

PRINCE SULTAN UNIVERSITY · COMPUTER SCIENCE DEPARTMENT

Social Implications of Artificial Intelligence & Expert Systems

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ETHC 303 · Computer Ethics

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8-minute presentation

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01 Topic Introduction

Every time an algorithm grants a loan, rejects a job application, or triages a patient, it makes a decision once made by people, without being able to explain its reasoning. AI does the work of computation and reasoning; Expert Systems imitate human expertise in a given field. As both take on more autonomy, their impact spreads well beyond any single industry.

Adoption brings real gains, but also privacy, discrimination, accountability, employment, cybersecurity, and sustainability concerns. This paper investigates the ethical, societal, and sustainability impact of AI and Expert Systems, and how they can be developed and adopted responsibly.

THREE RESEARCH QUESTIONS

- 1** What are the main social implications of AI and Expert Systems?
- 2** What ethical problems may arise because of their extensive adoption?
- 3** How can these technologies be responsibly developed and adopted?

02 Methodology

This study takes a literature review (secondary research) approach, synthesizing existing studies and reports on the societal impact of AI and Expert Systems from credible international organizations and peer-reviewed journals.



Secondary research

A literature review synthesizing existing studies and reports rather than collecting new primary data.



Keyword search

AI Ethics, Social Implications, Sustainability, Bias, Privacy, and AI Governance, filtered for credibility and relevance.



Three ethical lenses

Utilitarianism, Kantian Ethics, and Social Contract Theory frame the evaluation of every finding.

Sources included WHO, UNESCO, NIST, Stanford HAI, and recent peer-reviewed studies by Wang et al. (2024) and Jain et al. (2023), found via keywords such as AI Ethics, Social Implications, Sustainability, Bias, Privacy, and AI Governance, filtered for credibility and relevance. Findings were then evaluated through the three ethical lenses above.

03 Findings & Analysis

WORKFORCE SENTIMENT · STANFORD HAI (2024)

Expect AI to affect their
job in 5 years

57%

Fear their job could be
replaced by AI

36%

Ethical Implications **ETHICS**

AI ethics comes down to fairness, accountability, and privacy. WHO (2021) flags low-quality data, biased clinical data, and improper collection as recurring problems: biased inputs don't just persist, they worsen existing disparities. A documented case: a health care algorithm used past spending as a proxy for illness severity, and because less had historically been spent treating Black patients, it underestimated their need for additional services (Jain et al., 2023). Accountability is equally murky, since it's often unclear whether the developer, organization, or user is to blame when AI causes harm, though Tabassi (2023) notes proper controls can reduce that inequity.

Societal Implications **SOCIETY**

Societal impact shows up most in employment and inequality: Stanford HAI (2024) finds most people expect AI to affect their jobs, and many fear outright replacement, with AI reshaping not just which jobs exist but which skills they demand. UNESCO (2021) adds that AI can widen inequality within and between countries wherever access to it is uneven.

Sustainability Implications **SUSTAINABILITY**

Sustainability cuts both ways. Wang et al. (2024) find AI training demands significant energy, yet higher national AI development is linked to lower carbon emis-

sions, so its environmental impact needs assessing at every stage of development and use, not assumed either way.

1.287 GWh

ENERGY TO TRAIN A MODEL LIKE CHATGPT,
ROUGHLY 120 U.S. HOUSEHOLDS/YEAR

-0.0013%

CARBON EMISSIONS CHANGE PER 1%
GROWTH IN AI DEVELOPMENT

Ethical Theories

Three ethical lenses help weigh these findings:

Utilitarianism

AI is ethical when it produces the greatest overall benefit for society and minimizes harm, weighing gains in medicine and efficiency against risks of discrimination and job loss.

Kantian Ethics

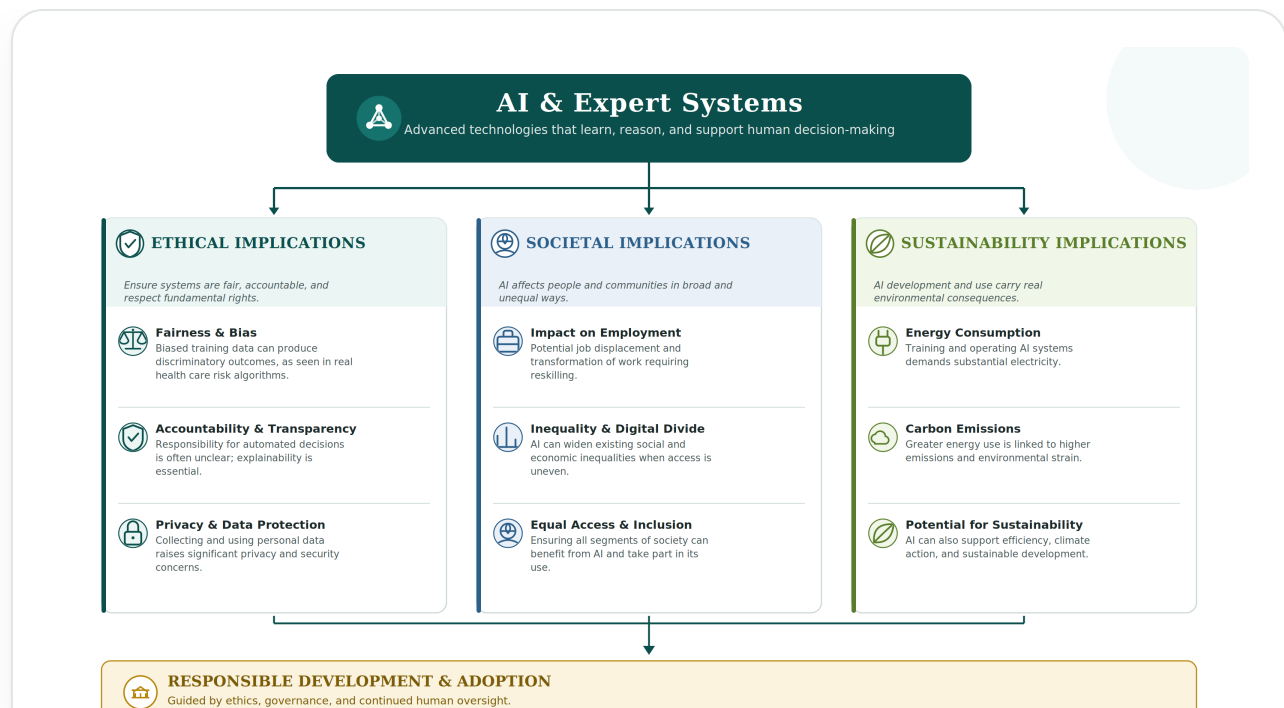
Human beings must be respected as ends in themselves, not merely as sources of data, whatever the efficiency gains on offer.

Social Contract Theory

Governments and organizations bear the duty to create regulations that let society share AI's benefits while minimizing potential harm.

Taken together, AI and Expert Systems can be genuinely beneficial for society when developed appropriately, but only if ethical, societal, and sustainability considerations are weighed together, not one at a time.

Figure 1: AI & Expert Systems



04 Recommendations

1 Audit and keep a human in the loop

Regular audits should check for bias and inequity, especially where results affect people's lives, with a human kept in the loop so responsibility never rests on the automated system alone (Tabassi, 2023; World Health Organization, 2021).

2 Close the access gap

Governments and organizations should ensure every segment of society gets equal access to AI's benefits, since uneven access deepens existing inequalities (UNESCO, 2021), and prepare people for AI's growing impact on employment.

3 Develop and use AI sustainably

Sustainability should be weighed throughout development and use, cutting unnecessary energy consumption while still exploring AI's potential to support sustainability (Wang et al., 2024).

05 Conclusion

This paper examined the ethical, societal, and sustainability implications of AI and Expert Systems. Despite real advantages for health care, education, economics, and industry, these technologies pose serious problems: bias, privacy, accountability, job displacement, inequality, and high energy usage.

The results point to one necessity: responsible AI. Fairness, transparency, human control, and respect for human rights must guide the creation of new AI tools, alongside equal access and sustainability.

"AI and Expert Systems may positively change society greatly, if governed properly."

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s3 References

- Jain, A., Brooks, J. R., Alford, C. C., Chang, C. S., Mueller, N. M., Umscheid, C. A., & Bierman, A. S. (2023). Awareness of racial and ethnic bias and potential solutions to address bias with use of health care algorithms. *JAMA Health Forum*, 4(6), e231197. <https://doi.org/10.1001/jamahealthforum.2023.1197>
- Stanford Institute for Human-Centered Artificial Intelligence. (2024). *AI Index report 2024*. Stanford University. <https://hai.stanford.edu/ai-index/2024-ai-index-report>
- Tabassi, E. (2023). *Artificial intelligence risk management framework (AI RMF 1.0)* (NIST AI 100-1). National Institute of Standards and Technology. <https://doi.org/10.6028/NIST.AI.100-1>
- UNESCO. (2021). *Recommendation on the ethics of artificial intelligence*. UNESCO. <https://www.unesco.org/en/legal-affairs/recommendation-ethics-artificial-intelligence>
- Wang, Q., Li, Y., & Li, R. (2024). Ecological footprints, carbon emissions, and energy transitions: The impact of artificial intelligence (AI). *Humanities and Social Sciences Communications*, 11, 1043. <https://doi.org/10.1057/s41599-024-03520-5>
- World Health Organization. (2021). *Ethics and governance of artificial intelligence for health: WHO guidance*. World Health Organization. <https://www.who.int/publications/i/item/9789240029200>

s1 Abstract

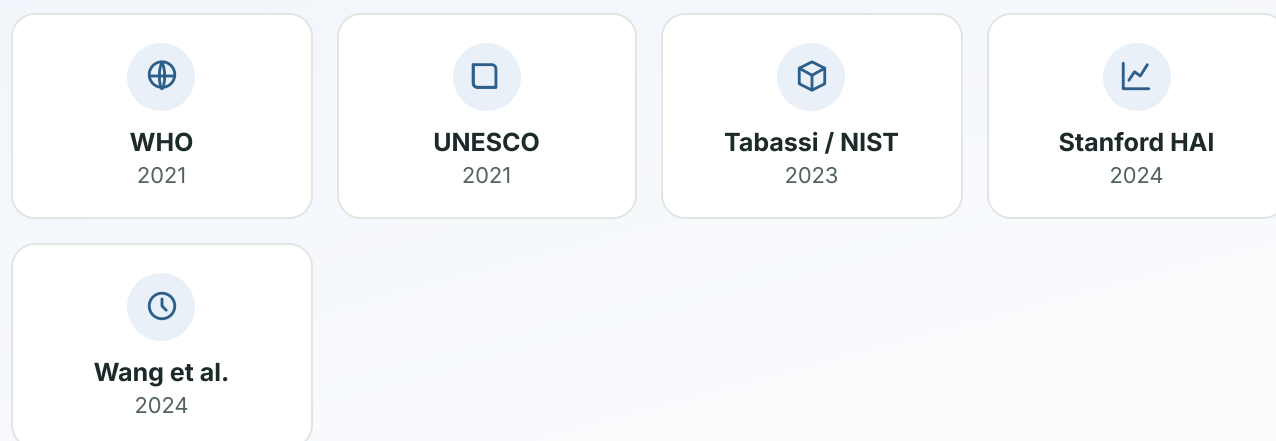
AI and Expert Systems are reshaping health care, education, finance, manufacturing, and cybersecurity through greater efficiency and better decision making. This report examines their ethical, societal, and sustainability implications, drawing on WHO, UNESCO, and NIST reports, the Stanford AI Index, and recent peer-reviewed research.

"There are ethical considerations because of issues such as skewed data, lack of accountability in AI-based decision making, and the violation of human rights."

These technologies bring real benefits, but also privacy, bias, accountability, job-loss, and inequality risks. Their sustainability impact cuts both ways too: heavy computational demand offset by AI's potential to help lower carbon emissions.

s2 Literature Review

Current research shows AI's immense potential, especially in health care: the World Health Organization (2021) points to real progress in drug discovery, genomics, radiology, pathology, and prevention. Alongside these gains, though, researchers and international bodies increasingly flag the wider consequences of AI for individuals and society.



On ethics, the World Health Organization (2021) points to the digital divide, poor data quality, biased clinical data, and improper collection as recurring problems, alongside questions of liability when someone is harmed by an AI system. UNESCO (2021) broadens the frame further, arguing ethical AI is not just about fixing bad datasets but about protecting human dignity, well-being, and basic rights. Tabassi (2023) adds that without proper controls, AI intensifies unfair outcomes, but with them, it can help reduce them.

On employment and inequality, the Stanford Institute for Human-Centered AI (2024) finds 57% of respondents expect AI to affect their jobs within five years, and 36% fear outright replacement. UNESCO (2021) reads this as an early warning: AI can deepen inequality both within and between countries wherever access to it is uneven.

"57% of respondents believe AI would impact their jobs within five years, and 36% fear their jobs might be replaced outright."

Stanford Institute for Human-Centered AI, 2024

On sustainability, Wang et al. (2024) find the picture cuts both ways: training a model like ChatGPT consumes 1.287 gigawatt-hours of electricity, roughly the annual usage of 120 American households, yet every 1% rise in a country's AI development level is linked to a 0.0013% drop in carbon emissions. Across the literature, the throughline is the same: AI's influence on society is genuinely mixed, and responsible implementation means weighing its ethical, social, and environmental effects together, not one at a time.

s4 **Appendix**

Supporting excerpts from the primary sources cited throughout this report.

AI Training and Energy Consumption

The explosive growth in AI capability comes with an exponential rise in training energy use. Training a single model like ChatGPT consumes 1.287 gigawatt-hours of electricity, roughly equivalent to the annual electricity consumption of 120 American households (Probst, 2023). Yet for every 1% increase in a country's AI development level, its carbon emissions decrease by 0.0013%, and its energy transition accelerates by 0.0025%, the largest coefficient of the effects studied.

Source: Wang et al. (2024).

AI, Inequality, and Equal Access

AI technologies can deepen existing divides and inequalities in the world, within and between countries, and justice, trust and fairness must be upheld so that no country and no one is left behind, either through fair access to AI's benefits or protection from its negative implications.

UNESCO frames AI ethics as a holistic, evolving framework guiding societies through the known and unknown impacts of these technologies. It considers ethics as a dynamic basis for the normative evaluation and guidance of AI technologies, referring to human dignity, well-being and the prevention of harm.

Source: UNESCO (2021).

AI Risk Management and Responsible Development

Without proper controls, AI systems can amplify, perpetuate, or exacerbate inequitable or undesirable outcomes for individuals and communities. With proper controls, AI systems can mitigate and manage inequitable outcomes. Core concepts in responsible AI emphasize human centricity, social responsibility, and sustainability. Understanding and managing these risks helps enhance trustworthiness and, in turn, cultivate public trust.

Source: Tabassi (2023), Artificial Intelligence Risk Management Framework (AI RMF 1.0), NIST.

AI in Healthcare: Benefits and Ethical Challenges

WHO recognizes that AI holds great promise for the practice of public health and medicine, and use of AI technologies for health has already contributed to important advances in fields such as drug discovery, genomics, radiology, pathology and prevention.

Several ethical challenges are emerging with the use of AI for health, many of which are especially relevant to LMIC (low- and middle-income countries), including an enduring digital divide, lack of good-quality data, and clinical biases. In many LMIC, injured parties may struggle to obtain compensation for harm caused by AI, and marginalized populations have even less protection or redress within the legal system.

Source: World Health Organization (2021), Ethics and Governance of Artificial Intelligence for Health: WHO Guidance.

AI, Race, and Complex-Needs Algorithms

An algorithm used to identify patients with complex medical needs who might benefit from additional services underestimated need among Black patients because health care use was misconstrued as a proxy for illness severity. As a re-

sult, some Black people appeared ineligible for additional services despite having worse health.

Source: Jain et al. (2023).

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