Research on Intelligent Informationization of Cigarette Processing and Production by Mes System

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Abstract. Cigarette processing and production process is essentially a production and implementation process, which has little difference with other production enterprises. With the deepening and development of information construction, the introduction of MES system makes the digitalization of new cigarette processing and production process further integrated and refined. The original production units have been scientifically organized through MES. But with the country's encouragement of intelligent manufacturing and the stimulation of domestic and international environment, intelligent information technology has been put on the agenda. Different from MES, intelligent informatization pays more attention to production intelligence, big data application and Internet of things. Based on the information system constructed by MES, intelligent technology will make the cigarette processing and production process more efficient, and will directly bring value to cigarette enterprises.

1. Introduction
With the continuous deepening and development of information construction, “promoting industrialization with information” has become an inevitable choice for factories to improve their production and operation level. Under the stimulation of the external environment, China should take the construction of service intelligent manufacturing industry ecosystem as an important goal, strengthen the overall coordination of intelligent manufacturing standardization, revise and improve the guide to the construction of national intelligent manufacturing standard system, and integrate the intelligent manufacturing standard system into the integration of the two. The tobacco industry has become an active explorer of the integration of the two industries since 2000. Tobacco enterprises have invested a lot of resources to research and develop intelligent manufacturing. The primary application of intelligent manufacturing is the implementation and application of MES. From the current actual development, the tobacco industry has a certain foundation of intelligent manufacturing applications, such as: production process and logistics distribution automation, management decision-making information, etc. But it still stays in the advanced automation, and does not form the intelligence with computer intelligence.

2. Application Status of Mes System in Cigarette Processing and Production
There are some common problems in the production management of tobacco processing enterprises: production plan and production organization fluctuate greatly with the market demand; production information transmission technology and means are backward, and information feedback is not timely; production information is wrong and missed too much, and there are loopholes in the management of controlled documents; product traceability is poor, etc. How to effectively combine the advanced production line control system and the production management information system at the factory level,
on the one hand, to enable the departments closely related to the production of the factory to timely and effectively understand all aspects of workshop production information. On the other hand, it also enables the production scheduling and decision-making information of the factory to reach the first line of production in time, which is an urgent problem to be solved in the informatization construction of the factory, and MES just can solve this problem. According to the characteristics of each process and production process of tobacco processing enterprises, the digitalization in the production management process needs to cover the specific business links such as production standard management, production scheduling plan and implementation, material management, process quality management, equipment downtime management, personnel management, production monitoring, etc., and the above processes are under unified control through the process control system. MES for cigarette processing and production usually has the system application flow and structure as shown in Figure 1.

For such a process and structure, the exposed functions of MES system are very clear. See Table 1 for details:

| Table 1 Main Functions Of Mes                      |
|---------------------------------------------------|
| Production command and dispatch                   |
| Scheduling scheduling                             |
| Workshop management                               |
| Personnel management                              |
| Production monitoring                             |
| Quality assurance and control                     |
| Production specification management               |
| Process quality management                        |
According to the functions listed in the table, it can be found that each functional group corresponds to a group of human or equipment resources in the real production process. Through the application of MES system, cigarette production enterprises can transfer the actual production business to the information system, and initially realize the information production. The implementation of MES system enables cigarette manufacturing enterprises to achieve: Production Scheduling in place; fine quality management; efficient equipment management; manufacturing process traceability; real-time decision analysis. Use the minimum resources to create the maximum value, achieve the maximum benefit and realize lean manufacturing.

3. Pain Point of Intelligent Cigarette Production Information
The biggest difference between production intelligent informatization and production informatization lies in the improvement of intelligent ability. In the traditional MES system, the transformation of production informatization has been preliminarily completed, and the whole business process of the production enterprise has been digitized, so that the information system can be directly applied to the production management process, and the production can be controlled with information science. Lean manufacturing as a general pursuit of the concept of production enterprises, in fact, also needs a lot of data as support. This is the direct contribution of MES to production informatization.

From the overall development of the tobacco industry, after years of accumulation and precipitation, the cigarette factory has initially possessed a certain level of intelligence, but there is still a large gap from the real intelligent factory. At present, the pain points of the development of Intelligent Manufacturing in tobacco industry are mainly concentrated in the following aspects.

Lack of perfect perception system. Taking the intelligent storage system of cigarette as an example, many intelligent storage systems of cigarette only have the function of identifying simple information such as the location and production time of cigarette products, but can not identify complex information such as anti-counterfeiting code, so the application value is relatively limited, and can not provide strong data support for intelligent factories.

(2) failed to realize resource sharing and interconnection. At present, there are some communication barriers in tobacco enterprises in various regions in China. The logistics system and information management system have not yet been seamlessly connected. High quality resources such as information, technology and equipment can not be efficiently circulated, which hinders the promotion of intelligent manufacturing waking of tobacco enterprises.

(3) intelligent application is still at a low level. For example, the data needed by the National Tobacco Monopoly Bureau is not collected by various intelligent devices and information systems, but provided by the employees of provincial tobacco factories. There are certain deficiencies in the breadth, quality and timeliness of information, which brings great resistance to supervision. At the same time, it is difficult to avoid the data being maliciously modified. Intelligent application is based on the collection and analysis of massive real-time high-quality data. However, restricted by many problems in the data collection process of domestic tobacco industry, it is difficult to improve the intelligent application to a higher level in a short time.

(4) it cannot reflect the scale effect of the overall operation. With the support of Internet of things technology, the Tobacco Monopoly Bureau can label all the products, equipment, practitioners,
tobacco enterprises, logistics service providers and other things involved in the industry with information, so as to carry out real-time management and unified scheduling, to ensure the full use of resources and play the scale effect of the overall operation. However, the application of Internet of things technology in the domestic tobacco industry is more limited in the storage and logistics links, and there is still a large gap from the standards required by intelligent manufacturing.

(5) there is no effective intelligent factory landing path. The 3D visualization, intelligent sorting and storage supported by RFID technology adopted by domestic cigarette factories belong to local intelligence and have not yet created an intelligent factory with overall intelligent production management level.

In the future, in addition to the above pain points, the domestic tobacco industry needs to strengthen the research and application of new generation information technology, such as big data and cloud computing, to achieve lean management. At the same time of developing intelligent manufacturing, tobacco enterprises also need to innovate management mode, organize production according to consumption demand and market environment, cultivate excellent talents, encourage employees to actively explore new fields, and promote the substantial growth of production efficiency and economic benefits.

Tobacco enterprises need to further speed up the construction process of intelligent factories to build a system platform with high matching degree, information management system and other infrastructure. Integrate the communication facilities, sensor equipment, intelligent control system, embedded analysis system, etc., and manage them through the cloud platform, so that people, equipment and services can interact in real time, providing strong support for the realization of intelligent production.

In the process of development and practice, tobacco enterprises should do a good job in overall layout and orderly promote the development and research of pilot projects. Encourage employees to actively use the new generation of information technology such as big data and cloud computing, as well as all kinds of advanced equipment, to realize the intelligent factory and the Internet interaction of all tobacco enterprises. We will fully integrate a series of links such as tobacco planting, cigarette production, storage and logistics, product sales and after-sales service, create a tobacco intelligent network covering the entire tobacco industry, and promote the maturity of China's tobacco industry.

4. Thoughts on the Construction of Intelligent Information in Cigarette Production
In the traditional MES system, the real-time interaction of people, equipment and products is the core foundation for the smooth operation of MES system. The same is true for intelligent information construction. Tobacco enterprises should be guided by the optimization of industrial value chain, pursue the customized production of products for the needs of users, highly integrate and make full use of resources, and strive for the maximization of economic and social benefits. From the development direction of information intelligence, the introduction and application of artificial intelligence, big data, Internet of things and other advanced technologies are bound to be the future direction. Therefore, in the construction of intelligent information for cigarette production, we can achieve more effective intelligent transformation on the basis of MES system, combined with the specific application of these directions in production. Specific to cigarette production enterprises, tobacco production intelligence, logistics distribution intelligence, enterprise management big data analysis, are the starting points.

4.1 Tobacco Intelligent Production Line
The intelligent production line of tobacco should meet the food safety standards, have digital traceability and full automatic control functions, and meet the requirements of environmental protection and sustainability. At the same time, in order to improve the competitiveness of tobacco products in the international market, it should also meet the EU standards. This kind of intelligent production line can do fine processing, strict control and flexible production, and has obvious advantages in fully meeting the personalized needs of users. Specifically, the tobacco intelligent
production line has the following characteristics.

Intelligent multi line machining. Due to the differences of climate, soil and other conditions in different regions, the tobacco leaves in different regions are obviously different. However, the traditional tobacco production line does not consider this difference, but directly uses a set of general processing technology for production, which is difficult to give full play to the inherent characteristics of tobacco products in different regions. The intelligent production line can use the intelligent multi line processing mode, and adopt the corresponding processing technology according to the characteristics of tobacco. It can not only ensure the quality of tobacco, but also reflect the unique charm of tobacco in each producing area.

Intelligent feeding. The traditional way of tobacco processing is easy to cause a large range of fluctuations in the quality of tobacco, and the intelligent production line can guarantee the stability of tobacco quality through intelligent feeding and other ways. Taking intelligent feeding as an example, first of all, the intelligent production line can achieve multi process addition to ensure the stability and uniformity of raw materials. Secondly, the intelligent production line adopts the international logistics standard identification system, which can label each equipment with information, so it has the whole traceability ability. Finally, the intelligent production line adopts the double system feeding equipment, which can effectively avoid many problems such as debris, raw material management confusion and so on.

Intelligent laser leaf selection. The intelligent production line will use laser leaf selection technology to strictly screen according to the shape, color and spectrum of tobacco, so as to ensure the quality of tobacco to the greatest extent.

Intelligent cut tobacco drying. In the traditional tobacco production line, the drying process does not distinguish the quality and category of tobacco, but deals with them in a unified way, which is easy to cause product quality problems. The intelligent production line uses new drying equipment to develop different drying mode for different categories and different quality of tobacco, and uses short-term low-temperature light treatment technology, which can reduce the loss of tobacco fragrance and improve the quality of tobacco.

Intelligent storage and tobacco leaf aging. The intelligent production line can strictly control the temperature, humidity and other indicators in the production process, ensure that the tobacco is in the best environment, and make it fully mellow in the processing process. At the same time, the intelligent production line will use the most advanced international wooden box to store the tobacco separately, and introduce the laser guided intelligent car in the production logistics link.

4.2 Lean Management in Big Data Environment

In the process of cigarette production, through building a production performance measurement and analysis platform supported by data warehouse technology, this paper makes a comprehensive and three-dimensional in-depth analysis on several major indicators, such as production material consumption index, quality index, equipment comprehensive efficiency, inventory turnover times, etc. At the same time, collect and process the real-time data in cigarette production, find out potential production problems, and quickly develop effective solutions to fully improve the efficiency and quality of cigarette production.

Taking the comprehensive efficiency index of equipment as an example, through the production performance measurement and analysis platform, we can analyze the data in a certain period, region and factory, analyze the comprehensive efficiency data of different equipment in different time periods, regions and even the same factory, and use big data technology to process these data, find the root of the problem, and achieve fine management.

The application of big data technology makes full use of the massive data resources accumulated by tobacco enterprises. Its in-depth application in all aspects of the business process of tobacco enterprises will greatly improve business efficiency and stability, and ensure that individuals and organizations participating in the value chain can be interconnected.

As a new product in the field of data acquisition and control, the Internet of things technology is
best suited to each control box data acquisition scenario. The original manual data collection, processing and decision-making are more efficient when they are handed over to the Internet of things. Take logistics as an example: the Internet of things technology is used to transform and upgrade the logistics link, greatly improve the efficiency of logistics distribution, realize scientific, efficient and refined management, reduce the loss of tobacco products in the logistics link, and enable enterprises to have a stronger market competitiveness. In the future, the tobacco industry will build a highly efficient, cooperative and traceable service network, strengthen the ability of tobacco supply chain management, more scientifically and reasonably allocate various resources such as raw materials, equipment, technology, talents and funds, so as to comprehensively improve the value creation ability and service level of enterprises.

5. Conclusion
In the process of digital production, cigarette manufacturers have preliminarily explored the application of MES, and have achieved some results. In terms of information intelligence, MES needs to be transformed to some extent. Through intelligent transformation of specific production business, decision-making analysis of big data application, and gradual improvement of business operation efficiency by means of Internet of things are the next development direction of intelligent and digitalization.

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