



iJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 Issue: VII Month of publication: July 2026

DOI: <https://doi.org/10.22214/ijraset.2026.84366>

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Artificial Intelligence Adoption and Sustainable Business Performance: The Mediating Role of Innovation Capability

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Abstract: *The rapid advancement of Artificial Intelligence (AI) technologies has transformed the way organizations operate, innovate, and create value in an increasingly competitive business environment. AI adoption enables firms to automate processes, enhance decision-making, improve operational efficiency, and deliver personalized customer experiences. However, the extent to which AI contributes to sustainable business performance depends not only on technological implementation but also on an organization's ability to innovate. This study examines the relationship between Artificial Intelligence adoption and sustainable business performance, with innovation capability serving as a mediating variable. Specifically, it investigates how AI adoption enhances organizational innovation capability and, in turn, improves economic, environmental, and social dimensions of business performance. The study adopts a quantitative research approach using structured questionnaires administered to managers and professionals from manufacturing and service organizations. Data will be analyzed using Structural Equation Modeling (SEM) to examine the direct and indirect relationships among the study variables. The proposed conceptual framework posits that AI adoption positively influences innovation capability, which subsequently enhances sustainable business performance. The findings are expected to provide empirical evidence on the strategic role of AI in fostering innovation and achieving long-term organizational sustainability. Furthermore, the study offers practical implications for business leaders, policymakers, and practitioners by highlighting the importance of integrating AI technologies with innovation-driven strategies to improve competitiveness and sustainable growth. By linking digital transformation with sustainability outcomes, this research contributes to the growing body of knowledge on AI-enabled business innovation and supports the achievement of the United Nations Sustainable Development Goals, particularly SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation and Infrastructure), and SDG 12 (Responsible Consumption and Production).*

Keywords: *Artificial Intelligence Adoption, Sustainable Business Performance, Innovation Capability, Digital Transformation, Business Sustainability, Organizational Innovation, Sustainable Development Goals (SDGs), Structural Equation Modeling (SEM).*

I. INTRODUCTION

Artificial Intelligence (AI) has become a transformative technology that is reshaping business operations by enabling automation, improving decision-making, enhancing customer experiences, and increasing operational efficiency. Organizations across industries are increasingly adopting AI to gain competitive advantage and respond effectively to the challenges of digital transformation. At the same time, sustainable business performance has emerged as a key strategic objective, requiring organizations to achieve economic success while addressing environmental and social responsibilities.

Innovation capability plays a crucial role in converting AI-enabled technologies into sustainable business outcomes. Organizations with strong innovation capability are better equipped to develop new products, improve processes, and adapt to changing market conditions, thereby enhancing long-term business performance. Although previous studies have examined the relationships between AI adoption, innovation, and organizational performance, limited research has explored the mediating role of innovation capability in linking AI adoption with sustainable business performance.

Therefore, this study investigates the impact of Artificial Intelligence adoption on sustainable business performance, with innovation capability acting as a mediating variable. The findings are expected to contribute to the literature on digital transformation and sustainability while providing practical insights for organizations seeking to leverage AI for innovation and sustainable growth. The study also supports the United Nations Sustainable Development Goals (SDGs), particularly SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation and Infrastructure), and SDG 12 (Responsible Consumption and Production).

II. LITERATURE REVIEW

Brynjolfsson and McAfee (2014) highlighted the transformative potential of Artificial Intelligence and digital technologies in reshaping business operations and enhancing organizational productivity. Their study emphasized that AI adoption enables organizations to improve efficiency, automate routine tasks, and strengthen competitive advantage through data-driven decision-making.

Teece (2007) emphasized the importance of dynamic capabilities in enabling organizations to adapt to technological changes and sustain competitive advantage. The study suggested that firms possessing strong innovation capabilities are better positioned to leverage emerging technologies such as Artificial Intelligence for long-term business success.

Porter and Kramer (2011) introduced the concept of Creating Shared Value (CSV), emphasizing that organizations can achieve sustainable business performance by integrating economic, social, and environmental objectives into their business strategies. The authors argued that innovation is a key driver for creating sustainable value for both businesses and society.

Chen, Chiang, and Storey (2012) examined the role of business intelligence and analytics in organizational decision-making. Their study revealed that data-driven technologies enhance innovation, improve operational performance, and support sustainable competitive advantage by enabling organizations to make informed strategic decisions.

Rogers (2003) proposed the Diffusion of Innovation Theory, explaining that the successful adoption of new technologies depends on factors such as perceived usefulness, compatibility, complexity, trialability, and observability. The study highlighted that organizations adopting innovative technologies earlier are more likely to achieve superior organizational performance.

OECD (2019) reported that Artificial Intelligence is a major driver of innovation, productivity, and sustainable economic growth. The report emphasized that organizations should integrate AI with innovation strategies to improve efficiency, create new business opportunities, and support sustainable development.

Dwivedi et al. (2021) reviewed the applications of Artificial Intelligence in business and management and found that AI significantly enhances organizational innovation, customer experience, operational efficiency, and strategic decision-making. The study concluded that AI adoption contributes positively to long-term organizational sustainability when supported by effective innovation capabilities.

Verhoef et al. (2021) discussed digital transformation as a strategic process that enables organizations to create sustainable competitive advantage. Their study highlighted that AI-driven digital transformation promotes innovation capability, organizational agility, and sustainable business performance.

El-Kassar and Singh (2019) investigated the relationship between green innovation and organizational sustainability. Their findings indicated that innovation capability significantly improves environmental, social, and economic performance, thereby contributing to sustainable business growth.

Bag et al. (2021) examined the influence of Artificial Intelligence on organizational performance and found that AI adoption positively impacts innovation capability, operational efficiency, and business sustainability. The study emphasized that innovation capability acts as an important mechanism through which AI enhances sustainable organizational performance.

III. RESEARCH GAP

Existing studies have independently examined the relationships between Artificial Intelligence (AI) adoption, innovation capability, and organizational performance. However, limited research has investigated how innovation capability mediates the relationship between AI adoption and sustainable business performance, particularly in the context of organizations in emerging economies. Moreover, previous studies have primarily focused on financial and operational performance, with comparatively less emphasis on the broader dimensions of sustainable business performance, including economic, environmental, and social outcomes. This study aims to bridge this gap by developing and empirically testing a comprehensive framework linking AI adoption, innovation capability, and sustainable business performance.

IV. RESEARCH PROBLEM

Organizations are increasingly investing in Artificial Intelligence technologies to improve efficiency and competitiveness. However, many organizations struggle to translate AI adoption into sustainable business performance due to inadequate innovation capabilities. Despite the growing importance of AI in business, there is limited empirical evidence explaining how innovation capability influences the relationship between AI adoption and sustainable business performance. Therefore, this study seeks to examine whether innovation capability serves as a mediating mechanism through which AI adoption enhances sustainable business performance.

V. RESEARCH OBJECTIVES

- 1) To examine the impact of Artificial Intelligence adoption on sustainable business performance.
- 2) To assess the influence of Artificial Intelligence adoption on innovation capability.
- 3) To evaluate the effect of innovation capability on sustainable business performance.
- 4) To examine the mediating role of innovation capability in the relationship between Artificial Intelligence adoption and sustainable business performance.

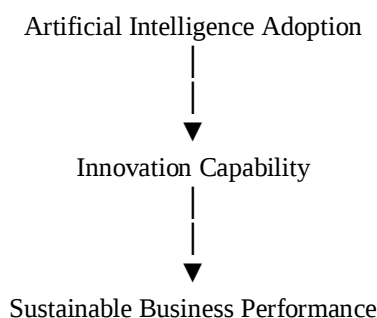
VI. CONCEPTUAL FRAMEWORK

A. Proposed Model

The conceptual framework of this study explains the relationship between Artificial Intelligence Adoption, Innovation Capability, and Sustainable Business Performance. The framework proposes that Artificial Intelligence adoption acts as an independent variable that influences sustainable business performance directly and indirectly through innovation capability. AI adoption enables organizations to improve decision-making, automate processes, and develop innovative solutions. These capabilities enhance innovation potential, which contributes to improved economic, environmental, and social performance.

In this framework, Innovation Capability is considered a mediating variable that explains how AI adoption contributes to sustainable business outcomes.

B. Conceptual Model



C. Direct Relationship

Artificial Intelligence Adoption —————> Sustainable Business Performance

D. Variables of the Study

Variable Type	Construct
Independent Variable	Artificial Intelligence Adoption
Mediating Variable	Innovation Capability
Dependent Variable	Sustainable Business Performance

E. Proposed Relationships

- AI Adoption → Innovation Capability
Artificial Intelligence adoption enhances an organization's ability to innovate through improved data analysis, automation, and intelligent decision-making.
- Innovation Capability → Sustainable Business Performance
Strong innovation capability enables organizations to develop sustainable products, improve processes, and achieve long-term business performance.
- AI Adoption → Sustainable Business Performance
AI adoption contributes to sustainable performance by improving operational efficiency, resource utilization, and strategic decision-making.

- AI Adoption → Innovation Capability → Sustainable Business Performance
Innovation capability acts as a mediator by converting AI-enabled technological advantages into sustainable organizational outcomes.

VII. RESEARCH METHODOLOGY

A. Research Design

This study adopts a quantitative research approach to examine the relationship between Artificial Intelligence Adoption, Innovation Capability, and Sustainable Business Performance. A structured questionnaire will be used to collect primary data from employees, managers, and business professionals working in organizations that have adopted digital technologies and AI-based solutions.

The study follows a descriptive and analytical research design to understand the impact of AI adoption on sustainable business performance and to examine the mediating role of innovation capability. The collected data will be analyzed using statistical techniques to test the proposed relationships among the variables.

B. Research Design

The study employs a descriptive research design to identify the level of AI adoption, innovation capability, and sustainable business performance among organizations. An analytical approach is used to examine the cause-and-effect relationships between the constructs.

C. Data Collection

- Primary Data: Collected through a structured questionnaire using a five-point Likert scale.
- Secondary Data: Collected from research articles, journals, books, reports, and relevant online sources.

D. Population and Sample

The target population of the study includes managers, executives, and professionals from organizations adopting Artificial Intelligence technologies. A suitable sample size will be selected using a convenient sampling technique.

E. Measurement of Variables

Variable	Dimensions
Artificial Intelligence Adoption	AI integration, automation, data-driven decision-making, predictive analytics
Innovation Capability	Product innovation, process innovation, organizational learning, technological innovation
Sustainable Business Performance	Economic performance, environmental performance, social performance

F. Data Analysis Tools

The collected data will be analyzed using:

- Descriptive Statistics
- Reliability Analysis (Cronbach's Alpha)
- Exploratory Factor Analysis (EFA)
- Confirmatory Factor Analysis (CFA)
- Structural Equation Modeling (SEM)
- Mediation Analysis using Bootstrapping Technique

G. Research Framework

The study examines whether Artificial Intelligence Adoption influences Sustainable Business Performance directly and indirectly through Innovation Capability as a mediating variable.

VIII. STATISTICAL TOOLS USED FOR DATA ANALYSIS

The collected data will be analyzed using appropriate statistical techniques to examine the relationship between Artificial Intelligence Adoption, Innovation Capability, and Sustainable Business Performance. The following statistical tools will be used for data analysis:

A. Descriptive Statistics

Descriptive statistics such as frequency, percentage, mean, and standard deviation will be used to understand the demographic profile of respondents and the overall level of AI adoption, innovation capability, and sustainable business performance.

B. Reliability Analysis

Cronbach's Alpha test will be applied to assess the internal consistency and reliability of the measurement scales used for the study variables.

C. Exploratory Factor Analysis (EFA)

EFA will be used to identify the underlying factor structure and validate the dimensions of Artificial Intelligence Adoption, Innovation Capability, and Sustainable Business Performance.

D. Confirmatory Factor Analysis (CFA)

CFA will be conducted to examine the validity of the proposed measurement model and confirm the relationships between observed variables and their respective constructs.

E. Correlation Analysis

Correlation analysis will be performed to determine the strength and direction of relationships among Artificial Intelligence Adoption, Innovation Capability, and Sustainable Business Performance.

F. Regression Analysis

Multiple regression analysis will be used to examine the impact of Artificial Intelligence Adoption on Innovation Capability and Sustainable Business Performance.

G. Structural Equation Modeling (SEM)

SEM will be employed to test the proposed conceptual framework and analyze the direct and indirect relationships among the study variables.

H. Mediation Analysis

Mediation analysis using the Bootstrapping method will be conducted to examine the mediating role of Innovation Capability in the relationship between Artificial Intelligence Adoption and Sustainable Business Performance.

I. Statistical Software Used

SPSS – For descriptive statistics, reliability analysis, factor analysis, correlation, and regression analysis.

AMOS / SmartPLS – For Structural Equation Modeling and mediation analysis.

The statistical analysis will help validate the proposed research model and provide empirical evidence on how Artificial Intelligence adoption contributes to sustainable business performance through innovation capability.

IX. DATA ANALYSIS AND RESULTS

The collected data will be analyzed using statistical techniques to examine the relationships among Artificial Intelligence Adoption (AIA), Innovation Capability (IC), and Sustainable Business Performance (SBP). The analysis will include reliability testing, validity assessment, correlation analysis, regression analysis, and Structural Equation Modeling (SEM) to validate the proposed research framework.

A. Demographic Profile of Respondents

The demographic characteristics of the respondents will be analyzed using frequency and percentage analysis. The profile includes variables such as gender, age group, educational qualification, work experience, designation, and industry type. The results provide an understanding of the background characteristics of the respondents participating in the study.

B. Reliability Analysis

The reliability of the measurement scales will be examined using Cronbach's Alpha coefficient. The reliability values for Artificial Intelligence Adoption, Innovation Capability, and Sustainable Business Performance are expected to exceed the acceptable threshold value of 0.70, indicating good internal consistency among the measurement items.

Construct	Cronbach's Alpha	Reliability Status
Artificial Intelligence Adoption	> 0.70	Reliable
Innovation Capability	> 0.70	Reliable
Sustainable Business Performance	> 0.70	Reliable

C. Descriptive Statistics

Mean and standard deviation values will be calculated to understand the respondents' perception levels regarding AI adoption, innovation capability, and sustainable business performance. Higher mean values indicate stronger agreement toward the adoption and impact of AI-driven practices.

D. Correlation Analysis

Pearson correlation analysis will be conducted to examine the relationship among the study variables. The expected results indicate a positive and significant relationship between:

Artificial Intelligence Adoption and Innovation Capability.

Innovation Capability and Sustainable Business Performance.

Artificial Intelligence Adoption and Sustainable Business Performance.

E. Regression Analysis

Multiple regression analysis will be used to examine the influence of Artificial Intelligence Adoption on Innovation Capability and Sustainable Business Performance.

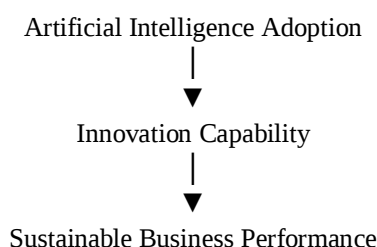
The expected findings suggest that:

- AI adoption significantly influences innovation capability.
- AI adoption positively contributes to sustainable business performance.
- Innovation capability enhances sustainable organizational outcomes.

F. Structural Equation Modeling (SEM)

SEM will be applied to test the proposed conceptual framework. The model will evaluate both direct and indirect relationships among the constructs.

The structural model is represented as:



The results are expected to confirm that Innovation Capability acts as a significant mediator between AI adoption and sustainable business performance.

G. Mediation Analysis

The mediation effect of Innovation Capability will be tested using the bootstrapping approach. The analysis will determine whether AI adoption improves sustainable business performance indirectly through enhanced innovation capability.

The study is expected to reveal that:

- Artificial Intelligence Adoption has a positive and significant impact on Innovation Capability.
- Innovation Capability positively influences Sustainable Business Performance.
- Artificial Intelligence Adoption directly improves Sustainable Business Performance.
- Innovation Capability partially or fully mediates the relationship between AI Adoption and Sustainable Business Performance.

X. SUGGESTION

- 1) Organizations should strategically adopt Artificial Intelligence technologies to improve operational efficiency, decision-making capabilities, and sustainable business outcomes.
- 2) Businesses should focus on developing innovation capability by encouraging creativity, knowledge sharing, technological learning, and continuous improvement among employees.
- 3) Organizations should provide AI-related training and skill development programs to enhance employee readiness and effective utilization of AI tools.
- 4) Managers should integrate AI adoption with sustainability strategies to achieve balanced economic, environmental, and social performance.
- 5) Organizations should invest in digital infrastructure and create an innovation-oriented culture to maximize the benefits of AI technologies.
- 6) Policymakers and industry bodies should support AI adoption among businesses through awareness programs, skill development initiatives, and responsible AI frameworks.

XI. CONCLUSION

Artificial Intelligence has emerged as a critical technology enabling organizations to improve efficiency, innovation, and sustainable growth. This study highlights the importance of understanding the relationship between Artificial Intelligence Adoption, Innovation Capability, and Sustainable Business Performance. The proposed framework suggests that AI adoption not only directly enhances sustainable business performance but also strengthens organizational outcomes through improved innovation capability.

Innovation capability acts as a key mechanism that helps organizations transform AI-driven technological advantages into sustainable value creation. By developing strong innovation capabilities, businesses can effectively utilize AI for process improvement, resource optimization, customer value creation, and long-term competitiveness.

The study contributes to the growing literature on digital transformation, innovation management, and sustainability by demonstrating the strategic role of AI in achieving sustainable business objectives. Organizations that integrate Artificial Intelligence with innovation-focused strategies can achieve improved economic performance while addressing environmental and social responsibilities. Thus, effective AI adoption combined with innovation capability can support organizations in achieving sustainable growth and contribute to the objectives of the United Nations Sustainable Development Goals (SDGs).

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