Research on Talent Ability Demand under Man-Machine Cooperation Interface of Intelligent Manufacturing Enterprises

Zeshuang Liu[1], Jin Han[1,*], Yifan Wang[2]

[1] Xi'an University of Technology, Xi'an, Shaanxi 710054, China

[2] School of Economics and Management, Shihezi University, Shihezi, Xinjiang Uygur Autonomous Region 832003, China

hanzhengyi0916@126.com

*Corresponding author

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Abstract: The introduction of machines and human cooperation in intelligent manufacturing enterprises can give full play to their respective advantages, significantly improve production efficiency, work comfort and reduce costs. However, the total amount of human-computer cooperation related talents is insufficient, the distribution is unbalanced and the structure is unreasonable, so it is impossible to match the human-computer cooperation talents with the development of intelligent manufacturing. Accordingly, this paper obtains the talent ability demand information under the man-machine cooperation interface of intelligent manufacturing enterprises. The analysis results show that when intelligent manufacturing enterprises recruit man-machine cooperation talents, they have a higher demand for compound talents with production management skills and intelligent knowledge, and pay the most attention to the solid level of basic knowledge and the overall quality level of talents.

1. Introduction

With the rapid development of China's manufacturing industry, the requirements for industrial production quality and efficiency are higher and higher. It is inevitable to introduce intelligent technology into the production site. Through learning and development, artificial intelligence has become an important link in the intelligent production process of enterprises. Human beings can establish cooperative relations with AI. Nowadays, all countries in the world are actively using man-machine cooperation in the manufacturing industry. In order to keep up with the pace of the times and accelerate the construction of intelligent manufacturing, China must cultivate excellent talents of man-machine cooperation to adapt to the development of manufacturing industry in the future. Therefore, it is necessary to analyze and study the impact of talent demand under the man-machine cooperation interface of manufacturing industry.

2. Overview

Chinese scholars mainly focus on the reference of relevant foreign research and the exploration of the reasons for the shortage of human-computer cooperation skilled talents in the environment of transformation and upgrading of domestic manufacturing industry. Some scholars have studied the skill shortage management in Germany, Britain, the United States and other countries, and put forward the enlightenment of China's skill shortage management [1]. Sang Lei analyzed the impact of skill shortage on the continuous promotion of "made in China 2025", and put forward the treatment plan according to practical experience [2]. Some scholars believe that insufficient investment in enterprise training, low income of professional and skilled talents, excessive work pressure and deviation in professional training direction will lead to the scarcity of some skilled talents to a certain extent [3]. They put forward that the lack of overall coordination in the training of skilled talents, the disconnection between industrial enterprises and the training of skilled talents

and the lack of attraction of skilled posts are the main factors causing the shortage of skills. They also suggest reforming the management system of vocational education, encouraging enterprises to participate and reforming the labor and personnel system. In order to train human-computer cooperation skilled talents for jobs, we must pay attention to students' mastery of machine knowledge and skills [4]. Although the popularization of artificial intelligence technology has become the trend of social development, there will still be unbalanced investment in enterprises and schools, and the skill training of technical school students can't be effectively implemented [5]. In the context of intelligent manufacturing, the role of human will change from the service provider and operator in the traditional manufacturing industry to the planner, coordinator, evaluator and decision-maker [6]. The talent training mode under the man-machine cooperation interface will also further transform with the development and changes of the intelligent era. To sum up, the existing studies mainly analyze the talent training of human-computer cooperation from the perspective of theory and experience, and less from the perspective of empirical research. This study intends to explore the needs of enterprises for human-computer cooperation talents from an objective perspective, that is, the actual recruitment needs of enterprises, with the help of relevant tools of data analysis.

3. Distribution and Recovery of Questionnaires

After the questionnaire was designed, 60 questionnaires were distributed to pre-test first. After simple validity analysis, the mismatched items were removed and the questionnaire was revised. The official questionnaire was distributed on October 2, 2021 and the recovery time was four months. The questionnaires were distributed online through WeChat, e-mail, microblog and other channels by means of convenient sampling and snowball. The offline means mainly relied on MBA and EMBA students of the University under the recommendation of tutors, and with their help, the questionnaires were distributed and recovered. The subjects of the study randomly selected manufacturing enterprises in four places with relatively developed and intensive manufacturing industries in Jiangsu, Shanghai, Anhui and Shaanxi. The questionnaires covered 16 prefecture level cities and 12 manufacturing enterprises, all of which were leaders in the industry. The distribution objects were the enterprise leadership, and 248 valid questionnaires were recovered, with a recovery rate of 86% and a total effective rate of 95%.

4. Analysis of Survey Data

4.1 Current Situation of Talent Capacity Demand

The talents of human-computer cooperation interface of enterprises are mainly concentrated in engineering majors. 83.2% of the surveyed companies have the demand to continue to introduce human-computer cooperation related talents, 39.2% of enterprises believe that it is appropriate to introduce less than 10 people, and human-computer cooperation talents are more needed for professional technical operation posts than senior management posts. 37.6% of enterprises introduced human-computer cooperation talents through head-hunting companies, 53.6% through on-site recruitment, 28% through recruitment outside the province, 48% entrusted government employment and talent service departments for recruitment, and 57.6% directly accepted fresh graduates to include talents in human-computer cooperation related majors.

At present, enterprises have the following talent demand tendencies in recruitment. First, they prefer compound human-computer cooperation talents. Among the sample enterprises, 63.2% and 57.6% of the enterprises require employees to have education and skill certificates respectively, 57.6% of the enterprises put forward the demand for graduates to have innovation ability and teamwork spirit, and 36% of the enterprises require graduates to have communication skills and interpersonal skills, respectively 33.6% and 19.2% of enterprises put forward the ability requirements for employees to master computer and foreign language skills. The market's professional demand for human-computer cooperation talents is changing, which puts forward new

requirements for graduates' interdisciplinary, cross language and cross industry abilities. Secondly, practical human-computer cooperation talents are favored. For engineering professionals such as automation and computer, it is needless to say the role and significance of man-machine practice activities, and the survey results also prove this. 26.4% of enterprises prefer candidates with work experience, especially those with foreign work experience.

4.2 Correlation between Job Category and Competency Requirements

There is a significant correlation between the human-computer cooperation position category of the enterprise and the applicant's education, graduation college, work experience, ability and quality requirements. The chi square test results are greater than 0.05. According to the importance ranking of the requirements of each position category according to the linear correlation value, it is found that: ability and quality requirements (0.519) > education (0.237) > graduation college (0.179) > work experience (0.142). It can be seen that in the human-computer cooperation talent position of manufacturing enterprises, the candidate's ability, quality and education are the most valued. In addition, there is an obvious direct correlation between ability, quality, education and job category, followed by the level of graduation institutions and work experience. This result is different from the traditional cognition of enterprise managers and the public on human-computer cooperation professionals. Enterprises and employees generally believe that enterprises will pay more attention to the work experience of human-computer cooperation talents, and the ability and quality and other abilities can be cultivated after entering the job, or only pay attention to skills, rather than pay too much attention to the educational background and graduation college of job seekers. However, the survey results are opposite. It is worth pondering.

4.3 Relevance between Enterprise Cognition and Future Development of Man-Machine Cooperation

There is a significant positive correlation between the view of man-machine advantage and talent training mode, as well as the development direction and prospect of man-machine cooperation. 67.44% of enterprises believe that people and machines have their own advantages and can cooperate, and the relevant talent training methods mainly rely on schools and institutions, followed by enterprises, self-study and other methods. 49.61% and 37.98% of enterprises believe that intelligence and efficiency are the core objectives of enterprise man-machine cooperation. There is a significant positive correlation between talent training mode and the difficulties encountered by enterprises in man-machine cooperation, core technology and future cooperation trend. 50.39% of enterprises prefer machines to provide choices and suggestions, and human decision-making; 20.16% of enterprises prefer machines to make decisions and implement them, and notify humans afterwards; Only 11.63% of enterprises will notify human beings if necessary. It can be seen that human beings either prefer to control the decision-making power in their own hands, or hand it over to machines to liberate themselves.

The difficulties encountered by enterprises in man-machine cooperation include: lack of innovation (30.23%), lack of perfect system (29.46%), lack of clear research direction (24.81%), lack of cooperation among enterprises (15.5%), etc. These enterprise disadvantages will affect whether enterprises choose to fully cooperate with machines and the way of cooperation. It will also affect whether the core technology adopted by the enterprise in the future is multi-dimensional perception (65.12%), mechanism design (22.48%) or place monitoring (12.4%), which also affects the vision of the enterprise for its own development of man-machine intelligent cooperation (49.23%), man-machine efficient cooperation (37.69%) and man-machine friendly cooperation (13.8%).

The results show that the cognition of enterprise managers has an important impact on the core technology of human-computer cooperation, the training mode of human-computer cooperation talents, the trend and Prospect of human-computer cooperation in the future. At the same time, the factors considered when the enterprise managers lead the team to study the man-machine cooperation, the educational level of the enterprise employees, and the safety core standards for the enterprise to build the man-machine cooperation are also significantly positively correlated with the

man-machine matching mode selected by the enterprise.

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