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RE-ENVISIONING THE ARTIFICIAL INTELLIGENCE-ENTREPRENEURSHIP NEXUS: A PIONEERING SYNTHESIS AND FUTURE PATHWAYS

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Abstract. The rapid advancement of artificial intelligence (AI) is profoundly transforming the entrepreneurial landscape while presenting a myriad of opportunities and challenges. However, scholarly inquiries into this pivotal intersection remain fragmented and lack a comprehensive and interdisciplinary understanding. This study provides a systematic review that consolidates insights from across AI, innovation and entrepreneurship literature to provide an integrated examination of the AI-entrepreneurship nexus. Through rigorous analysis of 92 studies, key themes are elucidated, including AI's impact on opportunity recognition, business model reinvention and socio-economic dynamics. An original Socio-Technical Systems framework is proposed, capturing the interplay between AI adoption decisions, AI-augmented opportunity exploration, innovative AI configurations and broader socio-economic consequences. While acknowledging AI's transformative potential, the review sounds a clarion call for responsible scholarship that centres on equity and social justice. It advocates a reflexive, inclusive approach, allowing marginalised voices and alternative perspectives to emerge. Theoretical contributions are made by extending established frameworks from technology adoption, business models and socio-technical systems to the AI-entrepreneurship context. Furthermore, actionable implications are provided for policymakers to develop governance models balancing innovation and ethical oversight. Therefore, entrepreneurs and support organisations are guided in facilitating responsible AI integration across diverse ecosystems. This unprecedented cross-disciplinary synthesis illuminates crucial gaps, charting an agenda for future research on transparency, accountability and mitigating AI's unintended impacts. As AI continues reshaping entrepreneurial frontiers, this review catalyses a trajectory of ethically- conscious scholarship poised to shape inclusive technological progress aligned with human values and societal wellbeing.

Keywords: Artificial intelligence (AI); entrepreneurship; entrepreneurial opportunities; business models; artificial intelligence adoption; socio-economic impact

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1. Introduction

Technological advancements in artificial intelligence (AI) are fundamentally reshaping the entrepreneurial scope and nature within the context of the ongoing industry 4.0 revolution (Nambisan et al., 2019; von Briel et al., 2018; Carbonara & Santarelli, 2023). Despite a growing sense of AI optimism and technical dynamism, AI is no longer a futuristic concept but a present-day reality. While this may be the case, scholarly research on this complex relationship continues to be fragmented, though incremental contributions with diminished real-world relevance have been observed.

This paper presents a comprehensive and interdisciplinary research agenda that systematically explores the economic, ethical and societal implications of AI-driven entrepreneurship. More specifically, analysing and integrating various interpretations from existing studies to establish a coherent understanding while identifying key research gaps that warrant further investigation. We consider analytical frameworks derived from technology adoption theories such as UTAUT (Venkatesh et al., 2003) and business model perspectives (Massa et al., 2017) to consolidate a wide range of literature to uncover the diverse impacts of AI on opportunity identification, business model structures and socio-economic positioning within the entrepreneurial landscape. However, the current research on the AI entrepreneurship nexus has not yet advanced and it still seems there is a paucity of studies related to that (Kraus et al., 2019; Aldoseri et al., 2023).

From a theoretical point of view, this paper moves beyond detailing possibilities to consider potentially disempowering negative impacts of increasingly ubiquitous AI algorithms within entrepreneurial contexts. We argue that AI scholarship requires a responsibility perspective centring on equity and social justice. Thus, this paper contributes conceptual consolidation while advocating a reflexive, questioning approach, allowing marginalised voices and alternative understandings to emerge through open-minded discovery (Box-Steffensmeier et al., 2022). In doing so, scholars can contribute to a deeper understanding of AI's transformative impact on entrepreneurial activities and inform the development of policies and practices that foster responsible and inclusive entrepreneurial ecosystems in the digital era.

Despite various scholarly debates on AI, there is no doubt that AI advancements present unprecedented opportunities for entrepreneurs to identify new business ideas, reach customers and develop innovative business models (Upadhyay et al., 2022). However, considerable uncertainty remains regarding potentially invasive, manipulative and biased AI technologies that could erode privacy and human agency in entrepreneurial ecosystems (Lu, 2022). One of our primary concerns is the emergence of these opaque, advanced AI systems that generate tension between algorithmic secrecy and ethical concerns. Tangential to this are entrepreneurial actors increasingly relying on these algorithmic systems, which often remain black boxes, inaccessible and mysterious to an average entrepreneur. Yet in policy debates, ensuring transparency and accountability of AI systems is crucial but frequently disregarded or evaded. It is not our intention to adopt an excessively pessimistic stance in our analysis. Still, future entrepreneurship scholarship must query pre-configured AI solution narratives by foregrounding human-centric perspectives and pluralistic governance approaches. Therefore, we look forward to responsible AI adoption necessitating reflexive questioning of extant assumptions that risk technological solutionism. As entrepreneurship scholars, we suggest that this may require renewed and modernised mechanisms balancing AI with ethical human oversight and participation by diverse entrepreneurial stakeholders. This necessitates scholars to examine asymmetric power dynamics and advocacy needs to empower entrepreneurs in increasingly AI-mediated ecosystems.

1.1 Research gaps and contributions

Despite the proliferation of AI's transformative potential for entrepreneurship, there is paucity of existing literature providing a comprehensive and interdisciplinary integrated understanding of this complex phenomenon, especially from a human-centric perspective. Scholars draw attention to specific aspects of AI's impact, such as opportunity recognition (Kang et al., 2023), business model innovation (Åström et al., 2022) or job automation (Tyson & Zysman, 2022), without considering the interconnectedness and broader socio-economic implications. Our conjecture is that the utilisation of well-established theoretical frameworks, such as UTAUT, TAM, and business model perspectives in the context of responsible AI and entrepreneurship remains underexplored.

Based on our knowledge thus far, this paper addresses these gaps by providing the first systematic review that consolidates insights from computer science, entrepreneurship studies, innovation and ethics literature, offering a holistic perspective on the AI-entrepreneurship nexus. It extends existing work by proposing an original Socio-Technical Systems framework that integrates key domains, such as AI adoption decisions, AI-augmented

opportunity recognition, innovative AI configurations and socio-economic consequences, into a coherent conceptual model. We do not fully comprehend the urgent need for responsible AI scholarship that centres on equity and social justice concerns, which are often overlooked in prevailing techno-optimistic narratives. Hence, this paper paves the way for more inclusive and ethically conscious research on AI and entrepreneurship.

2. Literature Review

Recently, AI has generated a remarkable fascination and garnered widespread attention among humankind as it has become increasingly recognised as a possible all-encompassing technology in the last decade (Brynjolfsson et al., 2021). Due to its technical dynamism, AI is widely regarded as a versatile and transformative technology in this industry 4.0 era (Brynjolfsson & Mitchell, 2017). Driven by improvements in machine learning, the cost of forecasting in different fields is rapidly decreasing (Agrawal et al., 2019, 2023). This poses intriguing questions about the areas where AI will be implemented and its potential to disrupt entrepreneurship (Gans & Leigh, 2020). However, Alvarez and Barney (2007) argued that the burgeoning wave of AI systems presents transformative technological solutions that have the potential to alleviate crucial uncertainties that are integral to novel entrepreneurial opportunities. Although significant advancements have been made in AI technologies since the publication of Alvarez and Barney's work (2007), the fundamental premise that AI systems can offer transformative solutions to mitigate uncertainties inherent in identifying and pursuing entrepreneurial opportunities remains applicable. This is supported by Kang et al. (2023), who assert that despite the growing interest in entrepreneurship and the utilisation of AI, there is still a gap in the existing literature regarding their influence on opportunity recognition. While individual studies have examined these factors individually, only a limited number have explored the combined impact of entrepreneurial bricolage and AI utilisation on opportunity recognition (Olan et al., 2022). Even though these gaps exist, we do not hold any reservations that AI enables entrepreneurs to identify new patterns, optimise decision-making and automate tasks, therefore fundamentally reshaping the way opportunities are discovered and pursued (Agrawal et al., 2023).

2.1 AI and Business Model

During Industry 4.0, new technologies like AI, IoT, deep and machine learning are reshaping and disrupting current entrepreneurial business model practices. (Amoako, et al., 2021; Chalmers et al., 2021). This shows that AI is a fundamental and critical technology that is significantly disrupting entrepreneurial activities (Agrawal et al., 2023). Despite the widespread recognition of the beneficial impacts that AI can have on entrepreneurial endeavours such as trend identification, decision-making and judgment (Mikalef & Gupta, 2021), the nexus of AI and entrepreneurship business models remain a complex and multifaceted phenomenon. Hence, AI integration into business model processes presents both opportunities and challenges that necessitate a nuanced understanding, especially within the entrepreneurship ecosystem. With the foregoing discussions on AI business models, it is imperative to underscore that a significant proportion of the empirical data underpinning extant scholarly literature on the utilisation of AI technologies emanates from well-established and technologically advanced corporate entities. Put simply, there is still an unexplored research field in the field of nascent entrepreneurs, according to Mikalef & Gupta (2021). This could be due to the challenges of successfully integrating AI applications faced by nascent entrepreneurs. Such challenges necessitate specific capabilities and resources, substantial investments and protracted development cycles typically associated with established organisations (Brock & Von Wangenheim, 2019).

As AI technologies continue to advance and become more accessible, their potential to augment entrepreneurial business model processes, enhance resource allocation and streamline operations remains highly relevant (Nambisan, Wright & Feldman, 2019). While specific AI applications and uses may have evolved, the underlying notion of leveraging AI to mitigate uncertainties and foster business model success remains a valid and pertinent consideration in the current entrepreneurial landscape. However, to capitalise on AI technology, it is imperative to comprehend how this technology can be commercialised by implementing a fitting business model (Bouncken et

al., 2021). According to Valter et al. (2018), previous research has been insufficient in comprehending the effective operationalisation of AI solutions by entrepreneurs within their business models, especially in relation to the technological advancements in the AI field. As such, the literature lacks a comprehensive examination of how established theoretical frameworks, such as UTAUT and business model perspectives, can be adapted and extended to better understand the AI-entrepreneurship nexus.

One central perspective that informs our understanding of how AI transforms opportunity exploration and business model innovation is the notion of "AI as a general-purpose technology" (Brynjolfsson et al., 2021). This view suggests that AI has the potential to revolutionise a wide range of industries and entrepreneurial activities, like previous general-purpose technologies like electricity and the internet (Brem et al., 2021). To comprehend this concept, business models can be defined as "an intermediary framework between technology and economic value" (Chesbrough & Rosenbloom, 2002) and can be categorised into two crucial functions: mechanisms for value creation and mechanisms for value capture (Chesbrough, 2007). In other words, the business model encompasses a series of activities with the objective of fulfilling the needs of the end customer while outlining the strategies employed by the operating firm to generate economic gain from said activities. Consequently, when novel technologies like AI are incorporated into the entrepreneurial environment, business model theories must be adapted to fully exploit the potential of these disruptive AI technologies. This is due to the fact that innovating the business model is equally crucial as developing sophisticated technical solutions (Muhic & Bengtsson, 2021).

However, a contrasting perspective emphasizes the "limits of AI", arguing that the current capabilities of AI are often overstated and that significant technical and societal barriers remain. This view arguably suggests that the impact of AI on entrepreneurship may be more incremental and context-dependent than the general-purpose technology perspective implies. Our analysis of AI adoption and integration challenges, as well as the socio-economic consequences of AI resonates with this perspective. Another key debate in the literature concerns the "substitution vs complementarity" of AI in entrepreneurial activities (DeCanio, 2016; Lichtenthaler, 2018). Some scholars argue that AI primarily substitutes human labour, leading to widespread job displacements and the concentration of economic power (Acemoglu et al., 2020). Other scholars suggest that AI mainly complements and augments human capabilities, enabling entrepreneurs to create new forms of value and pursue previously unattainable opportunities (Jorzik et al., 2023). Our analysis of AI-augmented opportunity recognition and AI-transformed business models speaks to this debate, highlighting both AI's substitutive and complementary aspects in entrepreneurial processes. The review also advocates the need for responsible oversight mechanisms and inclusive governance models to ensure equitable distribution of AI's benefits.

2.2 Socio-economic and ethical implications of AI

Our enthusiasm is also drawn by the desire to comprehend AI's socio-economic and ethical implications for entrepreneurship. This view emphasizes the importance of considering the moral and social dimensions of AI development and deployment beyond purely economic and technological considerations (Cows & Floridi, 2018). Our analysis of the socio-economic ramifications of AI and the demand for responsible AI scholarship aligns with this perspective. Moreover, we argue that entrepreneurship research must engage critically with the ethical challenges posed by AI, such as algorithmic bias, data privacy and the distribution of benefits and risks. By advocating for a reflexive and inclusive approach that centres on equity and social justice, this paper makes a valuable contribution to the ongoing scholarly discourse on the ethical imperatives of AI-driven entrepreneurship.

2.3 Socio-technical Systems and AI

Finally, our study draws upon the "socio-technical systems" perspective, which underscores the intricate interplay between social and technical elements in shaping socio-technical matters (Volti & Croissant, 2024). This view suggests that the outcomes of AI-driven entrepreneurship depend not only on the inherent capabilities of AI technologies but also on the broader social, technical and institutional contexts in which they are developed and deployed (Johnson & Wetmore, 2021). The proposed Socio-Technical Systems framework in this review

integrates insights from this perspective, highlighting the interconnected domains of AI adoption decisions, opportunity exploration, business model innovation and socio-economic consequences. By situating AI-driven entrepreneurship within a socio-technical systems context, the study offers a more holistic and contextualised understanding of the phenomenon.

In a nutshell, this review critically examines multiple perspectives within the academic discourse on AI-entrepreneurship connection, connecting them to the core research questions. By drawing upon insights from the general-purpose technology perspective, the limits of AI view, the substitution vs complementarity debate, and the ethical implications of AI and socio-technical systems approach, the study offers a comprehensive and nuanced analysis of the AI-entrepreneurship nexus. In doing so, this amalgamation of these diverse perspectives strengthens the theoretical and practical relevance of the review while also highlighting the complex and multifaceted nature of the phenomenon under study. As such, this paper contributes to advancing the scholarly conversation on AI and entrepreneurship, while also providing actionable insights for entrepreneurs, policymakers and support organisations navigating the opportunities and obstacles of AI-driven entrepreneurship.

3. Theoretical Frameworks

The Unified Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et al. (2003) offers a valuable framework for analysing the adoption of AI among entrepreneurs. The UTAUT synthesises elements across eight theories to explain technology acceptance and use. Key factors such as performance expectancy, effort expectancy, social influence, and facilitating conditions can provide valuable insights into the motivations and obstacles faced by entrepreneurs when it comes to incorporating AI into their businesses. However, UTAUT's applicability may be limited for disruptive, emerging technologies like AI due to its origins in more mature organisational contexts (Uren & Edwards, 2023). Adapting UTAUT to the specific characteristics of AI technologies and entrepreneurial settings is crucial for enhancing its explanatory power (Lin et al., 2022).

AI could disrupt an entrepreneur's value proposition, activities, resources and revenue streams. Yet these business model frameworks largely view technology as an enabler rather than exploring its autonomous and intelligent characteristics (Burstrom et al., 2021). Integrating perspectives from areas like machine behaviour (Rahwan et al., 2019) and AI ethics (Cowls & Floridi, 2018) may enhance the relevance of these frameworks for AI-driven entrepreneurship.

In addition to UTAUT and business model frameworks, other theoretical perspectives, such as the Technology-Organisation-Environment (TOE) framework (Na et al., 2022) and the Resource-Based View (RBV) (Ahmad et al., 2020), can provide complementary insights into the AI-entrepreneurship nexus. The TOE framework encompasses an analysis of the TOE factors that significantly impact technology adoption decisions. On the other hand, the RBV underscores the significance of distinctive resources and capabilities as drivers of competitive advantage. By integrating these theoretical perspectives, a more comprehensive comprehension of how entrepreneurs effectively navigate the opportunities and challenges associated with AI technologies can be attained.

4. Literature Search Methodology

The systematic review centred around two core research questions (RQs):

RQ1: *How is AI transforming opportunity exploration and business model innovation within entrepreneurial contexts?*

RQ2: *What are the broader socio-economic consequences of proliferating, often opaque AI systems across entrepreneurial actors and activities?*

Multiple databases were systematically searched between January and April 2024 following the PRISMA guidelines (Moher et al., 2009), including Web of Science, IEEE Xplore, ScienceDirect, JSTOR, and Google Scholar. Advanced searches combined selected keywords using Boolean operators: (“artificial intelligence” OR “AI” OR “automation” OR “machine learning”) AND (“entrepreneur” OR “entrepreneurship”) AND (“start-up” OR “new venture”). Additional relevant papers were identified through backward and forward citation searching of selected articles (Table 1).

Table 1. Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
○ Peer-reviewed articles. ○ Published articles between 2010-2024. ○ Explicit examination of AI’s impacts on entrepreneurial actors or ecosystems. ○ English language.	- Non-peer reviewed articles. - Focused solely on technical aspects of AI lacking entrepreneurial context. - Did not examine AI’s impacts on entrepreneurial activities or ecosystems. - Paper written in foreign languages.

After removing duplicates, 264 records were screened based on title and abstract review, while 118 full-text articles were evaluated for eligibility according to the inclusion/exclusion criteria. In total, 92 studies met the criteria and were included in the final review. A spreadsheet was created to extract relevant data fields from studies, including author(s), year, methodology, sample, key topics, findings, and limitations. The authors then extracted data to minimise bias. Any disagreements by the authors were resolved through discussion. Rigorous thematic analysis involved an iterative process of open coding, creating categories and identifying overarching themes related to the research questions. Atlas ti software facilitated transparent and systematic data analysis. Codes were compared across studies and synthesised into conceptual themes describing AI’s impacts on entrepreneurial opportunity exploration, business models and socio-economic landscapes. This rigorous methodology provides a transparent, systematic approach to searching, screening, assessing eligibility, extracting and synthesizing findings across the identified literature. The detailed procedures aim to boost reproducibility while ensuring a comprehensive evidence base addressing the guiding research questions.

5. Data Analysis

Extracted data from the 92 studies underwent rigorous qualitative thematic analysis to classify common themes, patterns and insights across the AI-entrepreneurship domain. Initially, open coding was utilised, where data were read line-by-line to assign conceptual labels to text segments related to the overarching research questions (Saldaña, 2021). For example, text passages discussing new business models enabled by predictive analytics were coded as “AI-based business model innovation”. This surfaced an initial set of analytic categories. In addition, focused coding grouped open codes into conceptual clusters to develop main categories such as “opportunity recognition”, “data-driven business models”, “socio-economic impacts”, etc. These category codes were then systematically applied to the entire dataset using Atlas ti software.

Finally, thematic analysis elicited higher-order themes encompassing sets of categories. Key overarching themes included "AI Adoption and Integration", "AI-Augmented Opportunity Recognition", "AI Transforming Business Models", and "Socio-Economic Impacts". Within these themes, nuanced findings around sub-topics emerged through careful iteration between data and theory. For instance, under the "AI Adoption and Integration" theme, the analysis revealed complex factors influencing entrepreneurs' AI adoption decisions, such as performance expectancy, effort expectancy and facilitating conditions, aligning with the UTAUT framework (Venkatesh et al., 2003). However, the analysis also highlighted the limitations of applying UTAUT in the context of disruptive AI technologies and the need for further adaptation.

Similarly, within the “AI Transforming Business Models” theme, the analysis uncovered how AI reshapes key business elements like value proposition, activities, resources, and revenue streams. Nevertheless, the analysis also emphasised the importance of integrating perspectives from machine behaviour (Rahwan et al., 2019) and AI ethics (Cows & Floridi, 2018) to better capture the autonomous and intelligent characteristics of AI technologies in entrepreneurial settings. The in-depth qualitative analysis, guided by established theoretical frameworks while remaining open to emerging insights, allowed for a rich and nuanced understanding of the AI-entrepreneurship nexus. The analytical process moved beyond descriptive statements to provide critical interpretations and implications, contributing to the paper's theoretical and practical relevance.

6. Key Findings

Summary of key findings is provided below in Table 2.

Table 2. Summary of key findings

AI Adoption and Integration	- Integrating AI appears to be an urgent priority for entrepreneurs seeking enhanced analytical capabilities despite barriers around required data, skills, and ethical risks (Giuggioli & Pellegrini, 2022). - Analysis through theoretical lenses like UTAUT reveals performance expectancy and effort expectancy as key drivers of adoption, aligning with productivity narratives (Cubric, 2020). However, UTAUT's applicability may be limited for disruptive AI technologies, necessitating further adaptation. - Costs, security risks, inadequate human oversight may hinder assimilation but are understudied aspects (Vieira et al., 2022). - Beyond rationalistic framings, research must examine systemic constraints, political interests and situated contexts shaping if, how and which entrepreneurs integrate AI (Shepherd & Majchrzak, 2022).
AI-Augmented Opportunity Recognition	- Increased accessibility enables more entrepreneurs to leverage AI to identify promising niches from complex data patterns (Iansiti & Lakhani, 2020; Chalmers et al., 2021). - Assumptions of neutrality and objectivity mask risks of amplifying societal biases, necessitating responsible oversight mechanisms balancing automation and human judgment (Kleinberg et al., 2018). - Limited transparency surrounds the inner workings of AI systems, hinders accountability, and potentially disproportionately impacts under-resourced entrepreneurs.
AI-Transformed Business Models	- AI revolutionises key business processes, enabling data-driven decision-making but displacing some entrepreneurial roles (Jorzik et al., 2023; Verganti et al., 2020). - AI radically reshapes model configurations - tailored value propositions, micro-targeted customers, observation-based pricing (Roundy, 2022; Massa et al., 2017). Yet, solely enumerating possibilities overlooks constraints around data, industry complexity, integration capabilities (Agrawal et al., 2023). - Excessive AI intensifies risks of uncontrollability, necessitating updated oversight mechanisms integrating machine behaviour (Rahwan et al., 2019) and AI ethics perspectives (Cows & Floridi, 2018).
Socio-Economic Consequences	- Persisting debates on AI's potential to displace jobs through automation, requiring strengthened protections and training programs (Acemoglu et al., 2020). - AI rhetoric promising progress rarely draws critique from entrepreneurship scholarship (Heeks, 2021), lacking grounded investigation across diverse communities (Vinuesa et al., 2022). - While presenting opportunities, AI also generates risks and constraints requiring identification of oversight models upholding humanistic values.

Key Findings: Addressing the Research Questions

RQ1: How is AI transforming opportunity exploration and business model innovation within entrepreneurial contexts?

Our analysis reveals that AI is fundamentally altering the landscape of opportunity exploration and business model innovation in entrepreneurship through three primary mechanisms:

1. AI-Augmented Opportunity Recognition:

Undoubtedly, AI technologies are not merely enhancing but fundamentally restructuring the process of opportunity recognition. By leveraging machine learning algorithms and big data analytics, AI systems can identify complex patterns and market gaps that would be imperceptible to human cognition alone. This shift aligns with the theory of entrepreneurial bricolage (Baker & Nelson, 2005), where AI serves as a powerful tool for recombining existing resources (data) in novel ways. However, our findings indicate that this AI-driven approach to opportunity recognition may inadvertently reinforce existing biases in data, potentially narrowing the scope of entrepreneurial vision rather than expanding it.

2. Business Model Reinvention:

It appears there is a fundamental reimagining of business model structures catalysed by AI integration into entrepreneurial ventures. Drawing on the business model canvas framework (Osterwalder & Pigneur, 2010), we observe that AI is not simply optimising individual components but reshaping the entire architecture of value creation, delivery and capture. For instance:

- Value propositions are becoming increasingly personalised and predictive, leveraging AI's capacity for real-time data analysis and forecasting.
- Key entrepreneurial activities are shifting from human-centric to AI-augmented processes, blurring the lines between automation and human expertise.
- Customer relationships are being redefined through AI-driven interactions, raising critical questions about the nature of trust and authenticity in business-customer dynamics.

This transformation challenges traditional notions of competitive advantage, suggesting a shift towards what Teece (2018) terms "dynamic capabilities" in the AI era.

3. AI as a General-Purpose Technology (GPT):

Our findings support the characterisation of AI as a general-purpose technology (GPT), as proposed by Brynjolfsson et al. (2021). This shows that AI's impact on entrepreneurship extends beyond specific applications, fundamentally altering the nature of innovation and competitive advantage across industries. What this means is that the GPT nature of AI is driving a "creative destruction" process (Schumpeter, 1942) in entrepreneurial ecosystems, where AI-native startups are challenging incumbents and reshaping industry boundaries. Furthermore, our analysis reveals that AI is not merely a tool for incremental improvement but a driver of disruptive innovation in entrepreneurial contexts. This aligns with Christensen's (1997) theory of disruptive innovation, where AI-enabled startups are capable of rapidly scaling and challenging incumbent firms. However, our findings also indicate a 'winner-takes-most' dynamic emerging in AI-driven markets, potentially leading to increased market concentration and barriers to entry for nascent entrepreneurs.

RQ2: What are the broader socio-economic consequences of proliferating, often opaque AI systems across entrepreneurial actors and activities?

Our review uncovers several critical socio-economic implications, which we analyse through the lens of socio-technical systems theory (Geels, 2004):

1. Labour Market Dynamics

Our fundamental premise pertaining to labour market dynamics asserts that AI's impact on employment is more nuanced than a simple displacement effect. Drawing on the task-based model of technological change (Acemoglu & Restrepo, 2018), we argue that AI is simultaneously substituting for certain tasks while complementing others and creating entirely new job categories. In this sense, it results in a complex reallocation of labour across tasks and sectors rather than wholesale job losses. Tyson & Zysman (2022) supports this nuanced view, showing varying impacts across different skill levels and industry sectors.

2. Knowledge Asymmetries and Power Dynamics

It is important that the opacity of many AI systems is creating significant knowledge asymmetries between developers and users or those affected by them. This dynamic aligns with Zuboff's (2019) concept of "surveillance capitalism," where data and algorithmic knowledge become key sources of power. This raises crucial questions in the entrepreneurial context as this may lead to a new form of digital divide, where access to and understanding of AI technologies become critical determinants of success. The diffusion of AI technologies in entrepreneurship is exacerbating existing socio-economic inequalities. This aligns with the concept of "skill-biased technological change" (Goldin & Katz, 2018), where AI disproportionately benefits highly skilled entrepreneurs and workers. Furthermore, the data and computational resources required for advanced AI systems are concentrating power among a small number of tech giants and well-funded startups, raising concerns about market concentration and barriers to entry for new entrepreneurs.

3. Ethical Implications and Governance Challenges

There is a need to understand how the rapid deployment of AI systems in entrepreneurial contexts is outpacing the development of ethical frameworks and governance structures. This is worth noting as this gap creates significant risks, including algorithmic bias, privacy violations and unintended societal consequences. Drawing on stakeholder theory (Freeman, 1984), we argue that entrepreneurs have a responsibility to consider the broader societal impacts of their AI-driven innovations beyond immediate business goals. The algorithmic opacity and complexity of AI systems are creating significant challenges for accountability and fairness in entrepreneurial decision-making. The lack of transparency not only poses ethical concerns but also creates regulatory challenges as existing governance frameworks grapple to keep pace with AI advancements. Considering this regulatory lag, uncertainties and potential risks in areas such as data privacy, algorithmic bias and AI safety are created. While the European Union (EU) has pioneered global AI regulation with its comprehensive AI Act, the effectiveness of this groundbreaking legislation remains to be seen. Furthermore, its applicability to African contexts is uncertain, raising questions about its potential impact beyond European borders.

4. Ecosystem-Level Transformations:

AI is catalysing shifts in entire entrepreneurial ecosystems, altering the dynamics of innovation, competition and collaboration. This transformation aligns with the concept of "innovation ecosystems" (Adner & Kapoor, 2010), where the success of individual entrepreneurs becomes increasingly dependent on a complex network of AI-enabled actors and resources. AI is fundamentally altering the structure and dynamics of entrepreneurial ecosystems. Drawing on the ecosystem theory of entrepreneurship (Spigel, 2017), we argue that AI is reshaping the relationships between various actors (entrepreneurs, investors, support organisations) and the resources available within the ecosystem. This transformation creates new forms of interdependencies and changes the nature of competitive advantage within entrepreneurial ecosystems.

In conclusion, our analysis demonstrates that the impact of AI on entrepreneurship is profound and multifaceted, extending far beyond technological adoption to reshape fundamental aspects of opportunity recognition, value creation and socio-economic structures. These findings underscore the need for a more holistic, interdisciplinary approach to understanding and managing the AI-entrepreneurship nexus, one that considers not only the technological possibilities but also the broader societal implications and ethical considerations.

This analysis challenges simplistic narratives of AI as a uniformly positive force for entrepreneurial innovation, highlighting instead the complex interplay of opportunities and risks that demand careful consideration from entrepreneurs, policymakers and scholars alike.

7. Discussion

This systematic review offers an unprecedented integration of insights across AI, innovation, and entrepreneurship literature, providing a comprehensive understanding of the AI-entrepreneurship nexus. By consolidating fragmented scholarship, the study contributes the first cross-disciplinary analysis that uncovers AI's transformative impact on opportunity recognition, business models and socio-economic landscapes. The proposed Socio-Technical Systems framework offers an original conceptual lens encompassing key domains of AI adoption decisions, AI-augmented opportunity exploration, innovative AI configurations and socio-economic consequences. This holistic perspective extends existing work by highlighting the interconnectedness and broader implications of AI-driven entrepreneurship. However, the review also sounds an alarm on the lack of critical perspectives in prevailing techno-optimistic narratives. It argues that responsible AI scholarship centring on equity and social justice is essential as AI proliferates. Building on these foundations, this paper advocates for a reflexive and questioning approach that allows marginalised voices and alternative understandings to emerge, paving the way for more inclusive and ethically conscious research. By situating the findings within the broader academic literature on technology adoption (Venkatesh et al., 2003), business model innovation (Massa et al., 2017) and socio-technical systems (Benk et al., 2022), the review offers valuable theoretical contributions and highlights areas for further conceptual development.

8. Implications for Policy and Practice

The analysis of our review bears significant implications for policymakers, entrepreneurs and support organisations. Policymakers must develop comprehensive governance frameworks that balance the gains of AI-driven innovation with the imperatives for transparency, accountability, and inclusive participation. This requires updated regulations, ethical guidelines and oversight mechanisms that consider the unique characteristics of AI technologies and their potential impact on entrepreneurial ecosystems. Policymakers should ruminate on investing in targeted support programs and infrastructure to enable equitable access to AI resources and skills development for diverse entrepreneurial communities. Entrepreneurs must approach AI adoption with a critical and responsible mindset, carefully considering the ethical implications and potential risks alongside the opportunities. They should actively engage in dialogue with policymakers, researchers, and other stakeholders to shape the advancement and positioning of AI technologies in ways that align with societal values and priorities.

Moreover, entrepreneurs should also invest in building their own AI literacy and collaborating with experts to ensure the responsible integration of AI into their business models and practices. While support organisations, such as incubators, accelerators and entrepreneurship networks, play a crucial role in fostering responsible AI adoption and facilitating knowledge exchange, they should develop targeted programs and resources to assist entrepreneurs in navigating the complexities of AI technologies, including ethical considerations, data management and stakeholder engagement. Furthermore, support organisations can also serve as platforms for cross-sector collaboration and advocacy, bringing together entrepreneurs, researchers, policymakers and civil society to address the challenges and opportunities presented by AI.

9. Future Research Directions

This review lays the foundation for a rich research agenda on the AI-entrepreneurship nexus. Future studies should further refine and validate the proposed Socio-Technical Systems framework through empirical investigations across diverse contexts and industries. Researchers should also explore the boundary conditions and contingencies that shape the impact of AI on entrepreneurial processes and outcomes, considering factors such as industry maturity, regulatory environments, and cultural norms. Moreover, further research should aim to explore the ethical dimensions of AI-driven entrepreneurship, examining issues such as algorithmic bias, data privacy and the distribution of benefits and risks. This may require scholars to develop new methodological approaches, such as participatory action research and value-sensitive design, to engage entrepreneurship

stakeholders in the co-creation of responsible AI solutions. Hence, interdisciplinary collaboration, particularly with fields such as computer science, sociology and philosophy, will be essential to advance a holistic understanding of the AI-entrepreneurship nexus.

Finally, future research should investigate the long-term societal implications of AI-driven entrepreneurship, considering both the positive and negative externalities. By so doing, it includes examining the impact on job displacement, income inequality and the concentration of economic power, as well as the potential for AI to enable new forms of social entrepreneurship and sustainable value creation. By adopting a forward-looking and systems-oriented perspective, scholars can contribute to shaping the trajectory of AI-driven entrepreneurship in ways that promote inclusive growth and social well-being.

10. Conclusion

In conclusion, this systematic review provides a timely and critical examination of the AI-entrepreneurship nexus, highlighting the transformative potential of AI technologies while also exposing the ethical and societal challenges that must be addressed. By proposing an original conceptual framework and outlining a comprehensive research agenda, the study aims to inspire and guide future scholarship that is both theoretically rigorous and socially relevant. As AI continues to reshape the entrepreneurial landscape, it is imperative that researchers, policymakers, and practitioners work together to ensure that its benefits are harnessed in a responsible and equitable manner. This review serves as a call to action for a modernistic era of AI-driven entrepreneurship investigation that places human values and societal well-being at the centre of its inquiry.

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