

Analysis of Social Impact of Smart Port on Workers' Employment

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Abstract: With the continuous development of science and technology, smart port, as a new port management model, has been applied worldwide. This paper aims to analyze the necessity of the construction and development of smart ports from the existing problems of traditional port operations and make a comparative study of the advantages and disadvantages of smart port development on workers' employment. Through relevant research, targeted measures and suggestions can be put forward to alleviate the negative impact of smart port construction on workers' employment, and promote the sustainable development of smart ports, and improve the employment level of workers.

Keywords: Smart port, Social impact, Worker employment, Response measures.

1. Introduction

The port has always been an indispensable part of the transportation system, and the continuous development of artificial intelligence technology has accelerated the intelligent construction process of the port, and the vigorous development of the smart port has effectively improved the pain points of the traditional port, such as large security risks, low efficiency, and large environmental pollution. The process of automatic transformation of traditional ports, also leads to the upgrading or loss of traditional jobs, resulting in social problems such as increased employment pressure or unemployment of workers. Since the port of Rotterdam in the Netherlands, the largest port in Europe, where workers went on strike in 2016 to protest competition from robots, similar strikes have repeatedly occurred in major ports in the United States, the United Kingdom, and Germany in recent years, putting the global maritime supply chain at great risk. "One of the threats that robots pose to people is taking their jobs." Therefore, in the process of promoting the construction of smart ports, how to effectively mitigate the social impact is of great importance.

Modern society has entered the information age, and the rapid development of artificial intelligence provides technical support for the progress and development of human society, but some scholars hold a negative attitude toward intelligent construction. Jiang Nanping pointed out that with the development of artificial intelligence, traditional industries in China's second and third industries have become the hardest hit areas of unemployment [1]. McKinsey research report points out that new technologies may replace 60% of occupations in the future, and 30% of jobs in different industries will be replaced by automation technology by 2030 [2]. Qu Xiaobo believes that when artificial intelligence replaces physical work tasks, it increases the automation of intellectual labor positions, and more jobs will be replaced by artificial intelligence technology [3]. Some scholars are optimistic, that although intelligent construction will have a certain substitution effect on workers' employment, it can create and generate more forms of jobs, and in the long run, the artificial intelligence creation effect is greater than the substitution effect, and will not have too much impact on

workers' employment.

To sum up, the social impact of smart port construction on workers' employment is a complex and diverse issue. Based on in-depth analysis and discussion of the necessity of the intelligent transformation of traditional ports and the social impact of the intelligent transformation of traditional ports on workers' employment, this paper will propose corresponding solutions to enable workers to better adapt to the intelligent transformation of traditional ports and promote the sustainable development of the construction of smart ports.

2. The Necessity of Intelligent Transformation of Traditional Ports

The traditional port is a labor-intensive and technology-intensive industry. The port operation is difficult, the schedule is tight, and the quality of management and operators is not high. Many points, long lines, wide areas, and dangerous and harmful factors constitute a major feature of port enterprise safety management. The continuous integration of diversified industries brings more challenges to the safety management of port enterprises.

2.1. Security Issues

According to the International Labour Organization, port cargo handling is one of the most dangerous occupations in the world. Traditional port workers face multiple hazards, including environmental risks such as heavy machinery, hazardous substances, noise, heat, and air quality. These hazards can lead to accidents, injuries, long-term illness, and death, causing suffering to workers and reducing productivity. Long-term exposure to occupational hazards can lead to health problems such as musculoskeletal disorders, hearing damage, respiratory diseases, and cancer among traditional port workers.

2.2. High-intensity Work

Traditional port work is characterized by physical labor such as loading and unloading heavy cargo, which can lead to excessive workloads, stress, and fatigue. These factors can negatively impact workers' mental and physical health, resulting in high absenteeism, low job satisfaction, and

limited productivity. In addition, repeated uncomfortable postures can lead to musculoskeletal disorders in workers, resulting in injuries and chronic pain, increasing the number of days missed from work and further reducing productivity.

2.3. Limited Opportunities

Many traditional port jobs are low-skilled and lack career development, skills training or promotion opportunities. As a result, workers may feel low job satisfaction, limited opportunities for advancement, and lack motivation to improve performance. This will lead to high employee turnover, negatively impacting productivity and industry stability.

3. The Impact of Smart Port Construction on Workers' Employment

The rapid development of port construction has a profound impact on workers' employment. The following table is a comparative analysis of the favorable and unfavorable impacts of smart port construction on workers' employment:

Table 1. The impact of the smart port on workers' employment

	Favorable effect	Adverse effect
Employment Opportunity	Bring new opportunities to the job market.	It is difficult to form a large-scale labor demand [4].
Skill demand	Upgrade the skill level of workers, high-quality employment [5].	Digital devices and systems perform work at a higher quality than workers [6].
Working environment	Reduce the occurrence of accidents.	Adds a sense of urgency and stress to the work environment.
Work efficiency	Automation technology increases work efficiency and Reduce workers' working hours [7].	The labor productivity of traditional port workers is relatively low, and some traditional posts are easy to be replaced.
Work intensity	Digital equipment and systems to reduce excessive physical labor.	Automation technology and intelligent systems lead to higher work stress for workers.

As can be seen from the above table, the impact of smart port construction on workers' employment is a double effect. Although it has brought some positive aspects, such as new employment opportunities and a reduction in manual labor, there are also some negative aspects, such as fewer jobs and changes in skill demand. In the process of promoting the construction of smart ports, appropriate policies and measures need to be taken to ensure workers' employment rights, skills training, and career transition support.

4. Employment Security Measures for Port Workers

The ultimate impact of the development of smart port construction on workers' employment depends not only on the technological development itself but also on the policy choices of the state and the behavior of enterprises and workers. Therefore, the state should join hands with

enterprises and workers to jointly deal with the challenges brought by the development of smart port construction, and seize the opportunities brought by smart port construction and development, so that port workers can better benefit from technological changes.

4.1. Establish a Sound Training and Education System

Personalized training plans: By establishing personalized training plans, the government and enterprises can better meet the needs of different workers, and improve the effectiveness of training and the learning experience of workers. This personalized approach to training helps to promote the career development and adaptability of workers, improving their employment opportunities and competitiveness.

Close tracking and feedback: Workers' learning progress and adaptability needs can be better met through training programs that include close tracking and feedback mechanisms. This focus on the individual differences and learning progress of workers helps to enhance the effectiveness of training and the learning experience of workers, facilitating their smooth adjustment to career development during the transition process.

Leveraging online education: With online education and distance learning tools, governments can increase the flexibility of training, allowing workers to learn on their schedule. This flexible training approach can better adapt to the needs and living conditions of workers and improve their learning outcomes and career development opportunities. At the same time, it also helps to promote the application and popularization of digital technologies and promote the digital transformation and sustainable development of society [8].

4.2. Social Security and Welfare Measures

Social innovation: The government can encourage social innovation by supporting the sharing economy welfare system, promoting flexible social security schemes, supporting social innovation and entrepreneurship, and promoting cross-sectoral cooperation to seek new social security models that better meet the needs of workers.

Real-life policies: Policies should be formulated with a deep understanding of the actual living conditions and needs of workers to ensure that policies can effectively address the economic difficulties of workers during the transition period. By having a deeper understanding of the actual living conditions and needs of workers, the government can formulate more realistic policies to effectively solve the economic difficulties of workers during the transition period. Such people-centered policymaking can improve the viability and sustainability of policies and promote stable employment and economic well-being of workers.

4.3. Establish Multi-Party Cooperation

Continuous dialogue and consultation: Multi-party cooperation mechanisms should be continuous to adapt to changing circumstances and needs. Dialogue and consultation between government, business, and trade unions should become the norm to ensure policy flexibility and sustainability [9].

Participation in social organizations: By actively including NGOs and social organizations, the government can gain broader perspectives and resource support, and promote cooperation opportunities and resource sharing. This diversity of participation and cooperation helps to develop more

inclusive and sustainable policies that better meet the real living conditions and needs of workers during the transition period.

Periodic evaluation of policies: By establishing a mechanism for periodic evaluation of policies, the government can promptly understand the effects of policies and make necessary revisions based on the evaluation results. Such a mechanism can ensure the adaptability and sustainability of policies, better address the economic difficulties of workers during the transition period, and promote social stability and sustainable development.

Through these optimizations, governments, businesses, and unions can better respond to the changes brought about by smart ports, ensure that workers are properly supported during the transition, and mitigate potential social impacts. This will contribute to the sustainable development of smart ports while ensuring that the well-being of workers is fully safeguarded.

The development of smart ports has a multifaceted impact on the job market for workers, working conditions, and social well-being. While it brings opportunities, it also raises challenges. Policymakers, businesses, and trade unions should work closely together to ensure that port workers can benefit from the benefits of smart ports while mitigating possible negative social impacts. Through ongoing training and career development opportunities, workers can better adapt to technological change, creating a more prosperous and secure future.

5. Concluding Remarks

The impact of smart port construction on workers' employment is a complex issue that presents both challenges and new opportunities. To cope with this impact, the government, employers, and workers need to work together to develop appropriate policies and measures to ensure that the interests of workers are fully protected and provide them

with opportunities for job transfer and training to adapt to the changes in the construction of smart ports so that port workers can better adapt to technological changes.

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