Forum For Economic Studies and Research Journal
Volume: 10/ N°: 01 (2026), p 416 - 432

Artificial Intelligence as a Strategic Lever for the Success of Startups: An Analytical Study of ByteDance's Experience in the Digital Entrepreneurship Environment

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Received:11/02/2026 **Accepted: 23/05/2026**

Abstract:

This study aims to analyze the role of Artificial Intelligence in enhancing the success of startups in dynamic environments, with a focus on its impact on performance and business models. The study adopted a literature review methodology based on academic sources and studies, while using ByteDance as a practical case study.

The study was based on a main hypothesis stating that Artificial Intelligence contributes to the success and growth of startups, in addition to three sub-hypotheses related to its impact on performance, business models, and the growth of ByteDance. The findings confirmed the validity of these hypotheses, showing that Artificial Intelligence contributes to enhancing innovation, improving operational efficiency, and supporting decision-making, which provides startups with a competitive advantage and helps achieve growth and sustainability.

Keywords: *Artificial Intelligence; Start-up; Business Model; Competitive Advantage; ByteDance .*

JEL Classification Codes: *O33؛ L26؛ L21؛ L10؛ M10.*

1 .Introduction

In light of the rapid transformations taking place in the digital world, and with the emergence of artificial intelligence (AI) as a powerful technological force across various sectors, it has become essential to examine the role this technology plays in enhancing the performance of startups, particularly in emerging economies. A startup has become a flexible economic entity that seeks to provide innovative solutions that respond to market needs through advanced business models. In this context, there is an increasing need to gain a deeper understanding of how AI is integrated into these organizations and the extent to which it contributes to enabling their expansion and strengthening their competitiveness.

1.1 Research Problem

- To what extent can artificial intelligence enhance the ability of startups to achieve success and growth in dynamic and changing environments?

1.2 Research Questions

- Does artificial intelligence have an impact on the business model of startups?
- Does artificial intelligence contribute to improving the performance of startups?
- Does the use of artificial intelligence contribute to the growth of ByteDance?

1.3 Research Hypotheses

- **Main Hypothesis:**
  - Artificial intelligence contributes to enhancing the success and growth of startups in dynamic and changing environments.
- **Sub-Hypotheses:**
  - **Sub-hypothesis 1(H1):** Artificial intelligence has a positive impact on the performance of startups
  - **Sub-hypothesis 2(H2):** Artificial intelligence has an impact on the business model of startups.
  - **Sub-hypothesis 3(H3):** The use of artificial intelligence contributes to the growth of ByteDance.

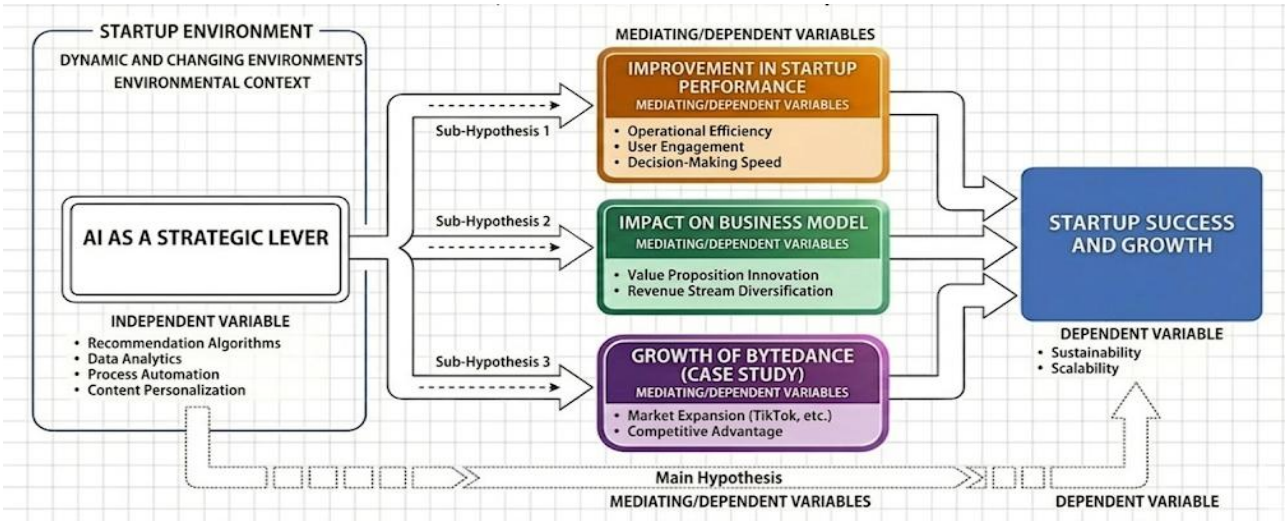
1.4 Conceptual Framework of the Study

The conceptual framework illustrates the relationship between the study variables, where artificial intelligence represents the main independent variable. The mediating variables include its impact on business model innovation, performance improvement, and startup development. In contrast, the dependent variable is represented by startup success and sustainable growth.

The model further indicates that the impact of artificial intelligence on startup success is not direct; rather, it operates through a set of mediating pathways, including business model innovation, operational performance improvement, and the scalability of growth, as illustrated by leading companies such as ByteDance.

Accordingly, this framework reflects the main hypothesis of the study, as well as the sub-hypotheses developed to examine the relationships between the variables.

Figure 1: Conceptual Framework of the Study



Source: From the author's preparation.

1.5 Importance of the Study

The importance of this study lies in its focus on the vital relationship between artificial intelligence and entrepreneurship, which allows for a better understanding of the new roles of technology in building more flexible and adaptable organizations. Addressing the topic from the perspective of startups also enriches the discussion on how to support this type of enterprise, which is considered one of the main drivers of a knowledge- and innovation-based economy.

1.6 Objectives of the Study

- To provide a precise conceptual framework for the concept of startups and their development stages.
- To analyze the characteristics of artificial intelligence that make it a strategic tool for startups.
- To clarify the impact of AI on business models and institutional innovation.
- To present an advanced case study illustrating the role of AI in the rapid success of startups.
- To provide practical recommendations for decision-makers and entrepreneurs on how to effectively invest in this technology.

1.7 Research Methodology

This study adopts a literature review methodology, relying on articles and academic sources to support the validity of the hypotheses at a theoretical level.

1.8 Structure of the Study

The first section was devoted to the theoretical framework of startups, while the second section addressed artificial intelligence and its role in empowering startups (Artificial Intelligence and Its Role in Empowering Startups). In this part, the research hypotheses were examined and theoretically validated through the analysis of relevant literature and previous studies.

2. An Overview of the Structure and Development of Startups

Within this context, the discussion will focus on the conceptual aspects related to startups, including their definition, key characteristics, stages of development, and the main factors contributing to their success.

2.1 A Conceptual Framework for Startups

Startups are among the most prominent forms of modern economic ventures, playing a vital role in stimulating innovation and driving economic growth. Various theoretical approaches and practical models have emerged to better understand the nature of these enterprises, given their distinctiveness from traditional firms in terms of origin, behavior, and operating environment.

A **startup** is defined as a newly established entrepreneurial project created to develop an innovative product or service that addresses a real market need. It operates in an unstable environment characterized by shifting challenges and opportunities. Startups are highly flexible and rely heavily on experimentation and rapid learning in the pursuit of a scalable and sustainable business model.

According to the **Global Entrepreneurship Monitor (GEM)**, several factors influence the success of startups, including sufficient funding, government support, entrepreneurial education, technology, and innovation. This highlights the importance of a comprehensive supportive ecosystem to ensure their survival and growth (Zoltan J. Acs, 2008).

In technical contexts, startups are described as entities with no prior operating history, often working in high-risk technological domains where **innovation** is the primary driver. Due to limited resources and high uncertainty, startups face challenges in applying traditional software engineering methods and are often forced to make quick decisions in development, production, and marketing. Responsiveness to market demands and adaptability are considered key success factors in this setting (Nicolò Paternoster, 2014).

To gain a deeper understanding of startups, researchers propose an **integrative perspective** that combines the following approaches (Aidin Salamzadeh, Startup Companies: Life Cycle and Challenges, 2015):

- **Entrepreneurial Approach**: Emphasizes the role of the entrepreneur as an innovator seeking to transform ideas into economically valuable ventures. Here, the startup is viewed as a hub of creativity and new opportunities, centered on the core idea and a value-creating business model.
- **Organizational Approach**: Focuses on the internal structure from the moment of establishment, where early design decisions—such as structure, tasks, and processes—play a crucial role in determining the startup's ability to adapt and scale. According to this perspective, the way a startup is founded impacts its sustainability and future performance.
- **Managerial Approach**: Views the startup as a small, collaborative team working in the absence of complex formal structures. In this context, effective human resource management, flexible leadership, and collective decision-making are essential in building organizational capabilities.

From this overview, it becomes clear that a startup is not merely a "small business at its beginning" but rather a unique organizational model that combines innovation, speed, agility, and teamwork. It is subject to interrelated influences that require a multidimensional analysis, making it a rich subject for study. This also highlights the need to develop specialized analytical frameworks that consider its specific nature within the current economic and technological context.

2.2 Key Characteristics of Startups

The characteristics of startups can be classified into four main dimensions: **organizational**, **ownership**, **strategy and innovation**, and **financial** dimensions.

Table (1): Characteristics of Startups.

Key Features	Main Dimension
Organizational Dimension	➢ Small size in terms of resources and number of employees ➢ Recent establishment ➢ Homogeneous environment ➢ Informal management structure ➢ Limited specialization and overlapping tasks ➢ Centralized decision-making
Strategy and Innovation Dimension	➢ Owner is also the manager or direct supervisor ➢ Intuitive and personal decision-making ➢ Direct oversight by the owner |
Ownership Dimension	➢ Targeting niche markets ➢ Tendency to take risks in decisions ➢ Rapid responsiveness to changes ➢ Early or late market entry ➢ Weak research and development
Financial Dimension	➢ Limited financial resources ➢ Reliance on self-financing ➢ Support from family or relatives

Source: (Rahmat Nurcahyo, 2018).

2.3 Stages of Startup Development

A study conducted by researchers from the University of California and Southern Methodist University examined the growth stages of startups, highlighting fundamental differences compared to large corporations. The researchers attributed these differences to several factors, most notably the smaller size of startups, which affects their scalability, as well as variations in organizational structures and management approaches. Notably, startups often enjoy greater autonomy in decision-making.

The study identified five main stages of startup development: Existence – Survival – Success – Take-off – Maturity. Each stage is characterized based on five central managerial factors: management style, organizational structure, presence of formal systems, business

strategy, and the owner's role in the company (Baya, 2021). Below is a breakdown of each stage based on these factors:

- **Existence Stage**: This stage focuses on testing the startup's ability to provide a product or service that meets an actual market need, as well as attracting customers and encouraging them to make purchases. From a managerial perspective, the management style is characterized by direct supervision from the owner. The organizational structure at this stage is primitive or nearly non-existent, and formal systems are either absent or at their lowest levels. The core strategy is centered on survival and continuity, while the owner plays a pivotal role that includes financing, management, and making all decisions related to the business.
- **Survival Stage**: At this stage, after the business has proven its ability to generate real revenues, it becomes necessary to efficiently manage revenues and expenses to ensure continuity and stability. Managerially, the management style shifts to indirect supervision. The organizational structure begins to expand to include roles such as general manager or sales manager. The company also begins introducing accounting systems and financial projections as part of building formal systems that aid in decision-making. The strategy remains focused on survival, while the owner continues to play a central role, although gradually starting to delegate some tasks.
- **Success Stage**: This stage represents a critical turning point in the startup's path, as it must make a strategic decision between two directions: pursuing organizational independence or expanding and growing. In the **Success–Disengagement** branch, the business focuses on improving operational efficiency while reducing the owner's involvement in day-to-day operations. The management style is characterized by functional delegation. The organizational structure becomes more organized, and integrated formal systems begin to emerge, particularly in finance and marketing. The strategy is to maintain the current state, and the owner's role is limited to general oversight without direct involvement. In the **Success–Growth** branch, the owner chooses to direct resources toward expansion and gaining a larger market share. This path features delegated management accompanied by the owner's strategic oversight. The organizational structure continues to expand, and formal systems evolve gradually and precisely. The strategy focuses on continuous growth, with the owner remaining a key figure in leading expansion efforts.
- **Take-off Stage**: In this stage, the startup concentrates on accelerating its growth significantly, which often requires securing additional funding to meet increasing expansion demands. Managerially, the management style is marked by clear functional divisions that allow for efficient distribution of tasks and responsibilities. The organizational structure is in the process of expanding to accommodate the growing volume of activities. Formal systems are comprehensive and advanced, supporting various business functions in an organized way. The strategy is focused on achieving rapid growth, while the owner gradually withdraws from daily operations, retaining a general supervisory role over the company's broader strategic direction.
- **Maturity Stage**: At this stage, the startup aims to enhance profits and achieve sustainable financial stability while maintaining its flexibility and the innovative spirit that

characterizes it as a startup. This phase requires the use of modern managerial tools such as strategic planning, budgeting, and management by objectives to ensure performance efficiency and anticipate changes. At the managerial level, the management style becomes executive and consultative. The organizational structure is advanced and stable, aligning with the scale and complexity of operations. Formal systems are precise and comprehensive, covering all aspects of the business. The strategy involves reinvesting profits to strengthen competitive positioning, while the owner is now fully detached from day-to-day management and assumes a purely advisory or investment role.

If the startup loses its ability to innovate and adapt during the maturity stage, it risks entering an undesirable phase of stagnation, where risk aversion increases and entrepreneurial spirit declines—ultimately threatening long-term sustainability and success.

2.4 Key Success Factors for Startups

The success of a startup cannot be reduced to financial indicators alone; rather, it is built on a comprehensive system of economic, social, organizational, and innovative factors. According to the Boston Consulting Group (BCG, 2021), these factors interact within four fundamental dimensions that together form the foundation for startup success (Soumia, 2022):

- **Economic Dimension:** Economic performance is the cornerstone for assessing a startup's success, as it reflects its ability to grow and expand in a competitive environment. This is reflected in several key indicators, including:
  - **Growth**: The expansion of business operations and increase in revenues, along with the ability to scale in both local and international markets.
  - **Financing**: Access to sufficient and flexible funding sources, whether through direct investment, venture capital, or innovative lending mechanisms.
  - **Profitability**: Measured by return on investment, financial stability, and the potential for medium- and long-term profits.
- **Social and Environmental Dimension:** Startups are no longer viewed solely as economic entities; they are now expected to have tangible social and environmental impacts. This dimension includes:
  - **Environmental impact**: Offering products or services that contribute to environmental sustainability and reduce carbon footprint.
  - **Social impact**: Supporting social causes such as job creation, empowering marginalized groups, and promoting social inclusion.
  - **Alignment with local context**: Engaging with local values and cultures, and complying with community development goals.
- **Innovation Dimension:** Innovation lies at the heart of a startup, enabling it to navigate market fluctuations and ongoing changes. This dimension is assessed by:
  - **Development of new products or services**: Meeting unmet needs or providing more efficient alternative solutions.
  - **Adaptability and scalability**: Rapid market entry and the ability to flexibly reach new customer segments.
  - **Business model**: Building a non-traditional model based on added value, repeatability, and scalability.

- **Governance and Responsibility Dimension:** Governance plays a pivotal role in enhancing transparency and trust both within and outside the startup. This includes:
  - **Sound management**: Clear organizational structure, rational role distribution, and effective decision-making mechanisms.
  - **Transparency and accountability**: Through regular reporting and information sharing with investors, partners, and stakeholders.
  - **Social responsibility**: Adhering to ethical standards, adopting sustainable community initiatives, and engaging in environmentally and socially responsible practices.

Startup success is not built on a single dimension; it is the result of a balanced integration of financial performance, social and environmental impact, innovation capacity, and effective governance. The strength of startups lies in their agility and ability to respond holistically to both market and societal demands, positioning them as a key pillar in the innovation-driven economy.

3. Artificial Intelligence and Its Role in Empowering Startups

This section explores a set of elements that contribute to building a comprehensive understanding of the role of artificial intelligence (AI) in startup environments. It begins by defining AI and highlighting its key characteristics, then clarifies its importance in supporting startups, and finally presents the experience of ByteDance as a case study that reflects the potential of AI in the entrepreneurial context.

3.1 The Concept of Artificial Intelligence

Artificial Intelligence (AI) is defined as a software system capable of learning and evolving, designed to simulate human behavior through continuous interaction with users and by processing large sets of diverse data. Its role goes beyond executing pre-programmed tasks; its essence lies in the ability to adapt to complex real-world environments and account for individual user differences. This allows AI to develop scalable behavioral models that serve as foundations for more advanced and effective future applications (Schank, 1991).

In the organizational context, AI is considered a core technological tool that enhances organizational performance. It encompasses a variety of advanced technologies such as machine learning (ML), natural language processing (NLP), and big data analytics. These are employed to foster innovation, improve decision-making efficiency, and boost operational performance. AI is also used to understand customer behavior, predict market trends, develop smart products, and offer personalized services tailored to user needs.

These technologies are particularly crucial in dynamic environments marked by volatility and uncertainty, where AI can significantly enhance a startup's ability to adapt and scale. However, their use must also account for ethical values such as privacy, transparency, and algorithmic fairness (Harry, 2023).

In the startup context, AI refers to a system of algorithms and technologies adopted from the earliest stages of the venture as a foundation for managing and operating organizational processes. The primary function of this system is to collect and analyze large volumes of data automatically, producing intelligent decisions that contribute to accelerated growth, business expansion, and organizational self-learning.

This philosophy is embodied in the concept of the **"AI Factory"**, an operational model that enables startups to establish continuous growth loops based on data flows and ongoing

algorithm optimization. This grants the startup exceptional capabilities in innovation and scalability, ultimately providing it with a competitive edge in the entrepreneurial landscape (Peiyi Jia, 2021).

3.2 Characteristics of Artificial Intelligence

Artificial Intelligence (AI) is one of the most advanced fields in computer science and has garnered growing interest in recent years due to its increasing capabilities in data analysis, self-learning, and performing complex tasks—often with efficiency beyond human abilities. While there is no single, universally agreed-upon definition, the common goal across different research directions is to produce intelligent machines that can "think" and "act" rationally or in a human-like manner.

Based on recent literature, several distinguishing features of AI can be identified, especially in the context of startups and digital transformation (Michael Weber, 2021):

- **Adaptive Intelligence**: AI learns from experience and improves its performance automatically over time by identifying patterns in data—this is the core of machine learning and deep learning technologies.
- **Multi-Level Abstraction**: Through deep learning, AI can extract insights from data at increasingly abstract levels, enabling it to understand data in a more complex and profound way.
- **Autonomous Rule Generation**: AI systems can create their own rules based on data analysis without direct human intervention.
- **Technological Diversity**: AI is not limited to a single technology. It includes a wide range of techniques such as machine learning, deep learning, NLP, computer vision, robotics, and knowledge-based reasoning.
- **Human-Like Behavior**: AI performs tasks that involve perception, reasoning, creativity, and problem-solving, thus simulating human cognitive abilities to varying degrees.
- **Integration with Big Data**: AI thrives in data-rich environments, with data serving as the raw material for learning and decision-making.
- **Computational Enhancement**: Advances in computing power have significantly improved the speed, efficiency, and performance of AI algorithms.
- **Cross-Domain Applicability**: AI is applied across a wide range of fields—education, healthcare, industry, entrepreneurship—demonstrating its flexibility and broad applicability.

AI is characterized by being flexible, evolving, and based on self-learning and deep data analysis. It relies on a wide spectrum of technologies that allow it to perform complex functions that resemble human behavior. This makes AI a cornerstone of digital transformation and institutional innovation.

3.3 The Importance of Artificial Intelligence for Startups (Testing Sub-Hypothesis 1)

Startups today are increasingly seeking smart and effective tools that enable them to compete and grow in rapidly changing and highly dynamic business environments. In this context, artificial intelligence (AI) has emerged as one of the most important pillars supporting startup development due to its ability to improve performance, foster innovation, support decision-making, develop marketing strategies, manage risks, and enhance competitive

advantage. AI is no longer viewed as merely a separate technology; rather, it has become an integrated system that influences various aspects of organizational activities and contributes to shaping the future of startups (Dahma Hussein, 2025).

The impact of AI is particularly evident in fostering **innovation and identifying opportunities**. AI supports digital transformation by enabling startups to develop innovative business models and discover new opportunities through the analysis of big data and the Internet of Things (IoT), allowing a deeper understanding of market trends and customer needs. AI also accelerates idea generation and improves product and service design through technologies such as deep learning, making innovation processes faster and more efficient. This enables entrepreneurs to move beyond traditional approaches and develop solutions that align with modern market changes. Despite these advantages, AI remains a supportive tool rather than a substitute for humans due to its limitations in independent creativity, while the adoption of AI technologies is also influenced by organizational, cultural, and technical factors that reflect the complexity of integrating AI into business environments.

AI also contributes significantly **to improving operational performance and efficiency** within startups by automating routine tasks, thereby reducing time, effort, and operational costs. In addition, AI supports data analysis and effective marketing through consumer behavior analysis and market trend forecasting, which enhances operational efficiency and strengthens marketing strategies. Furthermore, AI improves inventory management and resource allocation by predicting demand and analyzing operational patterns, enabling startups to respond more effectively and rapidly to market changes.

In terms of **management and decision-making**, AI provides advanced analytical tools that help startups make strategic decisions based on accurate predictions and comprehensive data analysis. This reduces uncertainty and improves the efficiency of resource allocation. AI-powered decision support systems also enhance organizational performance, identify appropriate opportunities at the right time, and strengthen the ability of startups to adapt to changing market conditions, ultimately supporting business continuity and growth.

AI also plays a crucial role in enhancing **customer experience** and building **long-term customer relationships**. It enables startups to deliver personalized and flexible services based on data analysis and intelligent interaction with users, which increases customer satisfaction and strengthens brand loyalty. Moreover, machine learning and natural language processing technologies help organizations better understand customer behavior, preferences, and emotions, thereby improving marketing strategies and decision-making processes. The effectiveness of these applications increases further when integrated with technologies such as augmented reality and predictive analytics, allowing startups to provide more interactive and efficient customer experiences, despite ongoing concerns related to privacy and user acceptance.

Regarding **risk management**, AI is widely used to analyze market, credit, and operational risks through predictive tools, stress testing, and fraud detection systems. This improves the accuracy of decisions and reduces financial errors. AI also enables the early detection of risks and transforms raw data into actionable insights that support more effective risk management, helping startups respond quickly to challenges and minimize potential losses. However, these applications still face challenges such as algorithmic bias and cybersecurity risks,

which require the integration of AI with big data analytics and the development of reliable regulatory and technical frameworks to ensure greater efficiency and trustworthiness.

In the area of **competitive advantage**, AI has become a strategic factor that enables startups to improve operational efficiency, reduce costs, personalize services, and foster innovation and rapid market responsiveness. According to the Resource-Based View (RBV), integrating AI with analytical tools such as the Analytic Hierarchy Process (AHP) helps startups, particularly small and medium-sized enterprises, utilize their resources more effectively and strengthen their competitiveness. Studies also indicate that organizations adopting AI tend to achieve higher levels of performance and profitability due to improved operations, better market understanding, and enhanced competitor analysis. Although the widespread accessibility of AI technologies may reduce some traditional sources of differentiation, their true value emerges when combined with human capabilities and organizational expertise (Al-Mamary, 2025).

In addition, AI supports **education and scientific research** within startups by developing intelligent training programs and enhancing interactive learning through technologies such as augmented reality and intelligent learning systems. This helps bridge the gap between theoretical knowledge and practical application while promoting a culture of innovation and entrepreneurship. AI also contributes to **sustainability and development** through environmental data analysis, energy efficiency improvement, and the automation of hazardous and repetitive tasks, thereby supporting sustainable economic growth and improving workplace conditions.

Based on the above, it is evident that AI does not function as an isolated tool within startups; rather, it operates as an integrated system that influences various organizational dimensions in an interconnected manner. AI enhances innovation, improves customer experience, supports decision-making, reduces risks, strengthens competitive advantage, and contributes to education and sustainability. Therefore, integrating AI technologies into startup strategies is no longer optional but has become a strategic necessity for survival and success in the modern digital economy (Dahma Hussein, 2025).

Figure 2: Summary model for the importance of artificial intelligence for startups



Source: From the author's preparation.

3.4 Fundamental Transformations in AI-Based Business Models (Testing Sub-Hypothesis 2)

Modern business models are undergoing profound transformations as a result of integrating Artificial Intelligence (AI) as a core element in the design and operation of startups. AI is no longer viewed merely as a technological tool for improving performance or operational efficiency; rather, it has become a strategic and knowledge-based infrastructure that contributes to reshaping business logic, creating innovative ways of generating and delivering value, and capturing revenues. In this context, a study conducted by (Michael Weber, 2021), published on the Springer platform under the title AI Startup Business Models, examined the impact of AI on startup business models, with a particular focus on how AI is integrated into the different components of business models.

The researchers based their study on an analysis of 100 AI startups selected from several countries, reflecting the international scope of the study. The data were collected from specialized databases and from Crunchbase, one of the world's largest databases dedicated to startups and entrepreneurial ventures. The study specifically focused on companies established after 2010, a period that coincided with the rapid and modern expansion of AI technologies.

The researchers developed a taxonomy of AI-based business models as well as a set of business model patterns to better understand how AI is employed within startups and how it influences the different dimensions of business models. The findings revealed a clear positive impact of AI on the structure and functions of business models compared to traditional IT-based models.

❖ **First: The Impact of AI on the Value Proposition**

The study demonstrated that AI opens new opportunities for value creation through its ability to:

- analyze complex data and extract valuable insights,
- support decision-making processes,
- automate tasks and operations,
- provide intelligent and innovative solutions.

As a result, startups no longer offer only traditional products or services; instead, they provide "smart value" based on learning, analytics, and predictive capabilities, which creates a competitive advantage that is difficult to replicate.

❖ **Second: Enhancing Value Creation**

The findings confirmed that AI contributes significantly to improving value creation mechanisms within startups by:

- ❖ enhancing operational efficiency,
- ❖ accelerating innovation processes,
- ❖ enabling more effective use of data,
- ❖ supporting continuous learning of intelligent systems.

The study also highlighted that data is no longer merely an operational input, but rather a strategic asset whose value increases over time as user interaction grows and algorithms improve. This contributes to building a self-reinforcing growth model based on continuous improvement.

❖ **Third: Developing Value Delivery**

The study indicated that AI-based business models rely on diverse and modern methods of delivering value, including:

- digital applications,
- Application Programming Interfaces (APIs),
- cloud-based platforms,
- direct analytical outputs and insights.

AI has also increased the level of service personalization, allowing solutions to adapt more effectively to customers' individual needs and preferences, thereby improving user experience and service effectiveness.

❖ **Fourth: Diversifying Revenue Capture Mechanisms**

The analysis showed that AI startups rely on flexible and diversified revenue models, including:

- subscription-based models,
- pay-per-use systems,
- one-time payment models.

This diversity reflects the greater adaptability of AI-based business models to digital market dynamics and changing customer demands compared to traditional business models.

❖ **Fifth: Fundamental Transformations in Business Logic**

The impact of AI extends beyond improving internal organizational performance to fundamentally redefining business logic itself. Through intelligent automation, market behavior prediction, and service personalization, AI enables startups to:

- reduce operational costs,
- improve customer experience,
- create new revenue streams,
- establish dynamic customer relationships based on real-time analysis and continuous feedback.

The researchers also identified four major categories of AI-based startups, including:

- AI solution providers,
- AI development enablers,
- data analytics providers,
- deep-tech research companies.

This demonstrates that AI does not merely improve performance and efficiency but also reshapes the structural foundations of the business model itself.

❖ **Sixth: Scientific Conclusion of the Study**

The study reached several major conclusions confirming the positive impact of AI on startup business models, namely:

- AI creates new opportunities for value proposition,
- data plays a central role in value creation,
- AI transforms the overall logic of business models in innovative and unconventional ways.

Accordingly, it can be concluded that integrating AI into startup business models contributes significantly to improving delivered value, enhancing value creation mechanisms,

and increasing the flexibility of revenue models. However, the effectiveness of this impact largely depends on the extent to which AI is integrated as a strategic and core component of the business model rather than merely being used as a supporting technological tool.

3.5 ByteDance's Experience in Employing Artificial Intelligence as a Leading Startup Model (Testing Sub-Hypothesis 3)

Numerous case studies demonstrate that integrating artificial intelligence into the operational framework of startups has become a key factor in improving performance and accelerating growth. For example, the use of Drift chatbots powered by natural language processing has led to an average increase in sales ranging from 10% to 20%. Similarly, Grammarly represents a prominent example of machine learning applications in improving language accuracy, contributing to its valuation reaching around one billion dollars.

In the same context, major companies such as Amazon rely on machine learning algorithms to enhance recommendation systems and improve user experience, which significantly strengthens their competitive advantage. Likewise, the ride-hailing platform Uber utilizes advanced artificial intelligence technologies to support transportation services and improve operational efficiency. These examples collectively highlight the growing role of AI in reshaping business models within startups and digital enterprises.

Among the most prominent contemporary models, ByteDance stands out as an advanced example of a startup that has placed artificial intelligence at the core of its operational model. A study by Ciprian Stan and Peiyi Jia (2021) examined the company's experience through the lens of the "AI Factory," defined as an integrated system connecting data collection, model training, content personalization, and performance optimization in a continuous feedback loop (Richmond Anane-Simon, 2024).

ByteDance was founded in 2012 in Beijing, China, by entrepreneur Zhang Yiming and became globally recognized for developing the popular platform TikTok (and its Chinese counterpart Douyin), along with a variety of AI-powered digital products. Despite its beginnings as a startup, ByteDance quickly rose to become one of the most influential technology companies in the world, thanks to its deep integration of artificial intelligence Artificial Intelligence into its operational and expansion model.

ByteDance represents an advanced model of startups that have fundamentally relied on artificial intelligence (AI) to build their operations, growth, and expansion. Unlike the conventional use of AI for partial tasks, ByteDance has made AI a strategic pillar of its operating model through its adoption of the so-called "AI Factory" AI Factory — an integrated system that connects data collection, algorithm training, content personalization, and performance optimization in a continuous feedback loop.

In this context, AI has not been used merely as a support tool but as a foundation for building the company's value chain. Algorithms are used not only to guide content but also to understand user behavior, develop products, and improve decision-making. The more users interact with the platform, the more data becomes available, which improves machine learning capabilities Machine Learning and, in turn, maximizes the effectiveness of growth and global market expansion.

To implement this AI-driven model, ByteDance reshaped its organizational structure to align with the requirements of speed and flexibility. The company adopted a flat and agile

organizational design, eliminating traditional hierarchies and enabling real-time knowledge flow and data-driven decision-making. It also promoted a culture of continuous innovation and rapid experimentation ("Fail Fast & Learn Fast"), supported by internal platforms that allow for hundreds of daily experiments to optimize algorithms and understand market trends.

However, the company also faced significant legal and ethical challenges due to its heavy reliance on data — one of the controversial aspects of AI — particularly concerning privacy, algorithmic bias, and the spread of misinformation. ByteDance addressed these concerns by implementing strict internal data governance and adopting technologies such as federated learning Federated Learning, which allows model training across different data sources without transferring the data, thus reducing legal risks and respecting user privacy.

AI also played a role in redefining relationships with external stakeholders. Venture capital firms (VCs) were crucial not only in financing but also in supporting ByteDance with expertise in data risk management and navigating complex regulatory systems. Approximately 40% of ByteDance's ownership belongs to global investors such as Sequoia Capital and General Atlantic, who helped build an AI-driven expansion strategy supported by high-level governance.

Furthermore, ByteDance strategically — not merely financially — invested in other startups operating in AI, fintech, robotics, and semiconductor industries. These investments, made through corporate venture capital (CVC), enabled ByteDance to strengthen its knowledge base and expand its technological capabilities, positioning it as a key player within global innovation ecosystems (Ciprian Stan, 2021).

This experience highlights that ByteDance's success stems not only from its advanced technologies but also from its ability to redesign its organizational, governance, and cultural models to serve AI as a core driver. This approach represents a radical shift in how startups can be built in the era of artificial intelligence and offers valuable lessons to other companies seeking to leverage this technology to create sustainable competitive advantage.

4. Conclusion

This study has demonstrated that artificial intelligence has become a fundamental strategic pillar in the evolution of startups, particularly in the context of rapid digital transformation and the increasing complexity of the business environment. AI is no longer limited to improving operational efficiency; rather, it has evolved into a core driver for reshaping business models and generating value in innovative ways. By analyzing the conceptual and organizational structure of startups, the study has highlighted how their flexibility and entrepreneurial nature make them highly suitable for the early adoption of AI technologies.

The findings of this research also confirm the validity of the proposed hypotheses. The main hypothesis was largely supported, showing that artificial intelligence significantly contributes to enhancing the success and growth of startups in dynamic environments. Similarly, the sub-hypotheses were validated: AI has a positive impact on startup performance (H1), plays a crucial role in transforming business models (H2), and contributes directly to the rapid growth and global expansion of ByteDance (H3).

Through the case study of ByteDance, the research illustrated how the integrated use of artificial intelligence can evolve into a complete operational infrastructure, enabling a self-sustaining growth cycle driven by data and algorithms. This represents a qualitative shift in the logic of innovation and entrepreneurship, demonstrating how startups can achieve a strong

global competitive advantage by deeply embedding technology into decision-making, organizational processes, and production systems.

Based on these findings, several practical recommendations can be proposed:

- Startups in emerging economies are encouraged to adopt artificial intelligence as a strategic priority from the outset rather than as a supplementary tool. This requires investing in data analytics capabilities, recruiting specialized talent, and fostering an organizational culture based on experimentation and continuous learning.
- It is essential to design flexible and scalable business models built on intelligent data systems, ensuring that AI becomes an integral part of value creation.
- Policymakers also play a critical role by establishing supportive regulatory frameworks that encourage innovation while ensuring data protection and ethical standards. In addition, collaboration between startups, universities, and research institutions should be strengthened to facilitate knowledge transfer and technological development.
- Startups must also recognize the ethical implications of artificial intelligence, particularly regarding privacy protection, algorithmic fairness, and transparency. In this context, ethical governance becomes a key factor for long-term credibility and sustainability.
- Furthermore, venture capital investment should increasingly focus on AI-driven startups, especially in early stages, where the transformative potential of technology is most significant, alongside providing non-financial support such as mentoring and market access.

In conclusion, this study confirms that the future of startups will depend on their ability to integrate technology into their core identity rather than treating it as a temporary tool. Artificial intelligence stands out as one of the most powerful drivers of transformation in this context. The main challenge is no longer the availability of technology, but rather the ability to rethink and redesign startups around it.

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