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Business Models of Startups in the Age of Digital Transformation and Artificial Intelligence: Opportunities and Challenges

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Abstract:

This study aimed to investigates the transformation of business models in the era of digital transformation and Artificial intelligence, highlighting how digitalization has reshaped traditional practices and opened new avenues for innovation to the startups. This study explores the evolution of business models in response to digitalization and AI, offering insights into key trends and their implications for organizations navigating this dynamic landscape. The article also explores emerging technologies such as artificial intelligence, blockchain, and the Internet of Things (IoT), evaluating their influence on business models. Key findings indicate that businesses adopting digital trends and prioritizing customer-centric approaches are better positioned for sustainable growth and competitive advantage. The article also highlights common challenges of digital transformation, such as regulatory compliance, cybersecurity risks, and workforce adaptability.

Keywords : Digital Transformation ; Business model ; Startup ; Artificiel intelligence.

1. Introduction

In the contemporary business landscape, digital transformation and artificial intelligence (AI) are reshaping the way startups develop their business models. These technological advancements offer unprecedented opportunities and challenges for entrepreneurial ventures, driving innovation and altering traditional business practices. Startups today are leveraging digital tools, AI capabilities, and data analytics to create value propositions that cater to the evolving needs of the market.

Business models of startups in this context often emphasize agility, scalability, and data-driven decision-making. The integration of AI enables startups to optimize operations, enhance customer experiences, and create new revenue streams through automation and predictive analytics.

Moreover, AI facilitates personalized products and services, allowing startups to tailor

offerings to individual consumer preferences in real-time.

Startups are increasingly adopting digital platforms and ecosystems that facilitate collaboration and engagement with customers, partners, and other stakeholders. These digital platforms not only enhance market reach but also enable innovative revenue models such as subscription services, freemium offerings, and platform-based businesses. The adoption of cloud technologies and blockchain also supports transparency, security, and decentralized models of operation, which are critical for startups in today's globalized economy.

However, the shift towards digitalization and AI introduces challenges, including the need for skilled human capital, technological infrastructure, and the management of vast amounts of data. Startups must also navigate ethical considerations related to AI usage, data privacy, and algorithmic bias.

This study aims to explore the evolving nature of business models for startups in the digital age, examining the impact of AI and digital transformation on strategic decisionmaking, operational efficiency, and market competitiveness. It also discusses the opportunities and challenges of adopting the startups of digital and AI tools in theirs activities, finally we will take some successful case studies like Amazon, Netflix, Uber, spotify and Airbnb.

2. New Business Model of Startups in the digital Age

Startups have been a keen field of interest for researchers and policy makers for decades. However, the definitions employed by them have adjusted with the course of time. This study will rely on four elements that identifie the concept of startups which is age of incorporation, innovation, growth and risk/uncertainty. the study identifies “innovation” as being the key differentiator of a startup and growth/risk being the following outcome of said “innovation”. (Al Ehsen. Z, 2021).

According to (FIGURA. M, et al, 2025, p. 123) « Startups represent a unique organisational form with their own agility, adaptability, and innovation potential », this definition indicate that startups' unique organizational form leverages agility, adaptability, and innovation potential to create competitive advantages that enable them to compete effectively.

Followig (Blank, S, 2013), it should define startups based on the key compenant of an entreprise which is Business Model (BM), while a company that operates a proven business model, that is, one adopted to minimise the risk of failure, is not a startup. Thus, neither a business setup in a franchise system, nor a proverbial greengrocer’s stall, nor any form of traditional trade is a startup. On further consideration, this condition means that a startup must implement some form of

innovation not necessarily an innovative product, but certainly one that means that the answers to the fundamental questions of what is the product? who is the customer? how to make money from this? are not obvious and have to be verified under market conditions (Skala. A, 2019).

According to Teece (2010), a business model articulates the fundamental business logic that guides a firm's operations. It encompasses the value proposition presented to customers, the mechanisms through which value is both created and delivered, as well as the processes by which revenue is generated and captured (Teece DJ , 2010). Business models are frequently understood through their constituent elements or foundational components, such as customer segments and revenue streams.

Although the conceptual components of a business model (BM) differ across the literature, scholars generally focus on several fundamental elements that constitute a BM. In this study, we adopt the framework of Richardson (2008), who distinguishes three core components that are consistently identified in prior research : (Weber, M., M. et al, 2022)

- The value proposition offered to target customers ;
- The mechanisms of value creation and delivery ; and
- The processes through which value is captured.

First, the value proposition refers to the benefits a firm offers to its target customers and the rationale for why customers should be willing to pay for them. It encompasses elements such as the core offering, the relative value generated, the intended customer base, and the relevant market segments. Second, the value creation and delivery system captures the mechanisms through which the firm produces and delivers this value to customers. This includes the resources and activities required, the delivery channels employed, as well as the firm’s connections to suppliers, partners, and customers within the broader value network. Third, value capture explains how the firm appropriates economic returns from its activities by generating revenue and profit. It specifies key financial aspects such as revenue streams, cost structures, and the underlying economics of the business model.

In the past two decades, digital technologies have emerged as increasingly vital tools for business model creation and the transformation of existing frameworks (Wessel, L., A. et al, 2021). According to **Steininger** each component of business model mentioned earlier can be influenced by digital technologies and initiate both modular and complex transformations in business models. (Steininger, D. M, 2019).

Research indicates that digital transformation trends have introduced heightened complexity and challenges to business model innovation (Kraus, S., et al, 2019). whereas business model innovation constitutes a dynamic process (Foss, N. J., & Saebi, T, 2017) demanding that managers execute strategic, novel, and

meaningful alterations to essential business model elements and/or the interconnected framework that linking these components (Foss, N. J., & Saebi, T, 2017, p. 216)..Unlike conventional entrepreneurship, digital entrepreneurship prioritizes digital technology as the fundamental driver of entrepreneurial ventures (Nambisan, S. , 2017).

Bock and Wiener indicate that the emerging "digital business models" exhibit key characteristics including digital offerings, digitized customer experiences, digital platforms, data analytics capabilities, and digital pricing strategies (Bock, M. and M. Wiener, 2017). To illustrate, companies develop innovative digital offerings within their value propositions, exemplified by manufacturers who integrate predictive services with their machinery (Weking, J., M. et al, 2020). Additionally, organizations establish digital platforms that connect new partners and customers for collaborative value creation, such as industrial Internet of Things (IoT) platforms.

Implementing digital technology requires fundamental changes in management thinking and organizational restructuring. Leaders must remain highly adaptable while remembering that skilled, engaged people drive successful transformations behind every technological or process change. Companies must eliminate outdated processes, reimagine work structures, and continuously adapt through ongoing learning and contextual awareness. Cultural transformation represents the most crucial yet challenging starting point unchanged organizational culture often drives inappropriate resource allocation decisions during digital initiatives. (Vescovi .T., Checchinato. F, 2021)

Today's executives are primarily concerned with understanding digital revolution impacts as the economy shifts from industrial to digital paradigms. Traditional industries like retail exemplify this challenge, with dominant companies experiencing profit declines despite efforts to preserve threatened brick-and-mortar models (Björkdahl J., 2020).

Business leaders engaged in digitalization efforts identify technology as a secondary rather than primary concern. Although new digital technologies and their implementation form essential prerequisites for transformation, they alone cannot ensure business success. True success requires strategic re-optimization that maximizes digital technology and data utilization while innovating value creation and capture mechanisms. In essence, digitalization encompasses far more than technology—it necessitates comprehensive business model innovation (Vescovi .T., Checchinato. F, 2021, p. 02).

Multiple variables, such as product market appeal, can impact organizational success equally or more significantly than digital competencies. Traditional business managers should therefore avoid viewing

digital solutions as automatic remedies. Digital transformation cannot be commoditized or simply installed to address business problems. It represents a complex, distributed concept extending beyond technological implementation. Digital transformation involves the continuous evolution of business practices. Organizations must also synchronize digital investments with industry maturity levels, accounting for both customer and competitive readiness. Nevertheless, when current business performance struggles, new business model attraction may exceed appropriate influence levels (Davenport T. H. and Westerman G. , 2018).

Firms are exploring innovative methods to generate value by creating new business models or redesigning current ones to satisfy dynamic customer needs and achieve competitive advantages in the digital age (Von Leipzig, T., et al, 2017, p. 518). Digitalization encompasses enhanced data creation, examination, and application aimed at simultaneously boosting internal operational efficiency and facilitating organizational growth through customer value enhancement via digital format conversion. This strategic customer-focused element necessitates new business models, since digital technology adoption transforms consumer behaviors and preferences, establishes new market competitors, and provides novel operational and analytical opportunities. Companies that neglect to modify their business models for digital environments may face catastrophic outcomes (Lucas, H. C. and Goh, J. M, 2009). Digital transformation scope can encompass both incremental adjustments and radical business model overhauls. Throughout digital business model transformation, enabling technologies such as big data facilitate the development of innovative applications and services.

Table 01 : Digitalization of business models

Business model category	**Short description**	**Examples**
Ownership-based business model	Customer purchases a product and owns it	Purchasing a car
Usage-based business model	Customer purchase a certain usage period of a good	Car sharing, rental a car
Performance-based business mode	Customer purchases a defined performance	Taxi, Uber services
Result-based business model	Customer purchase a defined end result	A-B mobility (moovel)
Freemium business model	Customer gets service for free (advertising etc.)	Google Map

Source : (Vescovi .T., Checchinato. F, 2021, pp. 02-03)

3. Artificial Intelligence (AI) Importance in Transformation of Business Model

AI constitutes a comprehensive and historically significant area of study in computer science. While the field of AI research has lacked a definitive definition, it has consistently been guided by the common aspiration to construct intelligent machines (Stone P, et al, 2016).

John McCarthy introduced the term "artificial intelligence" in the 1950s, and Marvin Minsky became a distinguished researcher in this domain (Burgess, A, 2018). Over time, AI researchers have created numerous techniques and methodologies, encompassing machine learning, deep learning, knowledge-based reasoning, natural language processing (NLP), computer vision, and robotics (Stone P, et al, 2016). We collectively refer to these approaches as AI technology.

Artificial intelligence (AI) has been transforming business operations, as demonstrated by companies like Airbnb, Ola, Uber, Flipkart, eBay, Amazon, and Mantra, which have integrated AI technologies to to create innovative business models (Fountaine, T.,et al, 2019).

Artificial intelligence in business aims to drive pioneering research in AI and machine learning, alongside related domains such as cryptography, cryptocurrency, and innovation, to create solutions that provide optimal value to customers and industries (Mishra. S & Tripathi.A.R, 2021).

With the increasing integration of AI in business operations, researchers have started examining AI's role within business models. Several studies highlight how AI facilitates the development of new AI-powered and AIenhanced products and services across both business-to-consumer (B2C) and business-tobusiness (B2B) contexts. Additionally, some companies integrate AI as an enhancement to their existing offerings. In contrast, another major research direction examines AI's effects on corporate value creation and delivery processes, with specific investigations spanning retail, insurance, professional services, operations management, and support activities. Companies typically utilize AI for task automation, workforce augmentation, and decision support. However, research indicates that AI's impact varies from achieving pure efficiency improvements to generating fundamental transformations in value creation that alter competitive advantage sources. Furthermore, studies suggest that AI can influence other business model dimensions, including customer relationships and revenue structures (Weber, M., M. et al, 2022, p. 03).

Startups are a distinct organizational form noted for agility, adaptability, and strong innovation capacity, and those leveraging AI can optimize internal processes, personalize offerings, and

significantly shorten time-tomarket (Sestino, A., & De Mauro, A., 2021). Beyond technology scope, AI ventures also differ in strategic ambition, with many structuring their entire business model value proposition, customer engagement, and commercialization on data-driven principles (Hartmann, P. M. et al, 2016). Evidence further suggests AI-driven startups can rapidly adjust to volatile markets, tap global networks through digital platforms, and trial novel value configurations that would be too risky or complex for larger firms (Tang, X.,et al, 2025).

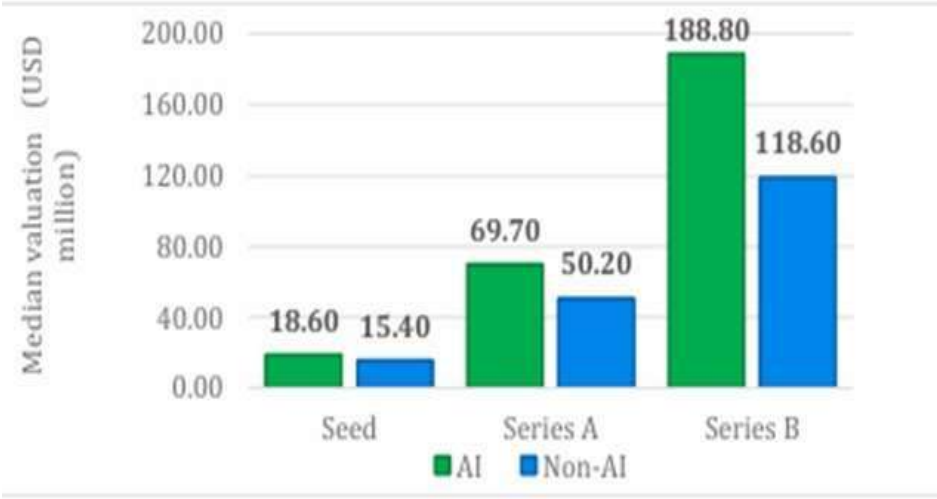
Figure 01 : The Four key pillars of the AI strategy

Source : (Gartner, 2024)

The figure 01 illustrate the four pillars of the AI strategy.

In a report carried out by the web site of statista indicate that the data of recent market reveals to a growing disparity between the perceived value of AI-driven and non-AIdriven startups. As described by Mohammadi and Shafiee (2022) startup financing, valuation stages are typically categorised as seed (early development and market entry), Series A (initial scaling and team expansion), and Series B (broader market penetration and operational growth) (Mohammadi, N., & Shafiee, M, 2022).

Figure 02 : Median valuations of AI and non-AI startups worldwide by funding stage in 2023



Source : (Insights CB, 2024)

According to CB Insights (2024), the median valuation of AI startups as shown in the figure 02, significantly exceeded that of non-AI startups across all funding stages in 2023. At the seed stage, AI startups reached a median valuation of $18.6 million, compared to $15.4 million for non-AI startups. This valuation gap widened notably in later stages, with Series A AI startups valued at $69.7 million, compared to $50.2 million for non-AI startups. Most significantly, the median valuation of Series B AI startups increased to $188.8 million, compared to $118.6 million for non-AI startups. This upward trend suggests strong investor confidence in the scalability, adaptability and innovation potential of AIbased business models. (Insights CB, 2024). This illustrate the importance of using AI to transforme the business model of startups.

4. Opportunities and challenges of start ups in Adoption of AI and DT

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4.1 The Oportunities

Evanita and fahmi indicate that the greatest advantages of the digital age is the opportunity to adopt leaner business models. Digital tools and platforms empower startups to streamline operations, reducing costs while boosting efficiency and scalability. For example, cloud computing provides startups with on demand access to powerful computing resources, eliminating the need for substantial initial hardware investments. Likewise, social media platforms offer an affordable way to market and engage with customers, allowing startups to enhance brand visibility and foster loyalty with minimal resources (Evanita, S., & Fahmi, Z, 2023).

In his study, Lytvyn (2024) identified the opportunities offered by digital transformation and artificial intelligence into five key trends as follow : (Lytvyn. A, 2024, p. 221)

Digital platforms and ecosystems: Digital marketplaces like Amazon, Alibaba, and Uber have reshaped traditional models by linking stakeholders, expanding reach, and opening new revenue channels; platform-centric ecosystems further spur collaboration, innovation, and network effects.

- **Subscriptions and "as-a-service"Models:** Recurring-access models (e.g., Netflix, Spotify) deliver predictable income and strengthen loyalty, while SaaS and IaaS provide on-demand capabilities that cut upfront investment and maintenance burdens.
- **Data-driven decisions:** Organizations increasingly use big data and analytics to understand customers, spot market shifts, and improve operations; personalization and targeted marketing translate these insights into tailored experiences.
- **Emerging technology integration:** AI, machine learning, blockchain, and IoT are reconfiguring processes and business models driving automation, prediction, secure and transparent transactions, and data from connected devices for optimization and new revenue opportunities.
- **Customer-centric personalization:** Expectations for tailored interactions are pushing adoption of CRM and marketing automation, with feedback loops informing product and service enhancements to better align with user needs.

4.2 The Challenges

As companies embrace Artificial intelligence and digital transformation and evolve their business models, they encounter several hurdles. Here are some of the primary challenges and their implications: (Lytvyn. A, 2024, p. 223)

Legal and regulatory

Challenge: As business becomes more digital, compliance burdens around data privacy and cybersecurity intensify, with frameworks like General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA) dictating strict rules on collecting, storing, and using personal data.

Implication: Non-compliance risks major fines and reputational harm, necessitating strong data protection, governance, and cybersecurity controls to meet evolving obligations.

Industry disruption

Challenge: Digital technologies upend traditional sectors, shifting competition and customer behavior, leaving incumbents struggling against agile digital entrants.

Implication: Firms must embrace innovation and adapt business models quickly to avoid obsolescence while pursuing new digital opportunities.

Skills and organizational gaps

Challenge: Many organizations lack up-todate digital and technical skills, and cultural resistance can stall transformation progress.

Implication: Investment in reskilling and building a pro-digital culture is essential to keep pace with more nimble competitors. **Business model frameworks**

- Challenge: Designing resilient digital business models requires understanding new technologies and changing customer expectations while balancing innovation with risk.
- **Implication:** Clear, adaptable transformation frameworks help maintain strategic focus as technologies and markets evolve.

- Agility and experimentation

- **Challenge:** Rapid technological change punishes rigid organizations that are slow to test and iterate.
- **Implication:** Cultivating agility and a testand-learn mindset can unlock innovation and new revenue, while accepting calculated risk and occasional failure.

- Collaboration and ecosystems

- **Challenge:** Building effective partnerships and digital ecosystems is hard; misaligned incentives and low trust can derail collaboration.
- **Implication:** Structured governance, aligned goals, and trust-building mechanisms are vital to make ecosystem innovation work

5. Case studies of companies that successfully adapted their business models in digital area

We selecte some case studies that demonstrate how companies have successfully changed and adapted their business models to adapt the digital technologies and AI as follow : (Lytvyn. A, 2024, p. 222)

- Amazon

Originating as a 1990s online bookstore, Amazon evolved into a sprawling e-commerce and technology enterprise, anchored in a deeply customer-centric model spanning Prime, AWS, and Alexa. By harnessing data and platform capabilities, it streamlined the end-to-end shopping journey, overhauled logistics, and unlocked major new revenues through AWS, now a core growth engine.

- Netflix

Transitioning from mail-order DVDs to streaming, Netflix upended entertainment consumption with a subscription model offering limitless access to a vast catalog and originals. Its personalization and data-driven commissioning of content underpin global hits and sustained subscriber loyalty.

- Uber

As a hallmark of the platform and sharing economy, Uber's app-based marketplace matched riders and drivers, disrupting taxis with on-demand, scalable mobility and cost efficiency. The platform's extensibility enabled adjacent moves like Uber Eats, reflecting continuous adaptation.

- Airbnb

Airbnb reimagined hospitality via a peerto-peer lodging platform connecting travelers and hosts for distinctive stays, providing an alternative to hotel chains. Asset-light economics, network effects, and global reach enabled rapid scaling and competitive pricing, while commissions rather than property ownership drive revenue.

- Spotify

Spotify led music streaming with a freemium and subscription mix, delivering ondemand access enriched by recommendations and personalized playlists. Data led insights and an agile operating model supported rapid feature iteration and worldwide expansion.

These examples illustrate how innovation, user focus, and platform strategies can reshape industries, create new revenue engines, and secure durable advantage in the digital era

6. Conclusion

The digital era has created both extraordinary openings and new hurdles for startups, reshaping the context in which they compete and grow. Digital technologies have lowered barriers to entry and broadened market access, making it easier to reach global customers. At the same time, this openness has heightened rivalry, compelling more inventive approaches to strategy and operations.

The digital era has fundamentally transformed business models, compelling companies to innovate and adapt to maintain competitiveness. This article explores key trends shaping the digital business environment, such as the emergence of digital platforms, subscription-based models, and data-driven decision-making. It also addresses challenges businesses encounter, including cybersecurity threats, regulatory compliance, and resistance to organizational change.

Companies that thrive in the digital transformation landscape prioritize agility, customer focus, and technology integration. Leading firms like Amazon, Netflix, and Uber highlight the value of leveraging digital platforms and building collaborative ecosystems. By emphasizing data analytics, cutting-edge technologies, and personalized customer

experiences, businesses are better positioned to meet evolving demands and stay competitive.

Nevertheless, companies face significant hurdles, such as compliance requirements, cybersecurity risks, and skill shortages. To address these, businesses must invest in workforce training, robust security measures, and adaptable organizational frameworks. The ability to experiment with new business models and adapt quickly is crucial in today's fast evolving digital landscape. For organizations aiming to succeed, embracing digital transformation is not optional it is imperative. Businesses must proactively adopt new technologies, cultivate innovation, and rethink traditional models. Collaborating with partners and engaging in digital ecosystems can unlock greater growth and scalability opportunities. As technology advances, companies must take calculated risks, explore innovative approaches, and remain flexible to meet changing market needs. Organizations that embrace digital transformation and prioritize customer-centricity are well positioned for success in the dynamic digital age.

6.1 The result of study

Here are the result which we obtained from the study :

- The shift to digital is transforming how companies create and capture value, demanding agility and continuous innovation to sustain advantage.
- Adoption of Digital Trends Enhances Competitiveness
- Technologies such as AI, blockchain, and the Internet of Things (IoT) significantly influence startup business models by enabling automation, predictive analytics, transparency, and new value propositions.
- Successful startups prioritize customer-centric approaches, leveraging data analytics and AI to deliver personalized experiences that align with evolving consumer preferences.
- Designing resilient digital business models requires balancing innovation with risk in a rapidly evolving technological and market landscape.
- Companies like Amazon, Netflix, Uber, Airbnb, and Spotify exemplify successful adaptation to digital and AI-driven business models. These firms leverage digital platforms, data analytics, and customer-centric strategies to create scalable, innovative models that disrupt industries and drive growth.

6.2 Propositions of the study

The study proposes several strategies and recommendations for startups aiming to thrive in the digital age through the adoption of digital transformation and AI:

- Startups should leverage digital platforms to connect with customers, partners, and stakeholders, fostering collaboration and

expanding market reach. Building or participating in platform-centric ecosystems can drive innovation and unlock new revenue streams.

- Implementing recurring-access models (e.g., subscriptions, SaaS, IaaS) can provide predictable revenue, enhance customer loyalty, and reduce upfront investment costs, enabling startups to scale efficiently.
- Making: Startups should invest in big data and analytics to gain insights into customer behavior, market trends, and operational efficiencies. This enables personalized offerings and targeted marketing, aligning products and services with customer needs.
- Prioritizing AI, machine learning, blockchain, and IoT can transform business models by enabling automation, secure transactions, and data-driven optimization. Startups should explore these technologies to create innovative value propositions and streamline operations.
- Using AI and customer relationship management (CRM) tools, startups should focus on delivering tailored experiences to meet evolving customer expectations, enhancing satisfaction and retention.

7. Refrences

References

1. Blank, S. (2013). Why the lean start-up changes everything. *Harvard Business Review, 91(5)*, 63–72.
2. FIGURA. M, et al. (2025). From Idea to Impact: The Role of Artificial Intelligence in the Transformation of Business Models. *Management Dynamics in the Knowledge Economy, 13(2), 120-147. DOI 10.2478/mdke2025-0008* .
3. Kraus, S., et al. (2019). Digital entrepreneurship: A research agenda on new business models for the twenty-first century. . *International Journal of Entrepreneurial Behavior & Research, 25(2)*, 353–375.
4. Mishra. S & Tripathi.A.R. (2021). AI business model: an integrative business approach. *Journal of Innovation and Entrepreneurship*, 02-21.
5. Al Ehsen. Z. (2021). Defining a startup- A critical Analysis. *SSRN Electronic Journal* .
6. Björkdahl J. (2020). "Strategies for Digitalization in Manufacturing Firms". *California Management Review, Vol. 62(4)*.
7. Bock, M. and M. Wiener. (2017). Towards a taxonomy of digital business modelsconceptual dimensions and empirical illustrations. *38th International Conference on Information Systems (ICIS). Seoul, .* South korea.
8. Burgess, A. (2018). AI in Action. In The Executive Guide to Artificial Intelligence . *Palgrave.Casadesus-Masanell, R., & Ricart, J. E. (2011). How to design a winning business model. Harvard Business Review, 89(1/2), 100–107*, 73–89.
9. Davenport T. H. and Westerman G. . (2018). "Why So Many High-Profile Digital Transformations Fail". *Harvard Business Review, March*.
10. Evanita, S., & Fahmi, Z. (2023). Analysis of Challenges and Opportunities for Micro, Small, and Medium Enterprises in the Digital Era in a Systematic Literature Review. *JMK (Jurnal Manajemen dan Kewirausahaan), 8(3).*

https://dx.doi.org/10.32503/jmk.v8i3.4190 DOI: 10.32503/jmk.v8i3.4190, 227-239.

11. Foss, N. J., & Saebi, T. (2017). Fifteen years of research on business model innovation: How far have we come, and where should we go? *Journal of Management, 43(1)*, 200-227.

12. Fountaine, T.,et al. (2019). Building the AIpowered organization. *Harvard Business Review, 97(4)*, 62–73.

13. Gartner. (2024). Building a Value-Driving AI Strategy for Your Business. Retrieved from . *https://www.gartner.com/en/informationtechnology/topics/ai-strategy-for-business*.

14. Hartmann, P. M. et al. (2016). Capturing value from big data – a taxonomy of data-driven business models used by start-up firms. *International Journal of operations and productions Management, 36(10), https://doi.org/10.1108/ijopm-02-2014-0098*, 1382-1406.

15. Insights CB. (2024). *Median valuations for artificial intelligence (AI) and non-AI startups world wide in 2023 by stage (in mellion US dollars).* https://www.statista.com/statistics/1446293/m edian-valuations-ai-startups-by-stage/.

16. Lizaveta. P. (2024). AI-driven transformation of business models: new opportunities for startups in the global marketplace . *Scientific Research Journal (SCIRJ), Volume XII, Issue VIII*, 1-10.

17. Lucas, H. C. and Goh, J. M. (2009). “Disruptive technology: how Kodak missed the digital photography revolution”. *Journal of Strategic Information Systems, 18(1)*.

18. Lytvyn. A. (2024). The evolution of business models in the digital Age: Trends and implications. *European scientific journal of Economic and Financial innovation, N1(13)*, 219-227.

19. Massa, L., C. et al. (2017). A critical assessment of business model research. *Academy of Management Annals 11 (1)* , 73104.

20. Mohammadi, N., & Shafiee, M. (2022). Predicting the success of seed-stage startups to enter the acceleration program and receive seed money. *International Journal of Entrepreneurial Venturing, 14(2), 168. https://doi.org/10.1504/ijev.2022.122654*.

21. Nambisan, S. . (2017). Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. . *Entrepreneurship Theory and Practice, 41(6)*, 1029–1055.

22. Sestino, A., & De Mauro, A. (2021). Leveraging artificial intelligence in business: implications, applications and methods. *Technology Analysis and Strategic Management, 34(1), https://doi.org/10.1080/09537325.2021.18835 83* , 16–29.

23. Skala. A. (2019). *Digital Startups in Transition EconomiesChallenges for Management, Entrepreneurship and education.* Warsaw: Warsaw University of Technology.

24. Steininger, D. M. (2019). "Linking information systems and entrepreneurship: A review and agenda for IT-associated and digital entrepreneurship research. *Information Systems Journal 29 (2)*, 363-407.

25. Stone P, et al. (2016). Artificial intelligence and life in 2030. . *One hundred year study on artificial intelligence. Stanford University,*.

26. Tang, X.,et al. (2025). Business innovation in digital startups: A case study of an AI startup, . *International Review of Economics & Finance, 98, 103898. https://doi.org/10.1016/j.iref.2025.103898*.

27. Teece DJ . (2010). Business models, business strategy and innovation. *Long Range Plan 43(2–3)*, 172–194.

28. Vescovi .T., Checchinato. F. (2021). *DIGITAL TRANSFORMATION AND BUSINESS MODELS.* Chapter book, Managing Digital Transformation, Routledge.

29. Von Leipzig, T., et al. (2017). Initialising customer-orientated digital transformation in enterprises". *Procedia Manufacturing, 8.* .

30. Weber, M., M. et al. (2022). AI startup business models. *Business & Information Systems Engineering 64 (1)*, 91-109.

31. Weking, J., M. et al. (2020). Leveraging industry 4.0 A business model pattern framework. *International Journal of Production Economics 225, 107588.*

32. Wessel, L., A. et al. (2021). Unpacking the difference between digital transformation and IT-enabled organizational transformation .
Journal of the Association for Information Systems 22 (1) , 102-129.