

# AI-Driven Decision-Making and Startup Performance: Empirical Evidence from IT Startups in Kerala

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**Abstract :** The rapid diffusion of Artificial Intelligence (AI) has significantly transformed entrepreneurial decision-making, particularly within technology-driven startup ecosystems. In recent years, IT startups have increasingly adopted AI-based tools to enhance data-driven decision-making, optimize resource allocation, and improve overall business performance. This study empirically examines the impact of AI-driven decision-making on the performance of IT startups in Kerala, a region that has emerged as a vibrant technology and innovation hub in India.

Using a mixed-method empirical approach, the study draws on primary data collected from founders, key decision-makers, and AI practitioners associated with IT startups operating in Kerala. Quantitative analysis is employed to examine the relationship between AI adoption and startup performance indicators such as operational efficiency, revenue growth, decision-making speed, innovation capability, and competitive advantage. Qualitative insights from interviews supplement the findings by capturing entrepreneurial perceptions, challenges, and contextual factors influencing AI integration.

The findings reveal that startups leveraging AI-driven decision-making exhibit significantly higher levels of performance compared to those relying primarily on traditional, intuition-based approaches. AI adoption is found to enhance decision accuracy, reduce uncertainty, and support strategic as well as operational decisions. However, the study also identifies key constraints, including high implementation costs, limited technical expertise, and data-related challenges, which moderate the effectiveness of AI usage in startups.

By providing region-specific empirical evidence, this study contributes to the growing literature on AI and entrepreneurship. It offers practical implications for startup founders, investors, and policymakers by highlighting best practices for effective AI adoption and underscoring the need for supportive ecosystems to maximize the performance benefits of AI-driven entrepreneurial decision-making.

**Index Terms - Artificial Intelligence; Entrepreneurial Decision-Making; Startup Performance; IT Startups; Data-Driven Decisions; Kerala Startup Ecosystem.**

## I. INTRODUCTION

Artificial Intelligence (AI) has emerged as one of the most transformative technologies influencing modern business environments. Organizations increasingly rely on AI technologies to improve decision-making capabilities, optimize operations, and enhance competitive positioning. Within entrepreneurial ecosystems, startups have become active adopters of AI due to the ir need for agility, rapid experimentation, and scalable growth models.

Entrepreneurial decision-making traditionally depended on founder intuition, prior experience, and market interpretation. However, growing data availability and increasing market complexity have encouraged startups to adopt AI-supported analytical approaches. AI technologies such as machine learning, predictive analytics, natural language processing (NLP), and intelligent automation provide entrepreneurs with opportunities to make faster and more evidence-based decisions.

The integration of AI into startup decision-making extends beyond operational automation. AI supports strategic choices including market selection, customer segmentation, pricing decisions, business model development, and growth planning. AI-driven decisions reduce uncertainty and enable entrepreneurs to respond proactively to changing market conditions.

Kerala has emerged as a rapidly developing startup ecosystem with increasing digital capability and technology adoption. Supported by innovation initiatives, incubation infrastructure, and entrepreneurial development programs, the region offers a relevant context for examining AI-enabled entrepreneurial practices. Nevertheless, empirical evidence on how AI influences entrepreneurial decision-making and startup performance remains limited.

This study therefore investigates the relationship between AI-driven decision-making and startup performance among IT startups in Kerala.

## II. NEED OF THE STUDY.

Although AI technologies are becoming increasingly accessible, startups continue to experience challenges in integrating AI into strategic and operational decisions. Existing studies largely focus on large enterprises and developed economies, leaving limited evidence regarding startup contexts and regional ecosystems.

This study addresses the gap by examining:

1. AI adoption practices among IT startups
2. Effects of AI on entrepreneurial decisions
3. Relationship between AI adoption and startup performance
4. Human–AI collaboration mechanisms
5. Challenges and barriers influencing implementation

### Objectives of the Study

1. To examine AI adoption practices among IT startups in Kerala.
2. To analyse the influence of AI on entrepreneurial decision-making.
3. To evaluate the impact of AI adoption on startup performance.
4. To identify barriers affecting AI implementation.
5. To recommend strategies for effective AI integration.

### Research Hypotheses

- H1: AI adoption positively influences startup performance.
- H2: AI-supported entrepreneurial decisions improve operational efficiency.
- H3: Human–AI collaboration significantly enhances decision quality.
- H4: Barriers to AI adoption negatively influence startup performance.

## III. REVIEW OF LITERATURE

- Agrawal, Gans, and Goldfarb (2018) argued that AI reduces prediction costs and improves strategic decision-making through enhanced forecasting capability.
- Brynjolfsson and McAfee (2014) reported that organizations integrating intelligent technologies achieve stronger operational efficiency and competitiveness.
- Davenport and Kirby (2022) emphasized that AI enhances managerial decision quality but cannot replace human judgment.
- Obschonka and Audretsch (2019) observed that entrepreneurial competitiveness increasingly depends on digital capability and technology adoption.
- The literature collectively supports the proposition that AI contributes positively to startup growth but requires effective human interpretation and organizational readiness.

## IV. RESEARCH METHODOLOGY

### 4.1 Research Design

The study adopted a mixed-method research design, integrating quantitative and qualitative approaches to examine the relationship between AI-driven decision-making and startup performance. The quantitative component measured AI adoption and performance outcomes, while qualitative insights explored entrepreneurial experiences, contextual interpretations, and implementation challenges.

### 4.2 Population and Sample

The study population consisted of stakeholders associated with IT startups operating in Kerala. The final sample included 200 respondents, distributed across four stakeholder groups:

Category	Sample
Startup Founders	50
Startup Managers	50
AI Practitioners	50
Ecosystem Stakeholders	50
Total	200

A purposive sampling approach was adopted to ensure representation of different perspectives in entrepreneurial decision-making.

### 4.3 Sources of Data

The study used:

#### Primary Data

- Structured questionnaire
- Semi-structured interviews

#### Secondary Data

- Research articles
- Startup ecosystem reports
- Industry publications
- Government documents

### 4.4 Variables of the Study

Independent Variables	Dependent Variables
AI Adoption	Startup Performance
Human–AI Collaboration	Operational Efficiency
Decision Speed	Innovation Capability
Analytical Capability	Competitive Advantage

### 4.5 Statistical Tools Used

The study employed:

- Descriptive Statistics
- Mean and Standard Deviation
- Correlation Analysis
- Regression Analysis
- Thematic Analysis

Regression model:

$$\text{Startup Performance} = \beta_0 + \beta_1(\text{AI Adoption}) + \epsilon$$

## V. RESULTS AND DISCUSSION

### 5.1 AI Adoption among Startups

The study found varying levels of AI integration across startups.

**Table 1: AI Adoption Levels**

Adoption Level	Percentage
No AI	12
Pilot Stage	28
Partial Adoption	38
Full Adoption	22

Interpretation:

Most startups remain in the **partial adoption stage (38%)**, suggesting gradual integration of AI into entrepreneurial practices.

### 5.2 Impact of AI on Startup Performance

**Table 2: Performance Outcomes**

Indicator	Improvement (%)
Revenue Growth	62
Cost Efficiency	58
Innovation	66
Market Responsiveness	71
Investor Confidence	54

The findings indicate that AI contributes most strongly to **market responsiveness and innovation capability**.

### 5.3 Barriers to AI Adoption

**Table 3: Barriers (Mean Scores)**

Barrier	Mean
Cost	4.34
Talent Shortage	4.18
Data Quality	4.02
Integration Issues	3.76
Ethical Concerns	3.41

Implementation cost emerged as the most significant constraint.

### 5.4 Regression Analysis

**Table 4: Regression Results**

**Dependent Variable: Startup Performance**

Variable	Beta	t-value	p-value
Constant	12.45	6.28	.000
AI Adoption	0.68	8.25	.000

Model Statistics:

$R^2 = 0.46$

F = 68.12

Significance = .000

Interpretation:

The regression results indicate that AI adoption explains approximately **46% of the variation in startup performance**, demonstrating a statistically significant positive relationship.

### Discussion

The findings support prior research suggesting that AI adoption improves entrepreneurial outcomes.

Consistent with Agrawal et al. (2018), AI reduced uncertainty and improved strategic decisions.

The findings align with Davenport and Kirby (2022), confirming that AI supports managerial decisions but does not replace entrepreneurial judgment.

The results also reinforce Wilson and Daugherty's collaborative intelligence model, indicating that startups achieve superior outcomes when combining AI capability with human interpretation.

## VI. CONCLUSION

The study concludes that AI-driven decision-making positively influences startup performance among IT startups in Kerala.

AI adoption improves:

- Decision quality
- Innovation capability
- Operational efficiency
- Strategic responsiveness

However, implementation barriers—including cost, technical capability, and data limitations—continue to affect adoption outcomes.

The study supports a **human–AI collaborative model**, where AI functions as a decision-support mechanism rather than a substitute for entrepreneurial leadership.

### Practical Implications

For Entrepreneurs:

- Invest in AI capability and analytics readiness.

For Policymakers:

- Develop startup AI infrastructure and skilling support.

For Investors:

- Encourage AI-enabled business models.

### Limitations

- Geographic limitation to Kerala
- Cross-sectional design
- Focus on IT startups only

Future studies may conduct longitudinal and comparative analysis.

### VII. ACKNOWLEDGMENT

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