

Impact of AI and ML in reducing Credit-Risk with Alternative Data: A Bibliometric Analysis

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ABSTRACT

The integration of Artificial Intelligence (AI) and Machine Learning (ML) with alternative data has emerged as an important approach for improving credit-risk assessment, particularly in addressing the limitations of conventional credit-scoring systems. This study aims to examine the intellectual structure, research trends, influential studies, and emerging themes in the application of AI and ML for credit-risk reduction using alternative data. A bibliometric analysis was conducted using Scopus-indexed literature, with the search conducted on 15 September 2026. After applying the defined inclusion and exclusion criteria, 2,674 relevant articles were considered for analysis. The study employs citation analysis, co-citation analysis, bibliographic coupling, keyword co-occurrence, and co-authorship analysis to identify major research clusters and developments in the field. The findings indicate a substantial growth in scholarly research linking AI, ML, alternative data, credit assessment, and financial decision-making. The analysis identifies major intellectual clusters around credit-risk prediction, machine-learning-based credit scoring, alternative data, financial technology, and explainable and responsible AI. Bibliographic coupling further highlights interconnected research streams and influential contributions that have shaped the development of the field. The study demonstrates that alternative data combined with AI and ML can broaden the information base available for credit assessment and support more data-driven risk-management practices. However, issues related to data quality, privacy, transparency, bias, explain ability, and regulatory compliance remain important areas for future research. The study contributes to the existing literature by mapping the evolution and intellectual structure of AI- and ML-based credit-risk research and identifying directions for future investigation.

Keyword: Artificial Intelligence, Machine Learning, Credit Risk, Alternative Data and Risk Assessment..

INTRODUCTION

The rapid digitalization of the global financial landscape has transformed credit risk management from a static, reactive process into a dynamic, predictive science (Rahman et al., 2025). Historically, creditworthiness was determined through narrow "traditional" datasets primarily payment histories and debt-to-income ratios which often excluded "credit invisible" populations (Agarwal et al., 2023). However, the integration of Artificial Intelligence (AI) and Machine Learning (ML) has revolutionized this sector by leveraging the computational power required to process vast amounts of alternative data, such as mobile phone usage, utility payments, and e-commerce activity (Raman et al., 2024). These AI-driven models offer the potential to assess risk with unprecedented precision, with recent data suggesting that ML-enhanced scoring can increase loan approval rates by nearly 20% without a corresponding rise in default (Ilhan et al., 2025). As financial inclusion becomes a global priority, understanding the synergy between advanced algorithms and non-traditional data sources has become a critical pillar of modern economic stability (Dubey et al., 2025). AI and ML algorithms possess the capability to process vast and complex datasets, identify hidden patterns, and generate highly accurate credit scoring models, thereby reducing default risk while improving loan accessibility (Faheem, 2021). Moreover, these technologies enhance operational efficiency by enabling real-time decision-making, minimizing processing costs, and continuously refining predictive performance through adaptive learning mechanisms (Shethiya, 2024). This transformation is particularly significant for fintech institutions and emerging economies, where access to formal credit remains limited (Alam et al., 2025). However, alongside these advancements, critical challenges such as data privacy concerns, algorithmic bias, lack of model transparency, and regulatory compliance have emerged, necessitating robust governance frameworks and ethical considerations. In this context, the growing body of literature examining the intersection of AI, ML, and alternative data in credit risk management underscores the need for a systematic and structured analysis (Iqbal & Ahmad 2025). Therefore, a bibliometric approach becomes essential to map the intellectual landscape, identify research trends, and highlight future directions in this rapidly evolving domain (Waheed et al., 2018).

Academic interest in this domain has evolved through several distinct phases, moving from the initial comparison of non-linear models like Random Forests against traditional logistic regression to more complex explorations of data ethics and Explainable AI (Shaalán et al., 2025). Recent literature has increasingly focused on the predictive power of alternative data in emerging markets and the necessity of maintaining transparency in automated decisions to satisfy evolving regulatory frameworks (Ahmad et al., 2025). However, despite the surge in individual studies, the literature remains highly fragmented across the disciplines of finance, computer science, and public policy (Mishra et al., 2025). There is currently a notable lack of a comprehensive mapping of the field's evolution, and existing reviews often focus on specific algorithmic performance rather than the broader structural trends of the research landscape (Islam et al., 2025). Without a formal bibliometric analysis, identifying the most influential contributors, primary collaboration networks, or emerging "hot topics" remains a significant challenge for researchers and practitioners alike (Zhang et al., 2024). In addition to identifying the intellectual and thematic evolution of the field, the study also evaluates temporal trends to understand how research output has progressed in response to technological advancements and regulatory shifts (Sabri et al., 2025). A longitudinal analysis of publication growth provides insights into periods of intensified scholarly attention, often corresponding with the adoption of Artificial Intelligence and Machine Learning techniques in financial services (Biju et al., 2024). Moreover, citation analysis is utilized to assess the impact and relevance of key studies, thereby distinguishing seminal contributions from emerging research (Ding et al., 2014). The integration of visualization tools such as VOS viewer further enhances the analytical depth by enabling the graphical representation of bibliometric networks, making complex relationships between authors, keywords, and institutions more interpretable (Yao et al., 2024). Another important contribution of this study lies in its ability to bridge interdisciplinary boundaries by consolidating research dispersed across finance, computer science, and policy domains (Bibri 2019). This integrative perspective facilitates a more holistic understanding of the subject, ensuring that technical advancements are examined alongside ethical, social, and regulatory considerations (Samir et al., 2024). By doing so, the study not only enriches the existing body of knowledge but also provides a robust foundation for future empirical and theoretical investigations in this rapidly evolving area (Kar & Dwivedi 2020).

This study addresses this gap by conducting a systematic bibliometric analysis of the literature surrounding AI and ML in credit risk reduction via alternative data to uncover the field's intellectual structure and evolutionary trends (Raman et al., 2024). Utilizing data from major scholarly databases such as Web of Science and Scopus, this research employs science mapping tools to visualize co-citation networks, keyword bursts, and the geographic distribution of research output (Kumar 2025). The primary contribution of this paper is a unique, meta-level perspective that identifies the current "blind spots" in the literature and offers a foundational framework for future inquiry (Shabbir 2025). By synthesizing disparate research clusters into a cohesive roadmap, this study provides both academics and fintech practitioners with a clear understanding of the historical trajectory and the future frontiers of AI-integrated credit risk modelling (Philbin et al., 2026).

METHODOLOGY

The present study employs a bibliometric analysis to explore the role of Artificial Intelligence (AI) and Machine Learning (ML) in reducing credit risk through the use of alternative data (Ahmed et al., 2022). Relevant research articles were retrieved from the Scopus database using a combination of keywords related to *Artificial Intelligence*, *Machine Learning*, *Credit Risk*, *Alternative Data*, *Credit Scoring*, and *Predictive Analytics* (Ahmed & Iqbal 2025). To ensure the quality and relevance of the dataset, duplicate records, non-English publications, and studies unrelated to the research objectives were excluded (Jackson et al., 2019). The literature screening was conducted through a systematic search and article-selection procedure, wherein predefined inclusion and exclusion criteria were applied to refine the initial search results (Sharma et al., 2023). The screening considered publication year, subject area, document type, publication stage, language, and open-access availability to ensure that the final dataset was both relevant to the research theme and suitable for detailed bibliometric investigation (Marzi et al., 2025). This structured approach also minimizes potential selection bias and enhances the transparency and reproducibility of the research process. A range of bibliometric techniques, including citation analysis, co-citation analysis, bibliographic coupling, keyword co-occurrence analysis, and co-authorship analysis, were employed to examine the evolution of research, intellectual structures, influential publications, key authors, thematic developments, and collaboration networks within the field (Mujtaba et al., 2025). The analysis also facilitates the identification of major research clusters and emerging themes concerning the application of AI and ML in credit-risk assessment and the utilization of alternative data (Alvi et al., 2021). The Scopus database was selected as the primary source for bibliographic data because of its extensive coverage of peer-reviewed scholarly publications across disciplines such as finance, banking, economics, management, information technology, and computer science (Shukla et al., 2021). The search strategy, inclusion and exclusion criteria, and article selection process are presented in Table 1.

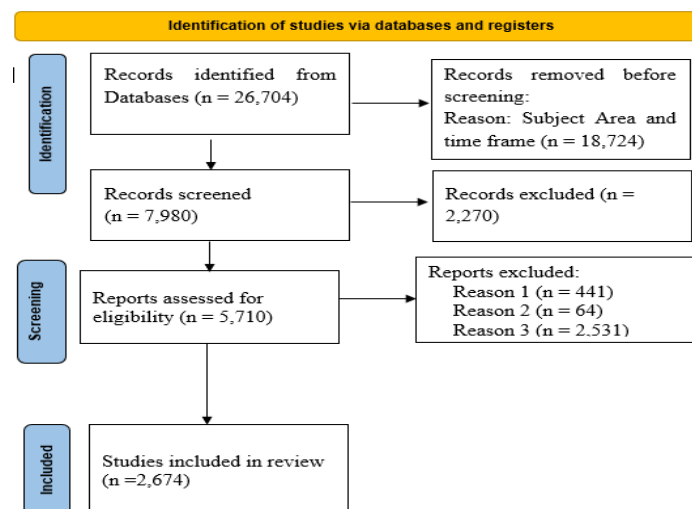
Table 1: Search Standard and Article Nomination

	Reject	Accept
1. Cleaning Standard Search Engine: Scopus Search Date: 15 th September, 2026 Search Term ((“Artificial Intelligence” OR “AI” OR “Machine Learning” OR “ML” OR “Deep Learning”) AND (“Credit Risk” OR “Credit Risk Management” OR “Credit Risk Assessment” OR “Credit Scoring” OR “Creditworthiness”) AND (“Alternative Data” OR “Non-Traditional Data” OR “Alternative Data Sources” OR “Big Data” OR “Transactional Data”) AND (“Risk Reduction” OR “Risk Mitigation” OR “Risk Prediction” OR “Risk Assessment”))		26,704
2. Subject Area and Time Frame “Business Management and Accounting”, “Economics, Econometrics and Finance” and duration of the study (2020-2025)	18,724	7,980
3. Document Type “Reviews” and “Article” (Exclude “Conference Papers” and “Book Chapters”)	2,270	5,710
4. Article Picking		
Publication Stage: Final Stage	441	5,269
Language: English Language solely	64	5,205
Open Access: All Open Access	2,531	2,674

The table displays the final selection of 2,674 Articles for review

Sources: Compiled by Researcher

Table 1 depicts the search standard and article nomination process adopted for the systematic review of literature on the role of Artificial Intelligence (AI) and Machine Learning (ML) in credit-risk reduction using alternative data. The literature search was conducted through the Scopus database on 15 September 2026 using a comprehensive search string incorporating four key dimensions: AI and ML technologies, credit risk and its assessment, alternative or non-traditional data, and risk reduction, mitigation, prediction, and assessment. The initial search generated 26,704 records, which formed the broad literature pool for further screening. The subsequent screening involved subject area and time-frame criteria, focusing on *Business, Management and Accounting* and *Economics, Econometrics and Finance* and publications from 2020 to 2025. This criterion resulted in 7,980 records being rejected and 18,724 being retained. The document-type criterion was then applied by retaining articles and review papers while excluding conference papers and book chapters. The table reports 5,710 records as rejected and 2,270 as accepted at this stage. Further article-picking criteria were applied based on publication stage, language, and open-access status. The publication-stage screening reports 5,269 records retained and 441 rejected, followed by the exclusion of 64 non-English records, leaving 5,205 English-language records. Finally, the Open Access criterion was applied, under which 2,531 records were excluded, resulting in 2,674 Open Access articles being nominated for the review.

**Figure 1: Prisma Flow Chart showing Inclusion and Exclusion Criteria**

Sources: Created by Researcher for Visual Representation

RESULTS

Publication Trends in Time

Figure 2 presents the annual publication trend of studies identified in the selected research domain from 2020 to 2026. The figure demonstrates a clear and consistent growth in scholarly publications over the period. Publications increased from 93 in 2020 to 161 in 2021, followed by 264 in 2022 and 364 in 2023. The growth became more prominent in 2024, reaching 512 publications, and peaked at 718 publications in 2025. In 2026, the database records 562 publications, which may reflect an incomplete publication year and should therefore be interpreted cautiously. Overall, the upward trend indicates increasing academic interest and research activity in the field. The substantial growth after 2022 particularly suggests that the subject has gained greater scholarly attention and emerged as an important area for contemporary research.

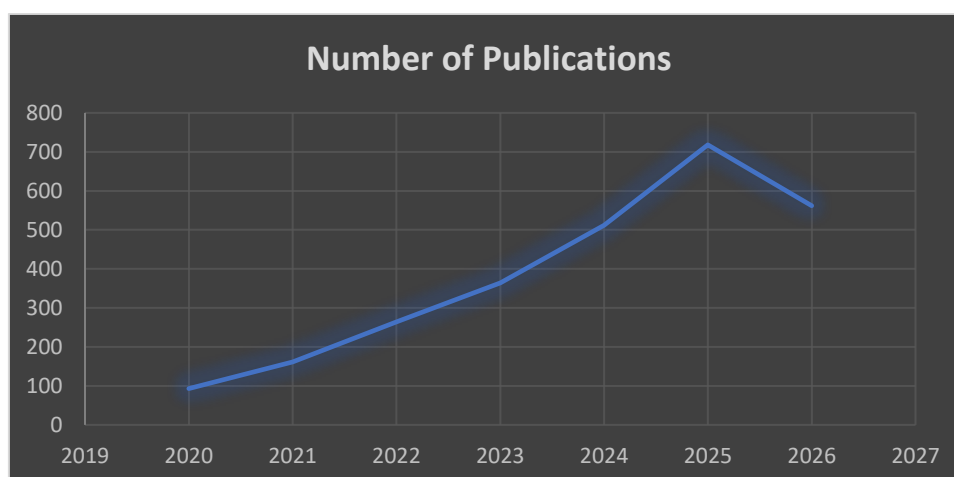


Figure 2 Yearly Publication Trends

Sources: Created by Researcher for Visual Representation

Figure 3 presents the number of publications in two major subject areas: Business, Management and Accounting and Economics, Econometrics and Finance. The figure shows that Business, Management and Accounting has the highest number of publications, with approximately 1,900 publications. In comparison, Economics, Econometrics and Finance accounts for around 1,600 publications. Therefore, Business, Management and Accounting has approximately 300 more publications than Economics, Econometrics and Finance. The results indicate that research activity is relatively stronger in Business, Management and Accounting. However, both disciplines demonstrate substantial scholarly output, suggesting that they are important areas of research. Overall, Figure 3 highlights a greater concentration of publications in Business, Management and Accounting compared with Economics, Econometrics and Finance.

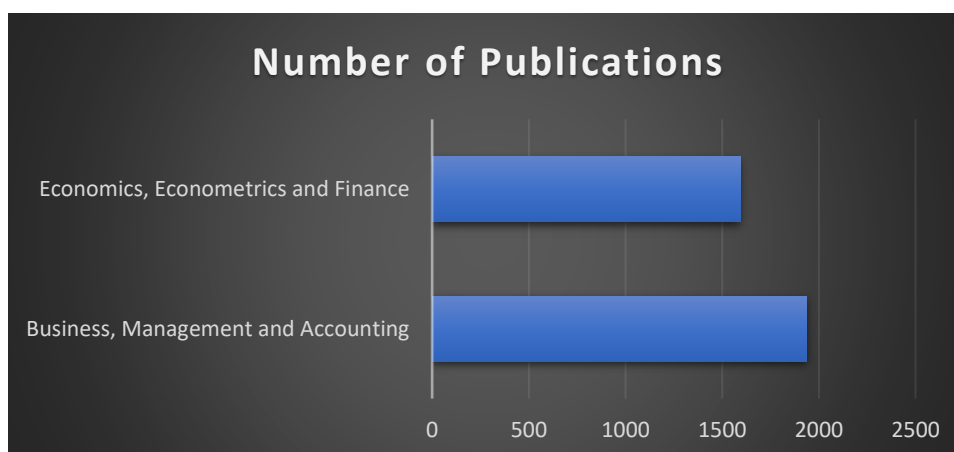


Figure 3 Publication Trends as per Discipline

Sources: Created by Researcher for Visual Representation

KEY CONTRIBUTORS: AUTHORS, INSTITUTIONS, AND COUNTRIES

Table 2 highlights the research productivity and citation impact of leading authors, organizations, and countries in AI and ML applications for credit-risk reduction using alternative data. At the author level, Yang, Yi achieved 570 citations from 2 publications, indicating considerable scholarly impact. Xu, Yong and Wu, Fan recorded 368 and 358 citations, respectively, despite each having only 1 publication. Wang, Xiaojun produced 2 publications with 337 citations, while Xu, Zeshui recorded 2 publications and 291 citations. At the organizational level, the University of Johannesburg contributed 3 publications and 587 citations, whereas the Work and Organisation Department, Aston Business School achieved 848 citations from only 1 publication. Country-level results show that China has the highest publication output (569 documents), while the United Kingdom records the highest citation impact (16,269 citations). The United States follows with 301 publications and 11,152 citations, while India contributes 191 publications and 8,545 citations. These figures indicate substantial global research engagement, with differences between publication volume and citation impact across countries and institutions.

Table 2: Top Authors, Organisations and Countries on AI and ML in reducing Credit-Risk with Alternative Data

Author	TP	TC	Organization	TP	TC	Country	TP	TC
Yang, Yi	2	570	Work and Organisation Department, Aston Business School, College of Business and Social Sciences	1	848	United Kingdom	398	16,269
Xu, Yong	1	368	University of Johannesburg, Department of Business Management	3	587	China	569	12,590
Wu, Fan	1	358	Swinburne University of Technology, School of Business	1	457	United States	301	11,152
Wang, Xiaojun	2	337	The University of Auckland	2	435	India	191	8,545
Xu, Zeshui	2	291	Xiamen University Malaysia	1	424	Germany	155	7,271
Winkler, Ingrid	1	285	Spiru Haret University, Romania	6	396	France	103	6,642
Weber, Patrick	1	216	Turing Intelligence Technology Limited, London	1	358	Italy	169	6,212
Çalık, Ahmet	2	196	University of Pennsylvania	2	339	Australia	167	5,516
Zekhniini, Kamar	1	193	University School of Management Studies, Guru Gobind Singh Indraprastha University	2	337	Malaysia	110	3,916
Zheng, Ge	2	182	TBS Business School, Toulouse, France	1	332	Spain	130	3,882

Sources: Compiled by Researcher

MOST CITED JOURNAL

The table presents the top 10 most cited sources contributing to research on AI and ML applications in credit-risk reduction using alternative data. Financial Innovation ranks first with 2,592 citations from 88 documents, indicating substantial scholarly visibility. Technological Forecasting and Social Change follows with 2,472 citations from 43 documents, while the Journal of Business Research records 2,100 citations from 23 documents. Notably, citation impact varies considerably when citations are considered relative to publication output. The Journal of Business Research records approximately 91.30 citations per document, while the International Journal of Forecasting achieves 82.00 citations per document from only 15 documents. The International Journal of Production Research also demonstrates strong impact, with 1,324 citations across 17 documents, equivalent to approximately 77.88 citations per document. Big Data and Cognitive Computing records 1,235 citations from 25 documents, whereas Journal of Cleaner Production receives 1,207 citations from 23 documents. Journal of Risk and Financial Management has the highest publication volume, with 110 documents and 1,535 citations. Overall, the results demonstrate that both publication productivity and citation impact contribute to the prominence of sources in this research domain.

Table 3: 10th Most Cited Journal

Journal	TP	TC
Financial Innovation	88	2,592
Technological Forecasting and Social Change	43	2,472
Journal of Business Research	23	2,100
Journal of Risk and Financial Management	110	1,535
Humanities and Social Sciences Communications	76	1,358
International Journal of Production Research	17	1,324
Big Data and Cognitive Computing	25	1,235
International Journal of Forecasting	15	1,230
Journal of Cleaner Production	23	1,207
Risks	66	1,081

Sources: Compiled by Researcher

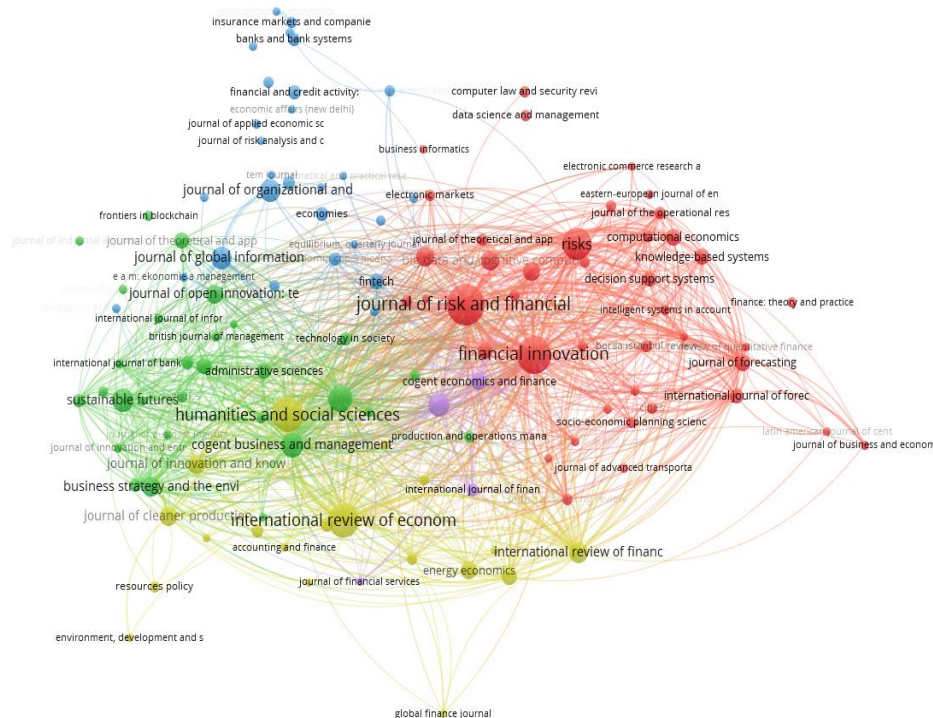


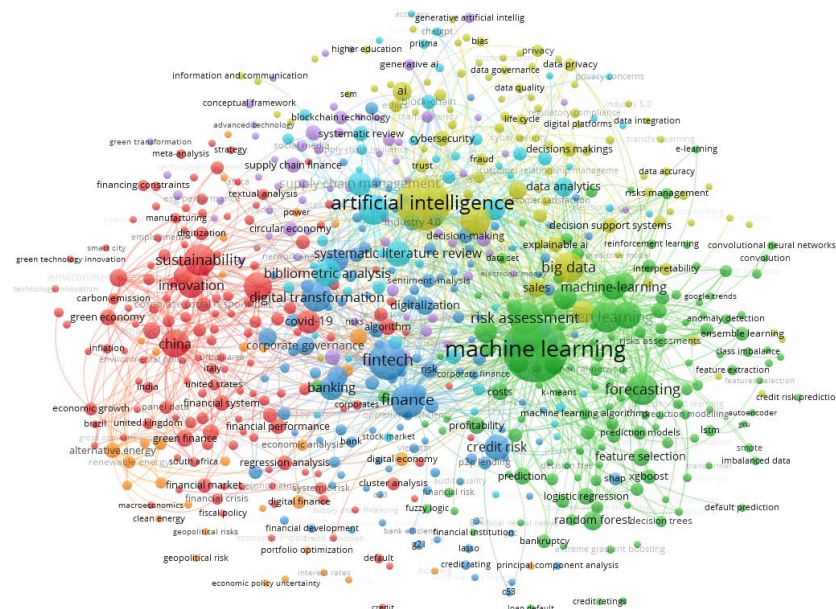
Figure 4: Network of Most Cited Journal

Sources: Vos Viewer

KEYWORD ANALYSIS

Table 4 highlights the top 10 keywords in the research literature. Machine learning records the highest occurrence, with 400 instances and a total link strength of 1,145, indicating its central role. Artificial intelligence follows with 266 occurrences and 775 link strength. Fintech appears 139 times, while finance records 108 occurrences and 568 link strength. Risk assessment has 100 occurrences and 581 link strength, followed by risk management with 98 and 421, respectively. Forecasting appears 96 times, with a link strength of 499, demonstrating the importance of predictive analysis. Sustainability records 94 occurrences and 368 link strength. Deep learning appears 91 times, with 429 link strength, while big data records 89 occurrences and 384 link strength. Collectively, these 10 keywords account for 1,481 occurrences, showing strong research concentration around AI, ML, finance, risk, forecasting, and data-driven technologies.

Keyword	Occurrences
Machine learning	400
Artificial intelligence	266
Fintech	139
Finance	108
Risk assessment	100
Risk management	98
Forecasting	96
Sustainability	94
Deep learning	91
Big data	89



Sources: Vos Viewer

Bibliographic coupling analysis was employed to examine the mapping erection of the works by recognizing publications sharing common references. Applying a minimum citation threshold of 150, a total of 68 publications were selected for analysis and grouped into thematic clusters. The resulting clusters reveal the major research streams, intellectual connections, and areas of scholarly concentration, while providing insights into the development and emerging directions of research on AI and ML in alternative data-based credit risk assessment.

Theme	Authors	Title	TC
Artificial Intelligence and Digital Capabilities for Resilient Supply Chains	Toorajipur et al., 2021	Artificial Intelligence in Supply Chain Management: A Systematic Literature Review	909
	Dubey et al., 2023	Dynamic Digital Capabilities and Supply Chain resilience: The role of government effectiveness	432
	Jackson et al., 2024	Generative AI in Supply Chain & Operation Management: A Capabilities based framework for Analysis & Implementation	404

	Lepeniotti et al., 2020	Perspective Analytics: Literature Review and Research Challenge	472
Emerging Technologies in Finance and Banking: Applications and Challenges	Huang et al., 2023	Finbert: A large language model for extracting information from financial text	570
	Shrestha et al., 2021	Augmenting organizational decision making with deep learning Algorithms: Principles, Promises and Challenges	268
	Singh et al., 2025	How are re-enforcement Learning and Deep Learning Algorithms used for big Data based decision making	225
	Chai et al., 2020	Deep learning in Finance and Banking: A Literature Review and Classification	218
Emerging Technologies and Methodological Trends in Business and Management Research	Kumar et al., 2022	Fuzzy set Qualitative Comparative Analysis (FSQCA) in business and management research: A Contemporary Overview	457
	Dwivedi et al., 2023	Evolution of Artificial Intelligence result in technological forecasting and social changes: Research topics, Trends and Future Direction	337
	Bawack et al., 2022	Artificial Intelligence in E-Commerce: A Bibliometric study and Literature Review	332
	Coombs et al., 2020	The Strategic impact of Intelligent automation for knowledge and service work: An Interdisciplinary Review	294
Blockchain for Business and Sustainability: Applications, Barriers and Opportunities	Javaid et al., 2022	A Review of Blockchain Technology Application for Financial Service	481
	Kimani et al., 2020	Blockchain, Business and the fourth Industrial Revolution: Where, Whither, Wherefore and how?	203
	Jiang et al., 2018	Blockchain Technology Application in Waste Management: Overview Challenges and Opportunities	168
	Mangla et al., 2022	A Conceptual Framework for Blockchain based sustainable supply chain and evaluating implementation barriers: A case of Tea Supply Chain	168
Emerging Trends in FinTech: Artificial Intelligence, Digital Transformation and Green Finance	Fuster et al., 2022	Predictably Unequal? The effects of Machine Learning on Credit Market	311
	Allen et al., 2022	A survey of fintech research and Policy Discussion	258
	Barroso et al., 2022	Digital Transformation and the emergence of the Fintech Sector: A Systematic Literature Review	191
	Hossain et al., 2024	Empowering energy transition: Green Innovation, Digital Finance and path to Sustainable	180
Artificial Intelligence, Machine Learning and Data-Driven Decision-Making	Goodell et al., 2021	AI & ML in Finance: Identifying foundations, themes and Research clusters from Bibliometric Analysis	617
	Kou et al., 2021	Bankruptcy prediction for SMEs using tradition data and two stage multi objective feature selection	368
	Fang et al., 2022	Cryptocurrency Trading: A comprehensive Survey	358
	Moravec et al., 2022	Appealing to sense and sensibility: System 1 and system 2 interventions for fake news on social media	156
	Reczek et al., 2021	Customer and Artificial Intelligence: An Experiential perspective	993

AI in Customer Management and Finance	Bruyn et al., 2020	Artificial Intelligence and Marketing: Pitfalls and Opportunities	424
	Libai et al., 2020	Brave new world? ON AI and Management of customer relationship	310
	Weber et al., 2024	Application of explainable Artificial Intelligence in Finance: A systematic review of finance, information system and computer science literature	216
AI-Driven Behavioural and Organizational Decision-Making	Chowdhary et al., 2023	Unblocking the value of Artificial Intelligence in human resource management through Artificial Intelligence capability framework	848
	Sherf et al., 2021	Distinguish voice and silence at work: Unique relationship with perceived impact, psychological safety and burnout	305
	Upadhyay et al., 2022	Consumer adoption of Mobile payment service during Covid-19: Extending META-UTAUT with perceived severity and self-efficacy	191
	Wang et al., 2022	Revisiting Tam-2 in behavioural targeting advertising: A deep Learning based dual stage SEM Analysis	174

Sources: Compiled by Researcher

Theme 1: Artificial Intelligence and Digital Capabilities for Resilient Supply Chains: This theme highlights the growing role of Artificial Intelligence (AI) and digital capabilities in strengthening supply chain resilience and operational performance. Toorajipur et al. (2021) provide a comprehensive review of AI applications in supply chain management, demonstrating its relevance for forecasting, optimization, automation, and decision-making. Dubey et al. (2023) emphasize the importance of dynamic digital capabilities in developing resilient supply chains, particularly in conjunction with institutional effectiveness. Jackson et al. (2024) extend this discussion to Generative AI, proposing a capabilities-based framework for implementation in supply chain and operations management. Lepenioti et al. (2020) further highlight the contribution of predictive analytics to data-driven decision-making. Collectively, these studies establish AI and digital capabilities as important mechanisms for improving adaptability, prediction, and resilience.

Theme 2: Emerging AI Technologies in Finance and Banking: Applications and Challenges: This theme focuses on the adoption of advanced AI and deep learning technologies within financial and banking contexts. Huang et al. (2023) demonstrate the application of Fin BERT, a large language model designed to extract and interpret information from financial texts, highlighting the growing importance of AI-driven financial text analysis. Shrestha et al. (2021) examine the potential of deep learning algorithms for augmenting organizational decision-making while also identifying implementation challenges. Singh et al. (2025) further explore the use of reinforcement learning and deep learning for big-data-based decision-making. Chai et al. (2020) provide a broader classification of deep-learning applications in finance and banking. Overall, the theme reflects the transition toward intelligent, automated, and data-intensive financial decision-making.

Theme 3: Emerging Technologies and Methodological Trends in Business and Management Research: This theme represents the intersection of emerging technologies, analytical methodologies, and contemporary business research. Kumar et al. (2022) highlight the increasing application of Fuzzy-set Qualitative Comparative Analysis (fsQCA) as a methodological approach for examining complex relationships in management research. Dwivedi et al. (2023) examine the evolution of AI research and its implications for technological forecasting and social change, identifying emerging research directions. Bawack et al. (2022) investigate AI applications in e-commerce through bibliometric and systematic literature approaches, demonstrating the expanding research landscape surrounding intelligent technologies. Coombs et al. (2020) focus on intelligent automation and its strategic implications for knowledge and service work. Collectively, these studies demonstrate methodological diversification alongside the expanding influence of AI and automation across business research.

Theme 4: Blockchain for Business and Sustainability: Applications, Barriers and Opportunities: This theme emphasizes blockchain technology as an emerging digital infrastructure for financial services, business transformation, and sustainable operations. Javaid et al. (2022) provide a comprehensive review of blockchain applications in financial services, demonstrating its potential for improving transparency, security, decentralization, and transaction efficiency. Kimani et al. (2020) position blockchain within the broader context of the Fourth Industrial Revolution and discuss its implications for business transformation. Jiang et al. (2018) examine blockchain applications in waste management, illustrating its relevance to sustainability-oriented

operations and resource management. Mangla et al. (2022) develop a conceptual framework for blockchain-enabled sustainable supply chains and identify barriers to implementation.

Theme 5: Emerging Trends in FinTech: Artificial Intelligence, Digital Transformation and Green Finance:

This theme captures the convergence of FinTech, Artificial Intelligence, digital transformation, and sustainable finance. Fuster et al. (2022) examine the effects of machine learning on credit markets, highlighting how algorithmic technologies can influence credit assessment and market outcomes. Allen et al. (2022) provide a broad review of FinTech research and policy issues, reflecting the increasing importance of technology-driven financial innovation. Barroso et al. (2022) examine digital transformation and the emergence of the FinTech sector, emphasizing the restructuring of financial services through digital technologies. Hossain et al. (2024) extend this technological perspective toward sustainability by examining the relationship between digital finance, green innovation, and energy transition. Collectively, the studies demonstrate the expanding FinTech ecosystem and its implications for financial inclusion, credit markets, digital transformation, and sustainable development.

Theme 6: Artificial Intelligence, Machine Learning and Data-Driven Decision-Making: This theme represents the integration of AI, Machine Learning (ML), and data-driven analytical approaches for improving decision-making across financial and organizational contexts. Goodell et al. (2021) systematically map the foundations, major themes, and research clusters within AI and ML in finance, establishing the intellectual development of the field. Kou et al. (2021) demonstrate the application of machine learning and feature-selection techniques to SME bankruptcy prediction, emphasizing the role of data-driven risk assessment. Fang et al. (2022) review cryptocurrency trading research, reflecting the increasing application of computational methods to digital financial markets. Moravec et al. (2022) examine AI-based interventions for addressing misinformation. Overall, this theme illustrates the broadening application of AI and ML for prediction, classification, risk assessment, and evidence-based decision-making.

Theme 7: AI in Customer Management and Finance: This theme focuses on the application of Artificial Intelligence in customer management, marketing, relationship management, and financial decision-making. Reczek et al. (2021) examine the customer experience perspective of AI, highlighting how intelligent technologies influence interactions between customers and organizations. Bruyn et al. (2020) discuss the opportunities and potential pitfalls associated with AI in marketing, emphasizing the need to consider both technological capabilities and managerial implications. Libai et al. (2020) examine the changing landscape of customer relationship management in the context of AI, indicating its potential to transform personalization, engagement, and customer analytics. Weber et al. (2024) extend the discussion to explainable AI in finance, emphasizing transparency and interpretability in AI-driven financial applications. Collectively, these studies highlight the increasing integration of AI across customer-centric and financial functions.

Theme 8: AI-Driven Behavioural and Organizational Decision-Making: This theme examines how AI influences organizational capabilities, employee behaviour, and technology-enabled decision-making. Chowdhary et al. (2023) investigate AI capabilities in human resource management and highlight mechanisms through which organizations can derive value from AI adoption. Sherf et al. (2021) focus on employee voice and silence, providing insights into behavioural factors relevant to organizational decision-making. Upadhyay et al. (2022) examine consumer adoption of mobile payment services during COVID-19 by extending the META-UTAUT framework with perceived severity and self-efficacy, demonstrating the importance of behavioural determinants in technology adoption. Wang et al. (2022) apply deep learning within behavioural targeting advertising and integrate it with structural equation modelling. Overall, this theme reflects the intersection of AI, organizational behaviour, employee management, consumer adoption, and data-driven behavioural analysis.

DISCUSSION AND CONCLUSION

The present study examines the intellectual structure and emerging research trends in Artificial Intelligence (AI) and Machine Learning (ML) for credit risk reduction using alternative data through a bibliometric analysis of 2,674 publications retrieved from the Scopus database. The findings reveal a substantial increase in scholarly output, particularly between 2020 and 2025, indicating growing academic interest in AI-enabled financial decision-making (Islam 2026). Business, Management and Accounting represents the largest subject area, followed by Economics, Econometrics and Finance (Lee et al., 2019). The author analysis identifies Yang, Yi as the most cited author among the selected contributors, while the United Kingdom records the highest citation impact and China leads in publication output (Yang et al., 2025). Financial Innovation emerges as the most cited journal, highlighting the growing importance of financial technology research (Xu & Li 2021). Keyword analysis further identifies Machine Learning and Artificial Intelligence as the most prominent research terms, followed by FinTech, Finance, Risk Assessment, Risk Management, Forecasting, Sustainability, Deep Learning, and Big Data (Raman et al., 2024). These findings demonstrate the interdisciplinary development of the research domain and the increasing integration of computational technologies into financial and managerial decision-making (Yusuf et al., 2023).

The bibliographic coupling analysis identifies eight major thematic clusters, covering AI and digital capabilities, emerging technologies in finance and banking, methodological developments, blockchain, FinTech, data-driven decision-making, customer management, and organizational behaviour (Tyagi et al., 2025). Among these, AI, ML and data-driven decision-making are particularly relevant to alternative-data-based credit risk assessment (Coa & Zhai 2022). The identified literature reflects the growing application of predictive analytics, machine learning, feature selection, and explainable AI in financial decision-making and risk evaluation (Mazhar et al., 2025).

The findings also highlight the potential of alternative data to broaden creditworthiness assessment, particularly for individuals and enterprises with limited conventional credit histories. However, the application of AI and ML in credit risk management requires appropriate consideration of data quality, privacy, algorithmic fairness, transparency, and regulatory compliance. The study contributes to the existing literature by mapping influential publications, major research contributors, thematic relationships, and emerging research directions. It also provides a foundation for future empirical investigations into alternative data, predictive performance, financial inclusion, and responsible AI-based credit assessment.

Despite its contributions, the study has certain limitations. First, the analysis relies exclusively on the Scopus database, which may exclude relevant publications indexed in other scholarly databases. Second, the selected publication period, language restrictions, document-type criteria, and open-access requirements may limit the comprehensiveness and representativeness of the dataset. Third, bibliometric indicators, including citation counts, publication output, and keyword occurrences, measure scholarly visibility and research relationships but do not directly establish the quality or practical effectiveness of individual studies. Furthermore, bibliographic coupling and keyword co-occurrence identify intellectual and thematic connections without establishing causal relationships or validating the predictive performance of AI and ML models. Some identified research clusters also encompass broader technological and managerial themes that are not directly associated with alternative-data-based credit risk assessment. Future research may overcome these limitations by incorporating multiple databases, extending the study period, and conducting systematic reviews and empirical investigations to evaluate the accuracy, explain ability, fairness, and practical applicability of AI- and ML-based credit risk assessment models using alternative data.

Informed Consent:

Participation in the study was voluntary, and all participants provided written informed consent. Participants were fully informed about the study objectives, their roles, and their rights to withdraw at any stage.

Conflict of interest:

There is no such conflict of interest with any party.

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The used data will be provided on proper request.

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