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Topic Modeling Blockchain in Accounting and Audit Research

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Abstract

This article examines blockchain research in accounting, auditing, and corporate governance (AAG), a field that has experienced rapid growth but remains fragmented. Using Latent Dirichlet Allocation (LDA) topic modeling, the study analyzes 486 Scopus-indexed abstracts published between 2017 and 2025 to uncover key themes and research trends. The analysis identifies eleven thematic clusters: Blockchain Research Landscape & Governance, Financial Reporting & Digital Security, Blockchain Applications in Diverse Domains, Auditing Practices & Taxation, Bitcoin & Emerging Digital Financial Tools, Corporate Governance & Compliance, Smart Contracts & Crypto Audits, Digital Transformation in Finance, ESG & Corporate Strategy, Supply Chain Transparency, and Adoption of Audit Technologies by Firms. A strategic thematic map further classifies these into motor, basic, niche, and emerging themes, providing the first data-driven overview of blockchain research in AAG. The results highlight well-developed areas such as supply chain transparency, alongside blind spots in standard-setting, assurance of smart contracts, and ESG integration. The study advances understanding by offering a structured framework that supports future research, regulatory development, and professional practice.

Keywords: Topic Modeling, Blockchain; Accounting, Auditing, Corporate Governance, Latent Dirichlet Allocation (LDA)

Introduction

Blockchain technology, a distributed ledger system built on cryptographic security and consensus-based validation, is a significant innovation with far-reaching implications across industries (Swan, 2015; Iansiti & Lakhani, 2017). In the fields of accounting, auditing, and corporate governance (AAG)—professions grounded in trust, verification, and accountability—blockchain is viewed as a disruptive force, not merely an incremental improvement (Dai & Vasarhelyi, 2017). Its core features of decentralization, immutability, and transparency offer compelling solutions to persistent challenges and may fundamentally reshape professional standards and stakeholder engagement (Pflueger et al., 2024).

In accounting, blockchain enables unprecedented data integrity (Putritama et al., 2024) and new models like “triple-entry accounting” (Grigg, 2005; Cai, 2019). Smart contracts, which embed executable business logic, can automate processes and facilitate real-time financial reporting (Christidis & Devetsikiotis, 2016). For auditing, the technology introduces the potential for continuous auditing and novel evidence collection methods (Alles, 2015). However, it also creates new assurance challenges related to smart contracts and decentralized organizations (Rozario & Thomas, 2019). In corporate governance, blockchain can enhance transparency and support emerging structures such as Decentralized Autonomous Organizations (DAOs) (Kaal, 2020). These applications collectively point toward a more efficient, transparent, and trustworthy AAG ecosystem.

Reflecting its growing practical importance, academic research at the intersection of blockchain and AAG has expanded rapidly in both volume and scope (Indrayani et al., 2024; Secinaro et al., 2021). While existing literature reviews and bibliometric analyses provide a valuable foundation (Pimentel & Boulianne, 2020; Han et al., 2023), the field's rapid growth has led to intellectual fragmentation. Thematic diversity now spans new areas like ESG reporting (Asif et al., 2023), tax compliance (Chouaibi et al., 2024), and AIS integration (Widayanti et al., 2024), making it difficult to discern the field's core themes, emerging frontiers, and intellectual structure (Marrone & Hazelton, 2019).

This fragmentation reveals a critical research gap: the need for a systematic, data-driven map of the intellectual landscape. To address this, our study employs Latent Dirichlet Allocation (LDA) (Blei et al., 2003), a computational topic modeling technique, to analyze a corpus of 486 academic abstracts. The analysis produces a data-driven "thematic map" of blockchain research in AAG. This contribution is valuable for positioning future research, identifying underexplored topics, and providing practitioners and educators with a structured overview of the field's key focus areas and intellectual architecture.

Literature Review

Research on blockchain's integration into accounting, auditing, and corporate governance (AAG) is expanding rapidly, encompassing diverse themes and revealing both opportunities and challenges. Foundational studies emphasize how blockchain's core attributes—immutability, transparency, and decentralization—can reshape accounting paradigms and Accounting Information Systems (AIS). A central example is Triple-Entry Accounting (TEA), which employs a shared, cryptographically secured ledger to enhance trust, data integrity, and real-time information access (Cai, 2019; Grigg, 2005; Nofel et al., 2024). Yet, practical hurdles persist, most notably the "first-mile problem"—ensuring that off-chain events are accurately recorded on-chain, which is critical for AIS integrity (Alles & Gray, 2023).

The audit profession is another focal point of transformation. Research highlights how smart contracts can automate audit processes and enable continuous auditing (Alles, 2015; Guo et al., 2025), while blockchain itself may strengthen the reliability of audit evidence. However, the technology also introduces new audit risks, particularly those associated with client blockchain adoption (Elmaasrawy et al., 2025), underscoring the need for updated auditor competencies and greater technology acceptance (Juma'h & Li, 2023).

Blockchain's influence extends to financial reporting. Studies highlight its potential to enhance reporting quality (Liao et al., 2025), although some caution is raised about potential unintended consequences, such as shifts in earnings management practices (Autore et al., 2024). The accounting treatment of crypto-assets remains contested, with growing calls for new standards to resolve inconsistencies across frameworks (Jackson & Luu, 2023). In parallel, blockchain applications are increasingly studied in Environmental, Social, and Governance (ESG) reporting and tax compliance, where the technology can enhance transparency, validation, and trust (Yu, 2024; Fatz et al., 2020).

In corporate governance, blockchain is widely recognized for its capacity to strengthen transparency, reduce agency costs, and improve governance quality (Singh et al., 2020; Kaal, 2020). The emergence of Decentralized Autonomous Organizations (DAOs) introduces a novel governance model, though studies critically assess both its opportunities and risks (Bellavitis et al., 2023). Beyond AAG, blockchain applications extend to supply chain traceability (Kleinknecht, 2021), healthcare data management (Kordestani et al., 2020), and convergence with AI, IoT, and big data—technologies considered central to broader digital transformation (Meiryani et al., 2023).

This evolving body of work reveals a vibrant yet fragmented research landscape. Optimism regarding blockchain's potential for transparency, security, and efficiency is tempered by challenges related to implementation complexity, emerging risks, the lack of standardized frameworks, and persistent skill gaps. The breadth and diversity of this

interdisciplinary research (Hakami et al., 2024; Indrayani et al., 2024) underscore the urgent need for systematic, data-driven mapping. While existing reviews provide valuable insights, many rely on qualitative synthesis or narrowly defined sub-domains, leaving the field's comprehensive thematic architecture underexplored. This study addresses that gap by employing topic modeling to construct a structured overview of blockchain research in AAG, offering clarity, organization, and a foundation for advancing coherent future scholarship.

Methodology

This study employs Latent Dirichlet Allocation (LDA) (Blei et al., 2003), a generative probabilistic model for discovering latent thematic structures within large text corpora. We use this statistical technique to map the intellectual landscape of blockchain research in Accounting, Auditing, and Governance (AAG). The LDA model assumes that each document is a mixture of topics and each topic is a probability distribution over a vocabulary of words. This approach enables a quantitative and reproducible analysis of thematic patterns in the literature.

1. Corpus Compilation and Preprocessing

The corpus was compiled from the Scopus database, targeting English-language, peer-reviewed articles and conference papers published between January 2017 and May 2025. Search criteria (detailed in Table 1) focused on business, management, and accounting, using keywords related to blockchain and AAG. An initial search yielded 507 publications; after deduplication, the final dataset comprised 486 unique abstracts.

A rigorous preprocessing pipeline was implemented in Python to prepare the text for modeling. First, texts were tokenized into lowercase words, and punctuation and short tokens (<3 characters) were removed. Next, a two-tier stop word removal process was applied: (i) common English stop words were filtered using the NLTK library, and (ii) a custom list of domain-general academic terms (e.g., research, study, paper, findings) was excluded to reduce noise and enhance topic specificity. Finally, to minimize the influence of rare or overly frequent words, tokens appearing in fewer than five documents or in more than 50% of the corpus were excluded. The remaining tokens were used to construct a document-term matrix (DTM), which served as the direct input for the LDA model.

2. LDA Model Training and Validation

LDA models were trained using the Gensim LdaMulticore implementation. A critical parameter is the number of topics (k). To determine the optimal k empirically, we trained models with k ranging from 2 to 20. Each configuration was executed five times using different random seeds to ensure the stability and robustness of the results.

Model selection was guided by two metrics. The primary criterion was the C_v coherence score (Röder et al., 2015), which measures the semantic interpretability of topics and correlates strongly with human judgment. We also computed perplexity, a measure of model fit, though it is known to favor a larger number of topics. As shown in Figure 1, which reports the average C_v coherence values with error bars indicating variability across seeds, a model with $k = 11$ achieved the optimal balance of high semantic coherence and statistical robustness. Furthermore, an examination of the topic prevalence distribution confirmed that this 11-topic solution produced distinct, interpretable themes with balanced coverage across the corpus.

3. Topic Interpretation and Reliability

To ensure interpretive reliability, two authors independently analyzed the top 20 keywords for each of the 11 topics and reviewed the abstracts most strongly associated with each. Based on this inductive analysis, preliminary labels were assigned. Discrepancies were reconciled through discussion, and inter-coder agreement for the final labels was quantified using Cohen's Kappa, indicating substantial agreement. This iterative process, supported by visualizations from the pyLDAvis library (Sievert & Shirley, 2014) to explore inter-topic distances, ensured the consistency and validity of the final thematic framework.

4. Data Handling and Reproducibility

Each abstract was assigned a dominant topic based on its highest posterior probability. For transparency and reproducibility, the full dataset, including topic distributions per document, was exported to a CSV file. The entire analytical pipeline was implemented in Python using Gensim, NLTK, and pyLDAvis, with all steps parameterized to ensure the study is replicable.

Results

The application of Latent Dirichlet Allocation (LDA) to the 486 unique academic abstracts, spanning 2017 to May 2025, yielded a structured overview of the research landscape at the intersection of blockchain technology with accounting, auditing, and governance. The Scopus database search (see Table 1 for detailed search criteria) initially retrieved 507 articles; after deduplication, 486 unique abstracts formed the final corpus for analysis. These publications amassed a total of 11,196 citations during the review period, with an average of 23.18 citations per article.

Table 1. Search Criteria

Search Terms	Blockchain search terms: ”blockchain” OR ” distributed ledger technology” OR ”DLT” OR ” smart contract” Accounting search terms: ”Accounting” OR ”Audit” OR “Audit Reporting” OR “financial reporting” OR “Management Reporting” OR “Accounting Information Systems” OR “Accountant” OR “Auditor” OR “Corporate Governance” OR “financial reporting”
Data Range	January 2017 to May 2025
Publication Type	Articles and conference papers
Source Type	Journals and conference proceedings
Language	English
Subjects	business, management, and accounting

Optimal Topic Identification

To determine the optimal number of thematic clusters, LDA models were trained for a range of topics (k=2 to 20). The C_v coherence score was used to evaluate these models, as it captures the semantic similarity of top words within a topic, indicating internal consistency and interpretability. As illustrated in Figure 1, a model with eleven topics (k=11) was identified as offering the best trade-off between coherence and human interpretability (Röder et al., 2015).

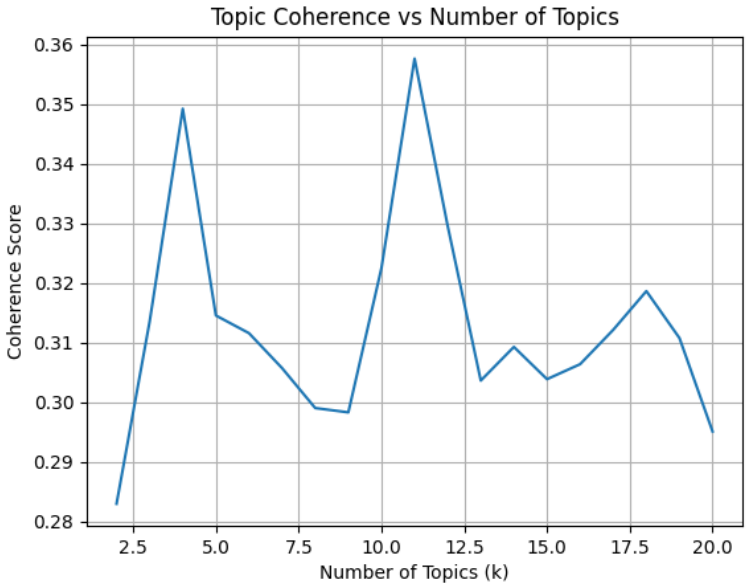

Figure 1. Coherence Score for Number of Topics (k) ranging from 2 to 20

Overview of Identified Thematic Clusters

The LDA analysis with k=11 topics identified distinct thematic clusters. Table 2 provides an overview of these eleven topics, including their assigned labels, top representative keywords, the number of publications associated with each, and the distribution between article and conference paper types. Sample articles, highly representative of each topic, are also provided

to illustrate the thematic content. The subsequent section will provide a more detailed qualitative description of each identified topic.

Table 2. Results Overview of Topic Modeling

Topic	Label	Topic Keyword	Number of Publications	Publications Type	Sample Article
0	Blockchain Research Landscape & Governance	literature, potential, review, technologies, future, governance, systems, accountability, information, corporate	64	Article: 53 Conference Paper: 11	Al-Abdullah et al. (2020) 99.56 % Werner (2023) 98.79 %
1	Financial Reporting & Digital Security	financial, public, reporting, management, technologies, security, auditing, framework, digital, systems	25	Article: 23 Conference Paper: 2	Nofel et al. (2024) 99.32 % Dubey & Goyal (2024) 99.08 %
2	Blockchain Applications in Diverse Domains	waste, management, transactions, learning, metaverse, food, students, entry, blockchains, safety	12	Article: 11 Conference Paper: 1	An & Mikhaylov (2023) 99.35 % Youn et al. (2025) 99.24 %
3	Auditing Practices & Taxation	audit, auditing, auditors, information, tax, value, intention, design, adoption, model	54	Article: 51 Conference Paper: 3	Dyball & Seethamraju (2022) 99.24 % Gauthier & Brender (2021) 99.14 %
4	Bitcoin & Emerging Digital Financial Tools	technologies, digital, bitcoin, financial, audit, reserved, rights, emerging, transformation, transactions	67	Article: 60 Conference Paper: 7	Caprolu et al. (2021) 99.13 % Grigoreva et al. (2019) 99.19 %
5	Corporate Governance & Compliance	governance, business, corporate, energy, rights, compliance, intelligence, artificial, real, smart	28	Article: 23 Conference Paper: 5	Agostini (2024) 99.23 % Sabour & Al-Waeli (2023) 99.22 %
6	Smart Contracts & Crypto Audits	audit, financial, smart, contracts, reporting, transactions, crypto, rights, tokens, ledger	54	Article: 38 Conference Paper: 16	Guan & Zhang (2020) 99.1 % Felipe Munoz et al. (2021) 99.14 %
7	Digital Transformation in Finance	digital, financial, information, technologies, system, enterprises, reporting, quality, market, economic	42	Article: 36 Conference Paper: 6	Kliestik et al. (2024) 99.62 % Tran et al. (2024) 99.33 %
8	ESG, Corporate Strategy & BCT	governance, digital, corporate, bct, esg, transformation, management, firms, sharing, risk	31	Article: 26 Conference Paper: 5	Basu et al. (2024) 99.47 % Chinedu & Awasthi (2019) 99.47 %
9	Supply Chain Transparency	supply, chain, management, system, systems, information, business, transparency, framework, carbon	82	Article: 50 Conference Paper: 32	Ashraf & Kader (2019) 99.26 % Choudhury et al. (2023) 99.25 %
10	Adoption of Audit Tech by Firms	adoption, auditors, firms, audit, business, factors, adopt, trust, quality, firm	24	Article: 21 Conference Paper: 3	Marzuki et al. (2019) 99.42 % Marrone & Hazelton (2019) 99.37 %

Thematic Structure and Inter-Topic Relationships

The analysis reveals that the eleven topics are not isolated but form a cohesive intellectual structure. Figure 2 presents a heatmap of the inter-topic semantic similarity, providing quantitative evidence of the conceptual relationships between themes. The heatmap shows distinct clusters of related topics; for instance, a strong semantic similarity (0.60) exists between 'Auditing Practices & Taxation' (T3) and 'Adoption of Audit Tech by Firms' (T10), highlighting the intrinsic link between the evolution of audit methodologies and the organizational challenges of their implementation. This interconnectedness justifies the higher-level strategic analysis that follows.

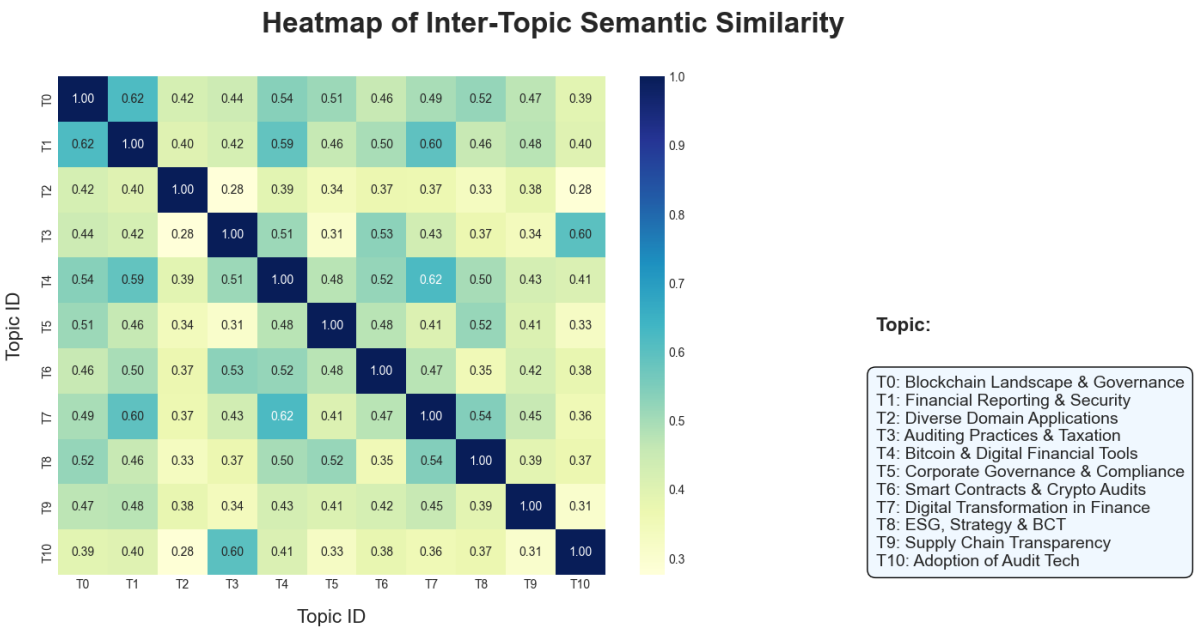

Figure 2. Heatmap of Inter-Topic Semantic Similarity

A Strategic Map of the Research Landscape

To move beyond a simple list of topics and provide a conceptual model of the field, we developed a strategic thematic map, shown in Figure 3. This map visualizes each topic's role based on two key statistical dimensions: Relevance Degree (Centrality), which measures a topic's importance and interaction within the research network, and Development Degree (Density), which reflects its internal coherence and maturity. This data-driven approach categorizes the eleven topics into four distinct strategic quadrants:

Motor Themes (Top-Right): Well-developed and highly central topics that are currently driving the research field.

Basic Themes (Bottom-Right): Foundational topics that are highly central but less developed, serving as essential building blocks for other themes.

Niche Themes (Top-Left): Highly developed but specialized topics with lower centrality, representing mature but contained areas of research.

Emerging Themes (Bottom-Left): Topics with low development and centrality, representing nascent areas of inquiry or future research frontiers.

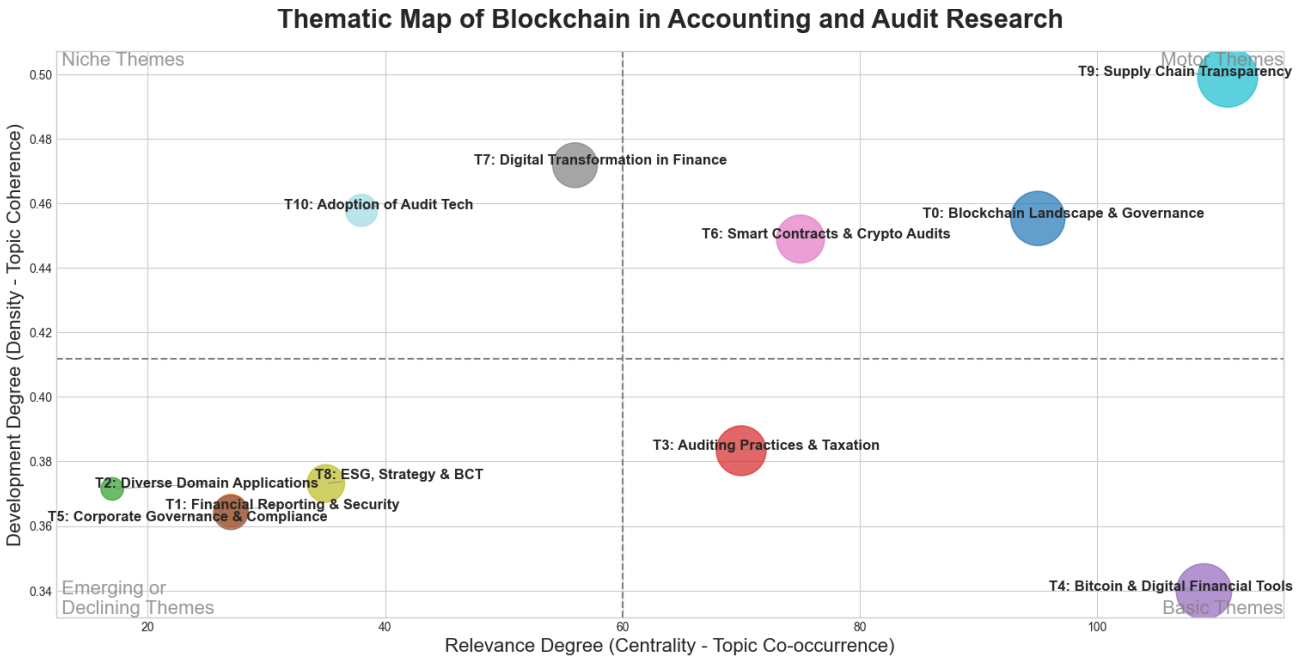

Figure 3. Thematic Map of Blockchain in Accounting and Audit Research

Analysis of Thematic Clusters by Strategic Role

This section presents a detailed qualitative analysis of the eleven thematic clusters identified in the strategic map (Figure 3). Each topic is examined in terms of its core focus, key findings from the literature, and broader implications for the accounting, auditing, and governance (AAG) field. The discussion is structured according to the four strategic quadrants: Motor Themes, Basic Themes, Niche Themes, and Emerging Themes

Motor Themes

Topic 9: Enhancing Supply Chain Transparency, Security, and Sustainability

This motor theme investigates blockchain applications for improving transparency, traceability, and security across supply chains. Traditional supply chains are often opaque, positioning blockchain as a transformative solution through its decentralized and immutable ledger (Wang & Kogan, 2018; Al-Htaybat et al., 2019; Gaur, 2020; Rijanto, 2021). Research highlights its ability to establish robust traceability systems across sectors, including manufacturing and agriculture (Ashraf & Kader, 2019; Dasaklis et al., 2019; Felipe Munoz et al., 2021; Tan, Huang, & Li, 2023).

By tokenizing assets, blockchain generates immutable audit trails that prevent counterfeiting and verify compliance with sustainability and ethical sourcing standards (Kshetri, 2021; Christ & Helliar, 2021; McGrath et al., 2021). The integration of smart contracts further enables automation (Chinedu & Awasthi, 2019; Lopez-Pimentel, Rojas, & Monroy, 2020), while permissioned blockchains address data privacy concerns (Sahai et al., 2020; Hill et al., 2021; Bergers et al., 2021). This theme also extends to improvements in supply chain finance (Zheng et al., 2022) and the credibility of ESG disclosures (Bakarich et al., 2020; Tian & Sarkis, 2024), with applications in managing carbon credits and e-waste (Basu et al., 2024; Luo et al., 2024; Seidenfad et al., 2023). Its prominence reflects the practical integration of blockchain into real-world operational contexts.

Topic 0: Blockchain Research Landscape & Governance

As a foundational motor theme, this topic represents scholarly engagement with blockchain's transformative potential for AAG. It investigates blockchain's capacity to create real-time, verifiable, and transparent accounting ecosystems, fundamentally reshaping traditional record-keeping (Dai & Vasarhelyi, 2017; Cai, 2021). Extensive literature reviews and bibliometric analyses map intellectual territory and track emerging streams (Marrone & Hazelton, 2019; Pimentel & Boulianne, 2020; Secinaro et al., 2021).

Governance is a central sub-theme, including the rise of Decentralized Autonomous Organizations (DAOs) (Kaal, 2020; Bellavitis et al., 2023) and the reconfiguration of traditional governance through blockchain's ability to enhance accountability and trust (Mutamimah et al., 2023; Trequattrini et al., 2024). This theme functions as the intellectual anchor of the field, assessing adoption (Kokina et al., 2017), applications beyond cryptocurrency (Stafford & Treiblmaier, 2020), and intersections with AI, education, and regulatory challenges (Han et al., 2023; Desplebin et al., 2024; Putritama et al., 2024).

Topic 6: Smart Contracts, Crypto-Asset Auditing, and the Transformation of Financial Systems

This technical motor theme focuses on the impact of smart contracts on auditing and financial systems. Research emphasizes how smart contracts can automate audit procedures, enable continuous assurance, and contribute to the "Audit 4.0" paradigm that integrates technologies such as IoT (Rozario & Vasarhelyi, 2018; Rozario & Thomas, 2019; Dai et al., 2019; Guo et al., 2025; Appelbaum & Nehmer, 2020; Zemánková, 2019).

Challenges include the complexities of auditing crypto-assets (Hsieh & Brennan, 2022; Appelbaum et al., 2022) and addressing the "oracle problem," concerning the reliability of external data inputs (Sheldon, 2021a). The development of new audit frameworks (Sheldon, 2019) and voluntary disclosure practices for crypto-assets (Juma'h & Albizri, 2025) positions this theme at the technical frontier of assurance. Its implications extend to auditing

decentralized finance (DeFi) platforms (Bourveau et al., 2024) and using DLT to streamline ESG reporting (Cerchiaro et al., 2025).

Basic Themes

Topic 3: Evolution of Auditing Practices, Risk Assessment, and Taxation

This basic theme investigates blockchain's impact on auditing and taxation. Studies highlight the re-engineering of audit processes through smart contracts to enable near real-time reporting (Rozario & Vasarhelyi, 2018; Rozario & Thomas, 2019) and to enhance evidence collection (Vincent et al., 2020). Open-access data introduces both opportunities and risks for auditors (O'Leary, 2018).

Research identifies adoption drivers such as performance expectations and organizational readiness (Ferri et al., 2020; Juma'h & Li, 2023; Alkhwaldi et al., 2024; Jena, 2024; Salim et al., 2022; Chowdhury et al., 2023), alongside evolving auditor roles in blockchain-based environments (Schmitz & Leoni, 2019; Elommal & Manita, 2022). This theme further explores emerging audit risks (Dyball & Seethamraju, 2021, 2022; Huang et al., 2024; Elmaasrawy et al., 2025), the adequacy of existing standards (Gauthier & Brender, 2021), and taxation implications (Gomaa et al., 2019; Søgaard, 2021; Lee et al., 2024; Chouaibi et al., 2024).

Topic 4: Bitcoin & Emerging Digital Financial Tools

This basic theme focuses on the disruptive impact of cryptocurrencies on financial accounting, reporting, and auditing. Literature highlights the need to re-evaluate traditional financial paradigms (Dimbean-Creta, 2017; Moll & Yigitbasioglu, 2019). Challenges include inconsistencies in accounting treatment under IFRS and US GAAP, with calls for clear, standardized guidance (Procházka, 2018; Smith et al., 2019; Alsalmi et al., 2023; Jackson & Luu, 2023; Luo & Yu, 2024).

The theme also explores broader implications such as enhancing information quality, reducing fraud, and mitigating information asymmetry (Yu et al., 2018; Bonyuet, 2020; Rivera & Foderick, 2024; Oosthoek & Doerr, 2020; Gray, 2024). A recurring sub-theme is the adaptation of accounting education to include blockchain, data analytics, and AI (Qasim & Kharbat, 2020; Aldredge et al., 2021; Kennedy & Stratopoulos, 2025).

Niche Themes

Topic 7: Digital Transformation in Finance

This niche theme analyzes the systemic impact of digital transformation, where blockchain interacts with AI, Big Data, and IoT. Research emphasizes improvements in efficiency, security, and modernization of accounting practices within the "Accounting 4.0" paradigm

(Albekov et al., 2017; Chyzhevska et al., 2021; Kliestik et al., 2024; Shapovalova et al., 2023; Petchenko et al., 2023).

Applications include RegTech and SupTech (Kavassalis et al., 2018; Brammertz & Mendelowitz, 2018) and innovations in AIS that enable triple-entry accounting (ALSaqa et al., 2019; Kwilinski, 2019; Alkafaji, Dashtbayaz, & Salehi, 2023), despite barriers such as security risks and required investments (Asonitou, 2020; Amanova et al., 2023). This theme also considers digital transformation's role in mitigating fraud (Abu-Dabaseh et al., 2025).

Topic 10: Adoption, Impact, and Challenges of Blockchain in Accounting Firms

This niche theme explores organizational adoption of blockchain, emphasizing the gap between perceived potential and practical implementation (Bennett et al., 2020; Akter et al., 2024; Oladejo et al., 2024). Adoption drivers include perceived usefulness and readiness (Jaradat et al., 2024; Salim et al., 2022), while barriers encompass costs, ease of use, and technostress (Moghrabi & Benameur, 2022; Abu Afifa et al., 2023; Alkhwaldi et al., 2024; Jena, 2024; Alshurafat et al., 2023; Majeed & Taha, 2024).

Findings on firm performance are mixed, highlighting the influence of contextual factors (Sharma et al., 2023; Fang et al., 2023; Autore et al., 2024). A recurring theme is the call to adapt accounting curricula to address the blockchain knowledge gap (Stern & Reinstein, 2021; Angeline et al., 2021; Hamadeh, Nouraldeen, Mahboub, & Hashem, 2025).

Emerging Themes

Topic 1: Financial Reporting & Digital Security

This emerging theme examines blockchain's intersection with financial reporting integrity and cybersecurity. It addresses data security across blockchain architectures (O'Leary, 2017), proposals to strengthen integrity (Cap & Leiding, 2018; White & Daniels, 2019), and tensions between decentralization and GDPR compliance (Al-Abdullah et al., 2020).

It also considers reporting inconsistencies for crypto-assets (Parrondo, 2023; Luo & Yu, 2024; Pimentel et al., 2021) and integration with IoT and XBRL for automated reporting systems (Nofel et al., 2024).

Topic 5: Corporate Governance & Compliance

This theme highlights blockchain's role in enhancing governance, transparency, and regulatory compliance. Applications include embedding "compliance by design" in complex processes such as renewable energy credits (Rien Agustin & Susilowati, 2019; Mehta et al., 2023; Fatz et al., 2019; Ashley & Johnson, 2018; Tang & Tang, 2019).

Research emphasizes blockchain's ability to augment, rather than replace, traditional governance (Werner, 2023), while also pointing to the need for new skills and adaptive organizational cultures (Yang, 2020; Kinory et al., 2020; Ronaghi, 2022).

Topic 8: ESG, Corporate Strategy & BCT

This emerging theme investigates blockchain's strategic integration into ESG initiatives and corporate strategy. Blockchain enhances traceability and authenticity of ESG data (Guan & Zhang, 2020; Coita et al., 2019; Du et al., 2023), mitigating greenwashing risks and supporting firm value (Asif et al., 2023; Trotta et al., 2024; Singhania et al., 2024; Wang et al., 2024; Tran et al., 2024).

It also facilitates decentralized governance models (Saurabh et al., 2024; Li & Chen, 2024; Monteiro et al., 2024), positioning blockchain as a tool for forward-looking corporate responsibility. Challenges include regulatory adaptation and workforce skill development (Smith, 2018; Alawadhi & Alrefai, 2024; Oladejo et al., 2024).

Topic 2: Blockchain Applications in Diverse Domains

This theme illustrates blockchain's cross-disciplinary applications beyond AAG. Case studies include agri-food traceability (Scuderi et al., 2019), e-voting (Cucurull et al., 2019), digital identity (Hazar, 2020), education (Marzuki et al., 2019), waste management (An & Mikhaylov, 2023), auditing AI systems (Sgantzos et al., 2025), and applications in the metaverse (AL-Hawamleh et al., 2024; Pandey & Gilmour, 2024). This theme underscores blockchain's expanding relevance and its potential for future cross-sector research.

Comparison with Prior Research

The results of this study align with and extend earlier reviews of blockchain applications in accounting, auditing, and governance (Marrone & Hazelton, 2019; Pimentel & Boulianne, 2020; Secinaro et al., 2021). While prior reviews provided valuable overviews, they primarily offered descriptive accounts of adoption trends and conceptual possibilities. By contrast, the present analysis integrates semantic similarity mapping and thematic clustering, enabling a more granular view of how blockchain-related topics are both interconnected and strategically positioned within the field.

Earlier work identified the transformative potential of blockchain for transparency, trust, and automation in accounting and auditing (Dai & Vasarhelyi, 2017; Cai, 2021). Our findings reinforce these conclusions while highlighting new dimensions. For example, the emergence of ESG and corporate strategy (T8) as a distinct cluster reflects the growing integration of blockchain with sustainability agendas—an area underexplored in earlier reviews. Similarly, the classification of digital transformation in finance (T7) as a niche theme underscores the specialization of research where blockchain converges with AI, IoT, and big data, consistent

with broader "Accounting 4.0" narratives (Albekov et al., 2017; Chyzhevska et al., 2021; Kliestik et al., 2024).

At the same time, our results refine prior categorizations of blockchain's role in auditing. For instance, Rozario and Vasarhelyi (2018) and Rozario and Thomas (2019) emphasized blockchain's potential for continuous assurance. Building on this foundation, our analysis identifies smart contracts and crypto-asset auditing (T6) as a motor theme, capturing both the technological innovations and the practical challenges of implementation, such as the "oracle problem" (Sheldon, 2021a) and evolving audit frameworks (Sheldon, 2019).

The strategic thematic map also highlights underdeveloped but central areas. For example, auditing practices, risk, and taxation (T3), positioned as a basic theme, suggest that while adoption drivers and risks have been explored (Ferri et al., 2020; Juma'h & Li, 2023; Elmaasrawy et al., 2025), further theoretical development and empirical validation are still needed. This distinction extends the insights of prior reviews by demonstrating not only which themes dominate but also which remain foundational yet insufficiently developed.

Finally, our findings illustrate blockchain's expanding scope beyond traditional financial domains. Prior reviews noted applications in education, supply chains, and governance (Stafford & Treiblmaier, 2020; Han et al., 2023). The present analysis confirms these patterns while also identifying applications in diverse domains (T2) and blockchain in ESG (T8) as emerging themes, indicating a broadening research frontier that future reviews will need to account for.

In sum, this study corroborates the conclusions of earlier literature reviews while providing a more nuanced, strategically oriented framework. By situating topics along the dimensions of centrality and development, it extends the field's understanding of blockchain's role in AAG and identifies clear opportunities for future research.

Discussion and Conclusion

The application of Latent Dirichlet Allocation (LDA) to 486 academic abstracts has generated the first strategic thematic map of the blockchain research landscape in accounting, auditing, and governance (AAG). This analysis distilled the scholarly discourse into eleven thematic clusters, which were then organized into a conceptual model of Motor, Basic, Niche, and Emerging themes. This discussion interprets these findings, outlines their implications, and acknowledges the study's limitations.

Interpretation of the Thematic Architecture

The central finding is that research on blockchain in AAG is evolving from broad exploratory inquiry into a more sophisticated ecosystem of specialized themes. The thematic architecture

reveals a persistent tension between blockchain's immense theoretical potential and the practical challenges of its real-world implementation.

Motor Themes, such as Blockchain Research Landscape & Governance (Topic 0) and Supply Chain Transparency (Topic 9), represent the dual engines of progress. One branch of research focuses on mapping the field and its governance needs (Pimentel & Boulianne, 2020; Lombardi et al., 2022), while the other engages with large-scale practical applications that test blockchain's capabilities (Wang & Kogan, 2018). Together, these streams reflect a discipline actively defining its scope in response to blockchain's transformative promise (Dai & Vasarhelyi, 2017).

Progress in these areas rests on Basic Themes such as Bitcoin & Emerging Digital Financial Tools (Topic 4) and Evolution of Auditing Practices (Topic 3). These topics highlight unresolved foundational issues, particularly the urgent need for robust accounting and reporting standards amid rapid innovation (Procházka, 2018; Luo & Yu, 2024). The ambiguity in valuing crypto-assets directly undermines the reliability of financial reporting, creating uncertainty for investors and regulators (Parrondo, 2023).

The emergence of Niche Themes reflects growing specialization. Smart Contracts & Crypto Audits (Topic 6) and Adoption of Audit Tech by Firms (Topic 10) demonstrate how scholarship is moving beyond generalities to address specific technical and organizational challenges. Research on smart contracts emphasizes the need for new assurance methodologies (Hsieh & Brennan, 2022), while adoption studies reveal the gap between blockchain's perceived potential and the realities of implementation, including costs, skill deficits, and integration barriers (Sharma et al., 2023; Akter et al., 2024).

Finally, Emerging Themes point to the field's future trajectory. Clusters such as ESG, Corporate Strategy & BCT (Topic 8) , and Corporate Governance & Compliance (Topic 5) highlight blockchain's potential in enabling auditable compliance trails (Fatz et al., 2019), credible sustainability reporting (Asif et al., 2023), and new governance models such as DAOs (Kaal, 2020; Saurabh et al., 2024). These themes illustrate a shift in focus from operational efficiency toward strategic value creation, corporate responsibility, and governance innovation.

Implications of the Findings

The thematic map provides a structured agenda for future inquiry. Scholars should focus on bridging gaps between quadrants—for example, by exploring how technical solutions developed in Niche Themes (e.g., Topic 6) can address foundational challenges in Basic Themes (e.g., Topic 3). The Emerging Themes represent fertile ground for novel contributions, particularly the empirical validation of blockchain's role in ESG reporting and governance. Longitudinal studies are also needed to trace how themes migrate across the map over time, thereby illuminating the life cycle of technological innovation in academia.

For practitioners, the findings emphasize that socio-organizational factors—such as strategic alignment, user acceptance, and professional competencies—are often more critical than purely technical ones. The prominence of adoption challenges (Topic 10) confirms this reality. For educators, the thematic map can guide curriculum development: Basic Themes form the foundation of core knowledge, while Motor and Niche Themes suggest advanced or specialized modules. Regulators and standard-setters should prioritize the Emerging Themes, where timely guidance is most needed to foster trust, comparability, and responsible innovation.

Limitations

This study has several limitations. First, the analysis is based on abstracts, which may not capture the full nuance of each paper. Applying the same approach to full-text articles could yield deeper insights. Second, the dataset was drawn exclusively from Scopus; incorporating additional databases would broaden coverage. Finally, the persistent "first-mile problem"—ensuring the faithful representation of real-world events on blockchain ledgers (Alles & Gray, 2020)—remains an unresolved challenge across all application-oriented themes that text analysis alone cannot resolve.

Conclusion

This study sought to bring clarity and structure to the fragmented and rapidly expanding research at the intersection of blockchain and AAG. By applying LDA topic modeling, we identified eleven thematic clusters and, more importantly, organized them into a four-quadrant strategic map that reveals the field's intellectual architecture.

The primary contribution of this research is the first data-driven strategic map of blockchain in AAG, demonstrating how the discourse is transitioning from early hype to a more nuanced engagement with the technical, organizational, and strategic complexities of embedding this foundational technology into professional and economic ecosystems.

The thematic map serves as a navigational tool for scholars, practitioners, and regulators. It highlights the field's established foundations, its current driving forces, its specialized niches, and its emerging frontiers. As blockchain continues to integrate into the fabric of business and governance, this conceptual model provides a robust framework for guiding coherent scholarship, informed practice, and effective policy development in this vital domain.

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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