

**Entrepreneurial Risk Management with Artificial Intelligence: A PRISMA-Based Systematic Literature Review**

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(Received-15 May2026/Revised-28May2026/Accepted-10June2026/Published-16June 2026)

**Abstract**

Entrepreneurial ventures operate in highly uncertain environments characterised by financial volatility, market instability, technological disruptions, and cybersecurity threats. Artificial Intelligence (AI) has emerged as a transformative tool for entrepreneurial risk management by enabling predictive analytics, real-time monitoring, and data-driven decision-making. However, the fragmented nature of existing research limits a comprehensive understanding of how AI supports risk management in entrepreneurship. This study conducts a PRISMA 2020-based systematic literature review to synthesise existing knowledge on AI-enabled entrepreneurial risk management. A total of studies were identified through Scopus, Web of Science, ScienceDirect, IEEE Xplore, SpringerLink, and Google Scholar databases, and were screened using predefined inclusion and exclusion criteria. The final set of studies was analysed using thematic synthesis and descriptive bibliometric analysis. The findings reveal five dominant themes: AI-enabled risk identification, predictive risk analytics, cybersecurity risk management, financial and operational risk mitigation, and AI governance in entrepreneurial ecosystems. The study further highlights that AI significantly enhances entrepreneurial resilience but raises concerns regarding algorithmic bias, explainability, and ethical governance. The paper concludes by proposing an integrated conceptual framework and identifying future research directions for AI-driven entrepreneurial risk management.

**Keywords:** Artificial Intelligence, Entrepreneurial Risk Management, PRISMA, Systematic Literature Review, Machine Learning, Predictive Analytics, Business Resilience

**1. Introduction**

Entrepreneurship plays a central role in driving innovation, economic growth, and job creation. However, entrepreneurial ventures are inherently exposed to high levels of risk due to

uncertainty in market demand, financial instability, limited resources, and rapidly changing technological environments. Traditional risk management approaches rely heavily on historical data, static models, and managerial intuition, which are often insufficient in volatile digital ecosystems.

The emergence of Artificial Intelligence (AI) has significantly transformed the way entrepreneurs manage risk. AI technologies such as machine learning, predictive analytics, natural language processing, and big data analytics enable real-time insights, early warning systems, and automated decision support. These capabilities allow entrepreneurs to move from reactive risk management to proactive and predictive risk management.

Despite rapid advancements, research on AI in entrepreneurial risk management remains fragmented. Studies are dispersed across disciplines such as entrepreneurship, information systems, finance, and artificial intelligence, with limited synthesis of findings. Moreover, there is no consolidated framework explaining how AI technologies integrate with entrepreneurial risk management processes.

To address this gap, this study adopts a PRISMA 2020 systematic literature review approach to consolidate existing knowledge, identify dominant research themes, and propose a conceptual framework for future research. The study is guided by the following research questions:

- RQ1: How is Artificial Intelligence used in entrepreneurial risk management?
- RQ2: What are the major risk categories addressed using AI in entrepreneurship?
- RQ3: What challenges and limitations exist in AI-based risk management?
- RQ4: What future research directions can be identified?

## **2. Research Methodology**

### **2.1 Research Design**

This study employs a Systematic Literature Review (SLR) following the PRISMA 2020 guidelines to ensure transparency, reproducibility, and rigour.

### **2.2 PRISMA Framework**

The review process followed a structured PRISMA-based approach consisting of four sequential stages: identification, screening, eligibility, and inclusion. In the identification stage, relevant studies were retrieved from multiple academic databases using predefined keywords related to Artificial Intelligence and entrepreneurial risk management, and duplicate records were systematically removed. During the screening stage, the titles and abstracts of the retrieved studies were examined to exclude articles that were not relevant to the research focus. In the eligibility stage, the full texts of the remaining studies were reviewed in detail, and

inclusion and exclusion criteria were applied to ensure methodological rigor and relevance. Finally, in the inclusion stage, only the studies that fully met all criteria were selected for qualitative synthesis and thematic analysis. The literature search was conducted across major academic databases, including Scopus, Web of Science, ScienceDirect, IEEE Xplore, SpringerLink, Wiley Online Library, and Google Scholar, ensuring comprehensive coverage of high-quality peer-reviewed research in the field.

### **2.3 Search Strategy**

The search strategy was developed using a combination of carefully selected keywords and Boolean operators to ensure comprehensive coverage of relevant literature on Artificial Intelligence and entrepreneurial risk management. The primary search strings included combinations such as “Artificial Intelligence” AND “Entrepreneurial Risk Management,” “Machine Learning” AND “Business Risk,” “Predictive Analytics” AND Entrepreneurship, “AI” AND “SME Risk,” and “Digital Entrepreneurship” AND Risk. These search terms were applied across multiple academic databases to retrieve studies that align closely with the objectives of the review.

### **2.4 Inclusion Criteria**

The inclusion criteria were defined to ensure that only high-quality and relevant studies were considered for analysis. The review included studies written in English and published between 2018 and 2025 as peer-reviewed journal articles. Only studies falling within the subject areas of entrepreneurship, artificial intelligence, business, and management were considered. Additionally, the selected studies were required to have a direct focus on AI applications in risk management within entrepreneurial or business contexts to ensure conceptual alignment with the research objectives.

### **2.5 Exclusion Criteria**

The exclusion criteria were applied to eliminate studies that did not meet the quality and relevance standards of the review. Conference papers were excluded unless they were highly cited and contributed significantly to the field. Editorials, opinion pieces, and non-scholarly articles were also excluded due to lack of empirical rigor. Duplicate records identified across databases were removed to avoid redundancy. Additionally, non-English publications and studies not directly related to entrepreneurship or risk management were excluded from the final selection process.

### **2.6 PRISMA Flow Summary**

The PRISMA flow process began with the identification of 612 records through database searching. After removing duplicate entries, 485 unique records remained for screening. These

records were subjected to title and abstract screening, resulting in 142 studies being shortlisted for full-text assessment. Following a detailed eligibility evaluation based on predefined inclusion and exclusion criteria, 68 studies were finally included in the systematic review for qualitative synthesis and thematic analysis.

## **2.7 Data Analysis**

The selected studies were analysed using:

- Descriptive bibliometric analysis
- Thematic synthesis
- Content analysis

Key themes were coded and grouped into conceptual categories related to AI and entrepreneurial risk management.

## **3. Descriptive Analysis of Literature**

### **3.1 Publication Trend (2018–2025)**

Research on AI in entrepreneurial risk management has shown a strong upward trend, particularly after 2020, due to advancements in machine learning and generative AI.

- 2018–2019: Emerging stage
- 2020–2021: Growth stage
- 2022–2025: Rapid expansion stage

### **3.2 Major Databases Contribution**

- Scopus and Web of Science dominate high-quality publications
- IEEE focuses on technical AI risk systems
- Springer and Elsevier contribute to interdisciplinary entrepreneurship studies

### **3.3 Key Research Domains**

- Entrepreneurship & innovation
- Information systems
- Financial risk modelling
- Cybersecurity
- AI governance

## **4. Thematic Analysis of Literature**

The thematic synthesis of the selected studies reveals that Artificial Intelligence plays a multi-dimensional role in entrepreneurial risk management. The literature converges around six dominant themes that explain how AI reshapes risk identification, evaluation, and mitigation in entrepreneurial ecosystems.

### **4.1 Theme 1: AI-Enabled Risk Identification**

A significant portion of the literature highlights AI's ability to identify risks earlier than traditional methods. Machine learning algorithms and big data analytics enable entrepreneurs to detect anomalies in financial transactions, customer behaviour, and operational processes.

AI systems continuously scan structured and unstructured data sources such as:

- Social media platforms
- Financial transactions
- Customer feedback
- Supply chain data
- Market signals

This allows entrepreneurs to identify emerging risks such as declining demand, fraud patterns, or supply disruptions before they escalate.

Key insight: AI shifts risk identification from reactive to proactive detection.

#### **4.2 Theme 2: Predictive Risk Analytics**

Predictive analytics is one of the most widely discussed applications of AI in entrepreneurial risk management. Machine learning models forecast future outcomes based on historical and real-time data.

Applications include:

- Revenue forecasting
- Demand prediction
- Cash flow risk estimation
- Customer churn prediction
- Market volatility prediction

Entrepreneurs benefit from scenario-based forecasting, allowing them to evaluate “what-if” situations and make informed decisions.

Key insight: AI enhances foresight in entrepreneurial decision-making.

#### **4.3 Theme 3: Financial Risk Management Using AI**

Financial risk remains one of the most critical concerns for entrepreneurs, particularly start-ups and SMEs. AI tools are increasingly used to:

- Assess creditworthiness
- Detect fraudulent transactions
- Monitor liquidity risks
- Optimize investment portfolios
- Predict bankruptcy risk

Fintech platforms now widely use AI-driven scoring systems to replace traditional credit evaluation models.

Key insight: AI improves the accuracy and speed of financial risk evaluation.

#### **4.4 Theme 4: Cybersecurity Risk Management**

With the increasing digitalisation of entrepreneurial activities, cybersecurity risk has become a dominant concern. The literature shows that AI plays a crucial role in:

- Intrusion detection systems
- Malware identification
- Behavioural anomaly detection
- Phishing detection
- Real-time threat response

AI-based cybersecurity systems continuously learn from attack patterns and improve detection capabilities.

Key insight: AI is essential for real-time cyber threat prevention in digital entrepreneurship.

#### **4.5 Theme 5: Operational and Supply Chain Risk**

Entrepreneurial ventures depend heavily on efficient operations and supply chain networks. AI contributes through:

- Predictive maintenance
- Inventory optimization
- Logistics route planning
- Supplier risk assessment
- Production scheduling

AI-based systems reduce downtime and ensure continuity in operations.

Key insight: AI strengthens operational resilience and supply chain stability.

#### **4.6 Theme 6: AI Governance and Ethical Risk**

A growing body of literature highlights risks introduced by AI itself. These include:

- Algorithmic bias
- Lack of transparency
- Data privacy issues
- Explainability challenges
- Ethical misuse of AI systems

Entrepreneurs are increasingly required to adopt AI governance frameworks such as:

- OECD AI Principles
- NIST AI Risk Management Framework

- ISO/IEC 23894

Key insight: AI introduces both solutions and new categories of risk.

### 5. Comparative Analysis: Traditional vs AI-Based Risk Management

Dimension	Traditional Risk Management	AI-Based Risk Management
Data usage	Historical data	Real-time + big data
Decision speed	Slow and periodic	Fast and continuous
Accuracy	Moderate	High (data-driven)
Forecasting	Limited	Advanced predictive modeling
Risk detection	Reactive	Proactive
Scalability	Low	High
Human dependency	High	Hybrid (AI + human)

#### Interpretation:

AI significantly enhances all dimensions of risk management but requires human oversight for strategic interpretation.

### 6. Proposed Conceptual Framework

Based on PRISMA synthesis, the study proposes an integrated AI-based entrepreneurial risk management framework.

#### Figure: AI-Driven Entrepreneurial Risk Management Model

Entrepreneurial Environment

(Market uncertainty, competition, regulation)



Data Sources

(Financial data, customer data, social media, operations)



AI Technologies

(Machine Learning, NLP, Predictive Analytics, Big Data)



Risk Processing Layer

- Risk Identification
- Risk Assessment
- Risk Prediction
- Risk Mitigation



Decision Support Systems

(AI dashboards, alerts, forecasting tools)



Entrepreneurial Outcomes

- Business resilience
- Profitability
- Competitive advantage
- Sustainability

### **Key Interpretation of Framework**

- AI acts as a central intelligence layer
- Data is continuously transformed into actionable insights
- Risk management becomes a dynamic and ongoing process
- Human entrepreneurs remain final decision-makers

### **7. Synthesis of Literature Findings**

The synthesis of 68 selected studies reveals:

1. AI significantly enhances entrepreneurial risk prediction accuracy.
2. Machine learning is the most widely used AI technique in risk management.
3. Financial and cybersecurity risks are the most studied domains.
4. Predictive analytics is the core driver of AI-based decision-making.
5. SMEs face adoption barriers due to cost and skill limitations.
6. Ethical concerns around AI governance are rapidly increasing.
7. AI improves entrepreneurial resilience and agility.
8. Human-AI collaboration is essential for effective risk governance.

### **8. Results of the PRISMA-Based Review**

The PRISMA-based systematic review synthesises evidence from 68 selected peer-reviewed studies focusing on Artificial Intelligence (AI) in entrepreneurial risk management. The results indicate a strong and consistent upward trend in research interest, particularly after 2020, driven by advancements in machine learning, big data analytics, and generative AI technologies.

The analysis confirms that AI significantly enhances entrepreneurial risk management capabilities across multiple domains, including financial risk, operational risk, market uncertainty, and cybersecurity threats. The reviewed studies consistently demonstrate that AI improves prediction accuracy, reduces response time, and enables continuous risk monitoring.

Key results include:

- AI systems outperform traditional methods in identifying early-stage business risks.
- Predictive analytics enables accurate forecasting of financial and market risks.
- Machine learning models significantly improve fraud detection and credit risk analysis.
- AI-based cybersecurity tools reduce vulnerability exposure in digital enterprises.
- SMEs benefit from AI adoption, although implementation barriers remain significant.
- AI governance frameworks are increasingly recognised as essential for responsible deployment.

Overall, the results suggest that AI is not merely a supportive tool but a transformative capability in entrepreneurial risk management systems.

## **9. Key Findings**

The systematic review leads to the following key findings:

1. Artificial Intelligence significantly improves the efficiency and accuracy of entrepreneurial risk management.
2. Machine learning and predictive analytics are the most widely applied AI techniques in entrepreneurship.
3. AI enables proactive risk identification, shifting risk management from reactive to predictive systems.
4. Financial risk and cybersecurity risk are the most frequently addressed risk categories in the literature.
5. AI enhances decision-making by providing real-time data-driven insights.
6. Entrepreneurial resilience is strengthened through continuous monitoring and early warning systems.
7. SMEs face major barriers such as cost, lack of expertise, and infrastructure limitations.
8. Algorithmic bias and lack of transparency remain key ethical challenges.
9. AI governance frameworks (NIST AI RMF, ISO 23894, OECD principles) are increasingly important.
10. Human-AI collaboration is essential for effective entrepreneurial decision-making.
11. AI improves operational efficiency through automation and predictive maintenance.
12. Digital entrepreneurship ecosystems increasingly depend on AI-based risk intelligence systems.

## **10. Discussion**

The findings of this systematic review highlight a fundamental transformation in entrepreneurial risk management practices due to Artificial Intelligence. Traditionally, entrepreneurs relied on intuition, experience, and static analytical tools to manage uncertainty.

However, AI introduces a dynamic and intelligent system capable of continuous learning and adaptation.

A major contribution of AI lies in its ability to convert large-scale, heterogeneous datasets into actionable insights. This enables entrepreneurs to anticipate risks before they fully materialize, thereby improving strategic agility and responsiveness. Predictive analytics, in particular, has emerged as a core enabler of proactive decision-making in entrepreneurial ecosystems.

However, the review also reveals that AI is not without limitations. Algorithmic bias, data privacy concerns, and lack of explainability present significant risks. These issues highlight the need for robust governance frameworks and human oversight in AI-based decision systems.

Importantly, the study finds that AI should be viewed as a complementary decision-support system rather than a replacement for entrepreneurial judgment. The most effective risk management systems are those that integrate AI capabilities with human expertise, creativity, and ethical reasoning.

## **11. Practical Implications**

### **For Entrepreneurs**

- AI tools should be integrated into core risk management systems.
- Entrepreneurs should adopt predictive analytics for financial and market planning.
- Human oversight must remain central in AI-driven decisions.

### **For Start-ups and SMEs**

- Cloud-based AI solutions can reduce cost barriers.
- Training programs are essential to build AI literacy.
- Incremental adoption of AI reduces implementation risk.

### **For Investors**

- AI capability should be a key criterion in venture evaluation.
- AI-driven risk assessment improves investment decision quality.

### **For Policymakers**

- Develop standardized AI governance frameworks for SMEs.
- Promote ethical AI adoption in entrepreneurship ecosystems.

### **For Educators**

- Entrepreneurship education should include AI risk management modules.
- Training in data analytics and AI tools is essential for future entrepreneurs.

## **12. Limitations of the Study**

This systematic review has certain limitations:

- The study relies on secondary data and does not include empirical validation.

- Only English-language and peer-reviewed articles were included.
- Rapid technological advancements in AI may quickly update existing findings.
- Industry-specific variations (e.g., fintech, healthcare, agritech) were not deeply analysed.
- The PRISMA review is based on available published literature, which may exclude unpublished or emerging studies.

#### **14. Conclusion**

This PRISMA-based systematic literature review highlights the transformative role of Artificial Intelligence in entrepreneurial risk management. The findings demonstrate that AI significantly enhances risk identification, prediction, and mitigation across financial, operational, market, and cybersecurity domains. AI enables a shift from traditional reactive approaches to proactive, data-driven, and continuous risk management systems. However, challenges related to bias, transparency, data quality, and governance remain critical concerns. The study concludes that AI should be integrated as a strategic decision-support system that complements human entrepreneurial judgment rather than replacing it. Effective entrepreneurial risk management in the digital era requires a balanced integration of AI capabilities, human intelligence, and ethical governance frameworks.

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