Symbiosis Analysis of Intelligent Manufacturing and Intelligent Logistics in Xi'an

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Abstract: Based on the analysis of the current situation of intelligent manufacturing and logistics in Xi'an, this paper uses SWOT-PEST analysis method to analyze the environment of intelligent manufacturing and logistics in Xi'an. From the perspective of internal integration and external symbiosis of enterprises, this paper puts forward the symbiosis countermeasures of integration of intelligent manufacturing and logistics in Xi'an, which can not only promote the rapid development of intelligent manufacturing and logistics in Xi'an, but also can effectively promote the intelligence of relevant industrial chains.

1. Introduction

With the emergence of new generation of information and communication technologies such as Internet +, Internet of things, cloud computing and big data, a new round of technological revolution and industrial transformation has arrived. The integration and innovation of information and industrialization (hereinafter referred to as "two oriented") is developing rapidly with unprecedented depth and breadth. The "Opinions on Implementing Made in China 2025" issued by Xi'an Municipal Government calls for promoting the deep integration of modernization and intelligent manufacturing as the core of innovation and development. Intelligent manufacturing is based on Intelligent factory, intelligent production and intelligent logistics. In order to support the development of intelligent manufacturing, not only individual equipment is required to be intelligent, but also the interconnection and interoperability between devices are required to meet the requirements of intelligent production and intelligent logistics, so as to build an intelligent factory and realize intelligent manufacturing. From the conceptual and practical point of view, intelligent manufacturing not only includes the internal intelligent logistics which emphasizes production logistics, but also is influenced by the external intelligent logistics enterprises. This paper mainly focuses on the integration of intelligent manufacturing and internal intelligent logistics and the symbiotic development of intelligent manufacturing and external intelligent logistics. As an important central city in Western China approved by the State Council and a "new inland reform and opening-up highland" and scientific and technological innovation base, Xi'an has advanced equipment manufacturing centers such as Weibei Industrial Zone, National Civil Space Base and financial and commercial logistics centers. However, intelligent logistics and intelligent manufacturing are still in its infancy. Through the study of the intelligent logistics and intelligent system in Xi'an City, we can conclude that the intelligent logistics and intelligent manufacturing are still in its infancy. The symbiosis model can not only further promote the common development of

the two industries, but also further promote the intelligent advancement of other fields, which has certain practical significance.

2. The Theoretical Basis of Intelligent Manufacturing and Intelligent Logistics

At present, there are few studies on intelligent logistics and intelligent manufacturing at home and abroad, mainly focusing on the linkage and symbiotic development of manufacturing and logistics industry. Professor Dong Qianli and his research team found that: (1) the coordination degree of manufacturing and logistics industry in Shaanxi Province presents an M-shaped change trend, and the linkage relationship between the two industries revolves around the "coordination-disharmony-coordination" process; (2) trade with Israel. Easy openness and international investment openness are the threshold. The mechanism of manufacturing industry and logistics industry is "inverted U" and "gradually weakened" correlation, respectively. (3) Only when manufacturing and logistics choose collective rationality can they promote the integration of logistics chain and product supply chain; (4) The linkage development of manufacturing and logistics industry can reduce the cost of social logistics, improve the ability of effective supply and achieve the goal of stabilizing prices. Professor Su Qin studied the integration, interaction and dynamic change law between logistics industry and manufacturing industry through input-output tables of China and G7 countries, which provided a basis for policy formulation of logistics industry and manufacturing industry linkage. Professor Wang Xiaoli established a cooperative service recovery decision-making model of logistics service system in manufacturing supply chain. Using this model, each participant in the system can make the optimal cost recovery decision-making strategy to meet their own and the expected goal of system recovery. Dr. Fraunhofer IML, Germany, pointed out that in the framework of intelligent factory, intelligent logistics is an important link linking supply, manufacturing and customers, and is also the cornerstone of building future intelligent factory. Intelligent unit logistics technology, automatic logistics equipment and intelligent logistics information system are the core elements of building intelligent logistics. Joseph, based on causal analysis, explores the competitive third-party logistics strategy for the development of Hong Kong's manufacturing industry. The above research results provide a theoretical basis for this paper.

3. Symbiosis of Intelligent Manufacturing and Intelligent Logistics in Xi'an City

Xi'an is an important national research, education and industrial base, in which the equipment manufacturing industry is the pillar industry of Xi'an industry. In 2015, Xi'an was named one of the first 40 key connected cities in the national industrial operation. Up to now, Xi'an has been awarded the Ministry of Industry and Information Technology by Xi'an Aircraft Industry (Group) Co., Ltd., Xi'an Shaangu Power Co., Ltd., China Aviation Industry Xi'an Flight Automatic Control Research Institute, Shaanxi Faster Gear Co., Ltd., Xi'an Zhongxing Communication Terminal Technology Co., Ltd. In June 2016, Xi'an was also identified as one of the 20 pilot cities for innovative development of modern logistics by the Development and Reform Commission. It can be seen that Xi'an has been advancing bravely in the fields of intelligent manufacturing and intelligent logistics. The power equipment intelligent cloud service platform of Xi'an-Shaanxi Drum Power Plant, the cooperative development/cloud manufacturing platform of Xifei, the intelligent terminal manufacturing of Xi'an ZTE, the intelligent manufacturing of transmission of Shaanxi Faster, and the intelligent manufacturing of micro inertial devices of Xi'an Institute of Automatic Flight Control of China Aviation Industry. They all set a model of intelligent manufacturing. With the rapid development of the intelligent manufacturing industry and the intelligent logistics industry, the status quo of their integration and symbiosis is analyzed as shown in Table 1.

Table 1: SWOT-PEST analysis of intelligent manufacturing and intelligent logistics in Xi'an.

SWOT		Politics	Economy	Society	Technology
Internal factors	Strength	(1) The Xi'an Municipal Government promulgated documents and regulations to promote the development of intelligent manufacturing. (2) National and local governments attach great importance to, actively guide and vigorously promote the development of intelligent manufacturing and intelligent logistics.	The state and local governments give more financial support to demonstration enterprises	Xi'an City Improves the Function of Urban Infrastructure	(1) modern information technology such as Internet of things, Internet plus and mobile Internet are widely used in enterprises. (2) Intelligent robots and other scientific research forces are strong
	Weakness	Intelligent Manufacturing and Intelligent Logistics Standard Foundation is Poor and Industry Development is Unbalanced	(1) Intelligent Manufacturing and Intelligent Logistics require more capital investment. (2) The incentive policy of the coexistence of intelligent manufacturing and intelligent logistics is not clear.	(1) insufficient supply and training of top-level design talents and cross-border talents in intelligent manufacturing (2) Mechanization, electrification, automation and informationization coexist in manufacturing industry, and the development of industries and enterprises is unbalanced.	(1) The level of intelligence is insufficient, and the proportion of intelligent manufacturing and logistics is low. (2) Core technologies in high-end sensors, control systems, industrial software, industrial Internet and other fields need to be broken through.
External factors	Opportunity	(1) The state has promulgated documents and fiscal and taxation policies to encourage the symbiotic development of	Xi'an's industrial economy continued to maintain a good trend of steady growth, with an increase of 9.9%	Intelligent level of key links such as R&D and design, production equipment, process	With the rapid development of network infrastructure and information and communication technology, a number of leading enterprises

	manufacturing and logistics industries. (2) Xi'an City strives to promote the transformation of airports from traditional airports to smart Airports.	over the same period last year.	management, logistics and distribution, energy management of third-party enterprises is constantly improving.	have been formed in the fields of high-performance computing, network communication equipment, intelligent terminals, software and so on.
Threats	Xi'an is facing difficulties such as increasing downward pressure of domestic and international economy, tightening resource and environment constraints, oversupply of traditional industrial products and prominent contradiction of structural overcapacity.	(1) The cost of manpower in manufacturing and logistics industries has increased substantially. (2) Intelligent Manufacturing and Intelligent Logistics Equipment Investment is Higher.	Insufficient capability of equipment and system integration solutions in the development of intelligent manufacturing and logistics.	(1) Logistics integrated information platform can not meet the needs of enterprises. (2) Insufficient protection of industrial network security.

Through the above analysis, we can see that the internal integration of intelligent manufacturing and intelligent logistics in Xi'an is mainly based on Intelligent production, the importance of logistics is not too much reflected in the planning of intelligent logistics system; external logistics and intelligent manufacturing synergy is not enough, and the development level of external intelligent logistics is uneven, can not meet the real-time intelligent manufacturing enterprises. Industry's demand for efficient logistics.

4. Necessity and Feasibility of Intelligent Manufacturing and Intelligent Logistics in Xi'an

With the further development of economy and technology, intelligent logistics will be integrated into the supply chain of intelligent factory, and the integration and symbiosis of intelligent manufacturing and intelligent logistics will be constructed. For intelligent factory, intelligent logistics is an important link and cornerstone connecting its supply and production, production and sales. It is not only responsible for the connection of production equipment and finished products in intelligent factory, but also plays a connecting role in the system. It also affects the logistics efficiency of materials, accessories and finished products outside intelligent factory and upstream and downstream enterprises in supply chain. At the same time, the intelligent logistics based on the Internet of Things can effectively connect the processed objects to the Internet, and realize the effective integration of intelligent manufacturing and intelligent logistics inside and outside the intelligent manufacturing enterprises.

At present, with the more marketization and specialization of intelligent manufacturing and intelligent logistics equipment services, the support services for the normal operation of intelligent manufacturing and intelligent logistics equipment, as well as the support services for logistics

management, technology improvement and system upgrading services have been further enhanced, which provides sufficient conditions for the integration and symbiosis of intelligent manufacturing and intelligent logistics.

5. Countermeasure of Intelligent Manufacturing and Intelligent Logistics Co-existence in Xi'an City

5.1. Countermeasure of Intelligent Manufacturing and Intelligent Logistics Integration in Xi'an City

For enterprises engaged in intelligent manufacturing, the relationship between manufacturing and logistics is inseparable. On the one hand, manufacturing demands logistics; on the other hand, logistics provides support for manufacturing. They are interdependent. Logistics demand in intelligent manufacturing is not a single and paradigm, but an all-round solution of intelligent logistics supply chain from production, inventory, sorting, packaging, distribution to information processing. Intelligent logistics system can effectively connect bar code technology, mobile devices, materials and ERP systems in series, which can not only improve the efficiency of production site, but also ensure the efficiency of production site. The order delivery ability of enterprises can effectively improve the inventory turnover level, which are the three key indicators of intelligent manufacturing, and can further enhance the core competitiveness of manufacturing enterprises. Therefore, in the implementation process of intelligent manufacturing, we must adhere to the concept of logistics first, and seamlessly integrate logistics into the large system of intelligent logistics. There is still a big gap between the intelligent level of Xi'an intelligent manufacturing enterprises and that of foreign countries. If we want to realize the internal intelligent logistics management, we need to import and digest the excellent equipment and technology of foreign countries to realize the intelligent identification, intelligent perception, intelligent monitoring and intelligent scheduling in enterprises. On this basis, we should constantly improve the ways and methods of internal logistics management.

5.2. Countermeasure of Intelligent Manufacturing and Intelligent Logistics Co-existence in Xi'an City

Firstly, in the upstream purchasing link of the supply chain of intelligent manufacturing enterprises, an intelligent warehousing system with deep perception of efficient logistics should be built, and two-dimensional code, wireless radio frequency identification and other Internet of Things perception technology and large data technology and intelligent logistics equipment should be widely used. Only in this way can real-time tracking and networked management of materials required by manufacturing enterprises be realized, and inventory information can be realized. Highly sharing, improve the efficiency of cargo dispatching.

Secondly, in the downstream sales link of the supply chain of intelligent manufacturing enterprises, the finished products of intelligent manufacturing enterprises should be delivered to users through intelligent logistics. In order to ensure the smooth operation of customer-centered intelligent logistics, we should further improve the distribution and distribution system of intelligent logistics through intelligent acquisition technology, intelligent transmission technology, intelligent processing technology and intelligent application technology, and build a collaborative real-time dynamic monitoring and management system for vehicles, which can flexibly adjust and change the mode of transportation according to the changing needs of consumers at any time.

Thirdly, intelligent manufacturing enterprises can cooperate with upstream and downstream enterprises to build a series of hardware, software and talent service system of intelligent

manufacturing, make full use of the rapid development of intelligent manufacturing equipment, intelligent logistics and warehousing technology, build intelligent factories, and enhance the market influence of intelligent manufacturing enterprises with "Xi'an element".

5.3. Symbiosis Model and Policy Guarantee of Intelligent Manufacturing and Intelligent Logistics Integration in Xi'an City

(1) Build a supply chain model of intellectualized manufacturing and intellectualized logistics in Xi'an

In order to better base itself on the northwest and develop the intelligent manufacturing industry in Xi'an for the whole country, we can learn from the experience of developed countries and developed areas in China. On the basis of the theory of coordinated development of manufacturing and logistics industry, we can build up the upstream and downstream industries with the government as the link, the public information platform as the support, the third-party information service enterprises as the support, the intelligent manufacturing enterprises as the core, and the upstream and downstream industries. Enterprises are the supply chain mode that integrates intelligent manufacturing and intelligent logistics in Xi'an. This mode not only requires effective cooperation and integration among supply chain enterprises, but also requires the government to further promote the application of intelligent manufacturing technology and promote the seamless cooperation of supply chain enterprises in R&D, design, production, manufacturing, distribution and other links.

(2) Policy Guarantee of Intelligent Manufacturing and Intelligent Logistics Co-existence in Xi'an

Firstly, the government should take the lead in establishing a public information platform for the symbiosis of intelligent manufacturing and intelligent logistics, integrating manufacturing, warehousing, transportation and distribution information, and carrying out the whole process monitoring and early warning of logistics activities; furthermore, it should further promote network collaborative manufacturing, promote seamless links between upstream and downstream enterprises in the supply chain, such as R&D, design, intelligent equipment, production and manufacturing, and further enhance the supply chain. Collaborative ability between upstream and downstream enterprises provides a platform and foundation for the integration and symbiosis of intelligent manufacturing and intelligent logistics.

Secondly, the government should also improve the distribution system of intelligent logistics. The importance of Intelligent Logistics to Intelligent Manufacturing has been fully proved. In the process of Intelligent Manufacturing and Intelligent Logistics merging, in addition to government support and encouragement for Intelligent Manufacturing and Intelligent Logistics, the distribution and distribution system of Intelligent Logistics should be further improved to provide a certain basis for the integration and symbiosis of Intelligent Manufacturing and Intelligent Logistics.

Thirdly, the government should encourage the establishment of a win-win socialized logistics system with the linkage of intelligent manufacturing and intelligent logistics, encourage the integration of intelligent manufacturing and intelligent logistics by means of logistics finance, logistics strategic alliance and logistics trusteeship, so as to make use of social resources, further reduce the risk of intelligent manufacturing enterprises, speed up the investment of intelligent manufacturing, and make intelligent manufacturing enterprises. Industry is more adapted to changes in the external environment.

Finally, the government should make full use of the sufficient educational resources in Xi'an, encourage educational institutions and intelligent manufacturing and logistics enterprises to adopt a variety of cooperative ways to cultivate the professional talents needed for intelligent manufacturing

and logistics, so as to provide a sustained impetus for the rapid development of intelligent manufacturing and logistics.

6. Conclusion

For manufacturing enterprises, not only need to use intelligent technology to improve the production process and improve internal logistics management, but also need to meet the individual needs of customers as far as possible, which puts forward higher requirements for internal production and external parts supply and product distribution. Therefore, Intelligent Manufacturing Enterprises need to integrate with Intelligent Logistics and cooperate with upstream and downstream enterprises of supply chain using public information platform to further enhance the flexibility of Intelligent Manufacturing.

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