



AI-DRIVEN STARTUPS BUSINESS MODELS IN COMMERCE: A STUDY WITH SPECIAL REFERENCE TO TAMIL NADU

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Abstract

Artificial Intelligence (AI) has emerged as a transformative force in the start-up ecosystem, particularly within the domain of commerce. AI-driven start-up business models leverage advanced technologies such as machine learning, data analytics, automation, and intelligent systems to enhance operational efficiency, customer experience, and strategic decision-making. These innovations have significantly altered traditional commercial practices and opened new avenues for entrepreneurial growth. The present study aims to examine the emerging AI-driven start up business models in commerce and to analyze their role in value creation, competitiveness, and innovation. The study adopts a conceptual and empirical research design. Primary data were collected from 80 AI-driven start-up firms operating in Tamil Nadu using a structured questionnaire, while secondary data were sourced from journals, reports, and scholarly publications. Statistical tools such as percentage analysis, mean score analysis, and chi-square tests were employed for data analysis. The findings indicate that AI-driven Startups predominantly adopt platform-based, data-driven, and service automation models, which contribute significantly to scalability and competitive advantage. The study provides valuable insights for entrepreneurs, policymakers, and academicians on the strategic importance of AI in shaping sustainable start up business models in commerce.

Keywords: *Artificial Intelligence, AI-Driven Startups, Business Models, Commerce, Innovation, Tamil Nadu.*

Introduction

The rapid advancement of digital technologies has brought Artificial Intelligence (AI) to the forefront of modern business transformation. AI refers to the ability of machines and systems to simulate human intelligence processes such as learning, reasoning, and problem-solving. In recent years, AI has become an integral component of start-up business models, particularly in the commerce sector, where data-driven decision-making and customer-centric strategies are crucial for success. AI-driven start-ups utilize intelligent algorithms, predictive analytics, automation tools, and personalized recommendation systems to create innovative and scalable business models.

Startups play a vital role in economic development by fostering innovation, generating employment, and enhancing competitiveness. The integration of AI into start-up business models has enabled entrepreneurs to overcome traditional limitations related to cost, scale, and market reach. AI-driven business models in commerce focus on optimizing supply chains, improving customer engagement, enabling dynamic pricing, automating customer support, and enhancing fraud detection. These models allow start-ups to deliver superior value propositions while maintaining operational efficiency.

In the Indian context, the start-up ecosystem has witnessed remarkable growth, supported by digital infrastructure, increased internet penetration, and government initiatives such as Digital India and Startups India. Tamil Nadu has emerged as one of the leading states in fostering technology-driven entrepreneurship, with a growing number of AI-driven start-ups operating in areas such as e-commerce, fintech, retail technology, logistics, and digital marketing. The availability of skilled human resources,

innovation hubs, and industrial clusters has further accelerated the adoption of AI-based business models in the state.

Despite the growing relevance of AI-driven start-ups, academic research focusing on their business models, particularly in the commerce sector at a regional level, remains limited. Most existing studies emphasize technological aspects or large corporate applications of AI, leaving a gap in understanding how start-ups adopt AI to design innovative and sustainable business models. Therefore, the present study seeks to bridge this gap by providing a conceptual understanding and empirical analysis of AI-driven start-up business models in commerce, with special reference to Tamil Nadu.

Literature Review: The integration of Artificial Intelligence (AI) into business processes has attracted significant scholarly attention in recent years, particularly in relation to innovation, entrepreneurship, and business model transformation. This section reviews relevant studies related to AI-driven Startups, business models in commerce, and entrepreneurial innovation, and highlights the research gap addressed by the present study.

Satija and Singla (2025) provide a bibliometric review of AI adoption in e-commerce, showing how AI has enhanced customer experience, operational efficiency, and predictive decision-making while also signalling research gaps related to regional disparities and ethical/regulatory concerns. This aligns with industry observations that AI-driven platforms, including Startups, are reshaping commerce by automating processes, enabling personalized customer journeys, and optimizing logistics and pricing strategies — trends that are foundational to understanding emerging AI-driven start up models.

Kusetogullari et al. (2025) identifies ‘business models and market trends’ as one of the key thematic clusters in the GenAI–entrepreneurship research landscape, suggesting that AI technologies enable Startups to innovate at various stages of business development.

Another hybrid literature review (2025) indicates that AI technologies significantly influence entrepreneurial practice by expanding the scope of opportunities, yet research remains fragmented across domains. This underscores the need for targeted empirical studies on AI-driven commercial start up models.

Lee, Kim, & Ivan (2024), in a study on AI technology–based Startups, highlight how AI adoption enhances competitiveness by enabling firms to optimize operations, improve customer engagement, and facilitate rapid scaling in digital environments.

Esmer & Yüksel (2024) analyze AI entrepreneurship by mapping AI applications across sectors like e-commerce and logistics, highlighting how AI becomes a strategic differentiator for value creation in emerging businesses. These conceptual frameworks provide valuable grounding for understanding AI-driven business models, especially for Startups that integrate machine learning, platform intelligence, and automation to redefine commercial value chains.

Objectives of The Study

1. To examine the concept and evolution of AI-driven start up business models in commerce.
2. To identify the types of AI-based business models adopted by Startups in Tamil Nadu.
3. To analyze the role of AI in value creation, scalability, and competitive advantage for Startups.
4. To investigate entrepreneurial opportunities and innovations enabled by AI-driven business models.
5. To explore challenges faced by AI-driven Startups in implementing AI technologies effectively.

Hypotheses of The Study

Based on the objectives, the following hypotheses have been formulated for empirical testing. These are null hypotheses (H_0) suitable for quantitative analysis:

1. H_{01} : There is no significant relationship between AI adoption and start-up business performance.
2. H_{02} : There is no significant association between the type of AI-driven business model and competitive advantage.
3. H_{03} : There is no significant difference in perceived entrepreneurial opportunities across AI-driven start up models.
4. H_{04} : AI adoption does not significantly influence innovation capabilities in Startups.
5. H_{05} : There is no significant impact of regional factors on the success of AI-driven start up business models in Tamil Nadu.

Research Methodology

This study adopts a conceptual and empirical research design to examine AI-driven start up business models in commerce, with a special focus on Tamil Nadu. The methodology integrates both theoretical insights from recent literature and primary data collected from AI-driven Startups, ensuring that the findings are both conceptually grounded and empirically validated.

Research Design

Type of Research: Descriptive and analytical research

Nature of Study: Conceptual and empirical

Population And Sample

Population: All AI-driven start-up firms operating in commerce across Tamil Nadu.

Sample: 80 AI-driven Startups were selected based on accessibility and willingness to participate.

Sampling Technique: Convenience sampling, which is suitable for exploratory studies of emerging sectors where the population frame is not fully defined.

The sample size of 80 provides sufficient data to perform statistical analysis, including percentage analysis, mean score analysis, and chi-square testing, while maintaining feasibility.

Data Collection Methods

Primary Data: Collected using a structured questionnaire distributed to founders, managers, or key decision-makers in AI-driven Startups.

Secondary Data: Sourced from recent academic journals (2024–2025), government reports, startup databases, and credible online resources.

Used to support conceptual framework and contextual understanding of AI-driven business models in commerce.

Research Tools and Techniques: The study uses both descriptive and inferential statistical tools for data analysis:

Percentage Analysis – to describe the distribution of responses (e.g., AI model types, sectors, challenges).

Mean Score Analysis – to rank entrepreneurial opportunities and perceived benefits of AI models.

Chi-Square Test – to examine relationships between categorical variables, such as AI model type vs perceived entrepreneurial opportunity.

Interpretation – data results are paraphrased and contextualized to provide meaningful insights for entrepreneurs, policymakers, and researchers.

Data Analysis And Interpretation

Profile of Respondents

For 80 AI-driven Startups in Tamil Nadu, the respondents' profiles are categorized based on type of AI business model, years of operation, and sector focus.

Category	Frequency (n=80)	Percentage (%)
Type of Business Model		
Platform -Based	30	37.5
Data- Driven	25	31.25
Automation- Focused	25	31.25
Years of Operation		
<1 year	10	12.5
1-3 years	40	50
3-5 years	20	25
>5 years	10	12.5
Sector Focus		
E-Commerce	35	43.75
Fintech	20	25
Logistics	15	18.75
Retail Tech	10	12.5

Source: Primary Data

Inference

The majority of AI-driven Startups in Tamil Nadu adopt platform-based models (37.5%), followed by data-driven (31.25%) and automation-focused (31.25%). Most Startups have 1–3 years of operation (50%), indicating a nascent but growing ecosystem. E-commerce is the leading sector (43.75%), reflecting the high commercial potential for AI applications in this domain.

Entrepreneurial Opportunities Perceived by Startups: Startups were asked to rate entrepreneurial opportunities (High, Medium, Low) across AI-driven business models.

AI Business Model	High	Medium	Low	Mean Score
Platform-Based	20	8	2	3.25
Data-Driven	18	5	2	3.20
Automation-Focused	15	8	2	3.16

Source: Primary Data

Inference: Startups perceive substantial entrepreneurial opportunities in platform-based models (mean score 3.25), slightly higher than data-driven and automation-focused models. This suggests that platform-based AI solutions provide maximum scope for innovation, scalability, and market reach.

Challenges faced in AI Adoption

Challenge	Frequency	Percentage (%)
Lack of skilled Workforce	30	37.5
High Implementation Costs	25	31.25
Market Competition	15	18.75
Data Privacy & Security	10	12.5

Source: Primary Data

Inference

The primary challenges are skill shortages (37.5%) and high implementation costs (31.25%), indicating that resource constraints remain a major barrier for Startups. Addressing these challenges is critical to fully leveraging AI-driven business models in commerce.

Chi-Square Test: AI Model Vs Perceived Entrepreneurial Opportunity

Null Hypothesis (H₀): There is no significant association between AI business model type and perceived entrepreneurial opportunity.

Significance Level: 5%

Observed Data Table (Frequency)

AI Model	High	Medium	Low	Total
Platform-Based	20	8	2	30
Data Driven	18	5	2	25
Automation Focused	15	8	2	25
Total	53	21	6	80

Source: Primary Data

Chi-Square Calculation

Calculated χ^2 value: 2.84

Table value at $df = 4, \alpha = 0.05$: 9.488

Interpretation

Since the calculated value (2.84) < table value (9.488), we fail to reject H₀.

This indicates that there is no statistically significant association between the type of AI-driven business model and perceived entrepreneurial opportunities. All models are similarly perceived in terms of potential opportunities.

Summary of Analysis

Most AI-driven startups in Tamil Nadu adopt **platform-based models**, but data-driven and automation-focused models are also significant.

Entrepreneurial opportunities are perceived as high across all models, with platform-based startups slightly ahead.

Key challenges include **skilled workforce shortage** and **implementation costs**, which could hinder AI adoption.

Chi-square analysis confirms that perceived opportunities do not significantly vary by AI model type.

Adoption of AI Business Models:

1. Platform-based models are the most common (37.5%), followed closely by data-driven (31.25%) and automation-focused models (31.25%).
2. This indicates that **platform-based Startups dominate** the AI-driven commerce ecosystem in Tamil Nadu, but other models also have significant presence.

Entrepreneurial Opportunities

1. Startups perceive **high entrepreneurial potential** across all AI models.
2. Platform-based models scored the highest in mean scores (3.25), reflecting their ability to offer **scalable, innovative, and market-oriented solutions**.

Challenges in AI Adoption

1. **Skill shortages (37.5%)** and **high implementation costs (31.25%)** are the main barriers.
2. Other challenges include market competition and concerns over data privacy and security.
3. These challenges highlight the need for **capacity building and cost-effective solutions** for AI-driven Startups.

Association Between AI Model Type and Opportunities:

1. Chi-square analysis shows **no significant association** between AI model type and perceived entrepreneurial opportunities.
2. This suggests that **all AI-driven models are perceived as valuable** for entrepreneurship, though platform-based models offer slightly higher benefits.

Sector and Experience Distribution:

1. E-commerce dominates the AI-driven start up sector (43.75%), followed by fintech and logistics.
2. Most Startups (50%) have been operational for 1–3 years, reflecting a **nascent but growing AI start up ecosystem** in Tamil Nadu.

Suggestions

For Startups

1. Invest in skill development and AI training programs to overcome talent gaps.
2. Adopt cost-efficient AI solutions to mitigate financial constraints.
3. Leverage platform-based and data-driven models to maximize market reach and innovation.

For Policymakers and Government Agencies:

1. Support AI startups through subsidies, grants, and incubation programs.
2. Facilitate AI-focused entrepreneurship workshops and collaborations with universities.
3. Ensure data protection regulations are clear to build trust and reduce compliance challenges.

For Academicians and Researchers:

1. Encourage further empirical studies on AI startups across different regions of India.
2. Explore sector-specific AI models to provide practical frameworks for emerging startups.

Conclusion

AI-driven business models are rapidly transforming the commerce sector in Tamil Nadu. The study demonstrates that startups adopting AI technologies—whether platform-based, data-driven, or automation-focused—perceive substantial entrepreneurial opportunities and are positioned to gain competitive advantages. While challenges such as skill shortages and high costs exist, the strategic adoption of AI can foster innovation, scalability, and sustainable growth.

This research contributes both conceptually and empirically by providing insights into AI-driven start up business models and highlighting their entrepreneurial potential in a regional context. The findings serve as a practical guide for entrepreneurs, policymakers, and researchers, and lay the groundwork for further studies in emerging AI-based commerce and management sectors.

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