THE ROLE OF ROBOTICS IN SUSTAINABLE DEVELOPMENT

Nozanin Makhmudjonova
student, Samarkand state Institute of Foreign Languages Republic of Uzbekistan, Samarkand

Abstract :*The integration of robotics into various sectors has emerged as a crucial factor in advancing sustainable development. This article explores the multifaceted role of robotics in job displacement, job creation, increased efficiency, quality of life and education. By examining the impact of robotics on society, we highlight both the benefits— such as cost efficiency, enhanced quality control, operating in dangerous environments—and the drawbacks, including potential job displacement and initial investment cost.*

Keywords: *Job displacement, automation, skilled workers, economic growth, healthcare assistance, profit margins, innovation.*

INTRODUCTION

In recent years, robots have become a bigger part of our daily lives thanks to rapid technological advancements. Unlike the scary robots often shown in movies, these machines are helpful tools that make difficult tasks easier for us. You can find robots in many areas, like manufacturing and healthcare, where they improve efficiency and productivity. However, this fast growth also brings challenges. Automation raises concerns about job loss and the need for new skills, even as it creates new jobs and industries. In this discussion, we will look at how robotics is changing our economy, improving our lives, and transforming the way we work and interact.

The impact of Robotics in society

The presence of robots in society has surged significantly in recent years, thanks to technological and robotic advancements. These machines can simplify our lives by handling tasks that might be challenging or unfeasible for humans to accomplish alone. Although some individuals might still perceive robots as frightening or threatening entities that could potentially dominate the world, they have actually become essential to our everyday routines, often without us even noticing.

MEP Merja Kyllönen gave an optimistic perspective to the development of robotics and the benefits they can bring to society: “Robotics is often seen as a threat and as the reason why there is less employment in many sectors. But societies are able to adapt as they have in the last three industrial revolutions. We do, however, need new types of knowledge, skills, and changes in our education system and terms of employment. These changes need to be well led and managed.”

While Finnish MEP Merja Kyllönen presents an optimistic view on the development of robotics, there are significant concerns that suggest a more cautious perspective.

My humble opinion is that the fear that robotics will lead to job displacement is not unfounded. Many industries are already experiencing significant layoffs due to automation, and the pace of technological advancement may outstrip society's ability to adapt. Historical examples of industrial revolutions often gloss over the immediate suffering of those whose jobs were lost, and it's unclear if new job creation can keep pace with the losses.

Robotics has a profound influence on various aspects of the economy, bringing both challenges and opportunities.

1. Job Displacement

• Automation of Routine Tasks: Many industries, particularly manufacturing, have increasingly adopted robotics to automate repetitive tasks. This can lead to significant job displacement as machines replace human labor in assembly lines, quality control, and packaging processes. For example, automotive manufacturing plants often utilize robots for welding and painting, reducing the need for manual labor.

• Sector-Specific Impacts: Job displacement is most pronounced in sectors where tasks are routine and predictable. Industries such as textiles, food processing, and warehousing have seen substantial reductions in workforce due to the adoption of robotic systems.

2. Job Creation

• Emergence of New Roles: While robotics can displace certain jobs, it also creates new opportunities. The demand for skilled workers in robotics development, programming, maintenance, and operation is on the rise. Roles such as robotic engineers, data analysts, and software developers are becoming increasingly important.

• Support Industries: The growth of robotics technology leads to the expansion of support industries, including research and development firms, training institutions, and consulting services focused on automation solutions.

3. Increased Efficiency

Brooks has argued that robots will become an integral part of society, much like personal computers. He believes robotics can assist in healthcare, education, and household tasks, but he stresses that robots should be seen as tools that assist humans rather than replace them entirely.

I appreciate Brooks' pragmatic approach to robotics as tools that enhance human capabilities rather than replace them. His vision aligns with the historical integration of technology into daily life, suggesting that robots can improve efficiency and quality of life in various sectors. However, I believe it's essential to remain vigilant about the potential for job displacement and ensure that society invests in reskilling workers to adapt to these changes. Brooks' emphasis on robots as assistants is reassuring, but it must be coupled with proactive measures to address the societal impacts of widespread automation.

• Enhanced Productivity: Robotics significantly boosts productivity by performing tasks faster and with greater precision than human workers. This can lead to increased output and efficiency across various sectors, including manufacturing, logistics, and agriculture.

4. Healthcare Assistance:

• Elderly Care: Robots such as companion robots and assistive devices are increasingly used to help the elderly. They can provide companionship, monitor health conditions, remind patients to take medications, and even assist with mobility. This helps reduce feelings of loneliness and enhances overall well-being.

• Rehabilitation: Robotic exoskeletons and rehabilitation robots aid in physical therapy, helping patients recover from injuries or surgeries. These devices can provide tailored exercises, improve mobility, and track progress, making rehabilitation more effective.

• Surgical Robots: Advanced surgical robots enhance precision in operations, leading to less invasive procedures, shorter recovery times, and improved patient outcomes.

• Support for Disabled Individuals:

• Robotics technology enables disabled individuals to perform daily tasks more independently. Assistive robots can help with activities such as cooking, cleaning, and personal care, improving their autonomy and quality of life.

• Innovations like robotic prosthetics provide enhanced functionality for amputees, allowing them to regain mobility and perform everyday tasks.

• Emergency Response:

• Robots are increasingly utilized in disaster response scenarios. They can navigate hazardous environments, search for survivors, and deliver supplies, thereby enhancing safety and efficiency during emergencies.

5. Education

• STEM Learning:

• Robotics is being integrated into educational curricula to engage students in science, technology, engineering, and mathematics (STEM). Hands-on robotics projects encourage critical thinking, problem-solving, and teamwork.

• Educational robotics platforms (like LEGO Mindstorms or VEX Robotics) allow students to design, build, and program robots, fostering creativity and technical skills.

• Skill Development:

• By learning about robotics, students acquire valuable skills that are increasingly relevant in the job market. This includes programming languages, engineering principles, and an understanding of automation technologies.

• Robotics competitions and clubs provide students with opportunities to apply their knowledge in real-world scenarios, enhancing their learning experience.

• Inclusive Education:

• Robotics can also support inclusive education by providing personalized learning experiences for students with different abilities. Adaptive robotics tools can cater to diverse learning needs, making education more accessible.

BENEFITS AND DRAWBACKS OF ROBOTICS

(SP Automation & Robotics, SP Elements, and our partners at our annual in-house Automation Expo on November 20th and 21st, 2024.)

Robotics offers a wide range of benefits across various sectors.The presence of robots in society has surged significantly in recent years, thanks to technological and robotic advancements. These machines can simplify our lives by handling tasks that might be challenging or unfeasible for humans to accomplish alone.

Benefits

1. Cost Efficiency

Robotic automation does not require lunch breaks, holidays, sick leave, or shift changes. Once programmed, robots can operate continuously on a repetitive cycle, provided they are properly maintained. This also reduces the risk of repetitive strain injuries (RSI).

The boost in production at a lower cost offers clear advantages for manufacturers. The initial investment can be recouped in a relatively short period, and the subsequent profits can be substantial.

2. Enhanced Quality Control

Alan Winfield advocates for "responsible robotics" and has developed ethical frameworks for robot behavior. He believes that as robots integrate further into society, there must be strict guidelines to ensure they do not exploit vulnerabilities, cause harm, or reduce human accountability.

Winfield's advocacy for responsible robotics resonates strongly with me. The development of ethical frameworks is vital as robots become more integrated into society, ensuring they operate safely and justly. His emphasis on preventing exploitation and harm is crucial, especially as robots take on more significant roles in people's lives. I agree that establishing strict guidelines will be necessary to maintain human accountability and trust in robotic systems, ultimately fostering a more positive relationship between humans and technology.

Most employees do not find repetitive tasks enjoyable, and their focus tends to wane over time. This decrease in attention, referred to as vigilance decrement, can result in expensive mistakes for the company and may even lead to serious injuries for workers.

Robotic automation mitigates these risks by consistently producing and verifying that products meet the necessary standards. With an increased volume of high-quality products being delivered, companies can explore numerous new opportunities for growth.

3. Working in Hazardous Conditions

Manuela Veloso sees robotics as collaborative partners for humans, particularly in complex and high-risk environments. She highlights their potential in fields like finance, healthcare, and disaster response but warns that society must prepare for the ethical and employment implications of increasingly autonomous systems.

Veloso's perspective on collaborative robotics in high-risk environments is insightful and highlights the potential for robots to enhance human capabilities in critical fields. Her caution regarding ethical and employment implications is well-founded; as robots become more autonomous, there's a need for frameworks that address accountability and job displacement. I believe her call for preparation in these areas is essential for a smooth transition into a future where humans and robots work side by side.

In addition to the risk of injuries, employees in certain sectors may be required to operate in unsafe or unpredictable environments. For instance, in areas where there is a significant presence of chemicals, robotic automation presents an excellent solution, as robots can perform tasks without exposure to danger.

Production settings with extreme temperatures often experience high employee turnover due to the challenging conditions. Automated robots can help reduce material waste and eliminate the need for humans to expose themselves to unnecessary hazards.

DRAWBACKS

1. Job Displacement:

A major concern regarding the rise of robotic automation is its effect on employment for workers. There is a fear that if robots can operate more quickly and consistently, human labor may become unnecessary. Although these concerns are valid, they are not entirely accurate. Similar worries were voiced during the early stages of the industrial revolution, yet history demonstrates that humans have remained crucial to the workforce. A prime example is Amazon, where the number of employees has surged even as their use of robots increased from about 1,000 to over 45,000.

2. Initial Investment Costs

The primary challenge that influences a company's decision to invest in robotic automation or postpone it is often the initial investment. When contemplating the adoption of this technology, a thorough business case must be developed. While the potential returns can be significant and often realized quickly, it is essential that cash flow remains stable in the interim. The company's stability is not worth jeopardizing for only minimal returns. Fortunately, repayment plans are usually available, making it easier to manage finances. Additionally, our downloadable automation payback calculator includes a financing option to help you assess its feasibility. When evaluating the business case for investment, it's important to consider both increased efficiency and reduced defects alongside the capital costs. Intangible benefits should also be taken into account, for which we've created a downloadable calculator to assist you.

In conclusion, the social impacts of robotics are profound and multifaceted. From enhancing the quality of life for individuals through healthcare assistance to revolutionizing education by promoting STEM learning, robotics is shaping the future of society. While it brings numerous benefits—such as cost efficiency, enhanced quality control, working in hazardous conditions—it also poses challenges that require careful consideration.

REFERENCES:

1.Alan Winfield (Professor at the University of the West of England and an expert in robot ethics).

2.Manuelo Veleso (Head of AI Research at JPMorgan Chase and former president of the Association for the Advancement of Artificial Intelligence (AAAI)).

3.MEP Merja Kyllönen (Finnish politician and Member of the European Parliament (MEP) from Finland).

4.Rodney Brooks (Co-founder of iRobot and a pioneer in robotics).

5.(SP Automation & Robotics, SP Elements, and our partners at our annual in-house Automation Expo on November 20th and 21st, 2024.)