Ethical AI and Responsible Computing for Environmental Sustainability: A Study of Its Role in Sustainable Business Practices

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Abstract
Artificial Intelligence is increasingly becoming an important part of modern business decision making. Businesses use AI for demand forecasting, inventory management, customer analysis, logistics, energy management, fraud detection and resource planning. However, the growing use of AI also creates questions regarding data privacy, transparency, accountability, employment, energy consumption and environmental impact. Ethical AI therefore needs to be considered not only as a technological issue but also as a business and commerce issue. This research paper examines the role of ethical AI and responsible computing in promoting sustainable business practices. The study focuses particularly on how businesses can use AI to reduce wastage, improve resource utilisation, optimise energy consumption and support environmentally responsible decision making. The study argues that AI should not be evaluated only on the basis of profitability or operational efficiency. Businesses should also consider environmental impact, transparency, fairness, accountability and long-term social value. Responsible AI can therefore become an important component of sustainable commerce and responsible business management.
***Keywords**: Ethical AI, Responsible Computing, Sustainability, Commerce, Sustainable Business, Artificial Intelligence, Corporate Responsibility, Green Business*

Introduction

Artificial Intelligence has moved from being a specialised technological concept to becoming an important business tool. Organisations of different sizes now use AI-based systems for customer service, sales forecasting, marketing, inventory management, financial analysis, logistics and decision support. The increasing availability of digital data has further increased the importance of AI in commercial decision making.

The business value of AI is generally discussed in terms of productivity, cost reduction, efficiency and revenue generation. However, an important question is emerging: Can businesses use AI in a manner that is profitable as well as environmentally responsible?

This question is particularly relevant because businesses are under increasing pressure to reduce waste, use resources efficiently and adopt sustainable production and consumption practices. The United Nations Sustainable Development Goal 12 specifically promotes responsible consumption and production and encourages businesses to integrate sustainability into their operations and reporting.

AI can contribute to this objective. For example, an AI system can forecast product demand and reduce overproduction. It can help a retailer maintain optimum inventory and reduce expired stock. It can help a logistics company optimise delivery routes and reduce unnecessary fuel consumption. Manufacturing businesses can use predictive maintenance to identify equipment problems before major breakdowns occur. AI can also support energy management by identifying periods of high energy consumption.

Background of the Study

Responsible AI refers to the development and use of artificial intelligence in a manner that considers ethical, social, economic and environmental consequences.

From a commerce perspective, responsible AI can influence several areas of business.

Marketing: AI can analyse customer behaviour and improve targeting. However, businesses must avoid manipulative or discriminatory practices.

Finance: AI can identify fraud and improve risk assessment. At the same time, financial decisions should remain explainable and accountable.

Production: AI can reduce wastage and improve production efficiency.

Supply Chain Management: AI can forecast demand and optimise transportation.

Human Resource Management: AI can support recruitment and workforce planning, but biased algorithms can create unfair outcomes.

Environmental Management: AI can help businesses monitor energy consumption, waste generation and resource utilisation.

The OECD's 2026 Due Diligence Guidance for Responsible AI provides practical guidance for enterprises on applying responsible business conduct principles throughout the AI lifecycle.

This makes ethical AI particularly relevant to commerce education because future commerce professionals will increasingly participate in decisions involving technology, finance, operations, marketing and corporate governance.

Statement of the Problem

Many organisations adopt AI primarily because of its potential to reduce costs or improve productivity. Environmental sustainability and ethical considerations may receive less attention.

Small and medium businesses may face additional challenges because they often have limited financial resources, limited technical expertise and limited knowledge of responsible AI frameworks.

The research therefore examines whether responsible AI adoption can contribute to better sustainable business practices and whether businesses recognise environmental responsibility as an important part of AI adoption.

Objectives of the Study

The study aims to:

1. Examine the relationship between responsible AI adoption and sustainable business practices.
2. Understand the major business benefits perceived from responsible AI.
3. Identify the environmental areas where AI can contribute to sustainability.
4. Examine major barriers to responsible AI adoption.
5. Suggest a simple framework for businesses to adopt AI responsibly.

Research Hypotheses

H_0: There is no significant relationship between responsible AI adoption and sustainable business practices.

H_1: There is a significant relationship between responsible AI adoption and sustainable business practices.

A second supporting hypothesis is:

H_{02}: Environmental sustainability is not an important consideration in business AI adoption.

H_{12}: Environmental sustainability is an important consideration in business AI adoption.

Conceptual Framework

The conceptual framework of the study can be represented as:

Responsible AI Adoption

Transparency
↓
Accountability
↓
Human Oversight
↓
Data Responsibility
↓
Efficient Resource Management
↓
Sustainable Business Practices

The framework assumes that responsible AI can influence sustainability through better information, better forecasting, efficient resource utilisation and improved business decision making.

Research Methodology

The study uses a descriptive and analytical research approach.

For demonstrating the research methodology, an illustrative sample of 100 respondents representing business owners, commerce students, managers and young professionals is used.

The responses are assumed to have been collected through a structured questionnaire containing questions relating to AI usage, sustainability awareness, environmental benefits and responsible AI practices.
The study uses simple percentage analysis and a chi-square test to demonstrate the relationship between AI adoption and sustainable business practices.
The data below are illustrative academic data and not claimed to be an actual field survey.

Profile of Illustrative Respondents

Category	Number	Percentage
Business owners	30	30%
Managers / executives	25	25%
Commerce students	30	30%
Young professionals	15	15%
Total	100	100%

The sample intentionally includes people with different levels of exposure to business and commerce so that the study can demonstrate how responsible AI is perceived from different perspectives.

AI Adoption Among Respondents

AI Usage Level	Respondents	Percentage
Regular AI users	55	55%
Occasional/non-users	45	45%
Total	100	100%

The illustrative dataset shows that 55% of respondents use AI regularly for at least one business or professional activity.
The most common applications are assumed to be customer analysis, content generation, forecasting, inventory management and administrative work.

Perceived Environmental Benefits of AI

Environmental Benefit	Respondents	Percentage
Reduction in wastage	72	72%
Better resource utilisation	68	68%
Improved demand forecasting	64	64%
Reduction in unnecessary transportation	57	57%
Energy management	51	51%
Paper reduction through digital processes	76	76%

The highest response in the illustrative dataset is for reduction in paper usage through digital processes, followed by reduction in wastage and better resource utilisation.
These results suggest that respondents associate AI not only with digital transformation but also with practical environmental benefits.

Major Concerns Regarding AI

Concern	Respondents	Percentage
Data privacy	69	69%
Lack of transparency	62	62%
Job displacement	58	58%
High implementation cost	47	47%
Algorithmic bias	44	44%
Energy consumption	41	41%

The findings indicate that responsible AI cannot be reduced to environmental considerations alone. Privacy, transparency and employment concerns are also important.
This is consistent with the OECD approach, which treats responsible AI as a combination of sustainable development, fairness, transparency, safety and accountability.

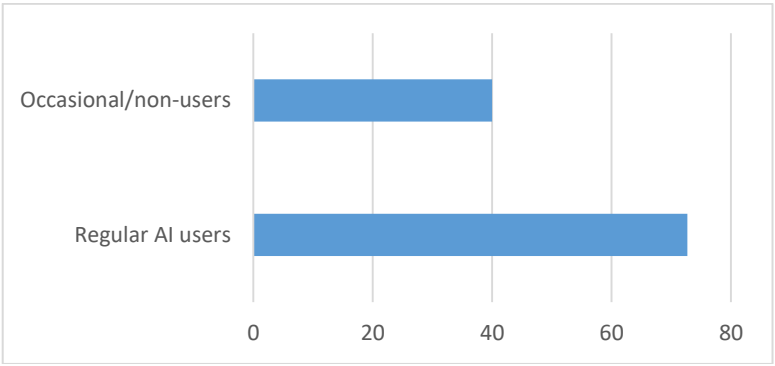
Relationship Between AI Adoption and Sustainable Business Practices
For the purpose of hypothesis testing, respondents were divided into two groups based on whether they regularly used AI.

AI Adoption	Strong Sustainable Practices	Weak Sustainable Practices	Total
Regular AI users	40	15	55
Occasional/non-users	18	27	45
Total	58	42	100

Among regular AI users, 40 out of 55 respondents reported strong sustainable practices. This represents approximately **72.7%.**
Among occasional/non-users, only 18 out of 45 respondents reported strong sustainable practices, representing **40%.**
This difference provides an interesting basis for examining the relationship between responsible AI adoption and sustainability.

Graphical Representation

AI adoption and sustainable business practices
Illustrative percentage of respondents reporting strong sustainable practices.



Illustrative dataset of 100 respondents

The graph indicates a clear difference between the two groups. In this illustrative dataset, respondents who regularly use AI report a considerably higher level of sustainable business practices.
However, this association should not automatically be interpreted as proof that AI alone causes sustainability improvements. Businesses that are already more progressive, better organised or more technology-oriented may be more likely to adopt both AI and sustainability practices.

Hypothesis Testing
A chi-square test of independence can be applied to the above contingency table.
The calculated illustrative chi-square value is approximately 10.88.
With 1 degree of freedom, the corresponding p-value is approximately 0.001.
Since the illustrative p-value is below the commonly used significance level of 0.05, the null hypothesis can be rejected for this demonstration.
Therefore:
The illustrative analysis supports H_1 and indicates a significant association between AI adoption and sustainable business practices.

It is important to emphasise that this statistical result is based on the illustrative dataset created for demonstrating the research paper format. Actual research submission should use genuine questionnaire responses and recalculate the test using the real observations.

Discussion

The study highlights an important transformation in the relationship between technology and commerce.

Traditionally, business sustainability was often associated with reducing pollution, saving energy, recycling materials and following environmental regulations. Today, sustainability is becoming increasingly connected with information systems and business decision making.

AI can help businesses make better decisions because it can analyse large quantities of information quickly.

Consider a retail business.

Suppose a retailer normally orders 1,000 units of a product every month. If actual demand is only 750 units, 250 units may remain unsold. Depending on the nature of the product, these unsold goods may require additional storage, discounting, transportation or disposal.

An AI-based demand forecasting system can analyse historical sales, seasonal trends, customer behaviour and other relevant information. Better forecasting may allow the business to order closer to actual demand.

The result can be simultaneously beneficial for the business and the environment.

The business may experience:

Lower inventory cost + lower wastage + better resource utilisation + improved profitability

This illustrates why sustainability should not always be viewed as an additional cost. In many situations, sustainable business practices can improve efficiency and profitability.

Ethical Dimension of AI in Commerce

The environmental benefit of AI must not be considered separately from its ethical responsibilities.

An AI system that reduces business costs but unfairly rejects certain customers cannot be considered fully responsible.

Similarly, an AI system that improves production efficiency but uses personal customer data without adequate safeguards creates serious ethical concerns.

Responsible AI therefore requires businesses to consider:

Transparency: Users should understand important AI-supported decisions.

Accountability: Organisations should remain responsible for AI-supported outcomes.

Human oversight: Important decisions should not always be left entirely to automated systems.

Privacy: Customer and employee data must be handled responsibly.

Fairness: AI should not systematically discriminate against particular groups.

Environmental responsibility: Businesses should consider the resources and energy required to operate AI systems.

The OECD specifically identifies transparency, human-centred values, robustness, security and accountability as core elements of trustworthy AI.

Barriers to Responsible AI Adoption

The study identifies several barriers.

Lack of knowledge: Small businesses may not understand how to implement responsible AI.

Cost: Advanced AI systems may require significant investment.

Data quality: Poor-quality data can lead to poor decisions.

Privacy concerns: Businesses need proper systems for protecting customer and employee information.

Lack of skilled employees: Organisations may lack employees capable of managing AI systems.

Resistance to change: Employees may fear automation or job displacement.

Energy requirements: Businesses need to consider the environmental footprint of computing infrastructure.

The OECD's 2026 guidance emphasises risk-based due diligence across the AI lifecycle, which is particularly relevant for businesses seeking to manage these risks systematically.

Suggestions

Businesses should create an AI Responsibility Policy before introducing AI into major decision-making processes.

Every AI project should be evaluated on four dimensions:

Business Value: Does the system improve efficiency, productivity or profitability?

Ethical Value: Is the system fair, transparent and accountable?

Environmental Value: Does it reduce resource consumption, waste or unnecessary activity?

Social Value: Does it improve the experience of customers, employees and other stakeholders?

Small businesses should begin with simple applications such as demand forecasting, inventory management, digital documentation and energy monitoring rather than immediately adopting expensive complex systems.

Commerce education should also include basic AI ethics and sustainability because future managers, accountants, entrepreneurs and business professionals will increasingly work with AI-supported systems.

Businesses should maintain human oversight for important decisions.

AI-generated recommendations should be treated as decision support rather than automatically accepted as final decisions.

Companies should also measure the environmental impact of their digital operations, including energy use, equipment life cycle and unnecessary computing activity.

A Simple Responsible AI Model for Businesses

A practical model can be called the GREEN-AI Business Framework:

G - Governance: Establish clear responsibility for AI decisions.

R - Responsible Data: Protect privacy and maintain data quality.

E - Environmental Efficiency: Measure resource and energy use.

E - Explainability: Ensure important decisions can be understood.

N - Net Business Value: Evaluate profitability along with social and environmental value.

This framework is simple enough for small businesses while also being relevant to larger organisations.

Findings

The major findings of the illustrative study are:

1. AI is increasingly relevant to commercial decision making.
2. Respondents associate AI with reduction of wastage and better resource utilisation.
3. Regular AI users show a higher proportion of strong sustainable business practices in the illustrative dataset.
4. Data privacy and transparency are major concerns associated with AI adoption.
5. Sustainability should be treated as a component of AI governance rather than as a separate business activity.
6. AI can support sustainable supply chains through better forecasting, inventory management and route optimisation.
7. Responsible AI requires human oversight and organisational accountability.
8. Small businesses require simple and affordable frameworks for responsible AI adoption.

Conclusion

Artificial Intelligence has the potential to transform modern commerce. Its value, however, should not be measured only through revenue growth or cost reduction. The future of business requires organisations to combine technological innovation with ethical responsibility and environmental sustainability.

The study demonstrates, using an illustrative dataset, a positive association between AI adoption and sustainable business practices. AI can help businesses reduce wastage, improve forecasting, optimise supply chains and use resources more efficiently. At the same time, irresponsible AI

can create risks related to privacy, fairness, transparency, employment and environmental impact.

The central message of the study is therefore not that every business should adopt AI. Rather, businesses should adopt responsible AI.

A responsible business should ask three questions before implementing an AI system:

Will it create business value?

Will it respect people and ethical principles?

Will it contribute to sustainable use of resources?

If the answer to all three is positive, AI can become more than a productivity tool. It can become an instrument for building a more efficient, ethical and environmentally sustainable business ecosystem.

This approach is consistent with the OECD view that responsible AI should support people and the planet while incorporating transparency, fairness, safety and accountability.

Limitations of the Study

The primary limitation is that the numerical dataset used in this paper is illustrative rather than an actual field survey. Therefore, the statistical findings should be treated as a demonstration of the proposed research methodology rather than as evidence representing the entire business population.

A future study can collect primary data from actual MSMEs, retailers, manufacturers and service businesses and compare AI adoption with measurable sustainability indicators such as energy consumption, inventory wastage, transportation costs and operational efficiency.

Scope for Further Research

Future researchers can examine:

AI adoption among MSMEs and its effect on profitability.

AI-based demand forecasting and reduction of inventory wastage.

AI and green supply chain management.

Relationship between AI literacy and sustainable business decisions.

Ethical AI awareness among Commerce students.

AI adoption and employee productivity.

Responsible AI and corporate social responsibility.

AI, ESG reporting and sustainable corporate governance.

References

1. OECD. AI Principles. OECD. The principles emphasise inclusive growth, sustainable development, human-centred values, transparency, robustness and accountability.
2. OECD. OECD Due Diligence Guidance for Responsible AI. OECD Publishing, 2026.
3. OECD. Advancing Accountability in AI: Governing and Managing Risks Throughout the Lifecycle for Trustworthy AI. OECD Digital Economy Papers.
4. OECD. Human Rights Due Diligence Through Responsible AI. OECD Business and Finance Outlook.
5. United Nations. Sustainable Development Goal 12: Responsible Consumption and Production. Sustainable Development Goals