

Sounding Board

AI in the workplace: A sustainability-focused contemplation of the ILO slogan for 2024

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Received 29 February 2023

Accepted 30 April 2024

Keywords: Occupational health, artificial intelligence, sustainable development, ergonomics, user-centered design, information technology, industrial development, international labor organization

1. Introduction

In recent decades, with the growing recognition of the paramount importance of saving human lives in the workplace, numerous national and international organizations have emerged, dedicated to advancing this crucial concern [1]. Prior to the advent of the fourth industrial revolution, experts convened within these organizations in person, alone or in groups, leveraging their collective experience, knowledge, consultation with each other, and the full spectrum of human intelligence to achieve the final goal, saving humans [2]. An exemplary instance of such collaborative efforts was the proclamation of the slogan by the International Labor Organization (ILO). As elucidated earlier, the overarching aim is to preserve human lives within work environments, enhance their quality of life, and mitigate occupational accidents [3].

In the past few years, particularly in the wake of the recent industrial revolution, there has been a resurgence in the discourse surrounding artificial intelligence (AI). Numerous scientific texts have portrayed AI as a potential substitute for human intelligence. However, many researchers argue that such technology is not yet intelligent enough to entirely supplant human intelligence [4]. Despite this debate, there is a consensus that AI entails the endeavor to impart to computer systems and machines the ability to emulate human intelligence, engage in mental processing, and ultimately make autonomous, intelligent decisions. The overarching aim of this endeavor is to replicate human cognition in order to enhance the capabilities of machines [5].

Reviewing recent articles published in prominent occupational health and safety journals reveals a widespread utilization of artificial intelligence (AI) in the workplace. This deployment aims to bolster safety measures, curtail accidents, and yield benefits for both employees and employers [6]. While this list is by no means exhaustive, it encapsulates several key applications of AI in the workplace:

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Improving accident prediction: Using AI algorithms to analyze workplace safety data can improve the prediction of accidents and their consequences.

Facilitating the promotion of safety culture: The use of AI-based technologies such as virtual reality, augmented reality, etc. to train and motivate employees in the fields related to workplace safety can help to facilitate the promotion of safety culture.

Prevention of injuries caused by work equipment: Utilizing AI, it becomes feasible to meticulously evaluate the efficacy of work equipment, discern their vulnerabilities, and anticipate potential risks, all with the aim of precluding harm to workers.

Facilitating the management of safety trends: AI algorithms can identify patterns and trends related to safety by analyzing data related to work accidents and safety statistics and provide solutions to improve management and prevent accidents.

Prevention of fatigue, stress and related risks: AI systems can analyze data related to work activities, identify employees who are at risk of fatigue and stress, and provide measures to reduce these risks.

Smart Personal Protective Equipment (PPE): The integration of AI sensors into PPE facilitates instantaneous monitoring of environmental conditions, offering real-time alerts to workers concerning potential hazards.

The aforementioned list can certainly be extended. With the emergence of artificial intelligence and associated technologies like industrial robots and collaborative robots (co-bots), the landscape of work has undergone significant transformations. While the overarching aim of integrating this artificial intelligence with human capabilities is to enhance productivity for the benefit of employers, improve the health and well-being of workers, and elevate occupational safety and health standards overall, it's crucial not to overlook the accompanying challenges and concerns. Prominent challenges include safeguarding privacy, ensuring data security, among others, necessitating a comprehensive examination. These issues have been addressed in previous systematic review articles [7].

With the daily increase in the importance of sustainability, this topic has been opened to the field of occupational health and industrial safety [8]. Within the framework of this year's ILO slogan, which highlights the impact of climate change on occupational health and safety, we've addressed a less-discussed challenge related to artificial intelligence: its increased energy consumption, particularly concerning the prevalent use of non-renewable and

fossil fuels even in the developed countries. Additionally, we've explored the sustainability challenges inherent in artificial intelligence [9].

Certain artificial intelligence technologies, particularly deep neural networks, exhibit high energy consumption. Modern artificial intelligence systems heavily rely on robust hardware to handle their extensive data processing needs during both training and testing phases. Moreover, the intensive computational requirements necessitate enhanced cooling systems, often employing more powerful fans, leading to a significant increase in overall energy consumption.

This heightened energy demand can result in increased pressure on energy resources, predominantly fossil fuels at least in the following years, exacerbating greenhouse gas emissions [10]. These shifts in energy consumption and the consequent rise in greenhouse gas emissions align with the focal point highlighted in the ILO's annual slogan, underscoring the interconnectedness of artificial intelligence advancements and their environmental implications.

2. Critical thinking

This sounding board raises a critical question: considering the extensive list of benefits previously outlined, is AI truly advantageous for occupational health and safety? Or do the potential drawbacks (as a non-sustainable technology) outweigh the benefits?

Ethical approval

Not applicable.

Informed consent

Not applicable.

Conflict of interest

None declared.

Acknowledgments

None declared.

Funding

None declared.

References

- [1] Niu S. Ergonomics and occupational safety and health: An ILO perspective. *Applied Ergonomics*. 2010;41(6):744-53.
- [2] Cayet T, Rosental P-A, Thébaud-Sorger M. How international organisations compete: occupational safety and health at the ILO, a diplomacy of expertise. *Journal of Modern European History*. 2009;7(2):174-96.
- [3] Fudge J. Labour rights as human rights: Turning slogans into legal claims. *Dalhousie LJ*. 2014;37:601.
- [4] De Cremer D, Kasparov G. AI should augment human intelligence, not replace it. *Harvard Business Review*. 2021;18:1.
- [5] Wang H, Fu T, Du Y, Gao W, Huang K, Liu Z, et al. Scientific discovery in the age of artificial intelligence. *Nature*. 2023;620(7972):47-60.
- [6] Shah IA, Mishra S. Artificial Intelligence in advancing the Occupational Health and Safety: An encapsulation of developments. *Journal of Occupational Health*. 2024:uiad017.
- [7] Oosthuizen RM. The fourth industrial revolution—Smart technology, artificial intelligence, robotics and algorithms: industrial psychologists in future workplaces. *Frontiers in Artificial Intelligence*. 2022;5:913168.
- [8] Umair S, Waqas U, Mrugalska B. Cultivating sustainable environmental performance: The role of green talent management, transformational leadership, and employee engagement with green initiatives. *Work*. 2023;Preprint:1-13.
- [9] Kar AK, Choudhary SK, Singh VK. How can artificial intelligence impact sustainability: A systematic literature review. *Journal of Cleaner Production*. 2022:134120.
- [10] Desislavov R, Martínez-Plumed F, Hernández-Orallo J. Trends in AI inference energy consumption: Beyond the performance-vs-parameter laws of deep learning. *Sustainable Computing: Informatics and Systems*. 2023;38:100857.