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Transforming Startup Ecosystems in Emerging Markets Through Artificial Intelligence.

Dr. Houa Mohamed[1]
[1]University of Ghardaia, Algeria. Email: Houa.mohamed@univ-ghardaia.edu.dz / **Orcid:** https://orcid.org/0009-0008-8980-0165

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Abstract:
In the current global economy, startups have emerged as a prominent trend that fosters individual entrepreneurship. They contribute to local economic growth and provide rapid and flexible solutions to the economic and service needs of society, relying on limited human and material resources. Artificial intelligence (AI) technologies have significantly contributed to the growth of these companies by providing tools that enable them to reduce operational costs and perform technical tasks with high efficiency and accuracy. However, the competitive landscape has undergone a profound transformation with the intensive adoption of AI by large corporations, imposing an unequal playing field on startups. This has led to the disappearance of many recent startups that were unable to keep pace with this unfair competition. In this regard, sociological studies indicate that the technological gap resulting from unequal access to and ownership of AI technologies has reproduced and deepened existing forms of social inequality, as technological disparities have become a mechanism for reproducing socioeconomic hierarchies within society.
Keywords: Artificial Intelligence, Startups, Entrepreneurship, Innovation, Competitiveness, Decision-making.

I. Introduction:

In recent years, artificial intelligence (AI) technologies have played a prominent and pivotal role in reshaping the structure of the contemporary economy. This is not merely a technological tool within the Fourth Industrial Revolution but also a social force redefining work patterns, the limits of human decision-making, and forms of competition within new economic fields, most notably startups, which represent the contemporary economic approach in major economies. This is achieved through the automation of routine tasks, the real-time analysis of massive amounts of data, and decision support in uncertain situations. In light of these profound and radical global changes, AI has become one of the most important strategic tools upon which the ability of economic actors to compete in a market characterized by competition, rapid innovation, and significant volatility depends.

From a sociological perspective, AI is not simply software and algorithms. Rather, it is viewed as a tool that reshapes the social structure within organizations and economic markets, reinforcing power relations and reproducing inequality of opportunity and injustice in resource

distribution. This occurs despite the foundations and principles upon which AI and its tools were developed, which aim to integrate competencies seamlessly without the influence of power dynamics such as human capital. Technological capital, characterized by its vast resources and market dominance, has raised concerns about the continued control of these tools by established economic powers. This control leads to anxieties about job losses, increased inequality, and the emergence of new forms of dominance based on data and algorithm monopolies. This raises a crucial question: Is artificial intelligence a tool for economic integration for newcomers to the competitive market? Or is it a tool for perpetuating the dominance of established economic powers, represented by large corporations? Are AI tools an effective entry point for startups into this new economic landscape?

II. Study Objectives:

This study aims to contribute to a deeper sociological understanding of the relationship between artificial intelligence (AI) tools and the structure of the new economic field. It does so by analyzing how startups utilize these tools to integrate into the market and enhance their competitiveness and resilience in the face of the concentration of technological and economic power held by dominant large corporations.

a) Clarifying the main objective of the study, which is to understand how startups employ AI tools to integrate into the new economic field and enhance their competitiveness and resilience against the dominance of large corporations.
b) Clarifying the main objective of the study, which is to understand how startups employ AI tools to integrate into the new economic field and enhance their competitiveness and resilience against the dominance of large corporations.
c) Highlighting the importance of AI not merely as a technology for improving productivity and innovation, but as a sociological force that reshapes power relations, patterns of dependency, and the distribution of opportunities within the globalized digital economy. - Analyzing whether AI tools offer startups genuine opportunities to bridge the resource and knowledge gap with established players, or whether they become a mechanism for reproducing dominance through the control of infrastructure, platforms, and cloud services by global giants.
d) Uncovering the potential effects of widespread AI adoption on market competitive dynamics and on the perpetuation of economic and regulatory inequalities between startups and established companies.
e) Providing a knowledge base that can contribute to guiding public policies toward a more equitable digital environment, supporting the empowerment of startups, particularly in peripheral contexts like Algeria, to utilize AI in a way that reduces dependency and expands the scope for independent economic action.

III. Backgrounds and Previous Studies:

a) ***Winecoff, A. A., & Watkins, E. A. (2022). Artificial Concepts of Artificial Intelligence: Institutional Compliance and Resistance in AI Startups. In Proceedings***

of the 2022 AAAI/ACM Conference on AI, Ethics, and Society (AIES'22), August 1–3, 2022, Oxford, United Kingdom (pp. 1-31). ACM.

The study examined the institutional and regulatory pressures facing AI startups using semi-structured qualitative interviews with 23 entrepreneurs at early-stage US companies (across diverse sectors in 2022). It revealed a central tension between scientific values, which emphasize methodological rigor and integrity, and the demands of technological entrepreneurship, which encourage rapid innovation and exaggerated promises. The study also found that entrepreneurs use the term "artificial intelligence" as a marketing tool to legitimize their work, despite their disdain for the concept's technical ambiguity. Their responses to regulatory pressures varied, ranging from embracing privacy regulations to expressing frustration with FDA regulations. The study recommends that ethical interventions in AI should consider the institutional and regulatory context of startups, as entrepreneurs actively uphold ethical values despite institutional constraints, while the effects of compliance and resistance strategies persist.

b) Suter, T. A., Brüggen, E., & Chambon, N. (2023). Bridging Social Gaps with Artificial Intelligence: Redefining the Role of Social Entrepreneurship. Advances in Consumer Research, 51, 1–27.

This study explored how artificial intelligence (AI) solutions can be employed within the framework of social entrepreneurship to bridge social gaps and reduce inequalities among vulnerable and marginalized groups. The study adopted a theoretical and analytical approach supported by case studies of digital social entrepreneurship initiatives that utilize personalization algorithms, recommendation systems, and digital mediation platforms to improve access to services and economic and educational opportunities for marginalized groups. The results showed that integrating AI into social business models redefines the role of the social entrepreneur from a traditional philanthropist to a designer of digital systems capable of generating scalable social value. However, the study also highlighted the risks of reproducing algorithmic biases and deepening inequalities if the principles of justice, transparency, and ethical governance are not integrated into the design of these solutions. The study recommended the development of regulatory frameworks and multi-stakeholder partnerships between the public and private sectors and civil society to ensure that AI applications in social entrepreneurship are directed toward achieving effective and sustainable social inclusion, rather than being limited to superficial technological solutions.

c) Fossen, F. M., McLemore, T., & Sorgner, A. (2024). Artificial Intelligence and Entrepreneurship. IZA Discussion Paper No. 17055, Institute of Labor Economics (IZA), Bonn, Germany.

This study provides a comprehensive and up-to-date review of the literature on the impact of artificial intelligence (AI) on entrepreneurship. It discusses AI definitions and their methodological limitations, demonstrating how the concept's ambiguity and broad scope can obscure the measurement of its actual impact on entrepreneurship in empirical studies. The study examines, both theoretically and empirically, the impact of AI technologies on

entrepreneurial opportunities, decision-making under uncertainty, startup adoption of AI technologies, barriers to entry for new businesses, and the resulting impact on the performance and growth of entrepreneurial ventures. Survey data from the German Socio-Economic Panel is used to highlight that entrepreneurs, particularly those with employment-based businesses, are more aware of and utilize AI technologies compared to employees. The findings revealed that the impact of artificial intelligence (AI) on entrepreneurship varies depending on the type of technology (automated or transformative) and the level of occupational and sectoral exposure. Automated AI is associated with increased opportunistic entrepreneurship, while transformative AI promotes chance entrepreneurship. Furthermore, AI is reshaping regional entrepreneurial ecosystems by redistributing roles among system components and diminishing the influence of traditional geography. The study also discussed the indirect effects of AI on the local labor market and the role of new regulatory frameworks, particularly in the European Union, in reshaping the AI-driven entrepreneurial landscape. It is recommended that innovation, competition, and digital governance policies consider the differences between chance and opportunistic entrepreneurship when designing AI-related interventions.

***d)*Alaoui Ahmed, Safra Ilham. (2024). Artificial Intelligence and Startups in Algeria: Manifestations of Use, Employment, and Expected Repercussions. Algerian Journal of Humanities, 9(2), 403-426.**

This study aims to identify the manifestations and advantages of using artificial intelligence (AI) by Algerian startups. It presents examples of companies active in the national market and analyzes the anticipated impact of this use on the national economy. The study found that many new economic entities are employing AI technologies to find practical solutions to their operational challenges and to enter the national market by producing and offering marketable innovations. Prominent applications are evident in the education sector (development of digital learning technologies), healthcare (smart health technologies), the environment (combating forest fires), agriculture (disease monitoring applications), and finance (electronic payment platforms). These applications reflect the global trend of using AI to solve the problems of individuals and communities across various economic sectors. Positive impacts are expected, such as increased productivity, liberation from traditional practices, improved performance efficiency, and the creation of new products. However, risks include workforce displacement and a reshaping of the nature of work. The study recommends strengthening government support and incubators to ensure the maturation of this nascent experience within the context of digital transformation and the knowledge economy in Algeria. It emphasizes the importance of building information infrastructure and developing talent to support the role of AI in a sustainable national economy. “Today, however, we face what could be termed algorithmic informationalism…” (Cheriti, 2025, p. 10)

IV. Defining the core concepts of the article:

The stage of defining concepts is a fundamental step in the structural and logical sequence upon which scientific research is based (Saad Eddine Ben Jakhdal, 2019, p. 203).

1 Artificial Intelligence:

Although the term artificial intelligence refers to modern technologies that have revolutionized the world of technology and computing, its origins actually date back to the 1950s, when computer scientists worked on developing the computer's ability to think intelligently (Alawi Ahmed, Safra Ilham, 2024, p. 406). Understanding the historical context of artificial intelligence's development helps in grasping its potential to influence the technological and economic advancements the world has witnessed since the late 20th century. One of the earliest definitions in this field is that of John McCarthy, presented at a Dartmouth College conference, who defined it as "the science and engineering of making intelligent machines" (McCarthy, J., Minsky, M. L., Rochester, N., & Shannon, C. E., 1955). Russell and Norvig, in their book *Artificial Intelligence: A Modern Approach*, define artificial intelligence as "activities that we associate with thinking." Human intelligence, such as decision-making, problem-solving, and learning" (Russell, S. J., & Norvig, P, 2016, p. 4). Ray defines artificial intelligence more precisely as "the ability of a machine to perform cognitive functions that we associate with the human mind, such as perception, reasoning, learning, interaction with the environment, problem-solving, decision-making, and even demonstrating creativity" (Rai, A., 2019, p. 10). Brent did not deviate from this definition when he defined artificial intelligence as "machines that perform cognitive functions normally associated with humans, including perception, reasoning, learning, interaction, etc." One of the most famous contemporary definitions of artificial intelligence is: "Artificial intelligence refers to the simulation of human intelligence by a system or machine. The goal of artificial intelligence is to develop a machine that can think like humans and mimic human behaviors, including perception, reasoning, learning, planning, prediction, etc." (Xu, Y., Liu, X., Cao, X.) (Huang, 2021, p2). Artificial intelligence (AI) is operationally defined as "an intelligent system designed for real-world applications, especially on a commercial scale." This definition encompasses technologies such as text analysis, advanced analytics, facial and image recognition, machine learning, and natural language processing. AI is characterized by three fundamental pillars: real-time data ingestion, continuous learning, and autonomous execution. Unlike traditional systems that analyze past data to provide insights, procedural AI operates in dynamic, ever-changing environments, making and executing decisions in real time.

2 Startups:

The word "startup" in English is composed of two parts: "start," meaning to begin or launch, and "up," which signifies rising, ascending, and growing to a higher level, not merely a geographical direction. Thus, the combination of these two parts in the term "startup" suggests the idea of launching a new project with high potential for growth and expansion—that is, starting a developing business that seeks rapid growth and development. This is usually translated into Arabic as "شركة ناشئة" (startup company) or "مشروع ناشئ" (startup project). The Cambridge Dictionary defines a startup as "a small business that has just begun, or a business or group of activities that generates a new business characterized by rapid revenue growth." (Dictionnaire Anglais de Cambridge, n.d.)

Eric Ries defines a startup as an organization built under conditions of extreme uncertainty. This definition focuses on the core of a startup: the inherent risks and uncertainties surrounding the market, customers, and economic model. This perspective contrasts traditional organizations that know what they do with startups that are searching for what they should do. This view supports the Learn Startup methodology, which relies on continuous experimentation and rapid learning (Ries, 2011, p. 37).

Blank and Dorf define a startup as "a temporary organization concerned with finding a profitable, replicable, and scalable business model" (Blank & Dorf, 2012, p. 19). In its early stages, it is depicted as a testing ground for ideas and designs before a final business model is established. Based on this definition, Ries's approach, which emphasizes the creative dimension, can be distinguished. He views a startup as a human organization producing a new product or service under conditions of extreme uncertainty, without requiring a specific size for the organization, its affiliation with a particular sector, or even the product's profitability at the outset. In contrast, Planck and Dorff link the description of "start-up" to the stage of searching for a business model that can be profitable, reproducible, scalable, and expandable, a perception that has become widespread in modern literature among researchers and entrepreneurs when they address the concept of startups. A pivotal question arises: Can AI startups with limited resources compete with tech giants like Alphabet, Amazon, Meta, and Microsoft in the AI field, or do significant barriers to entry tend to create and sustain monopolies or near-monopolies? This dynamic reflects not only resource disparities but also how AI systems themselves shape the conditions of competition. As Cheriti (2025) points out, “AI systems not only transmit information but also generate, filter, and sometimes decide the content itself,” emphasizing that participation in AI involves engaging with systems that have autonomous, generative influence over markets and decision environments

3 OECD The Digital Economy :

A modern concept reflecting the profound transformation brought about by digital technologies across various economic and social activities. The OECD defines it as a set of general technologies, such as digital technologies and the internet, that enable a wide range of economic and social activities undertaken by individuals through digital networks. This definition highlights the technological nature of the digital economy and emphasizes economic and social interaction across networks, making it a comprehensive definition that covers the areas of digital production, consumption, and trade, and links technology to development. Li et al., on the other hand, view the digital economy as a diverse set of economic activities that rely on digital knowledge and information as key factors of production, considering modern information networks as a fundamental space for economic activity, in addition to the pivotal role of information and communication technologies in promoting productivity growth. Dahlman et al. define the digital economy as the portion of economic production derived wholly or partially from digital technologies, through business models based on digital goods or services. This includes the digital sector, emerging digital services, and digital platforms. This definition focuses on the structure of the digital economy and facilitates its statistical measurement. In contrast, the British Computer Society offers a simplified definition of the

digital economy as an economy built on digital technologies, or one that relies primarily on these technologies as a key driver of economic activity. Hanna, on the other hand, views the digital economy as an evolutionary process characterized by the widespread adoption of digital technologies across various economic sectors, both private and public, with the aim of achieving comprehensive digital benefits and fostering economic development. This perspective highlights the dynamic nature of the digital economy and its broad impact across diverse fields.

Artificial intelligence has become a crucial tool for startups, enabling them to innovate, reduce costs, and improve operational efficiency. However, using AI platforms also raises legal and ethical challenges, particularly regarding shared or subscription-based models. As Cheriti (2025) notes, "AI-driven platforms blur the boundary between originality and reproduction, raising unresolved intellectual property issues." Startups must navigate these challenges carefully to maintain trust, comply with regulations, and ensure fair access to AI tools. Addressing these concerns is essential for fostering sustainable growth and long-term competitiveness in the AI-driven market.

Startups and local AI tool providers often rely on strategic pricing models to increase adoption and accessibility. In Algeria, vendors such as DzPlagiarism.in and Fikra Academy use subscription packages and flexible pricing to tailor AI tools to students, faculty, and researchers. As Cheriti (2025, p. 13) explains, these strategies "correspond to extensive trends in emerging markets, where suppliers adapt global technologies to local economic conditions," enabling broader participation in the digital economy. By aligning pricing with user needs, AI startups can foster trust, encourage engagement, and remain competitive in emerging markets. Such approaches illustrate how careful market design supports both business sustainability and the democratization of AI tools.

4 Social Origin

The concept of social origin is fundamental in sociological studies, particularly within the structuralist approach, where it forms a cornerstone in interpreting various social phenomena. According to this perspective, social origin is viewed as a crucial factor in shaping individuals' social actions, acting as either a driving force or a deterrent depending on the social environment in which the individual is raised. Numerous definitions have addressed this concept. Pierre Bourdieu defines it as the sum of the social circumstances of the family into which an individual is raised, which determines their position within the social space according to the size and composition of the economic, cultural, and social capital they inherit. Bourdieu argues that this origin represents an indirect form of inheritance of various forms of capital, such as income, education, and social relationships. This influences an individual's path from education to career and determines their position within the class structure of society. Bourdieu and Loïc Wacquin further expand this view by emphasizing that social origin reflects the actual or perceived capital acquired through the institutionally recognized network of social relationships, which is linked to an individual's social and class position. This highlights the role of social relationships in reproducing social inequality. In a related vein, Riley defines social origin as the set of socioeconomic and cultural characteristics of a family, such as

occupation, education, and income, that contribute to determining an individual's position in the social space and influence their social trajectory by providing opportunities or imposing constraints. Andresen et al. focus on the social circumstances of the family into which individuals are raised, including the economic, social, and cultural factors that affect career opportunities and social mobility. The APA Socioeconomic Status Task Force links social origin to the concept of socioeconomic status, encompassing a family's income level, education, and occupation, key indicators of access to resources and opportunities within society. These definitions demonstrate that social origin represents a crucial explanatory framework for understanding social inequalities and individual trajectories within the social structure.

V. Artificial Intelligence and Startups:

Artificial intelligence, with its various applications, is a crucial tool that supports the competitiveness of startups. It enhances their competitive edge, enabling them to perform their tasks and deliver their services more professionally, with less resource consumption, and ultimately, increased profits. Startups integrate AI functions into their business operations, particularly in customer service, marketing, sales growth, idea generation, building innovative models, and supporting decision-making amidst fluctuating economic markets. This integration is essential for the survival and continuity of these companies and for maintaining their competitive advantage in the knowledge economy and the digital economy.

1. Artificial Intelligence and Uncertainty in Entrepreneurship:

Artificial intelligence has the potential to impact the very core of entrepreneurship. As Townsend and Hunt (2019, p. 106) point out, entrepreneurial theories are built around a fundamental question: How do entrepreneurs deal with uncertainty? Entrepreneurs operate in environments where the possible future states of the world, and the consequences and probabilities of actions, are unknown. For example, there is uncertainty regarding market demand for new products and services, social resistance to innovation, and competitor reactions, while entrepreneurs remain constrained by limited resources. The core capability of artificial intelligence (AI) is predictivity, which allows it to reduce uncertainty (Lupp, 2023, p. 10). AI can be used to search through a vast array of options for opportunities, for example, in product design or market segment selection. Townsend and Hunt cite the use of AI in drug discovery (the startup Insilico Medicine) and AI-powered design tools (such as Autodesk or the startup Stitch Fix) as examples.

Entrepreneurial theories also emphasize that entrepreneurs employ imagination and creative decision-making approaches to discover opportunities amidst uncertainty (Kier & McMullen, 2018, p. 628). Today, generative artificial intelligence is beginning to show signs of creativity; Townsend and Hunt cite Autodesk's generative design AI as an example, and we can also think of AI-generated poems, images, videos, and musical pieces—a capability previously thought to be the preserve of humans. In their Delphi study, van Gelderen et al. (2021) note that several entrepreneurship experts predict that artificial intelligence (AI) will enhance entrepreneurs' creative abilities by 2030. The increasing predictive capabilities of AI, and consequently its

ability to reduce uncertainty and foster creativity, raises the question of whether subsequent significant developments in AI will fundamentally alter the core functions of entrepreneurship. For example, Foss and Klein (2012, p. 7) theorize that "entrepreneurial judgment is exercised in unstructured decision environments, where there are no clear decision rules, and that the exercise of judgment is a skill acquired gradually through experiential learning. By facilitating the systematic analysis of decision environments to identify resources and opportunities, AI can influence the degree of need for human judgment in entrepreneurial decision environments." However, Twensed and Hunt also point out that even if artificial intelligence can help answer the question "What is possible?", the human entrepreneur is still required to solve the fundamental problem of "What is desirable?" according to their own goals, preferences, and subjective purpose (McMullen & Shepherd, 2006, p. 132). Twensed and colleagues elaborate that entrepreneurial decision environments, described as "Knightian uncertainty," are inherently unpredictable and thus represent a fundamental limitation even for advanced forms of artificial intelligence. The entrepreneur is unable to determine what will be possible in the future, not only because of a lack of data; data is always about the past, and therefore its usefulness is limited when the future deviates in substantial and unforeseen ways from the present and the past.

2. Startups and the Use of Artificial Intelligence:

The development and application of artificial intelligence (AI) technologies have accelerated dramatically in recent years. Therefore, evidence regarding the use of AI in startups has only recently begun to emerge. Christina McLuhan and her colleagues examine early-stage AI adoption using a large, high-quality sample of US corporate data. Their study draws on more than 440,000 paid-employee organizations, observed in two sets of US Census Bureau databases: the 2018 Annual Business Survey, which included a technology module, and the Business Longitudinal Database. The analysis focuses particularly on a subsample of 75,000 young companies less than five years old. According to their findings, only 6% of US companies used at least one in five AI technologies. Ramir reports a similar percentage in 2019 based on the Mannheim Innovation Panel, a representative sample of German companies in the industrial and service sectors with at least five employees. This share of AI use is likely to be lower than reported because these studies do not use representative samples and tend to overrepresent large corporations. Another possible reason is that the LBD and MIP databases directly inquired about AI use. While many people are unaware that they are using AI technologies embedded in software, the indirect questions reveal higher levels of AI use, as will be explained in the next section. The results also show that the majority of companies using AI acquire commercially available applications rather than developing or customizing their own solutions internally. Despite low adoption rates, which supports the view that AI is destined to become a general-purpose technology, more than half of companies with over 5,000 employees report using at least one form of AI tool, and about a quarter of these indicate that they use it intensively. As Czarnitzki notes, based on German MIP data, companies using AI tools are larger and grow faster than others. The skewed distribution of AI-based companies suggests a potential disadvantage for small businesses and startups; one possible reason for this

is The drawback is the high fixed costs and specialized skill requirements for implementing artificial intelligence.

Regarding young companies less than five years old, McLuhan finds that younger owners with higher levels of education and experience are more likely to report adopting AI. Owners who use AI tools are also significantly more likely to cite process innovation as their business strategy (39% vs. 20% among non-users) and intellectual property as highly important to them (40% vs. 20%). McLuhan notes that AI-using entrepreneurs not only report relying on process innovation but also cite social entrepreneurship as a key driver of their entrepreneurial activity more frequently than owners who do not use AI tools. AI use among young companies shows a positive correlation with high-growth entrepreneurial indicators such as access to venture capital funding (3% on average vs. 1% for young companies not using AI tools), patent ownership, and a high level of seed capitalization. Even after controlling for these characteristics, a positive correlation was observed between AI adoption and revenue growth among young companies. The authors explain that this might suggest that using AI tools supports organizational performance, but the study cannot prove a causal relationship. For example, it could be that startups using AI tools attract venture capital, or vice versa, with venture capital firms driving startups to adopt AI tools. In any case, these descriptive findings indicate that the relationship between AI use and high-growth entrepreneurship represents a promising avenue for future research.

3. Startups and the Barrier to Entry into the World of Artificial Intelligence:

A pivotal question arises: Can AI startups with limited resources compete with tech giants like Alphabet, Amazon, Meta, and Microsoft in the AI field, or do significant barriers to entry tend to create and sustain monopolies or near-monopolies? The dynamics of corporate entry, competition, innovation, and the future vitality of the economy may depend on the answer to this question. This leads to another question: Will the returns and productivity gains resulting from AI be concentrated among large corporations? This question finds empirical support in a study by Babina, which used a measure of company-wide AI investments based on the skills of hired employees. The study found a positive correlation between AI investments and company growth driven by product innovation. Most importantly, they report that the positive impact of AI investments increases with the initial size of the company. The advantages enjoyed by large corporations in developing and using AI may stem from several potential barriers to entry for startups. The first of these is that developing and improving AI algorithms requires training data, and thus large corporations with vast resources and extensive customer bases may be better positioned to collect, acquire, and maintain large datasets, for example, through large proprietary databases. However, Bessen, Ampink, and colleagues note that 80% of the AI startups in their sample use customer data, and 63% use data available from third parties, including publicly available data, indicating that they have sufficient data access. There may be diminishing returns on data volume after a certain level (Bajari et al., 2019, p. 39), which works against the emergence of unbreakable monopolies. However, in some industries, the overwhelming data dominance of established companies makes it extremely difficult for new entrants to enter the market, as is the case in the search engine market.

A second, related challenge is that training AI models requires a massive IT infrastructure to store, process, and run the algorithms. The high fixed costs of this capital investment can be a significant barrier to entry and lead to monopolistic positions for large technology companies. However, Bessen, Ambek, and their colleagues find that the AI startups in their sample effectively utilize cloud computing, a technology that can make the necessary AI hardware available without imposing prohibitively high fixed costs.

Third, small and fledgling companies may find it difficult to comply with data protection legislation and new AI safety regulations. Companies of all sizes that aim to develop AI products are converging on data resources. Data regulations make collecting, storing, and analyzing data more difficult, especially when it comes to personally identifiable information or business/employment data. Large companies have better access to specialized legal teams to manage regulatory compliance, which can put smaller companies at a disadvantage. This concern is particularly pronounced in the European Union, which has a stricter General Data Protection Regulation (GDPR) and in 2023 passed the world's first AI safety law.

Fourth, scarce skills are a critical factor for AI startups. Goffman and Jean note that universities that have lost AI professors show a decrease in the likelihood of their students founding AI startups or securing funding. They conclude that acquiring knowledge from university AI professors is essential for successful student entrepreneurship in this field. A shortage of potential employees with the necessary skills and talents to develop AI products and services can also be a barrier, as startups may struggle to compete with large technology companies in terms of salaries and benefits. Bessen, Ambeck, and their colleagues point out that most of the startups in their sample develop their own software for most applications, suggesting that skilled software developers are available to them, but they emphasize that future research needs to provide more direct and accurate evidence on this point. Artificial intelligence supports the competitiveness of startups by enhancing performance, enabling them to operate more professionally, reduce resource costs, and increase profits. This is achieved by integrating AI tools into operations, particularly in customer service, marketing, and decision-making amid economic fluctuations. As Cheriti (2025) notes, "Pricing strategies vary across vendors, with subscription-based models, freemium offerings, and bundled multi-AI packages aimed at making these tools accessible to a wide range of academic users… Business models reflect a strategic focus on academic institutions, with vendors tailoring their offerings to meet the needs of students and faculty, thereby fostering early adoption and potential long-term engagement."

VI. Artificial Intelligence, Social Inequality, and Algorithmic Bias:

Social stratification and economic inequality have become among the most prominent structural challenges facing contemporary societies, especially in light of rapid digital transformations. In this context, artificial intelligence emerges as a strategic tool capable of fundamentally transforming the business models of startups, particularly those with a social focus, by redistributing opportunities, improving access to resources, and promoting social justice. It is an effective mechanism for bridging social gaps and reducing forms of structural exclusion. Artificial intelligence is not merely a technological tool; it can be a powerful catalyst for social change if used within programs and initiatives with clear social objectives. However,

it is crucial to recognize that it may carry new risks (such as bias or exacerbating inequality), necessitating a precise ethical framework. This is where social entrepreneurship comes in, through the mechanisms of startups and entrepreneurship as an organizational tool to transform technological innovation into practical applications aimed at creating sustainable social value (Mair and Marti, 2006, p. 36). This leads to the development of an approach to "artificial intelligence for social equality," which must be rooted in the theories and practices of entrepreneurship and startups so as not to remain at the level of abstract technical or ethical discourse.

Sociologists assume the existence of inequality in any sphere of society and recognize that the benefits and harms of technology are not distributed equally among everyone (Zajko, 2022, p. 2). Sociological studies, in particular, have addressed the "digital divide" and the issue of unequal access to and use of technologies since the 1990s. At the very moment the internet was presented as a powerful enabler of the common good, sociologists warned that these technologies would also reinforce many existing forms of inequality (DiMaggio et al., 2004, p. 378). Building on Pierre Bourdieu's theory and the concept of "social exclusion," he redefined the problem of the "digital divide" as "digital exclusion," where socio-technological inequalities are entrenched in broader social groups linked to other forms of deprivation and discrimination (Helsper, 2012, p. 406). Park and Humphrey extended this focus on exclusion to include artificial intelligence and automated decision-making systems, analyzing how automated systems in education and medical technologies exclude and discriminate against certain groups based on pre-existing social inequalities (Zajko, 2022, pp. 3–4).

Here, the dual dimension of these startups becomes apparent when we look at how they use artificial intelligence in designing their services. On the one hand, algorithms and machine learning models allow for the provision of more accurate and efficient services to groups excluded from the market or public services, such as educational platforms aimed at students from low-income families, data-driven health diagnostic tools to serve medically deprived areas, or microfinance solutions supported by alternative risk assessment models (Portales, 2019, p. 85). This paradox deepens when we place AI-powered startups on a global scale; Studies on “data colonialism” show that AI platforms and systems rely on extended, cross-border value chains, where the bulk of the value is produced in the centers of the Global North, while groups from the Global South bear the burdens of low-wage digital labor and their daily lives are turned into raw data material. In this context, socially conscious startups can act as an intermediary link within a broader pattern of extraction, unless data ownership, governance, and profit models are designed in a participatory way that redistributes value and decision-making towards the communities concerned. As Joyce and others point out, many initiatives labeled “AI for social equality” operate within the same logic as large corporations, where the rhetoric of justice and equity is used to polish projects that do not actually change the structures that produce inequality, but rather add a new technological layer on top of them. From the perspective of “digital exclusion,” AI in startups raises sharp questions about the fairness of access to and use of tools and platforms. Individual access to these services presupposes access to devices, good internet connectivity, digital skills, and trust in technology institutions—conditions that are unequal across social classes and regions, particularly in marginalized

contexts of the Global South or impoverished urban peripheries (DiMaggio et al., 2004, pp. 370–372).

Furthermore, other research demonstrates how automated systems used in social protection or eligibility assessment for state services can discriminate against the poor, transforming artificial intelligence into a tool for punishment and exclusion rather than inclusion when built on data saturated with institutional and historical biases. Applying these findings to startups developing solutions for employment, credit, or social targeting raises questions about how risk models are designed, who is defined as eligible or a good risk-taker, and who is left out due to data gaps or underrepresentation in databases (Zajko, 2022, pp. 5–7). All of this highlights the contribution of sociology to the critique of AI in startups, not only by identifying "bias" within models, but also by linking these technologies to the structures that produce and reproduce inequality: labor market structures, venture capital, data colonialism, the digital divide, and the global division of labor. Instead of merely addressing "bias correction" within algorithms, researchers like Birhane and Kruse advocate for a reframing of questions of justice in AI at the levels of ownership, governance, and the representation of marginalized groups at every stage of system design, from defining the problem to deploying solutions (Birhane, 2024, pp. 10–13). In this way, AI-based startups can be transformed from sites for reproducing class and digital hierarchies into spaces for experimenting with alternative models, such as collaborative platform ownership, community-based data governance, or limited-profit models linked to social value distribution goals. This opens the possibility of using AI as a tool to dismantle inequality rather than reinforce it.

A pivotal question arises: Can AI startups with limited resources compete with tech giants like Alphabet, Amazon, Meta, and Microsoft in the AI field, or do significant barriers to entry tend to create and sustain monopolies or near-monopolies? This dynamic reflects not only resource disparities but also how AI systems themselves shape the conditions of competition. As Cheriti (2025) points out, AI systems not only transmit information but also generate, filter, and sometimes decide the content itself, emphasizing that participation in AI involves engaging with systems that have autonomous, generative influence over markets and decision environments.

Company	Country	Specialization / Field	Estimated Annual Revenue
OpenAI	United States	Generative AI models, LLMs, AI platforms (e.g., ChatGPT, GPT models)	≈ $12 billion
Anthropic	United States	Large language models and AI safety (Claude models)	≈ $5.5 billion
Databricks	United States	Data infrastructure, AI analytics, machine learning platforms	≈ $4 billion
Scale AI	United States	Data labeling, AI training datasets, AI infrastructure	≈ $870 million
Perplexity AI	United States	AI-powered search engine and knowledge assistants	≈ $148 million
Mistral AI	France	Open-weight large language models and generative AI	≈ $100 million
xAI	United States	Advanced AI models and AI-powered search (Grok)	≈ $100–200 million

Table: Top AI Startups Worldwide (2026)

Note. *Data compiled from Jarsy (2025), TLDL (2026), and DirectIndustry (2025).*

Conclusion

Experience shows that the use of artificial intelligence in startups has the potential to expand access to services and reduce some forms of exclusion. However, it also threatens to deepen inequality if it remains tied to biased data, funding models, and a hierarchical structure that redistributes power and wealth. The crux of the matter lies not in the technology itself, but in the organizational and political choices surrounding it: Who defines the problem? Who owns the data? Who benefits materially and symbolically from its solution? Therefore, AI in startups will not be a tool for reducing inequality or for automatically reproducing it. Rather, its trajectory will be determined by governance rules, the degree of inclusion of marginalized groups, and value distribution models-all of which are sociological and political questions as much as they are technical ones.

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