THE TRANSFORMATION OF ENTREPRENEURIAL OPPORTUNIY RECOGNITION THROUGH ARTIFICIAL INTELLIGENCE: A SYSTEMATIC REVIEW

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Abstract. The development of artificial intelligence (AI) has brought fundamental changes to the entrepreneurial process, particularly in the stage of entrepreneurial opportunity recognition. Although the literature on AI and entrepreneurship continues to grow, an integrated understanding of how AI transforms the opportunity recognition process remains fragmented. Therefore, this study aims to systematically examine the role of AI in transforming entrepreneurial opportunity recognition through a Systematic Literature Review (SLR) approach. This research follows the PRISMA guidelines by analyzing 40 reputable journal articles published between 2015 and 2025 and sourced from the Scopus, Web of Science, and Google Scholar databases. The analysis employs a thematic synthesis approach to identify key patterns, mechanisms, and implications of AI integration in opportunity recognition. The synthesis results reveal four main themes: (1) AI as an enabler in detecting patterns and latent opportunities, (2) the transformation of entrepreneurial cognition toward a human–machine hybrid model, (3) enhanced opportunity validation and reduced uncertainty through predictive analytics, and (4) ethical challenges and risks of algorithmic dependence. This study contributes theoretically by expanding the understanding of opportunity recognition in the context of digital entrepreneurship and practically by providing implications for entrepreneurs and policymakers in managing the strategic and responsible use of AI.

Keywords: artificial intelligence, opportunity recognition, digital entrepreneurship, systematic literature review

I. INTRODUCTION

The ability to recognize entrepreneurial opportunities constitutes a fundamental foundation in the process of new venture creation and innovation development. In classical entrepreneurship literature, opportunity recognition is understood as a cognitive process influenced by experience, prior knowledge, social networks, and an individual's sensitivity to environmental changes (Shane & Venkataraman, 2000; Baron, 2006). However, the rapid advancement of digital technologies has fundamentally transformed the ways in which business opportunities are identified, evaluated, and exploited.

In recent years, artificial intelligence (AI) has emerged as an increasingly dominant technology in business and entrepreneurial activities. This technology enables the rapid and accurate processing of large volumes of data, allowing for the identification of patterns, market trends, and latent consumer needs that are difficult for humans to detect manually (Davenport & Ronanki, 2018; Cockburn et al., 2018). The presence of AI shifts opportunity recognition from a process that is fully based on human intuition to a hybrid process that combines human intelligence with algorithmic intelligence.

A growing body of research indicates that AI functions not only as an operational support tool but also as a cognitive enhancer for entrepreneurs. Obschonka and Audretsch (2020) argue that AI accelerates information flows within entrepreneurial ecosystems and reduces the costs of opportunity search. Similarly, Townsend and Hunt (2019) find

that the use of predictive algorithms assists entrepreneurs in evaluating opportunities more objectively and in a data-driven manner. Consequently, opportunity recognition no longer relies solely on subjective experience but increasingly depends on broader and more structured data analysis.

Nevertheless, the literature addressing the role of AI in entrepreneurial opportunity recognition remains fragmented. Some studies emphasize AI as a cognitive enhancer that expands entrepreneurial thinking and creativity (Brynjolfsson & McAfee, 2014), while other research highlights the risks of excessive dependence on algorithms, which may constrain imagination and reinforce existing business patterns. Moreover, variations in theoretical frameworks, research contexts, and methodological approaches make it difficult to develop an integrated understanding of AI-driven transformations in opportunity recognition.

To date, most review studies have focused on digital entrepreneurship in general (Nambisan, 2017; Kraus et al., 2022), without specifically examining how AI reshapes cognitive mechanisms and the opportunity recognition process. As a result, a significant research gap remains in systematically exploring the relationship between artificial intelligence and the transformation of entrepreneurial opportunity recognition.

Based on this context, the present study aims to conduct a systematic literature review on the transformation of entrepreneurial opportunity recognition through artificial intelligence. Specifically, this study seeks to:

1) identify the theoretical perspectives used to explain the role of AI in opportunity recognition;
2) map the dominant themes and technological contexts;
3) examine methodological patterns and empirical trends; and
4) propose directions for future research.

Through a structured synthesis, this article is expected to contribute theoretically to the development of the digital entrepreneurship literature and to provide practical implications for entrepreneurs, educators, and policymakers in leveraging AI strategically to enhance the ability to recognize business opportunities.

II. RESEARCH METHODS

This study adopts a Systematic Literature Review (SLR) approach to comprehensively examine how artificial intelligence transforms the process of entrepreneurial opportunity recognition. This approach is selected because SLR enables a structured, transparent, and replicable synthesis of findings dispersed across multiple disciplines (Tranfield et al., 2003; Kitchenham & Charters, 2007). The review process follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, which emphasize transparency in article selection procedures and research reproducibility (Page et al., 2021).

The literature search was conducted across three major databases relevant to entrepreneurship and technology research, namely Scopus, Web of Science (WoS), and Google Scholar, as these databases cover reputable publications in the fields of entrepreneurship, information systems, and technological innovation (Gusenbauer & Haddaway, 2020). The search was carried out in January 2026, covering publications from 2015 to 2025, as the past decade has witnessed significant growth in research related to artificial intelligence and entrepreneurship. Keywords were constructed using Boolean operators as follows: ("entrepreneurial opportunity" OR "opportunity recognition") AND ("artificial intelligence" OR "machine learning" OR "big data" OR "algorithmic decision"). The search was applied to titles, abstracts, and keywords.

The inclusion and exclusion criteria applied in this study are presented in Table 1.

Table 1. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Year	2015–2025	< 2015
Language	English	Non-English
Document type	Indexed journal articles	Conference proceedings, books, theses
Field	Entrepreneurship, business, innovation, information systems	Medical, pure engineering
Focus	AI and opportunity recognition	Not relevant

Source: Authors, 2026

The identification and selection process of articles followed the PRISMA guidelines and was conducted in several stages. In the initial stage, literature searches across Scopus, Web of Science, and Google Scholar yielded a total of 444 articles. From this pool, 118 duplicate records were identified and removed, as recommended in SLR protocols to minimize selection bias (Kitchenham & Charters, 2007). This resulted in 326 unique articles eligible for further screening.

The 326 articles were subsequently screened based on the relevance of their titles and abstracts to the research topic. At this stage, 187 articles were excluded due to irrelevance, leaving 139 articles for the next phase. This screening ensured that only studies explicitly addressing the relationship between artificial intelligence and entrepreneurial opportunity recognition were retained. The remaining 139 articles then underwent full-text review. During this stage, 87 articles were excluded because they did not explicitly examine the linkage between AI and entrepreneurial opportunity recognition or failed to meet minimum methodological criteria. Ultimately, 40 articles satisfied all inclusion criteria and were subjected to thematic analysis using a thematic synthesis approach to identify patterns of cognitive and technological transformation in entrepreneurial opportunity recognition (Thomas & Harden, 2008).
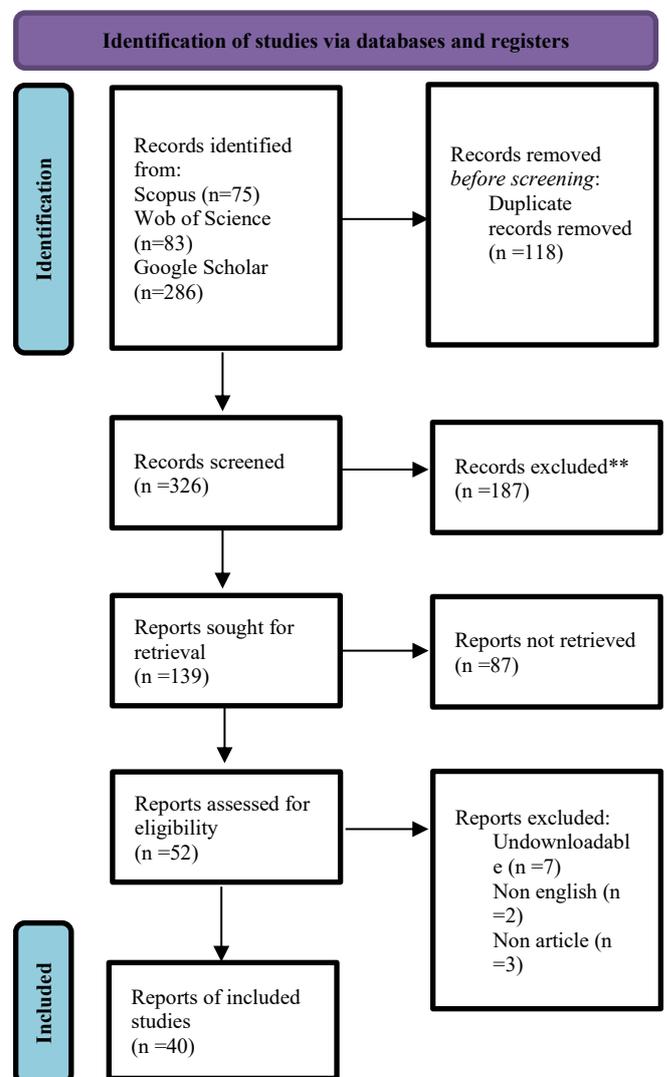

Figure 2. PRISMA Flow: Data Extraction Procedure
Source: Data Process (2026)

The selected articles were analyzed using a thematic synthesis approach as developed by Thomas and Harden (2008). This approach was chosen because it enables the integration of findings from diverse studies with different contexts, methodologies, and theoretical perspectives into meaningful thematic patterns. Through a process of open coding, theme clustering, and conceptual interpretation, the analysis was directed at identifying how artificial intelligence operates within the mechanisms of entrepreneurial opportunity recognition, how this technology triggers shifts in entrepreneurial cognitive processes from intuition-based reasoning toward data-driven decision-making, and how such transformations influence strategic implications for innovation and organizational competitive advantage. Accordingly, thematic synthesis facilitates a comprehensive understanding of the structural and cognitive changes generated by the integration of AI into the entrepreneurial process.

III. RESULTS AND DISCUSSION

Table 2. Summary of Thematic Analysis Results

No	Main Theme	Core Description	Transformational Focus	Number of Articles (≈)
1	AI as a Pattern Detection Enabler	AI enables large-scale data analysis to identify trends and latent opportunities that are difficult to recognize manually	From intuition → data-driven pattern recognition	12
2	Transformation of Entrepreneurial Cognition	AI acts as a cognitive enhancer that expands thinking capacity and reduces bias	From intuition → human–machine collaboration	11
3	Predictive-Based Opportunity Validation	AI enhances opportunity evaluation through simulation, demand prediction, and risk analysis	From speculation → data-driven validation	9
4	Ethical Challenges and Algorithmic Dependence	Risks related to bias, privacy, and constrained creativity due to algorithmic dominance	From flexibility → system lock-in	5

Source: Authors, 2026

The thematic analysis of 40 relevant articles reveals coherent patterns regarding how artificial intelligence (AI) transforms the process of entrepreneurial opportunity recognition (EOR). Overall, the synthesis highlights four key dimensions of change: (1) the expansion of pattern detection capabilities; (2) a cognitive shift toward a hybrid human–machine model of entrepreneurship; (3) enhanced opportunity validation and reduced uncertainty; and (4) conceptual and ethical risks that necessitate appropriate governance mechanisms.

First, the majority of studies indicate that AI technologies—represented by machine learning, big data analytics, natural language processing, and recommender systems—function as enablers for detecting market patterns and weak signals that are difficult to identify through human observation alone (Davenport & Ronanki, 2018; Cockburn et al., 2018;

Obschonka & Audretsch, 2020; Schade, 2023). Large-scale data processing allows entrepreneurs to identify latent opportunities from diverse data sources such as digital transactions, social media footprints, and patent databases. This capability broadens the scope of entrepreneurial observation and accelerates the pattern recognition process, which was previously closely associated with personal experience and intuition (Baron, 2006; Nambisan, 2017).

Second, the integration of AI triggers a cognitive shift in entrepreneurial opportunity recognition. EOR is no longer solely an individual, intuition-driven cognitive process but rather a hybrid process in which humans and machines complement one another (Brynjolfsson & McAfee, 2017a; Raisch & Krakowski, 2021). Empirical and conceptual studies portray AI as a cognitive enhancer that mitigates bounded rationality, enriches the available information base, and provides probabilistic recommendations that support decision-making (Mitchell et al., 2007; Townsend & Hunt, 2019; Mikalef et al., 2022). However, the literature also emphasizes that the effectiveness of human–machine collaboration depends on data literacy, domain expertise, and the level of AI capabilities embedded within organizations (Autio et al., 2018; Kraus et al., 2021).

Third, AI strengthens opportunity validation processes and reduces uncertainty during the evaluation stage through simulation, demand forecasting, and risk analysis (Mikalef et al., 2022; Obschonka & Audretsch, 2020; Schade, 2023). The acceleration of digital experimentation loops—such as A/B testing and rapid prototyping—enables entrepreneurs to test market hypotheses at lower cost and to obtain empirical evidence before committing substantial resources. This represents a significant contribution to improving the effectiveness of opportunity exploitation (Nambisan et al., 2019).

Fourth, despite its positive impacts, the use of AI introduces ethical challenges, algorithmic bias, and risks of over-reliance. Critical literature highlights the potential erosion of creativity when entrepreneurs excessively depend on algorithmic recommendations, the presence of hidden biases embedded in training data, and concerns related to privacy and data governance (Zuboff, 2019; Raisch & Krakowski, 2021). Consequently, recent studies call for the development of ethical frameworks, robust data quality controls, and enhanced AI interpretability to ensure that AI remains augmentative rather than a substitute for human creative cognitive processes (Fossen, 2024; Giuggioli, 2023).

From a metatheoretical perspective, these findings reinforce the notion that AI shifts the EOR model from an individual-centric approach toward a socio-technical model, in which opportunities emerge from the interaction between technological capabilities (data and algorithms), human capabilities (domain knowledge and creativity), and institutional contexts (policies and entrepreneurial ecosystems). The implications for future research point toward longitudinal studies of human–machine interaction in EOR, experimental fieldwork to assess the impact of AI on opportunity novelty, and the development of governance indicators that measure the balance between predictive accuracy and creative innovation.

IV. **CONCLUSIONS**

The findings of this study have significant theoretical and practical implications. From a theoretical perspective, the synthesis underscores the need for future research agendas that explicitly distinguish the impact of artificial intelligence on the quantity of entrepreneurial opportunities—reflected in the increased number of opportunities that can be identified—and the quality of opportunities, particularly in terms of their novelty and originality. This distinction is crucial to avoid the assumption that improvements in AI's predictive accuracy automatically translate into radical or breakthrough innovation. Accordingly, future studies are encouraged to adopt mixed-methods approaches and field experiments to capture the dynamic interactions between human intuition and algorithmic recommendations in the opportunity recognition process. From a practical standpoint, for entrepreneurs and business practitioners, these findings indicate that effective AI utilization should not focus solely on technological adoption but also requires investment in data governance and the development of data literacy. Such capabilities are essential for enabling entrepreneurs to interpret, critically evaluate, and creatively explore AI-generated recommendations, ensuring that technology functions as a cognitive enhancer rather than a substitute for human judgment. Meanwhile, for policymakers, the results highlight the importance of regulatory frameworks that safeguard data privacy, ensure algorithmic transparency, and promote accountability in AI usage. Well-balanced regulation constitutes a key prerequisite for enabling AI adoption to contribute sustainably and inclusively to the development of entrepreneurial ecosystems.

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