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The Impact of Artificial Intelligence Advancements on the Job Market and Potential Unemployment Risks

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Abstract: Artificial intelligence (AI) has now permeated many aspects of our lives, becoming a defining global trend in technological development. From healthcare and education to finance and transportation, AI is revolutionizing industries and reshaping the way we live, work, and interact. Its ability to process vast amounts of data, learn from patterns, and make intelligent decisions has unlocked unprecedented opportunities for innovation and efficiency. However, this rapid advancement also raises critical questions about its societal, economic, and ethical implications. This article will explore and analyze the underlying principles behind this phenomenon, examining how AI technologies such as machine learning, natural language processing, and computer vision are driving transformative changes.

1. Definition and Development of Artificial Intelligence

What is artificial intelligence? AI is a new technological science that studies and develops theories, methods, techniques, and application systems for simulating, extending, and expanding human intelligence. In simpler terms, AI is a way of mimicking human intellectual behavior through technology. The development of AI was actually laid with the birth of the first computer. However, its development has been very tortuous, as shown in the following figure[1].

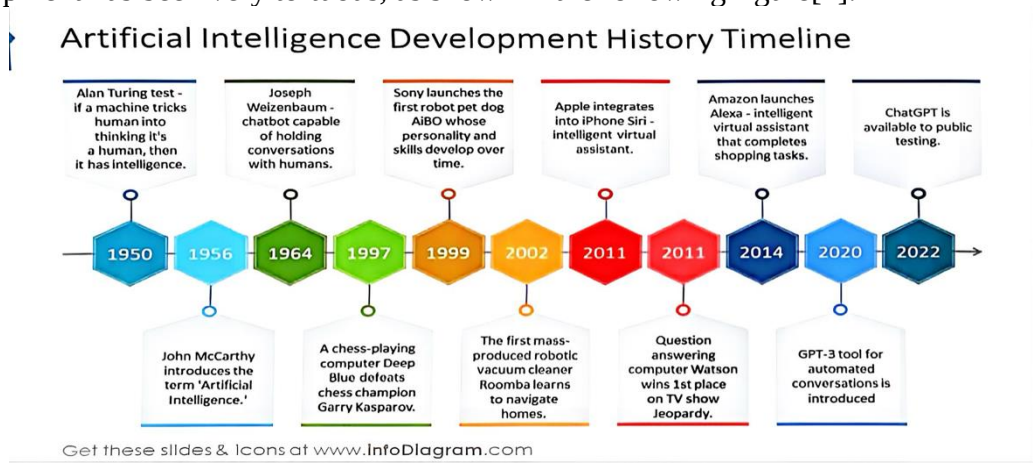

Figure 1 Artificial intelligence development history timeline

2. Economy is the foundation of AI and progresses together with it

The saying "the economic base determines the superstructure" applies to AI as well. In the early 1950s, the post-war economic recovery and reconstruction phase provided the necessary economic support for the initial development of AI. However, the limited economic strength at that time meant that its development was relatively slow[2]. Later, the global economy experienced the oil crisis and economic recession. Companies became more cautious in their investments, and funding for emerging technologies was affected[3].

At the same time, technical bottlenecks and market demand restrictions led to a low point in AI development. It was not until the early 21st century, when the global economy gradually recovered, the information technology industry rapidly developed, and the Internet became widespread, that new opportunities for AI development emerged, leading to its current boom.

During this period of AI development, I found that the economy is an important factor. It affects the progress of AI technology and indirectly determines the extent of its impact on our lives. So, why does AI now lead to job losses, and why didn't this happen in the past?

3. AI and Unemployment

An important factor behind this is the economy, especially the imbalance of supply and demand. The Great Depression of 1930 and the oil crisis of 1970 are the most obvious examples. During the Great Depression in 1930, the economic downturn led to an imbalance in supply and demand. There was an excess of supply and a lack of demand, which caused almost every country to reach its peak unemployment rate(Figure2).

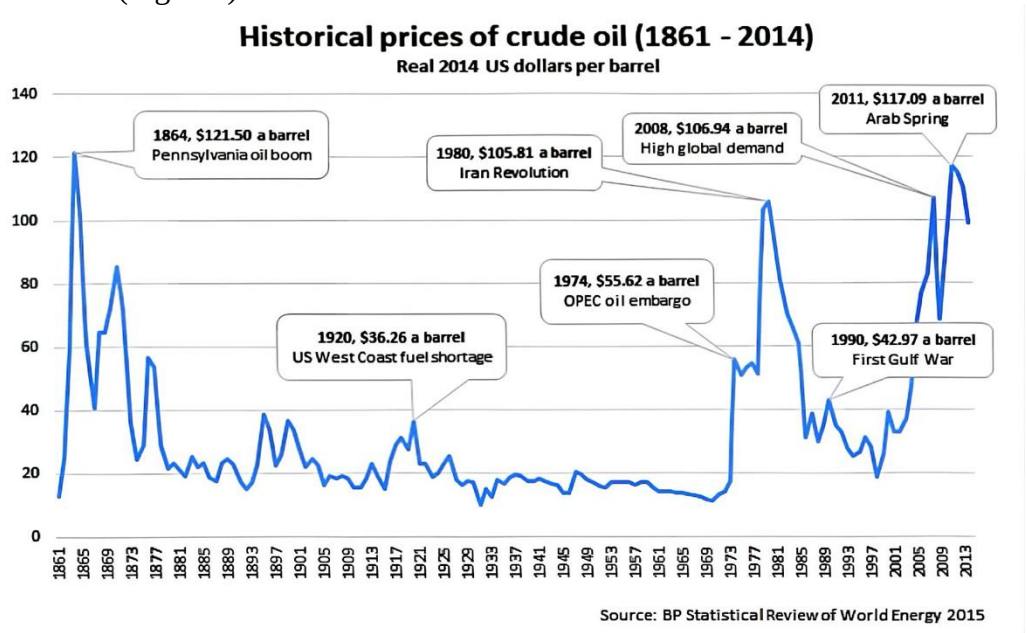

Figure 2 historical prices of crude oil

During the Great Depression in 1930, the economic downturn led to an imbalance in supply and demand. There was an excess of supply and a lack of demand, which caused almost every country to reach its peak unemployment rate.

In 1970, the oil crisis, which was caused by changes in natural resources, led to the scarcity of resources and a continuous rise in prices. The sharp increase in oil prices led to a significant rise in production costs. In order to cope with the increased costs, companies had to take measures such as layoffs to reduce costs, which directly led to an increase in unemployment rates. For example, the

unemployment rate in the United States rose from 4.9% in 1973 to 8.5% in 1975. This shows that during the oil crisis, a large number of workers in the United States lost their jobs(Figure3).

However, advancements in AI and machine learning are expected to significantly enhance the efficiency of oil exploration and production. This could lead to lower production costs and potentially lower oil prices in the long run[4].

Figure 3 United States unemployment rate

In the past, when the global economy was immature and unstable, AI was not mature enough to directly affect unemployment rates[5]. However, in the early 21st century, as the global economy gradually recovered, the information technology industry rapidly developed, and the Internet became widespread, new opportunities for AI development emerged. AI has been significantly enhanced, but its progress also poses a threat to some positions[6]. Currently, AI is still in the era of soft intelligence. It is constantly learning and improving. Its development at this stage will only threaten some low-skilled labor workers, because their job content does not require the same level of knowledge and creativity as that of programmers[7].

4. AI and the Future

In this era of AI progress, some people argue that the development of AI leads to unemployment among many workers. However, it also brings employment opportunities. According to a report by PwC, by 2030, AI is expected to boost China's GDP by 26.1% and North America's GDP by 14.5%. Moreover, AI technology will create new job opportunities, especially in the service and construction industries(Figure4).

The biggest impact is that AI technology may lead to structural unemployment. The rise of AI and automation is leading to a fundamental shift in the nature of work. As traditional jobs become obsolete, new forms of employment are emerging, characterized by greater flexibility and the need for advanced technical skills[7].

This means that certain positions will be replaced by automated technology, while the newly created positions may require different skill sets, leading to a mismatch in the labor market.

For example, low-end labor in manufacturing and service industries may be squeezed out by AI technology, while high-skilled labor may gain more opportunities due to technological development(4). (Figure 5)

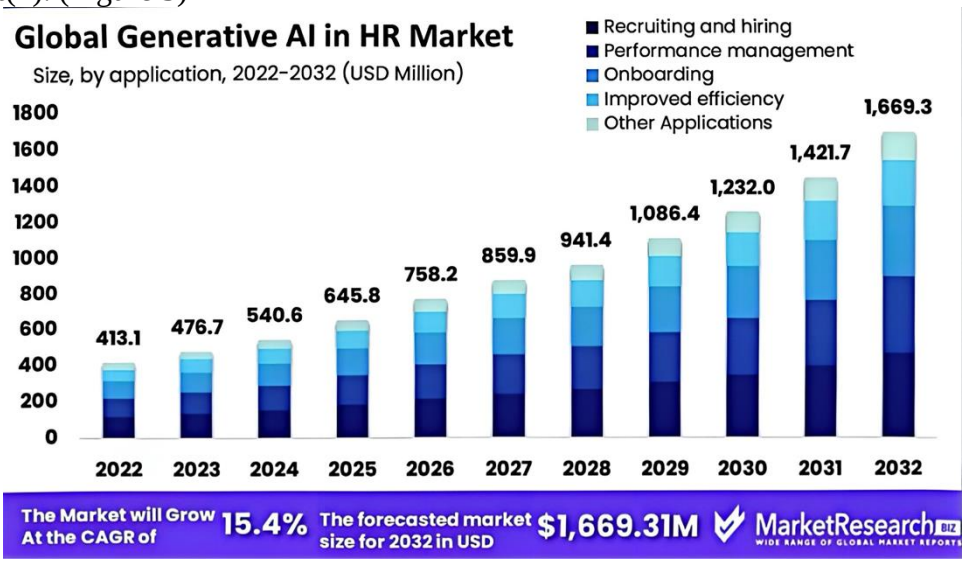

Figure 4 How AI will affect the job market

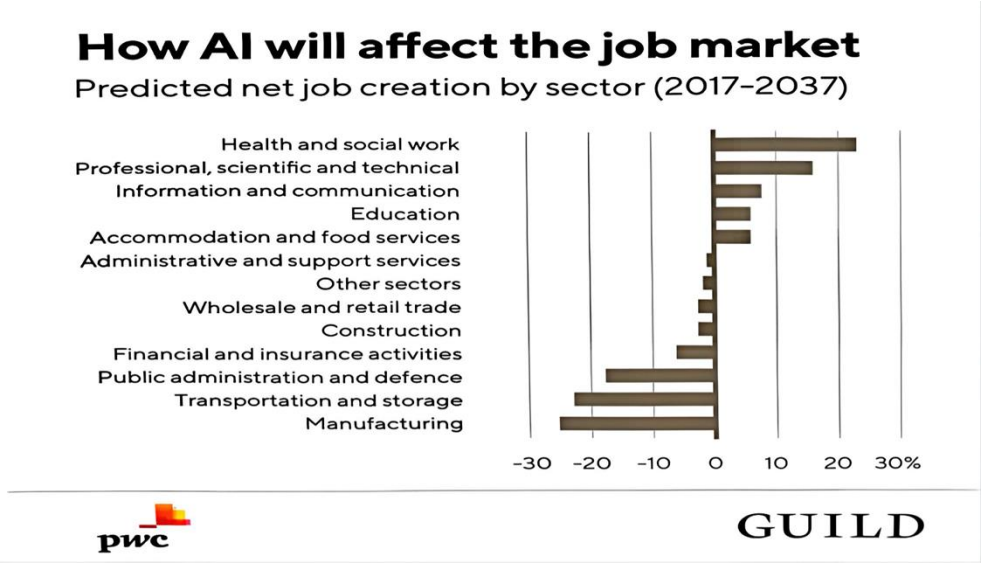

Figure 5 Global generation AI in HR market

However, as time progresses, the positive impact of AI and digital transformation on employment will rapidly expand.The study finds that while AI and machine learning have the potential to significantly increase productivity, they also pose a risk of job displacement in certain sectors. However, the overall impact on unemployment rates is mitigated by the creation of new job and categories the shift towards more knowledge-intensive industries[8]. The number of new job positions is expected to increase from 68.75 million in 2025 to 170 million in 2035. These new positions include AI engineering technicians, IoT engineering technicians, big data engineering technicians, cloud computing engineering technicians, and digital management specialists.

Education and Training: Enhancing the skill level and adaptability of workers, reforming the education system and curriculum, and cultivating digital literacy, innovative thinking, cross-disciplinary knowledge, and general skills.

Policy Guidance: Governments should increase support for the AI industry, promote the widespread application of AI technology in various industries, and improve employment service systems to provide support for unemployed or retrained workers[9].

Technological Innovation: Companies should increase investment in AI research and application, explore new models and methods, improve production efficiency and product quality, and provide on-the-job training and retraining for employees.

Social Security System: Improve the social security system to provide income protection for the unemployed. As automation and AI continue to advance, the need for a universal basic income becomes increasingly urgent. It serves as a social safety net, ensuring that individuals are not left destitute due to job displacement.

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