and compared with the development of countries with perfect digital infrastructure, it will cause the phenomenon of "digital divide", which is very unfavorable to the development of enterprises in the international and domestic double-cycle market. It is very unfavorable to the development of enterprises in the international and domestic double-cycle market.

In the process of enterprise operation, it is necessary for its members to coordinate and cooperate. No matter how different the goals of its members are, there must be a common goal accepted by its members; at the same time, the organization should promote the company's economic development, optimize the efficiency of resource allocation, and improve the core competitiveness as the goal. However, most enterprises in China do not have clear short-term, medium-term and long-term goals, and only have a general direction of planning and decision-making, or even hold the attitude of "the boat to the bridge naturally straight" for organizational management and business operations. However, without the support of goals, it will cause a series of problems. Organization is a system of activities with clear goal orientation and well-designed structure and conscious coordination and cooperation, and maintain close contact with the external environment. Organizational structures that are not organized, predictive and forward-looking require frequent revision and adjustment of objectives. In this case, it not only increases the management costs of the enterprise, but also reduces the management efficiency. If it is not optimized for a long time, the organization becomes rigid, the management is disorganized, and there is a lack of anticipation and necessary response to external changes, the enterprise will gradually withdraw from the market stage in the face of strong competition, and eventually disintegrate.

In the process of organizational development, it is inevitable that regular adjustments and changes are needed. Enterprise managers management casual irregularities, the organization in making structural adjustments, did not adjust the job responsibilities and structure allocation in a timely manner, these adjustments often lead to unclear allocation of job responsibilities, employees will be in a daze, do not know what responsibilities should be taken on, do not know what should be done to do their job, and ultimately lead to inefficiencies in the work efficiency, the business operations are hindered. Appeared between the department and the department of each other, shirking phenomenon, administrators and administrators of each other, shirking phenomenon, resulting in a serious waste of resources, low efficiency, the task can not meet the standard, and even "who all manage, who all do not care" and "who all do, who all do not do! The phenomenon of "whoever cares, whoever does not care" and "whoever does, whoever does not do" has even occurred, and no one takes responsibility for any problems, which makes the enterprise into a mess, and, at the same time, harms the enthusiasm of the employees to devote themselves to work and create performance, and reduces the enthusiasm of the members of the organization to work.

Organizational management is mostly centralized and authoritarian, with a lack of democratic decision-making. The power is firmly in the hands of senior management, resulting in senior management into the day-to-day management affairs, but ignored the tactical objectives and strategic decision-making, and, ignoring the status and role of the staff in the enterprise, functional staff can not play the function of staff, reducing the quality and speed of decision-making, but also affects the correctness and timeliness of decision-making. Enterprise personnel did not form a common corporate values, can not be coordinated; employees did not recognize the corporate culture, there is no good sense of group consciousness and the spirit of the whole, so that the hearts of the enterprise is unstable, scattered into a mass of sand, resulting in an "internal island", affecting the normal operation of the enterprise organization management system as a whole, but also affect the efficiency of business management.

### 3. Exploration of a New Model of Organizational Learning in Manufacturing Enterprises in the Digital Age

#### 3.1 Building a "Big Data + Internet" innovative digital intelligence organizational learning model

Integrate data intelligence with enterprise organizations to improve the scientific and technological innovation capacity of enterprises. In the process of enterprise development, the use of "big data + Internet" to collect and analyze data, predict market demand, adjust production plans to meet the individual needs of consumers; in the face of the large amount of resources that need to be invested in the process of operation, including human resources, financial and technical support, etc., to formulate a clear and reasonable decision-making on the allocation of manpower and resources, to ensure that big data can greatly support the sustainable development of the manufacturing enterprise organization. Guarantee that big data can greatly support the sustainable development of manufacturing business organizations.

Manufacturing enterprises actively improve their independent research and development capabilities, firmly grasp the key core technologies in their own hands, and strengthen innovative technologies and innovation capabilities. At the same time, the use of big data, the Internet, artificial intelligence and other technologies, the introduction of advanced digital technology and intelligent equipment, industrial adjustment and structural optimization of the entire industrial chain, the construction of a suitable industrial indicator system, the realization of the collaborative management of the industrial chain, and the realization of the automation of the production process, intelligentization and scientification. Enterprises can improve the quality of their products, thereby increasing their productivity, reducing production costs, promoting the transformation of traditional manufacturing industries to a cleaner and greener direction, and enhancing the market competitiveness of manufacturing enterprises.

#### 3.2 Implementing the "Training + Cognition" Digital Composite Talent Training Organizational Learning Model

Cultivate digital composite talents, conduct skills training, and increase the talent pool. Manufacturing enterprises carry out a diversified curriculum system, and at the same time, through one-to-one job test matching, assess the comprehensive quality of employees, formulate corresponding learning guidance programs, cultivate the connection between enterprise content and employee capabilities, increase the quality of employees' digital intelligence, strengthen employees' work skills, improve employees' dialectical thinking and problem-solving ability, find the most suitable positions for employees themselves, and through digital intelligence intervention Achieve good realization effect. By exploring the new mode of organizational learning in manufacturing enterprises, we can provide talent guarantee for the development of enterprises and improve the labor productivity of workers.

Pay attention to external changes, take the initiative to contact the outside world and obtain information from the outside world. In the new era to improve the talent keen insight, and constantly improve their familiarity with the environment and the degree of discrimination, so as to extend to the individual's cognitive ability to the organization's internal. And, learn from the failure of the enterprise as well as the success of competitors, to learn from their strengths and weaknesses, and obtain information and resources for their own benefit. Organizational learning will make more new attempts and explorations to explore more fresh things that appeal to consumers, as shown in Figure 1 below.

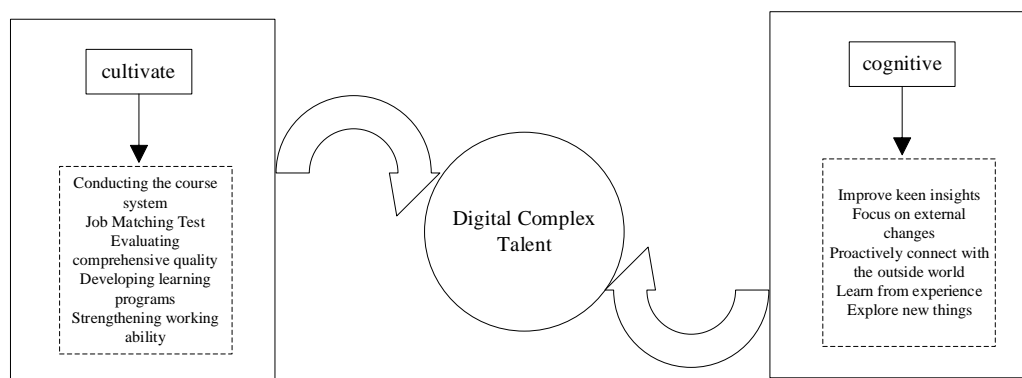


Figure 1 Digital Composite Talent Cultivation

### 3.3 Exploring a new model of "convergent and coordinated" organizational learning.

Clarify goals, strengthen team communication and collaboration, and establish common corporate values. Through the technology support of Digital Intelligence, enterprises need to clarify their rules and visions, develop their strategic goals and long-term plans, and take innovation breakthroughs, organizational synergy and business transformation as the comprehensive goals, so as to facilitate the enterprises to have a clear direction of development, and to lead the employees to do their own work. Secondly, the development of reasonable values belonging to the enterprise, such as: dedication, integrity, friendliness, coordination, etc., shaping the corporate culture, creating an atmosphere dedicated to corporate culture, through various ways to promote corporate culture and values, and strengthen the publicity and dissemination of corporate culture, so that employees understand the culture, identify with the culture, and participate in the construction of culture and values.

Grasp the inner core of the enterprise around the strategic realization of the enterprise, along with the wide dissemination of information technology, facilitating the popularization of information technology between the members, prompting their communication more simple and easy. Create a good communication environment, so that employees are free to express themselves without fear of being criticized or blamed. Secondly, strengthen the leaders' participation and management of the organization, and actively and seriously support organizational learning. There is no longer the phenomenon of departments and departments shirking their responsibilities and administrators shirking their responsibilities and administrators shirking their responsibilities, and when things go wrong, the executives actively take responsibility for it and strengthen the internal collaboration and management of the organization.

## 4. Conclusion

With the development of big data artificial intelligence, digital intelligence permeates all industries, especially in manufacturing enterprise organizations. This paper focuses on how manufacturing enterprises should comply with the requirements of the times and explore new modes of organizational learning in the context of the digital intelligence era, to break the current backward situation caused by the external problems such as low percentage of manufacturing industry, rising costs, increasing demand for talents, serious shortage of supply, promotion of concepts, and impact on the environment, as well as the internal problems such as insufficient motivation to innovate, outdated infrastructure, ambiguous goals, unclear orientation, arbitrary management, confusing responsibilities, authoritarian decision-making, and internal fragmentation. The situation of backwardness is caused by internal problems such as internal decentralization. Through research, this paper proposes the following new model. First, to build a "big data + Internet" innovative digital intelligence organizational learning model, integrate data intelligence with enterprise organization, improve independent research and development capabilities, firmly grasp the key core technologies in their own hands, and strengthen innovative technology and innovation capabilities. Second, implement the "endogenous + exogenous" digital composite talent training organizational learning model, cultivate digital composite talents, skills training, improve the keen insight of talents, so that they actively pay attention to external changes, contact with the outside world, and obtain information from the outside world. Third, explore the "integration and coordination" organizational learning mode, clear goals, strengthen team communication and collaboration, establish common corporate values, and strengthen internal collaboration and management. By exploring new paths of organizational learning, manufacturing enterprises can promote the transformation and upgrading of manufacturing enterprises and give full play to their competitive advantages in the Chinese market.

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