

Social Implications of Artificial Intelligence & Expert Systems

Author Names

SHOUG FAWAZ ABDULLAH ALOMRAN

LAYAN ABDULAZIZ ALNASSER

Prince Sultan University

Computer Science Department

ETHC 303: Computer Ethics

Dr. Najla Althuniyan

Date

July 20, 2026

ABSTRACT.....	3
INTRODUCTION.....	3
LITERATURE REVIEW.....	4
METHODOLOGY.....	7
ANALYSIS.....	8
Ethical Implications.....	8
Societal Implications.....	9
Sustainability Implications.....	9
Ethical Theories.....	9
AI & Expert Systems.....	10
RECOMMENDATIONS.....	10
CONCLUSION.....	11
REFERENCES.....	13
APPENDIX.....	14
AI Training and Energy Consumption.....	14
AI, Inequality, and Equal Access.....	14
AI Risk Management and Responsible Development.....	15
AI in Healthcare: Benefits and Ethical Challenges.....	15
AI, Race, and Complex-Needs Algorithms.....	16

ABSTRACT

Artificial Intelligence (AI) and Expert Systems are rapidly changing various industries including health care, education, finance, manufacturing, and cybersecurity through increased efficiency and better decision making. This report explores the social implications of these new technologies in particular highlighting their ethical, societal, and sustainability implications. This research is based on a thorough literature review and critical analysis of reliable sources which include WHO reports, UNESCO reports, NIST reports, Stanford Institute for HCAI, and some recent research articles. The research suggests that although these technologies have many positive aspects, they also pose certain challenges with respect to privacy issues, bias, accountability, job loss, inequalities, and environmental sustainability. 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. Socially, there is the chance that the emergence of AI could lead to changes in the labor market and increase inequality in case the use of technology is not distributed evenly. Considering sustainability, there is the need for large amounts of computational power and energy, but at the same time AI has the potential to lower the emission of carbon and support sustainable development.

INTRODUCTION

Every time an algorithm grants a loan, rejects a job application, or prioritizes patients based on the urgency of their conditions, it makes a decision traditionally made by people without being able to explain the reasoning process behind the decision. The use of Artificial Intelligence (AI) and Expert Systems has become widespread in our society, affecting industries ranging from health care and education to banking and transportation, manufacturing, and cyber-security. Yet as these systems take on greater autonomy, they raise concerns that go

beyond any single industry, touching on the ethical, societal, and sustainability costs that must be weighed against their benefits. AI allows the computer to do work that involves intelligence, while Expert Systems simulate the expertise of humans in a particular field. With the increasing usage of these systems and their growing autonomy, their impact on society is also becoming more significant.

Alongside these industry-wide gains, the adoption of AI and Expert Systems raises significant social implications. Privacy issues, discrimination, accountability, employment concerns, cybersecurity issues, responsible usage of personal information, and sustainability issues because of their high computation requirements are some of the issues that can occur from the adoption of these technologies. **In this paper, the social implications of AI and Expert Systems are investigated by assessing the ethical, societal, and sustainability impact of these systems and showing how these technologies can be responsibly developed and adopted, while making sure they provide maximum benefits and minimal harm.** Three research questions will be answered in this study, which are; What are the main social implications of AI and Expert Systems? What ethical problems may arise because of their extensive adoption? How can these technologies be responsibly developed and adopted?

LITERATURE REVIEW

Current research on this subject shows the immense possibilities that can be achieved by means of Artificial Intelligence (AI) in the future, especially in the healthcare sector. As the World Health Organization (2021) highlights, there is a great potential of AI applications in public health and medicine, and some achievements have been made in drug discovery, genomics, radiology, pathology, and prevention. These developments demonstrate the potential of AI for benefiting many spheres of life in society. At the same time, along with increasing

applications of AI technologies, researchers and international bodies have expressed their concerns regarding the wider consequences of AI on the individual and societal level.

Issues concerning the ethical implications of Artificial Intelligence have gained increasing significance with the rise in the application of such technologies. According to the World Health Organization (2021), some of the ethical questions associated with the use of AI are the digital divide, poor data quality, biased clinical data, and improper data collection techniques, which may be common among the disadvantaged people. Other ethics issues include those of liability and justice in case an individual is injured due to AI technology. Another similar yet different issue is brought up by UNESCO (2021), which focuses not on data integrity but rather on human dignity, well-being, and non-harm, meaning that the problem of ethical AI should not be narrowed down only to fixing bad datasets but should also involve basic human rights regardless of data integrity. The arguments have been further supported by Tabassi (2023), who claims that AI technologies, without proper controls, will intensify negative or unfair consequences to individuals and communities, but with appropriate controls, it will help reduce such consequences.

Furthermore, the increasing adoption of artificial intelligence is bringing about some changes within the society as well, particularly in the context of employment and inequality. As per the report from the Stanford Institute for Human-Centered Artificial Intelligence (2024), 57% of respondents believe that artificial intelligence would impact their jobs within the next five years, and 36% of the respondents fear that their jobs might be replaced by artificial intelligence within the next five years. The above data proves that people are apprehensive about the impact of AI on their jobs. This fear of being displaced from jobs is linked to another more fundamental structure. UNESCO (2021) highlights that the AI technology can add to growing inequalities

both nationally and internationally, implying that the finding by Stanford on employment is an early warning of something larger happening. In addition, AI may have specific advantages and disadvantages that would apply differently to different segments of society. Thus, it becomes evident how important it is for people to have equal access to such technologies and the ability to benefit from them. Hence, despite the opportunities and advantages provided by AI technologies, their implementation is likely to have some influence on people's employment and social inequalities.

The sustainability impact of AI is another relevant issue to assess when examining the overall impact of AI on society. As mentioned by Wang et al. (2024), the rapid development of AI capabilities relates to an increase in energy use, especially at the stage of training AI models. According to Probst (as cited in Wang et al., 2024), training a model like ChatGPT consumes 1.287 gigawatt-hours of electricity, roughly equivalent to the annual electricity consumption of 120 American households. Still, the positive effect that AI may produce during the process of sustainability cannot be underestimated. Hence, Wang et al. (2024) state that for every 1% growth in the AI development level in the country, carbon dioxide emissions will decrease by 0.0013%. In other words, one may say that the effect of AI on sustainability is both negative and positive. Consequently, it is necessary to develop AI responsibly and use it in order to achieve its sustainability advantages.

In general, it can be seen from the literature review that the influence of AI on society has both positive and negative aspects. While using such technologies can be advantageous in several ways, there are still some ethical, social, and sustainability factors that need to be considered when implementing this technology. It is necessary to implement AI technology

responsibly so as to achieve maximum benefit from it while minimizing its possible ethical, societal, and environmental impacts.

METHODOLOGY

This study employs a literature review (Secondary Research) approach in exploring the societal impact of Artificial Intelligence (AI) and Expert System.

This research focuses on the synthesis and analysis of existing information that has been provided in different studies and reports from various international organizations.

In conducting an analysis of this study, credible sources have been used from the World Health Organization (WHO), UNESCO, the National Institute of Standards and Technology (NIST), Stanford Institute of Human Centered Artificial Intelligence (HAI), and recent peer-reviewed studies by Wang et al. (2024).

This search process entailed identifying articles on the issues of ethics, society and the environment associated with AI and Expert Systems through the use of keywords such as Artificial Intelligence, Expert Systems, AI Ethics, Social Implications, Sustainability, Bias, Privacy, and AI Governance. Only credible, current and relevant literature pertaining to the research problem was considered for inclusion into the review.

Only sources of information dealing with issues of ethics, society, and sustainability in relation to AI from credible organizations and academic journals were selected. The rest of the sources were not considered.

The evaluation of the results is conducted through three ethical perspectives such as Utilitarianism, which looks at actions from the perspective of maximizing overall benefit to the society; Kantian Ethics, which focuses on respect for human dignity and individual rights; and

Social Contract Theory, which stresses the duty of the state and corporations to set rules to regulate responsible AI technology development and implementation.

ANALYSIS

Ethical Implications

In terms of ethics, issues surrounding AI and Expert Systems have a connection with fairness, accountability, privacy, as well as the possible damage from those technologies. According to the World Health Organization (WHO, 2021), some problems are low-quality data, bias in the clinical data, and improper data collection methods. In other words, the quality and the nature of the data can influence the outcomes' fairness in regard to artificial intelligence. With the usage of biased data, AI can not only maintain but also worsen the existing disparities in certain populations. One example where this was observed relates to the algorithmic identification of patients with complex needs in order to deliver additional health care services. The algorithm considered the past health care expenses of individuals as a measure of their severity of condition, however, due to the lesser amounts that were spent on treating Black individuals compared to white individuals with similar health conditions in the past, the algorithm underreported the need for more services for the Black population, thus making them seem ineligible for receiving additional services even when they were in a worse state than white individuals (Jain et al., 2023). In addition, the problem with accountability becomes severe in cases when a person is affected by AI and the responsibility for the situation is not clear enough. It is not known if it is the developer, organization, or user of AI who is to blame for the problem. As pointed out by Tabassi (2023), proper control measures can help decrease the inequity.

Societal Implications

The societal implications of AI can be seen particularly in employment and inequality. According to the Stanford Institute for Human-Centered Artificial Intelligence (2024), there is an expectation on the part of many people that AI will impact their employment, although there is also an apprehension that their occupation might be substituted in the future by artificial intelligence. It implies that apart from affecting the availability of certain occupations, AI may also change the skills necessary for a worker to possess. In addition, UNESCO (2021) notes that artificial intelligence can exacerbate already existing inequalities both within countries and between them. In case when access to artificial intelligence is not equal, then those who have less technological potential will be at a considerable disadvantage.

Sustainability Implications

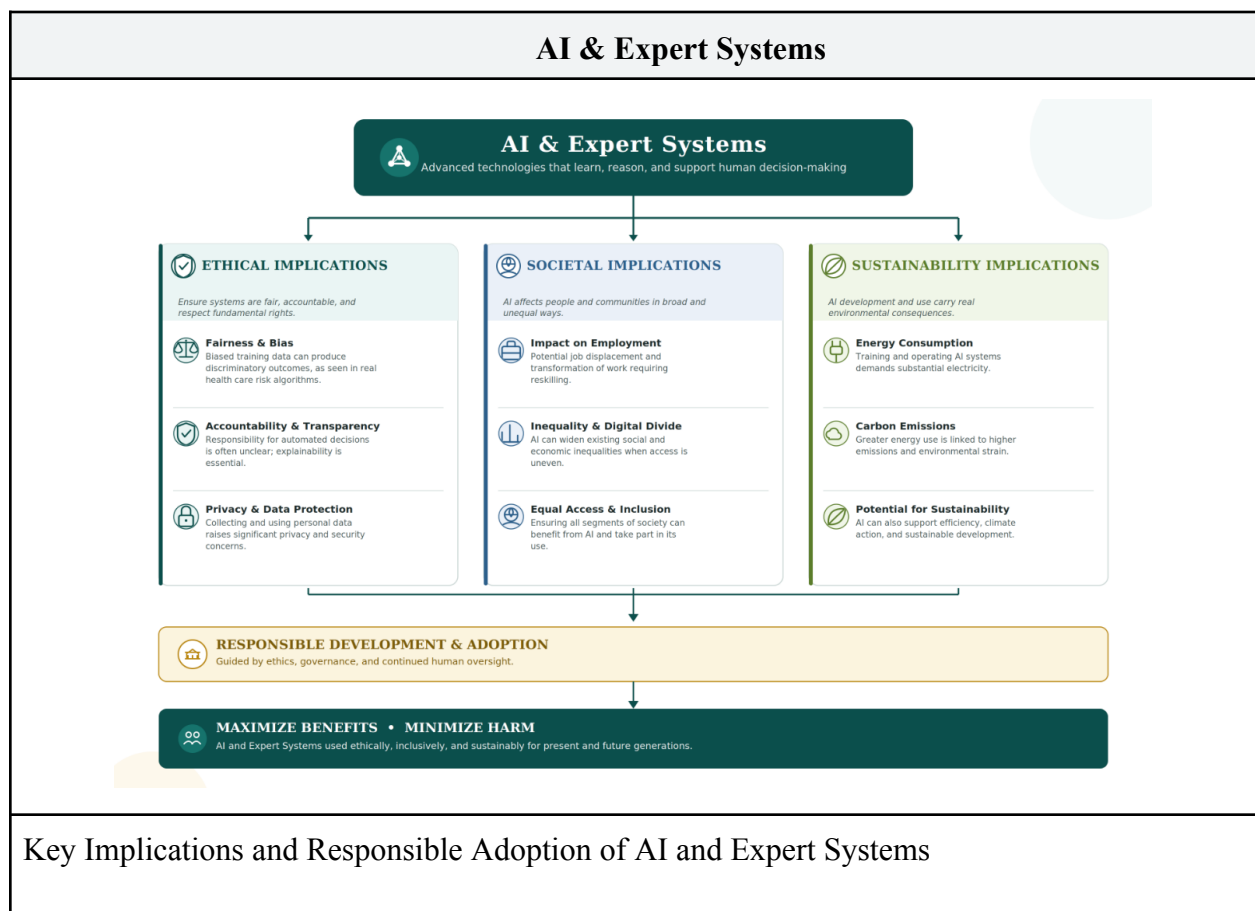
The sustainability implications of AI present both advantages and disadvantages. According to Wang et al. (2024), there is an important issue of energy demands involved in the training of AI systems, but greater levels of AI development were associated with lower carbon emissions. In other words, AI helps become sustainable, but consumes a lot of energy in this process. Thus, the environmental impact of AI needs to be assessed at all stages of development and usage of the technology.

Ethical Theories

The impact of AI and Expert Systems can also be examined using different ethical theories. In accordance with the Utilitarian philosophy, the use of AI would be deemed as ethical provided that the process results in good for the society and decreases chances of any harm. Thus, the gains made in such areas as medicine and efficiency would have to be compared with possible dangers of discrimination, loss of jobs, and pollution. In accordance with Kantian

philosophy, human beings ought to be respected as humans rather than as sources of data. Finally, according to Social Contract Theory, governments and organizations are supposed to create proper regulations concerning the use of AI and thus help society reap the benefits of technological progress while minimizing potential harm.

In conclusion, it could be said that the analysis above demonstrates that the use of AI and Expert Systems can be extremely beneficial for society as long as it is done in an appropriate way. Ethical considerations, changes taking place in society, and sustainability issues need to be taken into consideration at once and not individually.



RECOMMENDATIONS

Given the ethical implications of AI and Expert Systems described above, it is necessary to consider some controls needed to protect individuals. First, there should be regular audits of

AI to check if AI creates any biases or inequity, especially if AI is applied to those cases where such results can negatively impact the lives of people. Human involvement in important decision making should also be ensured so that the whole responsibility cannot rely only on the automated system (Tabassi, 2023; World Health Organization, 2021).

In addition, the societal implications of AI should be taken into account in the process of its implementation. Governments and organizations need to make sure that the different segments of the society receive equal opportunities of getting the technology and its benefits since it is likely that the access to new technologies can deepen the existing inequalities (UNESCO, 2021). Moreover, the growing impact of AI on employment requires further preparation of people to the changing environment.

Finally, the sustainability of AI must also be taken into account during both the development and use of AI. While the goal must be reducing unnecessary energy consumption associated with AI technology, further exploration of the potential role of such technologies for sustainability must also be undertaken (Wang et al., 2024). All in all, proper implementation of AI involves weighing its ethical, social, and environmental implications.

CONCLUSION

This paper examined the social implications of Artificial Intelligence (AI) and Expert Systems by investigating their ethical, societal, and sustainability implications. It can be concluded that despite the fact that AI provides many advantages to humanity in health care, education, economics, and industry, it poses serious problems to humankind such as bias, privacy, accountability, changes in employment, social inequality, and high energy usage.

It can be stated that the aforementioned results point to the necessity of the development and implementation of responsible AI. Fairness, transparency, human control, respect for human

rights and individualism are vital factors that need to be considered during the creation of new AI tools in order to use AI safely and beneficially for society and minimize any possible harm. At the same time, equal access and sustainability should be provided.

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

REFERENCES

- Alomran, S., & Alnasser, L. (2026). *Social implications of artificial intelligence & expert systems* [Presentation]. <https://ethics.shoug-tech.com>
- 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>

APPENDIX

AI Training and Energy Consumption
On the other hand, an increasing number of practitioners and scholars point out that the explosive growth in AI capabilities is accompanied by an exponential increase in the energy consumption required for AI training. For example, research indicates that 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). In short, AI is impacting the current energy system in different directions through multiple channels.
According to Model L2, AI also has a significant reduction effect on CE. For every 1% increase in a country's artificial intelligence development level, the country's carbon emissions will decrease by 0.0013%. This means that the development of AI development level of artificial intelligence will boost the energy transition by 0.0025%. The coefficient is the largest among the
Source: Wang et al. (2024).

AI, Inequality, and Equal Access
Also recognizing that AI technologies can deepen existing divides and inequalities in the world, within and between countries, and that justice, trust and fairness must be upheld so that no country and no one should be left behind, either by having fair access to AI technologies and enjoying their benefits or in the protection against their negative implications, while recognizing the different circumstances of different countries and respecting the desire of some people not to take part in all technological developments,
I. SCOPE OF APPLICATION 1. This Recommendation addresses ethical issues related to the domain of Artificial Intelligence to the extent that they are within UNESCO's mandate. It approaches AI ethics as a systematic normative reflection, based on a holistic, comprehensive, multicultural and evolving framework of interdependent values, principles and actions that can guide societies in dealing responsibly with the known and unknown impacts of AI technologies on human beings, societies and the environment and ecosystems, and offers them a basis to accept or reject AI 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 as a compass and as rooted in the ethics of science and technology.
Source: UNESCO (2021).

AI Risk Management and Responsible Development

These risks make AI a uniquely challenging technology to deploy and utilize both for organizations and within society. 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.

AI risk management is a key component of responsible development and use of AI systems. Responsible AI practices can help align the decisions about AI system design, development, and uses with intended aim and values. Core concepts in responsible AI emphasize human centrality, social responsibility, and sustainability. AI risk management can drive responsible uses and practices by prompting organizations and their internal teams who design, develop, and deploy AI to think more critically about context and potential or unexpected negative and positive impacts. Understanding and managing the risks of AI systems will help to 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

Artificial Intelligence (AI) refers to the ability of algorithms encoded in technology to learn from data so that they can perform automated tasks without every step in the process having to be programmed explicitly by a human. WHO recognizes that AI holds great promise for the practice of public health and medicine. WHO also recognizes that, to fully reap the benefits of AI, ethical challenges for health care systems, practitioners and beneficiaries of medical and public health services must be addressed. Many of the ethical concerns described in this report predate the advent of AI, although AI itself presents a number of novel concerns.

Use of AI technologies for health holds great promise and has already contributed to important advances in fields such as drug discovery, genomics, radiology, pathology and prevention. AI could assist health-care providers in avoiding errors and allow clinicians to focus on providing care and solving complex cases. The potential benefits of these technologies and the economic and commercial potential of AI for health care presage ever greater use of AI worldwide.

AI in Healthcare: Benefits and Ethical Challenges

Several ethical challenges are emerging with the use of AI for health, many of which are especially relevant to LMIC. These challenges must be addressed if AI technologies are to support achievement of universal health coverage. Use of AI to extend health-care coverage and services in marginalized communities in HIC can raise similar ethical concerns, including an enduring digital divide, lack of good-quality data, collection of data that incorporate clinical biases (as well as inappropriate data collection practices) and lack of treatment options after diagnosis.

In many LMIC, injured parties may not have access to justice, or it may be too expensive or too protracted, so that it not just difficult to obtain compensation for harm caused by AI technologies but it is also unlikely to serve as a deterrent to those responsible for the development and deployment of such technologies. Marginalized populations have even less protection and are often excluded from redress within the legal system. It might also be difficult to seek compensation if the AI technology was developed by an international company or developer with no physical presence where the harm occurs. These challenges must be addressed to increase the effectiveness of liability rules.

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

AI, Race, and Complex-Needs Algorithms

access to kidney transplants.⁵ 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.² As a result, some Black people appeared ineligible for additional services despite having worse health.

Jain et al. (2023).