Research in International Business and Finance 76 (2025) 102816

Contents lists available at ScienceDirect

Research in International Business and Finance

journal homepage: www.elsevier.com/locate/ribaf

The effects of disruptive technologies on accountability in fintech industry: Using bibliometric analysis to develop a research agenda

Silvana Secinaro [a,1], Federico Lanzalonga [b,c,*,2], Michele Oppioli [d,3], Elbano de Nuccio [e,4]

[a] Department of Management, University of Turin, Corso Unione Sovietica, 218 bis, Turin 10134, Italy
[b] Społeczna Akademia Nauk, University of Social Science, ul. Sienkiewicza 9, 90-113, Łódź, Poland
[c] Department of Management, University of Turin, Corso Unione Sovietica, 218 bis, Turin 10134, Italy
[d] Department of Management, University of Turin, Corso Unione Sovietica, 218 bis, Turin 10134, Italy
[e] Department of Management, Finance and Technology, LUM University Giuseppe Degennaro, S.S. 100 km 18, Casamassima (BA) 70010, Italy

ARTICLE INFO

Keywords:
Fintech
Accountability
Disruptive technology
Bibliometric analysis
Blockchain
Artificial intelligence

ABSTRACT

The fintech industry has fundamentally reshaped the financial landscape, driven by disruptive technologies such as blockchain and artificial intelligence, which have revolutionized big data analysis. These advancements empower users to bypass traditional intermediaries, achieving cost reductions and fostering safer, more efficient information and verification processes. However, the rapid evolution of fintech demands a deeper understanding of how accountability can be integrated into this transformative ecosystem. This research employs bibliometric analysis to synthesize existing knowledge on fintech and accountability-enabling technologies, exploring associated risks and opportunities. The study focuses on critical dimensions such as sustainability, governance, and innovative accounting approaches, illustrating how these technologies foster transparency and trust in financial systems. It also examines the interplay between fintech, ethical finance, and predictive technologies, emphasizing their role in forecasting financial, environmental, and social impacts. The findings highlight the importance of aligning disruptive technologies with global sustainability goals, including the Paris Climate Agreement and the SDGs, while addressing regulatory challenges. This research contributes by advancing theoretical insights into fintech's accountability and providing practical recommendations for decision-makers and policymakers. By proposing strategies for regulatory frameworks and governance, this study underscores fintech's transformative potential in enhancing transparency, trust, and accountability across the financial sector and beyond.

* Corresponding author at: Społeczna Akademia Nauk, University of Social Science, ul. Sienkiewicza 9, 90-113, Łódź, Poland.
E-mail addresses: silvana.secinaro@unito.it (S. Secinaro), federico.lanzalonga@unito.it (F. Lanzalonga), michele.oppioli@unito.it (M. Oppioli), denuccio@lum.it (E. de Nuccio).
[1] Orcid: https://orcid.org/0000-0002-0811-6580
[2] Orcid: https://orcid.org/0000-0003-3195-3528
[3] Orcid: https://orcid.org/0000-0003-3787-8995
[4] Orcid: https://orcid.org/0000-0002-9293-1667

https://doi.org/10.1016/j.ribaf.2025.102816
Received 5 May 2023; Received in revised form 23 January 2025; Accepted 13 February 2025
Available online 18 February 2025

1. Introduction

The fintech industry has revolutionised the financial sector, and its enduring relevance is undeniable. The transformative potential of fintech stems from its capacity to integrate advanced technologies, thereby reshaping traditional financial services and fostering innovative solutions (Henriques and Sadorsky, 2025). Acknowledging the pivotal role of fintech within the financial industry is essential for understanding its current impact and future potential. (Lee and Shin, 2018). The current growth phase in the financial technology (fintech) industry began after the 2008 financial crisis. A widespread distrust of the established banking system created an opportunity for new entrants, such as fintech startups (Arner, 2016). The integration of disruptive technologies has fundamentally transformed the financial landscape by allowing users to bypass intermediaries and reduce costs (Thakor, 2020). This technological transformation, which includes advancements such as blockchain, open banking, and artificial intelligence applied to big data, has revolutionised financial transactions and influenced everyday business activities (Zachariadis et al., 2019). These innovations have enhanced the security and cost-efficiency of information transfer while reducing verification costs (Secinaro et al., 2021). For instance, blockchain technologies play a critical role in improving the security and efficiency of financial operations by increasing transparency and minimising systemic risks (He et al., 2024).

In the present fintech landscape, blockchain enables secure, rapid, and low-cost money transfers by facilitating instantaneous transactions, removing the need for third-party intermediaries, and lowering the risk of hacking (Ganderson, 2021; Kumari and Devi, 2022). In addition, the concept of open banking defines refers to free access to banking information, enabling the development of applications that link a network of financial institutions and other service providers (Thiruma Valavan A, 2023). Moreover, according to Ashta and Herrmann (2021), artificial intelligence applied to big data can drive economic growth by enhancing efficiency and productivity, particularly in addressing the volatility, uncertainty, ambiguity, and complexity inherent in fintech. Fintech also contributes to sustainable financial practices, particularly in areas such as green credit and climate finance, by leveraging advanced analytics to align financial objectives with environmental goals (He et al., 2024).

In this context, it is vital to highlight the issue of accountability in the fintech industry (Ganderson, 2021). While accountability was originally devised as a means to bolster the effectiveness of regulatory bodies (Mulgan, 2000), its evolution within the dynamic realm of fintech has led it to function as a conceptual framework for interrelated concepts including transparency and efficiency (Bovens, 2007). Fintech is considered one of the most impactful innovations in the financial sector (Lee and Shin, 2018; Milian et al., 2019). Its impact extends beyond traditional financial boundaries, influencing systemic risks and redefining global financial interconnectedness (Henriques and Sadorsky, 2025). The rapid evolution of fintech has introduced new technologies to offer solutions with significantly different objectives and processes, such as financial literacy, retail banking, investments, and cryptocurrencies (Gomber et al., 2018). From a financial regulation perspective, governments are increasingly urging regulators to actively collaborate with companies seeking market entry (Ganderson, 2021). Indeed, many countries have already embraced fintech investments, leading to a substantial shift in national industry strategy dynamics (Bhaskar and Bansal, 2022; Frost, 2020). However, the issue of accountability in fintech appears to be only partially addressed, which has led to the need for further investigation.

The literature on fintech and accountability is rapidly expanding, with relevant contributions from different research fields. Despite this, the resulting body of knowledge lacks cohesion and requires a structured approach to foster its development. Therefore, an integrative framework that synthesizes available research evidence from various disciplines is necessary to address the effects of disruptive technologies in enhancing accountability in the fintech sector. Recent studies emphasize the importance of integrating accountability into fintech ecosystems, particularly in the context of emerging economies where regulatory frameworks are still developing (Hornuf et al., 2025).

To this end, this research builds upon the Dorfleitner et al. (2017) framework to organize and structure insights into fintech and technologies that enable accountability. Specifically, the four clusters facilitate the analysis of disruptive technologies and highlight risks and potential opportunities for improving accountability, transparency, and efficiency (Behn, 2001). This paper aims to synthesize existing research on the topic and answer research questions based on the following assumptions. Journals play a pivotal role in shaping academic debates and guiding research trajectories on a topic (Zupic and Čater, 2015). Thus, the first research question (RQ1) is as follows: What are the journals of reference for the study on disruptive technology for accountability in the fintech sector?

Geographical analysis based on the number of publications and author affiliation can provide evidence of collaboration and elucidate the social structure of the field. However, collaboration is not always reflected with co-authorship, and studying homogeneous areas can yield interesting inferences about a topic (Zupic and Čater, 2015). Therefore, the second research question (RQ2) is: What is the geographical structure of the research stream on disruptive technologies for accountability in fintech?

Finally, keyword analysis identifies connections between concepts that co-occur in document titles, keywords, or abstracts (Zupic and Čater, 2015). The analysis of words entered by authors represents a tool to conceptualise a topic through existing literature (Biancone et al., 2022). The integration of bibliometric techniques enables a deeper understanding of the thematic structure of fintech research and its intersection with accountability (Henriques and Sadorsky, 2025). Thus, the third research question (RQ3) is: What are the opportunities and risks in using disruptive technologies for accountability in the fintech sector?

Analysing existing literature provides the foundation to answer the research questions by employing rigorous scientific research processes (Massaro et al., 2016). The present study uses bibliometric analysis to enable a thorough and reliable examination of knowledge on the topic and to identify future developments (Paul and Criado, 2020). Bibliometric approaches have proven effective in mapping emerging fields, including fintech and green finance, by highlighting systemic risks and innovation trends (He et al., 2024; Oppioli et al., 2023). The use of bibliometrics allows researchers to identify qualitative variables and extract critical information about a research stream (Secinaro et al., 2020). For instance, bibliometric analysis can reveal the authors in the field, keywords, the number of publications in the literature, and the interactions between them.

In addition, the proposed approach facilitates the implementation of scientific mapping techniques (Aria and Cuccurullo, 2017). This methodology has been successfully applied to analyse present aspects of knowledge management and digital transformation for Industry 4.0 (de Bem Machado et al., 2022); furthermore, the same approach was also employed to highlight aspects of accountability (Secinaro et al., 2021). Articles published in peer-reviewed journals and grey literature written in English were considered, resulting in a final pool of 135 articles. For the analysis, the authors used Bibliometrix (Aria and Cuccurullo, 2017), a package for R-Studio, which provides an interface for data interpretation using the R language (Yan et al., 2000). In addition, Bibliometrix includes a web interface called biblioshiny to enable the creation of the topic dendrogram, the word cloud of 'Author keywords,' and the country collaboration map.

This paper contributes to understanding the risks and opportunities associated with fintech in the context of accountability. It highlights distinctions within the economics-based concept of fintech, underscores the significance of sustainability considerations, and advocates for governance to embrace novel accounting approaches and alternative data dissemination methods (Cai, 2021). It enhances theoretical insights into fintech by incorporating disruptive technologies to enhance accountability, extending Dorfleitner et al.'s (2017) framework. It introduces a new fintech phase emerging after the 2008 crisis, emphasizing accountability and regulatory developments initiated in 2016 under EU regulation (European Union, 2016; Guerar et al., 2020). The paper contributes to academic research by suggesting future research directions in fintech accountability and practical implications, urging regulatory reform in response to technological advancements. It highlights the inadequacy of current cryptocurrency regulations (Massad, 2019) and links fintech with ethical finance, suggesting its role in achieving climate neutrality and fulfilling global agreements like the Paris Climate Agreement (Charamba et al., 2021; Marke and Sylvester, 2018). Furthermore, it emphasizes the potential of predictive technologies like machine learning in forecasting the impacts of financial initiatives (Tamang et al., 2021), proposing a comprehensive model for assessing financial, environmental, and social impacts. The study also identifies regional regulatory variations, highlighting the need for harmonized fintech policies (Ganderson, 2021; Milian et al., 2019), advocating for supranational bodies to ensure uniformity and transparency across regions.

The introduction of the paper is followed by an in-depth discussion of the background and key scientific contributions related to the topic. Next, the methodological section and findings are presented and analysed. Finally, a discussion section and an extensive conclusion conclude the paper.

2. Background

2.1. Fintech

The concept of fintech merges finance and refers to the integration of financial services with innovative technologies (Dorfleitner et al., 2017). It represents a paradigm shift in the financial sector, driven by the integration of technology into traditional financial systems, which creates opportunities for efficiency, transparency, and accountability (Henriques and Sadorsky, 2025). The concept of fintech has been present in the literature since the early 1990s, but it has recently attracted the attention of researchers, consumers, practitioners and authorities (Cai, 2018; Prowse, 1994). The global fintech market was valued at USD 112.5 billion in 2021 and is projected to reach USD 332.5 billion by 2028 (Vantage Market Research, 2022). These figures highlight not only the economic potential of fintech but also its transformative role in the financial sector, where accountability and transparency are becoming increasingly pivotal (Lee and Shin, 2018).

Over time, with a rapid transformation of traditional financial services, numerous studies have been published in the literature (Arner, 2016). Therefore, different definitions of fintech exist. According to Thakor (2020), fintech encompasses the use of technology to provide new and improved financial services. Several authors regard fintech as one of the most relevant innovations in the financial sector since the end of the first decade of the 21st century (Lee and Shin, 2018). Beyond these definitions, fintech represents a challenge to traditional accountability frameworks, as it decentralizes financial processes and relies on advanced technologies such as blockchain and artificial intelligence (Chatterjee et al., 2024). The evolution of the concept of fintech in the literature has broadened the meaning to include all technological innovations pertaining to the financial sector (Gomber et al., 2018). In this sense, technological innovations include financial education, retail banking, investments and cryptocurrencies such as Bitcoin (Gomber et al., 2018).

Financial intermediaries should integrate these technologies into their processes to transfer information and data seamlessly (Thakor, 2020). These disruptive technologies enable more functional and cost-effective processes because they eliminate the involvement of a trusted third party in the transaction (Cong and He, 2019). However, this disintermediation also raises critical questions about accountability, as traditional mechanisms for oversight and regulation may no longer be effectively applicable (Rerung et al., 2024). Based on these premises, fintech enables the discovery and application of more efficient and cost-effective ways to reduce the cost of financial services (Gennaioli et al., 2014; Vasquez and San-Jose, 2022). The unit cost of intermediation has

Source: Arner (2016)

Fig. 1. The three phases of Fintech. Source: Arner (2016).

remained largely unchanged over the last 130 years, so the reduction in the cost of financial services is noteworthy (Philippon, 2014). Recently, fintech has evolved rapidly through exogenous influences, including the sharing economy, developments and innovations in information technology, and favourable regulation (Lee and Shin, 2018). The implementation of blockchain technology, a key factor in fintech innovation, has revolutionized financial transactions by increasing transparency and enabling secure, efficient, and decentralized processes (Thakor, 2020). These advances, however, create a new landscape where accountability mechanisms must adapt to ensure ethical and effective use of such technologies (Zachariadis et al., 2019).

Although the term fintech is recent, financial innovation has a long history. Arner (2016) outlines the evolution of fintech through three main eras (Fig. 1): Fintech 1.0 (1866–1967), Fintech 2.0 (1976–2008) and Fintech 3.0 (2008-present). In these three phases, accountability has evolved alongside technological developments, reflecting the growing need for robust mechanisms to address the risks and complexities introduced by financial innovation. In the first period, Fintech 1.0 represents one of the first steps towards financial globalisation, transcending national borders (Arner et al., 2015). The second phase, "Fintech 2.0", marks the transition from analogue to digital driven primarily by traditional financial institutions (Thakor, 2020). The third phase, 'Fintech 3.0′ begins after the 2008 financial crisis. The defining element of this phase is a general distrust of the traditional banking system by the public, which facilitated the entry of new players such as fintech startups (Arner, 2016). Moreover, another key role was played by the entry of disruptive technologies such as blockchain technologies, open banking, machine learning and Non-Fungible Tokens (NFTs) (Arner et al., 2015). These technologies have not only changed the way financial services are delivered but have also challenged traditional accountability systems, demanding new approaches to regulation and oversight (Thakor, 2020).

According to Dorfleitner et al. (2017), fintech companies can be grouped into four segments based on their business models: (i) financing, (ii) asset management, (iii) payments and (iv) other fintechs (Fig. 2).

The financing segment aims to make financing available to individuals and companies (Zhang and Chen, 2019). Two service classes can be identified based on the number of players involved. On the one hand, the area of crowdfunding, whose offerings are based on the participation of many funders to achieve a common goal (Belleflamme et al., 2012). Crowdfunding platforms act as intermediaries, replacing traditional banks as the link between funders and borrowers (Klöhn and Hornuf, 2012). On the other hand, the credit and factoring class involves a collaboration with a partner credit institution, extending credit to individuals and businesses without

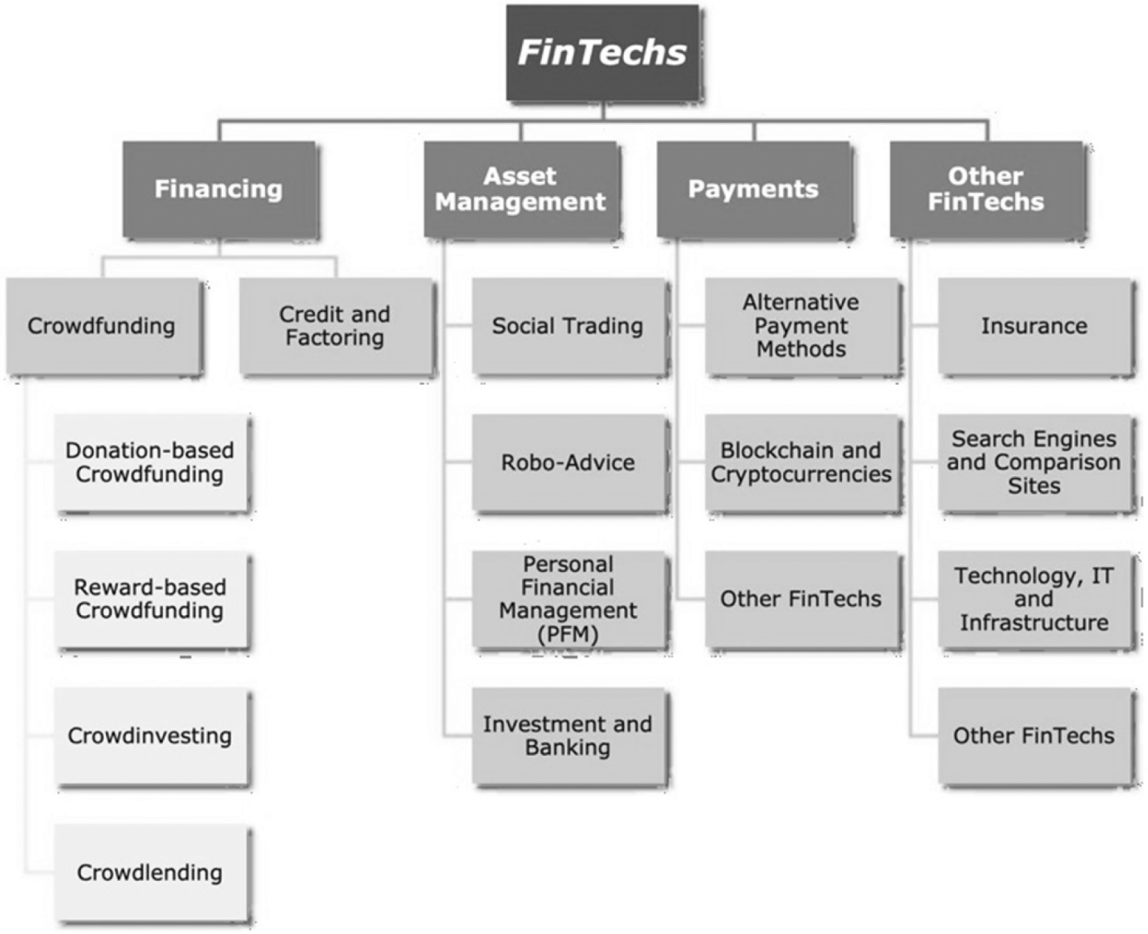

Fig. 2. Segments of the Fintech Industry. Source: Dorfleitner et al. (2017).

involving many lenders (Dorfleitner et al., 2017; Foglia et al., 2024). Crowdfunding platforms have gained traction due to their ability to leverage blockchain technology for improved transparency and trust, as well as reducing operational risks, fostering greater adoption globally (Hornuf et al., 2025). In recent years, the crowdfunding industry has grown significantly, propelled by the adoption of technologies like blockchain and Distributed Ledger Technology (DLT), which enhance transparency and trust (Halden et al., 2021; Riedl, 2013). According to Gulin et al. (2019), developing software and technologies such as the cloud, AI, and blockchain has strengthened the financial sector by reducing data transactions and improving their speed, quality and accuracy. Moreover, the decentralisation enabled by these technologies facilitates seamless information flow, enhancing transparency and accountability among stakeholders (Secinaro et al., 2021).

In the 'asset management' segment, the literature refers to services that enable asset management and financial advice and offer aggregate indicators of personal wealth (Dorfleitner et al., 2017). The asset management category includes four subsegments related to wealth management: social trading, robo-advice, personal financial management (PFM) and investment and banking (Liu et al., 2014; Sironi, 2016). These subsegments highlight the diversity within asset management. For instance, social trading involves collaborative investment strategies, robo-advice offers algorithm-driven financial planning, PFM tools provide individuals with tailored financial insights, and investment platforms blend traditional banking services with fintech innovations (Fein, 2015; Ferilli, Palmieri, et al., 2024). The technologies underpinning these services include advanced software solutions, information systems, and mobile apps designed to automate portfolio management while enhancing user interaction (Dorfleitner et al., 2017). These tools enhance user autonomy by facilitating comparison across options, democratizing financial management and improving efficiency (Nienaber, 2016).

The 'payments' segment encompasses applications and services that enable national and international payment transactions (Dorfleitner et al., 2017). This segment integrates blockchain and cryptocurrencies to ensure secure monetary transactions. Blockchain reduces the risk of fraud by creating immutable transaction records, thereby reinforcing trust in digital payments (Böhme et al., 2015; Secinaro et al., 2021). Additionally, blockchain supports cryptocurrency transactions and exchanges, simplifying processes and reducing transaction times (Grinberg, 2011). Emerging solutions in this area, such as peer-to-peer (P2P) payment systems, facilitate real-time transactions without the need for traditional intermediaries, enhancing both speed and accessibility (Cong and He, 2019).

Finally, the 'other fintechs' segment encompasses activities not included in the three main categories. This segment includes operations related to insurance, search engines comparison platforms, information technology, and infrastructure (Zavolokina et al., 2016). Peer-to-peer insurance models, for example, allow groups of policyholders to share risk collectively, bypassing traditional insurers. Meanwhile, search and comparison tools empower users to find financial products tailored to their needs (Stoeckli et al., 2018). Additionally, advanced technologies enable auditing and accounting innovations, allowing quicker responses to regulatory requirements and meeting stakeholders' expectations for transparency (Kahyaoglu, 2019). These disruptive innovations reduce inefficiencies and ensure greater accountability, particularly in sectors requiring precise financial reporting (Bhaskar and Flower., 2019).

2.2. *Accountability*

The existing literature indicates that definitions of accountability describe it as a complex and chameleon-like term (Mulgan, 2000). Accountability applies to several contexts, such as healthcare, business, politics, and criminal and civil justice (Cronshaw and Alexander, 1985; Tetlock, 1983). Furthermore, accountability encompasses related concepts, including transparency, fairness, efficiency, responsiveness, responsibility, and integrity (Behn, 2001). This multidimensionality highlights its adaptability to different sectors and its critical role in governance and ethical practices. Academics and practitioners have proposed several definitions of the term (Ebrahim, 2003). In its simplest sense, accountability can be defined as a relationship in which people are required to explain and take responsibility for their actions (Sinclair, 1995).

Originally conceived as a governance tool, accountability emerged as a mechanism to enhance the effectiveness and efficiency of public institutions (Mulgan, 2000). Over time, however, it has evolved into a broader concept with independent significance (Bovens, 2007). According to Edwards and Hulme (1996), accountability refers to the obligation of organizations and individuals to answer for their actions to an authority. This obligation involves external responsibility, where an external entity holds organizations or individuals accountable for their actions (Thynne and Goldring, 1987). Furthermore, accountability operates within a social relationship, where one party demands explanations and the other provides them, reflecting an interactional dynamic between the two entities (Isaac-Henry, 2003). Another defining aspect is the authority of the entity demanding accountability, which includes the right to request explanations and impose consequences for unmet obligations (Mulgan, 2000). These dimensions underscore the relational nature of accountability, which extends beyond mere reporting to include moral and ethical obligations.

In addition to its relational aspects, accountability involves concrete reporting practices that require entities to explain and justify their conduct (Bovens, 2007). Debates surrounding accountability often focus on fundamental questions such as who is accountable, to whom, under what rules, and based on which information (March et al., 1995). Today, accountability serves as a conceptual container that encompasses concepts including responsibility, transparency, and efficiency (Behn, 2001). Notably, the concept has shifted from being subordinate to responsibility to fully encompassing it (Uhr, 1993). This shift allows accountability to incorporate both internal responsibilities, such as ethical conduct and professional integrity, and external responsibilities, such as compliance with regulatory requirements (Harmon and Mayer, 1986).

The concept of transparency entails the duty of the controlled entity to share its accounts with the accountable stakeholder in an accurately and confidential manner (Novelli et al., 2023). By clearly defining the relationship between controllers and controlled entities, transparency fosters trust and accountability in governance structures (Kaminski, 2020). Moreover, transparency enhances the quality of reporting and strengthens the relationship between stakeholders (Fox, 2007).

While accountability was originally intended to enhance the efficiency of controlling bodies (Mulgan, 2000), its evolution has

broadened to include the promotion of ethical and transparent practices (Bovens, 2007). This shift reflects the increasing complexity of modern governance, where efficiency and ethics must coexist. Enhancing accountability, therefore, requires controlling entities to create incentives for improving efficiency among those under their oversight (Curtin, 2005).

In conclusion, although the concept of accountability varies depending on the context, ideologies and language, it is broadly defined as the responsibility for communicating an entity's performance, both internally and externally, towards stakeholders (Dubnick, 2005; Tetlock, 1983; Uhr, 1993). Its relevance lies in its ability to adapt to diverse settings, from public governance to private enterprises, ensuring both operational efficiency and ethical integrity.

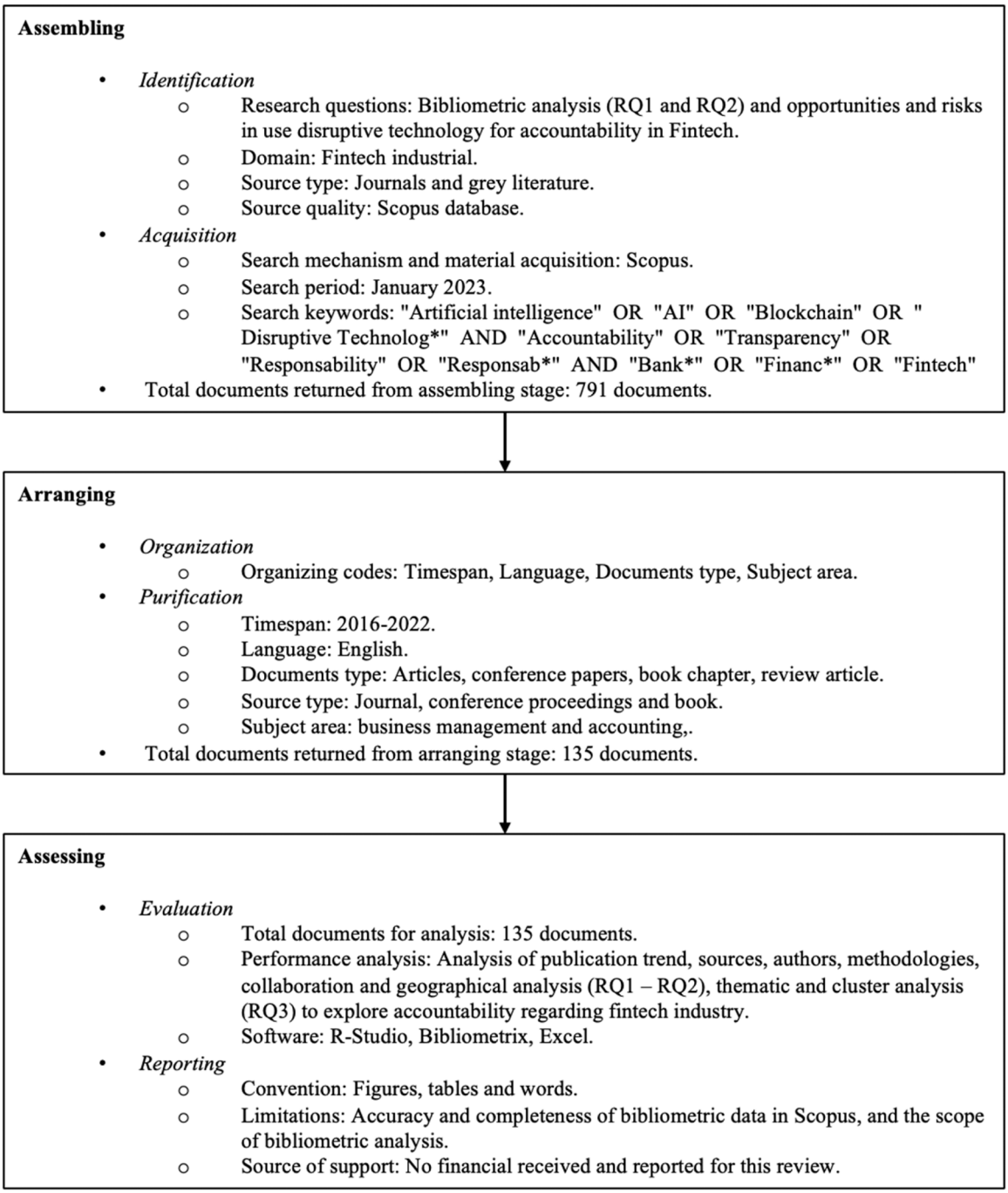

Fig. 3. SPAR-4-SLR protocol. Source: Author's elaboration on Paul et al. (2021).

3. Methodology

The following section outlines the implemented methodology for the bibliometric analysis and the identification of key elements to explore opportunities and risks in using disruptive technology for accountability in fintech (Biancone et al., 2022). Applying the literature review methodology empowers researchers to examine scientific sources meticulously and precisely (Delle Foglie and Keshminder, 2022). This process is instrumental in delineating distinct research streams, contributing to a more structured and comprehensive understanding of the subject matter. The authors used bibliometric analysis to conduct a systematic literature review because of its ability to synthesise extensive bibliometric data that represent the state of the intellectual structure of a topic and emerging trends (Oppioli et al., 2023; Secinaro et al., 2025). Furthermore, bibliometric analysis is appropriate when the scope of the review is broad, and the dataset is large enough to preclude a manual review, as in fintech (Bhaskar and Bansal, 2022; de Bem Machado et al., 2022). Considering the research gaps described in the introduction section, bibliometric analysis integrated with in-depth factorial analysis enables the objectives of the study to be met through a rigorous and systematic search procedure (Uluyol et al., 2021). Implementing this methodology facilitates the analysis of bibliometric variables, including authors, citations, keywords, and publication countries (Lal et al., 2022; Pandey, Hunjra, et al., 2023). This approach enables the generation of thematic analyses of the sample, providing a comprehensive understanding of its scope and impact (Zupic and Čater, 2015). Furthermore, delineating research streams paves the way for future efforts by other scholars to undertake fruitful future research efforts, building on the foundations established by this analysis (Athanasiadou and Theriou, 2021; Paul and Criado, 2020; Shepherd et al., 2021).

According to Massaro et al. (2016) and Secundo et al. (2020), to analyse accountability in the fintech industry, the researchers followed a methodology comprising the following five rigorous steps:

1. Formulation of the RQs;
2. Writing of the research protocol;
3. Determining the research sample;
4. Development of coding schemes for analysis;
5. Critical analysis, discussion, and identification of future research.

To determine relevant literature, the analysis utilised Scopus, the largest citation database for peer-reviewed literature in economics and management. Okoli (2015) asserts that it is a multidisciplinary database with more indexed journals than Web of Science, making it highly suitable for management researchers. Despite these results, two researchers independently examined the two databases to ensure no significant and relevant sources were missed (Secinaro et al., 2022). Furthermore, the authors conducted a methodology consistent with the SPAR-4-SLR criteria of Paul et al. (2021). In particular, the SPAR-4-SLR was used because it has broader applicability in management studies, whereas PRISMA is primarily utilised in the medical sector (Moher et al., 2009; Page et al., 2021). Furthermore, the SPAR-4-SLR provides a methodological framework that encompasses all crucial steps and ensures rigour in selecting and evaluating studies, allowing for an in-depth understanding of emerging trends and patterns in the management field. On the other hand, the different frameworks reflect different aspects. For example, the ADO reflects current and future knowledge (Lim et al., 2021), while the TCM Framework explains why, how and where knowledge was acquired (Tsiotsou and Boukis, 2022), and finally the TCCM sheds light on various theories, contexts, characteristics and methodologies (Sharma et al., 2023). Based on the above observations, SPAR-4-SLR is particularly appropriate for explaining the phenomenon of accountability in fintech because, compared to the other models, it provides a more comprehensive and detailed representation of past and future research trends (Page et al., 2021). Fig. 3 presents data assessing the reliability and reproducibility of the study. Inclusion and exclusion criteria were applied in the analysis, and the search key identified publications published between 2016 and 2022. According to Martínez-López et al. (2018), when conducting bibliometric analyses, excluding partial years is advisable to avoid considering incomplete data that could distort the results.

Grey literature, including conference proceedings and book chapters, was included in the sample as it is was considered suitable for identifying disruptive tools and relevant technological changes in the fintech sector (Casino et al., 2019). Furthermore, grey literature studies enable the identification of references for further studies relevant to the research objective (Iribarren et al., 2017). The papers were also meticulously reviewed, highlighting aspects relevant for the research. The research analysed the results of 135 articles, focusing exclusively on English-language sources (Brescia et al., 2021). Considering the hybrid approach to the literature review, quantitative analysis enables researchers to avoid bias and focus on articles directly related to the research focus (de Bem Machado et al., 2021). In addition, the study employed the evaluation strategy of snowball sampling to scrutinise the sample for relevant sources not included in the Scopus dataset (Noy, 2008).

The analysis was conducted using Bibliometrix, a statistical package in R-Studio (Aria and Cuccurullo, 2017). It gathers bibliometric information, including authors, citations, country information and keywords (Biancone et al., 2023). Through citation analysis, it is possible to explore the structure of a topic investigating the articles used as references in an article (Cobo et al., 2011). Although it allows the identification of meaningful connections between authors, this approach primarily investigates past research topics, focusing on past contributions rather than new ones (Eck and Waltman, 2009). However, the method proves effective in providing a holistic view of the specific field of study (Sadraei et al., 2022). According to Donthu et al. (2020), data on country relations are valuable for obtaining information on where the topic is most discussed and for examining whether correlations occur between authors' contributions and interests. Keyword analysis, a bibliometric technique for analysing the primary content of selected publications (Di Vaio et al., 2022), enables the visualisation of the essential words in a search field and their occurrences.

4. Results

The bibliometric analysis provides a scientific study and a comprehensive view of the area of scientific investigation (Secinaro et al., 2020). Indeed, implementing bibliometric analysis is pivotal in identifying the key characteristics of the studied topic (Ahmed and Hussainey, 2023). This analytical approach facilitates the resolution of research questions through a blend of quantitative and qualitative variables, thereby enabling a comprehensive and nuanced understanding of the subject matter (Cobo et al., 2011). First, this section reports the main bibliometric descriptive statistics, such as the sample of articles, and includes details on document types and annual scientific output. Secondly, the aspects concerning the scientific sources and the author's keywords most used in the scientific article were analysed. Third, the analysis explores the academic network by exploring collaborations between authors from different countries. Finally, the section investigates the main themes of studies on fintech and accountability through the factor analysis reported in the dendrogram topic.

4.1. Descriptive bibliometric analysis

Table 1 presents the selected sample of 135 papers extracted from the Scopus database and published from 2016 to 2022. Although there are papers in the literature related to fintech before 2016, only since then have articles emerged that combine fintech with the concept of accountability (Guerar et al., 2020; Zhu and Zhou, 2016). Research on the topic has grown as a result of external factors, particularly the General Data Protection Regulation (EU) 2016/679 (GDPR) (European Union, 2016). The EU has been promoting the development of fintech by publishing the GDPR that clarifies how personal data should be processed, including how it is collected, used, protected and shared (Regulation (Eu) 2016/679 of the European Parliament and of the Council, 2016). The total number of sources within the sample is 108, divided between journals, books and others. On the one hand, the average annual growth of publications of 76.27 % indicates the scientific community's interest in integrating the two concepts. On the other hand, the high number of references illustrates the multidisciplinary nature of the topic (Secinaro et al., 2020).

Table 1 demonstrates the level of co-authorship between the different authors participating in the scientific production. The average number of authors in a single paper is 2.99, and the international co-authorship is 21.48 %. This value suggests limited international collaboration between authors from different countries. The diversity of national regulations or supranational bodies leads to little collaboration (European Parliament, 2019; Ganderson, 2021). However, the number of collaborations is small due to the different regional applications of fintech in different economies worldwide (Frost, 2020). The keywords authors use are about four times higher than the number of published papers. This figure indicates that the topic was approached from different perspectives (Biancone et al., 2022). Table 1 illustrates the types of papers selected within the sample, such as articles, books, book chapters, and conference papers.

Table 2 presents the distribution of sources and illustrates that the sources that publish the most on the topic are specialised in accountability, blockchain, science and technology. The journal titled "Transforming climate finance and green investment with blockchains" ranked first in terms of published papers (8). This journal explores the connections between this disruptive technology and global efforts to combat climate change. Furthermore, it discusses the many impactful benefits of blockchain. The second-largest journal is "International journal of production research", with four published papers. This journal specialises in the production, industrial engineering, operations research and management science. In addition, other leading journals focus on topics such as accountability, technology, and management from an engineering and information perspective. The analysis of the different sources reveals the multidisciplinary nature of the topic. Finally, the presence of conference proceedings underscores the embryonic nature of the topic in the academic literature. An example related to the research topic is the 6th International Conference for Convergence in

Table 1
Variables description.

Main information	Explanation	Results
Documents	Total number of documents	135
Sources	Total frequency distribution of sources as journal, books etc	108
Author's Keywords (DE)	Total number of keywords	452
Keywords Plus (ID)	Total number of phrases that frequently appear in title of an article's references	500
Period	Years of publication	2016–2022
Annual Growth Rat%	The average annual growth rate	76,27
Document Average Age	The average number of documents per year	2,7
Authors	Total number of authors	390
Authors of single-authored documents	The number of single authors per articles	25
Co-Authors per Documents	The average number of co-authors in each document	2.99
International co-authorships %	The average percentage of international co-authorship	21,48
References	Total number of references	7213
Average citations per documents	The average number of citations in each article	17,8
Article	Total number of articles	60
Book	Total number of book	4
Book chapter	Total number of book chapter	32
Conference paper	Total number of conference paper	33
Review	Total number of review	6

Source: Authors' elaboration using the bibliometrix R-package.

Table 2
Sources for Fintech and Accountability.

Sources	Articles
Transforming Climate Finance and Green Investment with Blockchains	8
International Journal of Production Research	4
Lecture Notes in Business Information Processing	4
International Journal of Scientific and Technology Research	3
2021 6th International Conference for Convergence in Technology	2
Accounting, Auditing and Accountability Journal	2
Economics, Law, and Institutions in Asia Pacific	2
Handbook of Blockchain, Digital Finance, and Inclusion	2
Ieee Transactions on Engineering Management	2
Journal of Enterprise Information Management	2

Source: Authors' elaboration using the bibliometrix R-package.

Technology, which brings together research on data science, blockchain, Artificial Intelligence and technology applications.

Fig. 4 indicates that in terms of annual scientific production, there is a steady increase in the publication of papers. From 2016 to 2021, scientific production on the topic showed consistent growth, except in 2022, when there was a decrease in publications, although it remained consistently above 30 papers in one year. Notably, the two most significant growth rates were observed in 2017 and 2019.

In connection with Arner's (2016) framework showing the third phase of Fintech (2009-present) and given the absence of documents published between 2009 and 2016 within the sample used for the analysis, a second data collection was carried out by excluding accountability topics within the search string. This approach allows combining and showing the results obtained regarding the third phase of Fintech, which began in 2009 and continues to this day. Table 3 summarises key information concerning documents published in the two different time slices. The first time slice includes documents published from 2009 to 2016, while the second time slice includes documents published from 2016 to 2022. Within the first time slice, 134 documents were published from a total of 93 sources, while in the second time slice, 126 documents were published from a total of 102 sources. To better understand the central topics of the two-time slices, the analysis involved the authors' five most frequently used keywords. For the first time slice, as shown in Table 3, the keywords most frequently occurring are the topics of decision support systems, artificial intelligence, credit scoring, machine learning, and classification. These topics were also highly relevant within this period due to the financial crisis 2008. Turning to the themes from 2017 to 2022, the five keywords most frequently used by the authors are blockchain, smart contracts, DLT, supply chains, and transparency. In particular, the themes of this second time horizon focus on aspects of information and data security and reliability enabled by blockchain technology, while placing significant emphasis on transparency. In addition, the table also reveals the total number of citations obtained by the papers published in the two-time slices. Being less recent, the papers in the first slice received more citations. However, interest in the topic remains high even in the second time slice, given the citations received by the papers.

Looking deeper into the temporal division highlighted by the framework used in the literature review phase, the thematic analysis derived from the authors' keywords reveals the main topics and how, in 2016, researchers' interests shifted (Arner, 2016). Prior to 2016, research primarily focused on understanding the dynamics of fintech decision-making systems and how technology could advance these tools. From 2009 to 2016, the central themes regarding credit scoring were still heavily influenced by the 2008 financial

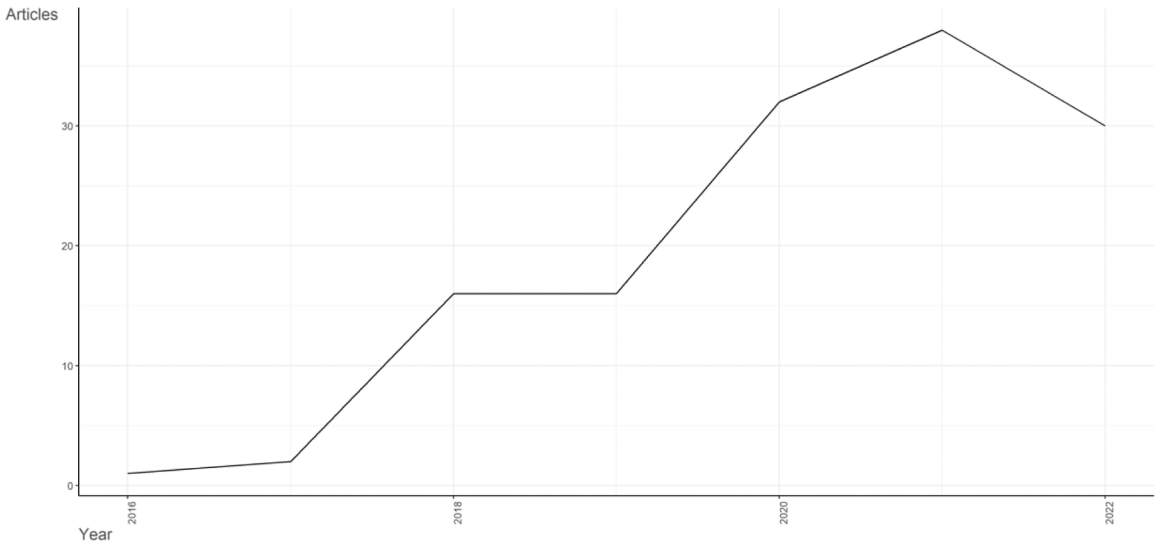

Fig. 4. Annual Scientific Production. Source: Authors' elaboration using the bibliometrix R-package.

Table 3
Summary table of article published before and after 2016.

	2009–2016	2017–2022
Number of published documents	134	126
Number of sources	93	102
Top five author keywords	Decision support system	Blockchain
	Artificial intelligence	Smart contract
	Credit scoring	DLT
	Machine learning	Supply chain
	Classification	Transparency
Sum of citations received by documents	5080	2295

Source: Authors' elaboration using the bibliometrix R-package.

crisis and decision support with technologies such as artificial intelligence and machine learning. Furthermore, Fig. 5 shows that in 2016, there was a fundamental change in the central themes related to this topic. Specifically, it highlights how the strong connection between the fintech tool and technological progress has led to an increase in the number of studies focusing on the potential of disruptive technologies such as artificial intelligence, machine learning and blockchain often at the expense of other topics.

4.2. Author's keywords

This section of the study delves into the keywords used by the authors to explain the phenomenon of fintech and accountability. Analysing the keywords employed by authors is critical in discerning the prevailing research trends within a given topic (Biancone et al., 2022). This analysis not only aids in identifying potential gaps in the existing literature but also proposes avenues for future research (Goodell, 2020; Lal et al., 2023). Table 4 presents the frequency of keywords identified by the authors of the documents selected in the sample. The keywords that have a higher numerosity and are visible in the table are 'Blockchain' (96), 'Smart contracts' (22), 'DLT' (16), 'Supply chain' (14), 'Transparency' (14), 'Cryptocurrency' (12).

According to Zhu and Zhou (2016), blockchain is defined as a decentralised and distributed ledger technology (DLT) that ensures data security and integrity. Specifically, in the fintech context, blockchain enables simultaneous registration on multiple servers during the transitions, reducing the possibility of forgery (Böhme et al., 2015; Secinaro et al., 2021). Based on these premises, this technology has been recognised for its great potential in fintech (Pilkington, 2015). Turning to the author's keyword 'Smart contract', which recorded 22 frequencies in the sample, these refer to generic scripts used to develop decentralised applications in many areas besides payments (Tsai et al., 2019). Smart contracts combined with fintech have the potential to transform auditing financial statements, cryptocurrency payments and others (Rozario and Thomas, 2019). The third author's keyword regarding frequencies within the sample is DLT, with 16 frequencies. DLT stands for Distributed Ledger Technology, and a blockchain is a form of DLT with a specific technological application. DLT is designed to enhance efficiency, reduce costs and ensure immutability, traceability, security and transparency (Hashimy et al., 2021). Then, in terms of frequencies, the keyword 'Supply chain' appears 14 times. In the present context, an institution's supply chain can be improved by implementing crowdfunding by fintech. These solutions allows entities to improve its working capital and the role the entity plays within the supply chain (Çağlıyangil et al., 2020). The keyword

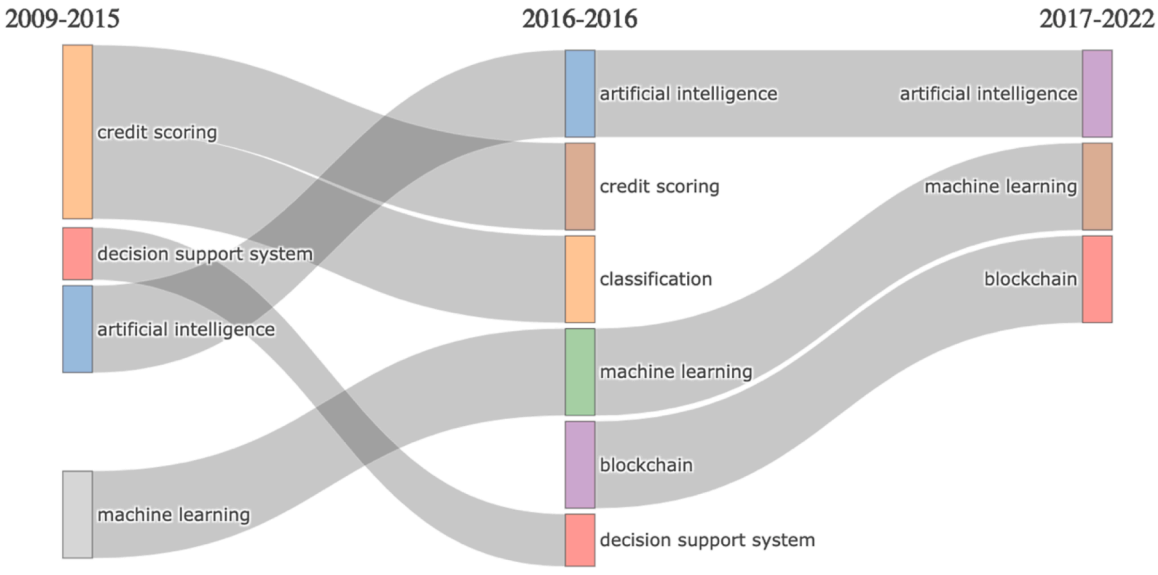

Fig. 5. Thematic Evolution. Source: Authors' elaboration using the bibliometrix R-package.

Table 4
Author's Keywords in Fintech and Accountability.

Author's Keywords	Occurrences	Frequency
Blockchain	96	21,24 %
Smart contract	22	4,87 %
DLT	16	3,54 %
Supply chain	14	3,10 %
Transparency	14	3,10 %
Cryptocurrency	12	2,65 %
Fintech	9	1,99 %
Technology	9	1,99 %
Artificial intelligence	6	1,33 %
Bitcoin	6	1,33 %

Source: Authors' elaboration using the bibliometrix R-package.

'Transparency' is also mentioned 14 times within the sample. Transparency is element of the concept of accountability. In particular, authors use this concept to express transparency in communications between different entities (Feller et al., 2017). Furthermore, the concept of transparency is central to the topic of fintech but with a focus on its applications using blockchain technology (Zhu and Zhou, 2016). The author's keyword 'Cryptocurrency' is among the most frequently used keywords within the reference sample, with 12 frequencies. Cryptocurrencies are digital currency systems based on computer cryptography and decentralised (peer-to-peer) network architecture (R. Bhaskar et al., 2022; Li and Wang, 2017). In fintech, cryptocurrencies function as peer-to-peer electronic money systems that allow online payments to be sent without involving any financial institution (Corbet et al., 2020). Underlying all cryptocurrencies is blockchain technology, which ensures the security of transactions (Arslan-Ayaydin et al., 2020).

4.3. Co-author analysis

Fig. 6 illustrates the collaboration between different authors who participated in writing papers on the research topic in question. Through this analysis, it is possible to answer the second research question of this study. The Country Collaboration Map shows that the most pronounced collaborations are found between authors from Commonwealth countries. The cultural influences of British imperialism have shaped similar economic systems (Commonwealth Secretariat, 2022). Therefore, the analysis underscores shared regulations for both fintech and user responsibility. Consequently, it suggests a strong collaboration between Australia and Great Britain on economic phenomena. In addition, the figure indicates that American authors engage in significant collaborations with authors from the UK and China. India is also among the countries with extensive international collaborations. In particular, Indian authors collaborate with European, American and Chinese authors. Furthermore, this figure shows substantial differences between fintech Europe and fintech Asia (Morgan, 2022). The key difference is that in Europe, the leading companies in this sector emerge, aiming to compete in the banking sector. In contrast, in Asia, there is a transformation of the major e-commerce and e-payment players (Gupta and Xia, 2018). These differences between the development of fintech in the two continents are likely influenced by differences in government-imposed regulations (Ferreira and Sandner, 2021).

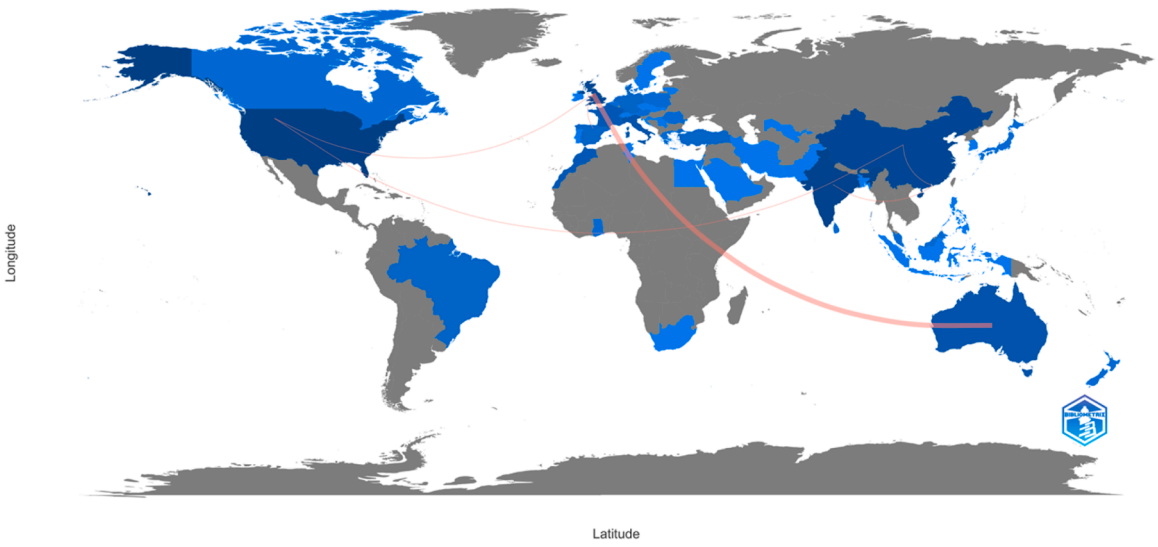

Fig. 6. Country Collaboration Map. Source: Authors' elaboration using the bibliometrix R-package.

4.4. Cluster analysis

In this section, the authors clearly outline the search clusters that have emerged from the correlation analysis conducted on the keywords used within the titles and abstracts of the relevant literature (Pandey et al., 2023). This detailed presentation aims to elucidate the interconnections and thematic concentrations identified in the analysis (Boyack and Klavans, 2010). In particular, the Topic Dendrogram (Fig. 7) shows the hierarchical relationships between the different keywords employed in the studies (Aria and Cuccurullo, 2017). Fig. 7 also presents the result of factor analysis with correspondence analysis as a method for analysing keyword parameters (P. P. Biancone et al., 2022).

The first cluster identified (red) focuses on how current risks are mitigated and managed through regulation. The rapid development of disruptive technologies poses significant challenges to regulatory authorities, particularly in their capacity to adapt swiftly to unforeseen technological changes (Omarova, 2020). Specifically, the real challenge lies in the reduced response time required to safeguard customers and investors while managing the risks associated with technological advancements (Ferreira and Sandner, 2021). The transformative technologies in the fintech industry, coupled with increasing accountability, necessitate the development of appropriate regulatory tools. This involves adapting existing regulations and designing new ones to keep pace with these changes (Massad, 2019). Presently, the most conspicuous regulatory gap pertains to cryptocurrencies, contributing to legal uncertainty and inadequate investor protection (Office of Financial Research, 2018). From the analysed sample, it is evident that the pursuit of suitable regulation is a global endeavour, albeit approached differently across various jurisdictions. Some jurisdictions aim for precise and industry-friendly regulations to attract the fintech sector and investors (Jayasuriya and Sims, 2022; Massad, 2019), while others prioritize managing risk through robust regulations. Additionally, certain states have adopted a 'wait-and-see' stance regarding the introduction of new regulations (Chenguel, 2023; Ferreira and Sandner, 2021).

The second cluster identified (blue) elucidates the impact of fintech and accountability on the governance aspect, encompassing all facets of management, accounting, and the subsequent auditing phase (Ntanos et al., 2020). Within this analysis, governance is interpreted as the set of actions aimed at managing and steering organizational processes that influence local economies, public entities, enterprises, and states (Prux et al., 2021). In these domains, blockchain technology emerges as a pivotal opportunity, enabling auditing and accounting professionals to enhance corporate information systems and enhance accountability (K. Bhaskar and Flower., 2019; Lombardi et al., 2021). Consequently, there arises a necessity to reassess and adapt auditing and accounting procedures in response to these technological advancements (Rozario and Thomas, 2019). A notable opportunity for bolstering the accountability of various entities is the transition towards an innovative accounting method known as triple-entry accounting (Cai, 2021). Nonetheless, the implementation of blockchain within the triad of governance, accounting, and auditing presents a considerable challenge due to its inherent complexity (Kahyaoglu, 2019; Sheldon, 2019).

The green cluster encompasses keywords that epitomize the concepts of transparency, trust, traceability, and climate finance, achievable through disruptive technologies within the fintech sector, thereby enhancing accountability (Schloesser and Schulz, 2022).

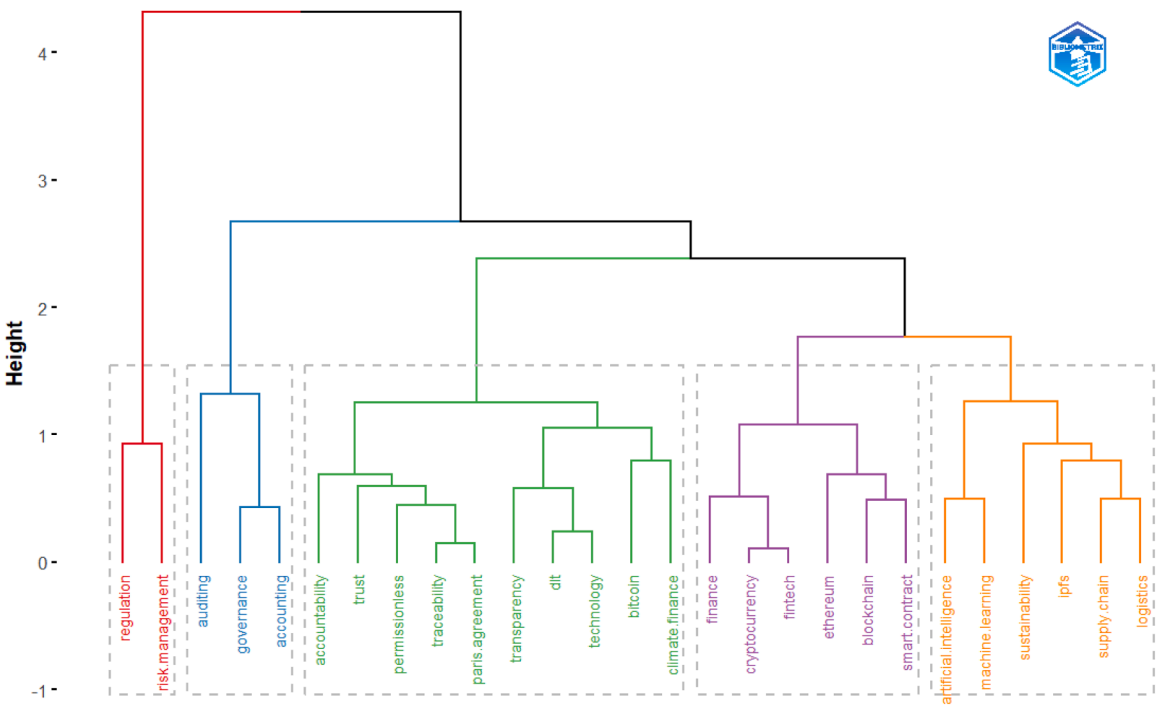

Fig. 7. Topic Dendrogram. Source: Authors' elaboration using the bibliometrix R-package.

This form of accountability relies on blockchain and Distributed Ledger Technology (DLT), which enable trustless transactions characterized by traceability and transparency (Hashimy et al., 2021). Additionally, this cluster correlates with the objectives of the Paris Climate Agreement, particularly the Sustainable Development Goals (SDGs) (United Nations, 2015). This reference highlights the role of fintech in mobilizing substantial capital flows to steer the global economy towards climate neutrality (Marke and Sylvester, 2018). In this regard, fintech and enhanced accountability are seen as pivotal in amplifying opportunities for green investments (Charamba et al., 2021). The attributes of security, transparency, and verifiability inherent in DLT position it as a significant enabler for environmental transformation (Schloesser and Schulz, 2022).

The purple cluster shows the future trends and promising opportunities of fintech and accountability. This cluster incorporates keywords pertinent to cryptocurrencies, blockchain, and smart contract technologies. The topic of cryptocurrencies is particularly salient in this study due to its integration of multiple disruptive technologies (Corbet et al., 2020). Given their high transparency and data-intensive nature, it is crucial to explore whether cryptocurrencies might offer a safer alternative to traditional currencies in the future (Kumar et al., 2019). Nonetheless, the risks associated with cryptocurrencies, particularly concerning monetary policy and financial stability, stem from their limited control and regulation (Chenguel, 2023). Elbashbishy et al. (2022) suggest that future research in the literature supporting fintech will likely focus on cryptocurrencies, smart contracts, and payment procedures.

Finally, the yellow cluster encompasses concepts related to leveraging technology to enhance sustainability in supply chain and logistics operations. Key technologies facilitating these improvements include Machine Learning and Business Intelligence (Tamang et al., 2021). For instance, Machine Learning enables the prediction of customer satisfaction in future periods (Tian et al., 2021) and aids in managing an organization's financial risk by minimizing errors (Cheng et al., 2021). Furthermore, Machine Learning facilitates the implementation of Business Intelligence, which is instrumental in the collection, integration, and analysis of raw data, transforming it into insightful information (Tamang et al., 2021). The adoption of these technologies offers substantial benefits to organizations, notably in enhancing operational processes, delivering superior customer service, analysing large datasets, and accessing real-time information (Attaran and Deb, 2018). Additionally, Köhler and Pizzol (2020) highlight that blockchain-based technologies are instrumental in promoting sustainability within food supply chains.

5. Discussion

Based on the results presented in the previous section, this section aims to answer RQ3. In this study, the literature is analysed to define the technologies that enable greater accountability within each fintech segment (Dorfleitner et al., 2017). Specifically, the different fintech segments identified in the literature are examined in connection with the clusters identified in the factor analysis and visualised through the topic dendrogram (Biancone et al., 2023; Dorfleitner et al., 2017).

The red cluster identified in the topic dendrogram, comprising concepts such as regulation and risk management influences all fintech segments. In the fintech sector, regulations have not always kept up with the proliferation of technologies (Bonsón and Bednárová, 2022; Hornuf et al., 2025). Looking ahead, regulatory developments could have a significant impact on the various fintech segments (Pocher and Veneris, 2021). In addition, data sharing facilitated by new technologies enables value creation. However, managing the risk associated with the disclosure of information and data remains critical (Grassi and Lanfranchi, 2022). Consequently, concerns regarding the disclosure of information and data include the risk of human rights violations, data security and subject privacy (Robbins, 2020). Institutions and states should strike the right balance between regulation and risk management to support the development of different segments while maintaining a certain security threshold (Chenguel, 2023; Ferreira and Sandner, 2021). An example of regulation is the General Data Protection Regulation, (2016)/679 (GDPR) (European Union, 2016). This regulation has facilitated the development of fintech by regulating the handling of personal data (Regulation (Eu) 2016/679 of the European Parliament and of the Council, 2016).

5.1. Financing

Disruptive technologies that enable improvements within the financing segment include blockchain, DLT, Artificial Intelligence and the cloud (Bonsón and Bednárová, 2022; Halden et al., 2021; Kumar et al., 2019). These technologies facilitate greater speed, enhanced quality and accuracy of information (Zhu and Zhou, 2016). Through increased transparency and accountability, a decentralised information flow can be realised (Kaminski, 2020). Consequently, these advancements seek to steer large amounts of capital towards green investments (Nguyen and Pham, 2025; Schloesser and Schulz, 2022). The common goal of lenders using crowdfunding and partner lending institutions (credit and factoring) is to foster the transition of our global economy towards climate neutrality (Marke and Sylvester, 2018). To achieve this, lending institutions increasingly require ESG and sustainability ratings to grant credit to institutions (Ferilli, et al., 2024). Therefore, this increased focus by lending institutions promotes a greater propensity for providing information such as sustainability report and integrated reports and, consequently, enhanced accountability among different economic actors. In this context, the financing segment could play a pivotal role in supporting the Paris climate agreement and the SDGs (Charamba et al., 2021; Tang et al., 2024).

5.2. Asset management

Within the asset management segment, disruptive technologies enable and facilitate asset management, personal wealth indicators and financial advice (Liu et al., 2014). In particular, technologies enable a more effective comparison of traditional and online wealth management (e.g., social trading and investment and banking) or automation of portfolio management (robo-advice and Personal

Financial Management) (Ferilli, et al., 2024; Sironi, 2016). The algorithms and information systems powered by Machine Learning and Artificial Intelligence are the disruptive technologies that make these functionalities possible (Tamang et al., 2021). As indicated in the results section, Machine Learning supports predictive activities; thus, algorithms are developed to understand investment trends (Cheng et al., 2021). However, Machine Learning not only facilitate the achievement of sustainability goals by predicting the social, economic and environmental impacts of operations but also increases transparency and, thus, accountability of companies for their actions (Attaran and Deb, 2018; Tang et al., 2024).

5.3. Payments

Blockchain and smart contracts are the most widely used disruptive technologies in the payments segment, as evidenced in the results section (Cong and He, 2019). In particular, blockchain technology not only reduces the risk of transaction forgery but also enhances accountability (Galeone et al., 2024; Köhler and Pizzol, 2020). Specifically, blockchain facilitates trustless transactions that were not possible or very risky in the past (Tian et al., 2021). Indeed, this technology allows records to be stored on several servers simultaneously (Elbashbishy et al., 2022). Transaction information is stored by a network of peers making its alteration extremely complex (França et al., 2020). Blockchain technology underpins cryptocurrencies because it enables secure, robust, traceable and reliable transactions and bolsters transparency and accountability (George et al., 2019). For example, it supports cryptocurrencies such as Ethereum and Bitcoin (Böhme et al., 2015). Furthermore, using blockchain curtails opportunistic behaviour and the impact of uncertainty related to potential regulatory, political, economic or behavioural changes (Drago et al., 2025; Schmidt and Wagner, 2019). Therefore, it is possible to use these technologies to exchange and pay for traditional currencies and to trade cryptocurrencies (Secinaro et al., 2021). Additionally, blockchain technology has revolutionised traditional transfers through peer-to-peer money transfers (Feller et al., 2017). The payments segment is arguably one of the most relevant with regard to the possible evolutions that may happen in the future (Dorfleitner et al., 2017; França et al., 2020; Giakoumelou et al., 2024). In particular, a significant change may take place if and when states recognise cryptocurrencies (Corbet et al., 2020). If this recognition occurs in the future, it may induce a substantial change and innovation within this segment of the fintech with repercussions on others as well (Massad, 2019). As a result, the comparison regarding increased security between traditional currencies and cryptocurrencies will be one of the most relevant issues in the future (Ferreira and Sandner, 2021).

5.4. Other Fintechs

Finally, the last segment of the fintech sector encompasses all those activities that are not part of the other clusters (Dorfleitner et al., 2017). According to the results section, the areas of accounting, auditing and governance of different institutions will be significantly influenced by blockchain (Ferilli, Altunbas, et al., 2024; Kahyaoglu, 2019). Numerous studies in the literature suggest that this technology can also improve public as well as corporate accounting. Trustless transactions with increased control against fraud can revolutionise accounting, auditing and governance (Prux et al., 2021). Consequently, governance must adapt to the evolution in how information is collected (Zachariadis et al., 2019). Based on these premises, it is evident that technological change is prompting an evolution of double-entry accounting with a shift to triple-entry accounting (Cai, 2021). Therefore, it is imperative for institutions to follow the developments in triple-entry accounting and consider placing information in the cloud. By doing so, growth in transparency and accountability will be achieved by allowing validated files, reliability of sources, and reduction in the number of intermediaries (Ntanos et al., 2020).

6. Future research avenues

Regarding future research perspectives, the authors believe that future studies should deepen the debate on this research topic. While the analysis conducted identifies the opportunities and risks for accountability in the fintech sector arising from the integration of disruptive technologies, future research should test and identify other technologies for the relevant domains. In particular, the authors suggest that future analyses could expand the theoretical framework with new domains of fintech to be included in the authors' framework, considering the phenomenon's evolution and the growing interest of international bodies in the topic. Furthermore, the analysis of disruptive technologies requires integrated frameworks to collect and present information that align with study findings. The analysis thus paves the way for many future studies on the accountability of the fintech sector as a basis for expanding

Table 5
Research area and future research questions.

Research area	Future research questions
Financing	1) What is the potential impact of European incentives towards the adoption of disruptive technologies in a smart city context? 2) How can the different economies identified provide financing services based on disruptive technologies to foster accountability?
Asset management	1) What regulations can provide a framework for asset management introducing sustainability-based assessment elements?
Payments	1) How does a data-driven approach impact reporting to implement transparency and accountability? 2) What initiatives enable changes in governance approaches to technological introductions in accounting systems?
Other fintechs	1) Which technologies can change the insurance service by providing greater accountability and sustainability?

Source: Author's elaboration.

transparency, accessibility, and sustainability.

Table 5 presents specific research questions for potential research (Chaudhary et al., 2021). The authors suggest several questions to satisfy some of the gaps identified in the literature. Notably, the authors also subdivided the questions according to research area. Starting from the research area 'Financing', it will be relevant to understand the impact of adopting the new technologies identified above within the smart city context. Furthermore, it is deemed essential to understand how different economies can offer financial services based on disruptive technologies to increase accountability. Turning to the research area of 'Asset management', it is suggested that future research should investigate which regulations aim to introduce a framework that considers sustainability-based assessment elements for asset management. This approach will make it possible to understand which regulations have a more significant impact concerning this aspect. Within the research area of 'Payments', the authors suggest research questions to understand how a guided approach can influence reporting to increase the level of transparency and accountability. Furthermore, the second question suggests identifying which initiatives enable a change in governance approaches due to the use of new technologies within accounting systems. Finally, concerning the last research area of 'Other fintechs', research is suggested to identify which technologies can change the insurance service with regard to sustainability and accountability.

7. Conclusion

Drawing on Dorfleitner et al. (2017) framework, the present research has explored the role of disruptive technologies within fintech areas to highlight the state-of-the-art and potential developments related to accountability. The research proposes a clustering of research strands to investigate the body of knowledge and provide an integrated fintech and accountability framework to synthesise the available evidence from different fields. To achieve this goal, the authors conducted a bibliometric analysis to map sources, countries involved in studying the phenomenon through the analysis of authorship information and keyword usage (Oppioli et al., 2023; Trotta et al., 2024).

The present research contributes to broadening the understanding of risks and opportunities arising from disruptive technology for accountability in fintech knowledge, thereby addressing the third research question. It underscores differences in the concept of fintech based on economic context. The analysis clarifies these differences by shedding light on collaborations between authors in similar maturity-level economies using the fintech tool for homogeneous objectives. The significance of the contribution lies in the regulatory characterisation of the phenomenon, which varies across similar areas and is influenced by the cultural and regulatory sphere of reference (Commonwealth Secretariat, 2022). Secondly, the study elevates the topic of sustainability to the forefront (Schloesser and Schulz, 2022). Several international entities have contributed to an increased focus on non-financial reporting as a tool for conveying accountability (Giakoumelou et al., 2024; La Torre et al., 2018). Consequently, introducing an ESG rating as a criterion for funding procedures helps to achieve sustainability goals and ensures greater accountability for the actions of funding organisations (Charamba et al., 2021). Thirdly, the research identifies a forward-looking topic of particular interest in the context under analysis. Integrating disruptive technologies - blockchain and AI - requires governance capable of adopting new accounting approaches and different data dissemination methods (Cai, 2021). Therefore, the paper contributes to highlighting the critical importance of decision-makers in ensuring greater access to information for stakeholders and enhanced accountability in accounting operations.

This paper has several theoretical implications. According to the framework of Dorfleitner et al. (2017), this study extends the understanding of the latest chronological phase by introducing disruptive technologies to enhance accountability. Specifically, the paper refines research streams by identifying new challenges for understanding the evolving phenomenon. Secondly, the paper provides a time foundation for a new season in the fintech industry. While the last season of the framework was a consequence of the 2008 global economic crisis (Dorfleitner et al., 2017), since 2016 researchers have developed a new research stream (Guerar et al., 2020). The integration of accountability within the research domain was not previously emphasized and had set the stage for parallel and consequential developments in the EU's regulations (European Union, 2016). The entire fintech discipline is susceptible to regulatory changes, which underscores the need for and originality of a synthesis paper on research related to different disruptive technologies for the benefit of accountability in the fintech industry. Thirdly, this paper provides a future research agenda that is both rigorous and practical for researchers in the field who wish to explore the phenomenon of accountability. By suggesting future research questions to other scholars, it will be possible to fill new gaps in the literature that have been previously identified.

Additionally, this analysis provides practical implications for numerous stakeholders, such as managers and policymakers. Firstly, the study highlights the need to reformulate regulatory instruments to keep up with the rapid changes in the field. In this sense, the cryptocurrency regulation currently in place lacks sufficient mechanisms to allow stakeholders to assess the liability of holders and users of the service, and it is a tool that fail to protect investors (Massad, 2019). Secondly, the analysis allows a link between the domain of fintech and ethical finance. Indeed, if interpreted with appropriate tools, the fintech domain could lead the transition of the global economy towards climate neutrality (Marke and Sylvester, 2018) and contribute to pursuing the Paris Climate Agreement and the SDGs (Carè et al., 2023; Charamba et al., 2021). Thirdly, the entry of new technologies concerning predictive technologies, such as machine learning, makes it possible to predict trends while anticipating likely positive or negative effects of an initiative (Tamang et al., 2021). Consequently, regulators should consider a new model that allows users to assess an appropriate level of financial, environmental, and social impacts through corporate communications. Keeping with the regulators' point of view, another practical implication of the study concerns regional differences in regulation that highlight a need for regulatory harmonization (Ganderson, 2021; Milian et al., 2019; Trotta et al., 2024). Fintech tools are characterized by an unrestricted cross-boundary supply. Therefore, to avoid establishing convenience policies that favour the use of a tool in one region over another, regulatory unification and harmonization dictated by supranational bodies may allow for greater uniformity and transparency in the use of these tools.

Like other research, the present study is subject to certain limitations. While snowball sampling may mitigate risks, the exclusive

reliance on the Scopus database could inadvertently result in the omission of pivotal research contributions. Furthermore, the dynamic nature of research implies that subsequent studies may challenge or supersede the findings of this study. Thirdly, the study's research design inherently bears limitations, particularly concerning the selection of keywords for the search string, which significantly influences the scope of the research. Lastly, the study did not incorporate insights from professionals and managers obtained through non-academic channels, which could provide additional practical perspectives.

CRediT authorship contribution statement

Lanzalonga Federico: Writing – review & editing, Writing – original draft, Investigation, Data curation, Conceptualization. **Secinaro Silvana:** Validation, Supervision, Project administration, Methodology, Conceptualization. **de Nuccio Elbano:** Visualization, Supervision, Investigation. **Oppioli Michele:** Writing – review & editing, Writing – original draft, Visualization, Software, Methodology, Formal analysis.

Declaration of Competing Interest

- All authors have participated in (a) conception and design, or analysis and interpretation of the data; (b) drafting the article or revising it critically for important intellectual content; and (c) approval of the final version.
- This manuscript has not been submitted to, nor is under review at, another journal or other publishing venue.
- The authors have no affiliation with any organization with a direct or indirect financial interest in the subject matter discussed in the manuscript

The following authors have affiliations with organizations with direct or indirect financial interest in the subject matter discussed in the manuscript:

Data availability

Data will be made available on request.

References

Ahmed, F., Hussainey, K., 2023. A bibliometric analysis of political connections literature. Rev. Account. Financ. 22 (2), 206–226. https://doi.org/10.1108/RAF-11-2022-0306.

Aria, M., Cuccurullo, C., 2017. bibliometrix: an R-tool for comprehensive science mapping analysis. J. Informetr. 11 (4), 959–975. https://doi.org/10.1016/j.joi.2017.08.007.

Arner, D.W., 2016. 150 years of fintech. JASSA Finsia J. Appl. Financ. 3.

Arner, D.W., Barberis, J.N., Buckley, R.P., 2015. The evolution of fintech: a new post-crisis paradigm? SSRN Electron. J. https://doi.org/10.2139/ssrn.2676553.

Arslan-Ayaydin, Ö., Shrestha, P., Thewissen, J., 2020. Blockchain as a technology backbone for an open energy market. In: Dorsman, A., Arslan-Ayaydin, Ö., Thewissen, J. (Eds.), Regulations in the Energy Industry: Financial, Economic and Legal Implications. Springer International Publishing, pp. 65–84. https://doi.org/10.1007/978-3-030-32296-0_5.

Ashta, A., Herrmann, H., 2021. Artificial intelligence and fintech: an overview of opportunities and risks for banking, investments, and microfinance. Strateg. Change 30 (3), 211–222. https://doi.org/10.1002/jsc.2404.

Athanasiadou, C., Theriou, G., 2021. Telework: systematic literature review and future research agenda. Heliyon 7 (10). https://doi.org/10.1016/j.heliyon.2021.e08165.

Attaran, M., Deb, P., 2018. Machine learning: the new 'big thing' for competitive advantage, 5, 277–305. https://doi.org/10.1504/IJKEDM.2018.10015621.

Behn, R.D., 2001. Rethink. Democr. Account. ⟨https://www.brookings.edu/book/rethinking-democratic-accountability/⟩.

Belleflamme, P., Lambert, T., Schwienbacher, A., 2012. Crowdfunding: tapping the right crowd. J. Bus. Ventur. 29. https://doi.org/10.2139/ssrn.1578175.

de Bem Machado, A., Secinaro, S., Calandra, D., Lanzalonga, F., 2021. Knowledge management and digital transformation for Industry 4.0: a structured literature review. Knowl. Manag. Res. Pract. 0 (0), 1–19. https://doi.org/10.1080/14778238.2021.2015261.

de Bem Machado, A., Secinaro, S., Calandra, D., Lanzalonga, F., 2022. Knowledge management and digital transformation for Industry 4.0: A structured literature review. Knowl. Manag. Res. Pract. 20 (2), 320–338. https://doi.org/10.1080/14778238.2021.2015261.

Bhaskar, K., Flower, J., & Sellers, R., 2019. Disruption in the audit market: The future of the big four (p. 144). Scopus. https://doi.org/10.4324/9780429270611.

Bhaskar, R., Bansal, S., 2022. Nineteen years of emerging markets finance and trade: a bibliometric analysis. Emerg. Mark. Financ. Trade 58 (14), 4120–4135. https://doi.org/10.1080/1540496X.2022.2086041.

Bhaskar, R., Hunjra, A.I., Bansal, S., Pandey, D.K., 2022. Central Bank Digital Currencies: Agendas for future research. Res. Int. Bus. Financ. 62, 101737. https://doi.org/10.1016/j.ribaf.2022.101737.

Biancone, P., Brescia, V., Oppioli, M., 2023. Modest fashion and sustainability: research trends by bibliometric and content analysis. In: Brandstrup, In.M., Dana, L.-P., Ryding, D., Vignali, G., Caratù, M. (Eds.), Understanding History, Developing Business Models, and Leveraging Digital Technologies, *The Garment Economy*. Springer International Publishing, pp. 109–135. https://doi.org/10.1007/978-3-031-33302-6_7.

Biancone, P.P., Brescia, V., Lanzalonga, F., Alam, G.M., 2022. Using bibliometric analysis to map innovative business models for vertical farm entrepreneurs. *Br. Food J.*, *Ahead–Print.*(Ahead–Print.). https://doi.org/10.1108/BFJ-08-2021-0904.

Böhme, R., Christin, N., Edelman, B., Moore, T., 2015. Bitcoin: economics, technology, and governance. J. Econ. Perspect. 29 (2), 213–238. https://doi.org/10.1257/jep.29.2.213.

Bonsón, E., Bednárová, M., 2022. Artificial intelligence disclosures in sustainability reports: towards an artificial intelligence reporting framework. Scopus 54, 391–407. https://doi.org/10.1007/978-3-030-94617-3_27.

Bovens, M., 2007. Analysing and assessing accountability: a conceptual framework. Eur. Law J. 13 (4), 447–468. https://doi.org/10.1111/j.1468-0386.2007.00378.x.

Boyack, K.W., Klavans, R., 2010. Co-citation analysis, bibliographic coupling, and direct citation: which citation approach represents the research front most accurately? J. Am. Soc. Inf. Sci. Technol. 61 (12), 2389–2404. https://doi.org/10.1002/asi.21419.

Brescia, V., Sa'ad, A.A., Alhabshi, S.M.B.S.J., Hassan, R.B., Lanzalonga, F., 2021. Exploring sustainability from the Islamic finance perspective. Eur. J. Islamic Financ 19, 45–53. https://doi.org/10.13135/2421-2172/6107.

Çağlıyangil, M., Erdem, S., Özdağoğlu, G., 2020. A blockchain based framework for blood distribution (Scopus). Contrib. Manag. Sci. 63–82. https://doi.org/10.1007/978-3-030-29739-8_4.
Cai, C.W., 2018. Disruption of financial intermediation by FinTech: a review on crowdfunding and blockchain. Account. Financ. 58 (4), 965–992. https://doi.org/10.1111/acfi.12405.
Cai, C.W., 2021. Triple-entry accounting with blockchain: how far have we come? (Scopus). Account. Financ. 61 (1), 71–93. https://doi.org/10.1111/acfi.12556.
Carè, R., Boitan, I.A., Fatima, R., 2023. How do FinTech companies contribute to the achievement of SDGs? Insights from case studies. Res. Int. Bus. Financ. 66, 102072. https://doi.org/10.1016/j.ribaf.2023.102072.
Casino, F., Dasaklis, T.K., Patsakis, C., 2019. A systematic literature review of blockchain-based applications: current status, classification and open issues. Telemat. Inform. 36, 55–81. https://doi.org/10.1016/j.tele.2018.11.006.
Charamba, K., Arner, D., & Sergeev, A., 2021. BigFintechs and international governance, policymaking and the United Nations Sustainable Development Goals: The SDGs in the international governance of finance..
Chatterjee, P., Das, D., Rawat, D.B., 2024. A generative AI approach for ensuring data integrity security resilience in fintech systems. IEEE 24th Int. Symp. . Clust., Cloud Internet Comput. Workshops (CCGridW) 2024, 168–173. https://doi.org/10.1109/CCGridW63211.2024.00027.
Chaudhary, S., Dhir, A., Ferraris, A., Bertoldi, B., 2021. Trust and reputation in family businesses: a systematic literature review of past achievements and future promises. J. Bus. Res. 137, 143–161. https://doi.org/10.1016/j.jbusres.2021.07.052.
Cheng, Y., Li, Q., Wan, F., 2021. Financial risk management using machine learning method. 3rd Int. Conf. Mach. Learn., Big Data Bus. Intell. (MLBDBI) 2021, 133–139. https://doi.org/10.1109/MLBDBI54094.2021.00034.
Chenguel, M.B., 2023. Blockchain and cryptocurrency: development without regulation? Impact Artif. Intell., Fourth Ind. Revolut. Bus. Success 663–679. https://doi.org/10.1007/978-3-031-08093-7_44.
Cobo, M.J., López-Herrera, A.G., Herrera-Viedma, E., Herrera, F., 2011. Science mapping software tools: Review, analysis, and cooperative study among tools. J. Am. Soc. Inf. Sci. Technol. 62 (7), 1382–1402.
Commonwealth Secretariat, 2022. Commonwealth Countries: Driving FinTech Innovation.
Cong, L.W., He, Z., 2019. Blockchain disruption and smart contracts. Rev. Financ. Stud. 32 (5), 1754–1797. https://doi.org/10.1093/rfs/hhz007.
Corbet, S., Lucey, B., Urquhart, A., & Yarovaya, L., 2020. Cryptocurrencies as a Financial Asset: A systematic analysis..
Cronshaw, S.F., Alexander, R.A., 1985. One answer to the demand for accountability: Selection utility as an investment decision. Organ. Behav. Hum. Decis. Process. 35, 102–118. https://doi.org/10.1016/0749-5978(85)90047-0.
Curtin, D., 2005. Deleg. EU Non-Major. Agencies Emerg. Pract. Public Account. 88–119.
Delle Foglie, A., Keshminder, J.S., 2022. Challenges and opportunities of SRI sukuk toward financial system sustainability: a bibliometric and systematic literature review. *Int. J. Emerg. Mark.*, *Ahead–Print.*(Ahead–Print.). https://doi.org/10.1108/IJOEM-04-2022-0601.
Di Vaio, A., Hassan, R., Alavoine, C., 2022. Data intelligence and analytics: a bibliometric analysis of human–Artificial intelligence in public sector decision-making effectiveness. Technol. Forecast. Soc. Change 174, 121201. https://doi.org/10.1016/j.techfore.2021.121201.
Donthu, N., Kumar, S., Pattnaik, D., 2020. Forty-five years of Journal of Business Research: a bibliometric analysis. J. Bus. Res. 109, 1–14.
Dorfleitner, G., Hornuf, L., Schmitt, M., Weber, M., 2017. Definition of FinTech and Description of the FinTech Industry. In: Dorfleitner, G., Hornuf, L., Schmitt, M., Weber, M. (Eds.), FinTech in Germany. Springer International Publishing, pp. 5–10. https://doi.org/10.1007/978-3-319-54666-7_2.
Drago, C., Minnetti, F., Di Nallo, L., Manzari, A., 2025. Uncovering patterns of fintech behavior in Italian banks: a multidimensional statistical analysis. Res. Int. Bus. Financ. 73, 102598. https://doi.org/10.1016/j.ribaf.2024.102598.
Dubnick, M., 2005. Accountability and the promise of performance: in search of the mechanisms. Public Perform. Manag. Rev. 28 (3), 376–417.
Ebrahim, A., 2003. Accountability in practice: mechanisms for NGOs. World Dev. 31 (5), 813–829. https://doi.org/10.1016/S0305-750X(03)00014-7.
Eck, N.J. van, Waltman, L., 2009. How to normalize cooccurrence data? An analysis of some well-known similarity measures. J. Am. Soc. Inf. Sci. Technol. 60 (8), 1635–1651.
Edwards, M., Hulme, D., 1996. Too close for comfort? The impact of official aid on nongovernmental organizations. World Dev. 24 (6), 961–973. https://doi.org/10.1016/0305-750X(96)00019-8.
Elbashbishy, T.S., Ali, G.G., El-adaway, I.H., 2022. Blockchain technology in the construction industry: mapping current research trends using social network analysis and clustering. Constr. Manag. Econ. 40 (5), 406–427. https://doi.org/10.1080/01446193.2022.2056216.
European Parliament. (2019). Fintech (financial technology) and the European Union.
European Union (Ed.), 2016. Regulation (EU) 2016/679 of the European Parliament and of the Council. Hart Publishing. https://doi.org/10.5040/9781782258674.
Fein, M.L., 2015. Robo-Advis.: A Closer Look. https://doi.org/10.2139/ssrn.2658701.
Feller, J., Gleasure, R., Treacy, S., 2017. Information sharing and user behavior in internet-enabled peer-to-peer lending systems: an empirical study. J. Inf. Technol. 32 (2), 127–146. https://doi.org/10.1057/jit.2016.1.
Ferilli, G.B., Altunbas, Y., Stefanelli, V., Palmieri, E., Boscia, V., 2024. Fintech governance and performance: Implications for banking and financial stability. Res. Int. Bus. Financ. 70, 102349. https://doi.org/10.1016/j.ribaf.2024.102349.
Ferilli, G.B., Palmieri, E., Miani, S., Stefanelli, V., 2024. The impact of FinTech innovation on digital financial literacy in Europe: insights from the banking industry. Res. Int. Bus. Financ. 69, 102218. https://doi.org/10.1016/j.ribaf.2024.102218.
Ferreira, A., Sandner, P., 2021. Eu search for regulatory answers to crypto assets and their place in the financial markets' infrastructure. Comput. Law Secur. Rev. 43, 105632. https://doi.org/10.1016/j.clsr.2021.105632.
Foglia, M., Maci, G., Pacelli, V., 2024. FinTech and fan tokens: Understanding the risks spillover of digital asset investment. Res. Int. Bus. Financ. 68, 102190. https://doi.org/10.1016/j.ribaf.2023.102190.
Fox, J., 2007. The uncertain relationship between transparency and accountability. Dev. Pract. 17 (4–5), 663–671. https://doi.org/10.1080/09614520701469955.
França, A.S.L., Amato Neto, J., Gonçalves, R.F., Almeida, C.M.V.B., 2020. Proposing the use of blockchain to improve the solid waste management in small municipalities. J. Clean. Prod. 244, 118529. https://doi.org/10.1016/j.jclepro.2019.118529.
Frost, J., 2020. The economic forces driving fintech adoption across countries. https://www.bis.org/publ/work838.htm.
Galeone, G., Ranaldo, S., Fusco, A., 2024. ESG and FinTech: are they connected? Res. Int. Bus. Financ. 69, 102225. https://doi.org/10.1016/j.ribaf.2024.102225.
Ganderson, J., 2021. Fighting for Fintech: Competition, regulation and accountability in a Europe of financial innovation. Chapters 101–125.
Gennaioli, N., Shleifer, A., Vishny, R., 2014. Finance and the preservation of wealth *. Q. J. Econ. 129 (3), 1221–1254. https://doi.org/10.1093/qje/qju012.
George, R.V., Harsh, H.O., Ray, P., Babu, A.K., 2019. Food quality traceability prototype for restaurants using blockchain and food quality data index. J. Clean. Prod. 240, 118021. https://doi.org/10.1016/j.jclepro.2019.118021.
Giakoumelou, A., Salvi, A., Bekiros, S., Onorato, G., 2024. ESG and FinTech funding in the EU. Res. Int. Bus. Financ. 69, 102233. https://doi.org/10.1016/j.ribaf.2024.102233.
Gomber, P., Kauffman, R.J., Parker, C., Weber, B.W., 2018. On the fintech revolution: interpreting the forces of innovation, disruption, and transformation in financial services. J. Manag. Inf. Syst. 35 (1), 220–265. https://doi.org/10.1080/07421222.2018.1440766.
Goodell, J.W., 2020. COVID-19 and finance: agendas for future research. Financ. Res. Lett. 35, 101512. https://doi.org/10.1016/j.frl.2020.101512.
Grassi, L., Lanfranchi, D., 2022. RegTech in public and private sectors: The nexus between data, technology and regulation (Scopus). J. Ind. Bus. Econ. 49 (3), 441–479. https://doi.org/10.1007/s40812-022-00226-0.
Grinberg, R., 2011. Bitcoin: An Innovative Alternative Digital Currency. https://papers.ssrn.com/abstract=1817857.
Guerar, M., Merlo, A., Migliardi, M., Palmieri, F., Verderame, L., 2020. A fraud-resilient blockchain-based solution for invoice financing (IEEE Transactions on Engineering Management). IEEE Trans. Eng. Manag. 67 (4), 1086–1098. https://doi.org/10.1109/TEM.2020.2971865.
Gulin, D., Hladika, M., Valenta, I., 2019. Digitalization and the challenges for the accounting profession. SSRN Electron. J. https://doi.org/10.2139/ssrn.3492237.
Gupta, A., Xia, C., 2018. A paradigm shift in banking: unfolding asia's fintech adventures (Scopus). Int. Symp. Econ. Theory Econ. 25, 215–254. https://doi.org/10.1108/S1571-038620180000025010.

Halden, U., Cali, U., Dynge, M.F., Stekli, J., Bai, L., 2021. DLT-based equity crowdfunding on the techno-economic feasibility of solar energy investments (Scopus). Sol. Energy 227, 137–150. https://doi.org/10.1016/j.solener.2021.08.067.
Harmon, M.M., Mayer, R.T., 1986. Organization Theory for Public Administration. Scott Foresman & Co.
Hashimy, L., Treiblmaier, H., Jain, G., 2021. Distributed ledger technology as a catalyst for open innovation adoption among small and medium-sized enterprises (Scopus). J. High. Technol. Manag. Res. 32 (1). https://doi.org/10.1016/j.hitech.2021.100405.
He, Z., Ge, F., Ban, S., Min Du, A., Sheehan, M., 2024. Fintech's influence on green credit provision: Empirical evidence from China's listed banking sector. Res. Int. Bus. Financ. 70, 102394. https://doi.org/10.1016/j.ribaf.2024.102394.
Henriques, I., Sadorsky, P., 2025. Connectedness and systemic risk between FinTech and traditional financial stocks: Implications for portfolio diversification. Res. Int. Bus. Financ. 73, 102629. https://doi.org/10.1016/j.ribaf.2024.102629.
Hornuf, L., Safari, K., Voshaar, J., 2025. Mobile fintech adoption in Sub-Saharan Africa: A systematic literature review and meta-analysis. Res. Int. Bus. Financ. 73, 102529. https://doi.org/10.1016/j.ribaf.2024.102529.
Iribarren, S.J., Cato, K., Falzon, L., Stone, P.W., 2017. What is the economic evidence for mHealth? A systematic review of economic evaluations of mHealth solutions. PloS One 12 (2), e0170581.
Isaac-Henry, K., 2003. Leadership, politics and accountability: G.W. Jones' Contribution to Local Government. Public Policy Adm. 18 (4), 80–101. https://doi.org/10.1177/095207670301800406.
Jayasuriya, D.D., Sims, A., 2022. From the abacus to enterprise resource planning: Is blockchain the next big accounting tool? Account., Audit. Account. J. 36 (1), 24–62. https://doi.org/10.1108/AAAJ-08-2020-4718.
Kahyaoglu, S.B., 2019. An analysis on the implementation of new approaches and techniques in the auditing of business processes based on blockchain technologies. In *Cryptocurrency in all Aspects*, pp. 93–109.
Kaminski, M.E., 2020. Understanding transparency in algorithmic accountability. In: Barfield, In.W. (Ed.), The Cambridge Handbook of the Law of Algorithms, 1st ed. Cambridge University Press, pp. 121–138. https://doi.org/10.1017/9781108680844.006.
Klöhn, L., Hornuf, L., 2012. Crowdinvesting in deutschland: markt, rechtslage und regulierungsperspektiven. Z. F. üR. Bankr. Und Bankwirtsch. 24 (4), 237–266. https://doi.org/10.15375/zbb-2012-0401.
Köhler, S., Pizzol, M., 2020. Technology assessment of blockchain-based technologies in the food supply chain. J. Clean. Prod. 269. https://doi.org/10.1016/j.jclepro.2020.122193.
Kumar, D.A. N., Jegadeesan, D.R., Ravi, D.C. N., & Greeda, J., 2019. A Secure Transaction Authentication Scheme using Blockchain based on IOT. 8(10)..
Kumari, A., Devi, N.C., 2022. The impact of FinTech and blockchain technologies on banking and financial services. Technol. Innov. Manag. Rev. 12 (1).
La Torre, M., Sabelfeld, S., Blomkvist, M., Tarquinio, L., Dumay, J., 2018. Harmonising non-financial reporting regulation in Europe: Practical forces and projections for future research. Meditari Account. Res. 26 (4), 598–621. https://doi.org/10.1108/MEDAR-02-2018-0290.
Lal, M., Kumar, R.B., Kumar, A., Saud, H.S., Rai, V.K., 2022. Corporate social responsibility, accounting, and auditing: a retrospective review. Article 2. Int. J. Account., Bus. Financ. 1 (2). https://doi.org/10.55429/ijabf.v1i2.65.
Lal, M., Kumar, S., Pandey, D.K., Rai, V.K., Lim, W.M., 2023. Exchange rate volatility and international trade. J. Bus. Res. 167, 114156. https://doi.org/10.1016/j.jbusres.2023.114156.
Lee, I., Shin, Y.J., 2018. Fintech: Ecosystem, business models, investment decisions, and challenges. Bus. Horiz. 61 (1), 35–46. https://doi.org/10.1016/j.bushor.2017.09.003.
Li, X., Wang, C.A., 2017. The technology and economic determinants of cryptocurrency exchange rates: the case of Bitcoin. Decis. Support Syst. 95, 49–60. https://doi.org/10.1016/j.dss.2016.12.001.
Lim, W.M., Yap, S.-F., Makkar, M., 2021. Home sharing in marketing and tourism at a tipping point: What do we know, how do we know, and where should we be heading? J. Bus. Res. 122, 534–566. https://doi.org/10.1016/j.jbusres.2020.08.051.
Liu, Y.-Y., Nacher, J.C., Ochiai, T., Martino, M., Altshuler, Y., 2014. Prospect theory for online financial trading. PLOS ONE 9 (10), e109458. https://doi.org/10.1371/journal.pone.0109458.
Lombardi, R., de Villiers, C., Moscariello, N., Pizzo, M., 2021. The disruption of blockchain in auditing – a systematic literature review and an agenda for future research. Account., Audit. Account. J. 35 (7), 1534–1565. https://doi.org/10.1108/AAAJ-10-2020-4992.
March, J.G., et al., 1995. Democratic Governance. The Free Press. ⟨http://digilib.fisipol.ugm.ac.id/handle/15717717/10551⟩.
Marke, A., Sylvester, B., 2018. Chapter 4—decoding the current global climate finance architecture. In: Marke, A. (Ed.), Transforming Climate Finance and Green Investment with Blockchains. Academic Press, pp. 35–59. https://doi.org/10.1016/B978-0-12-814447-3.00004-5.
Martínez-López, F.J., Merigó, J.M., Valenzuela-Fernández, L., Nicolás, C., 2018. Fifty years of the European Journal of Marketing: a bibliometric analysis. Eur. J. Mark. 52 (1/2), 439–468. https://doi.org/10.1108/EJM-11-2017-0853.
Massad, T.G., 2019. It's Time to Strengthen the Regulation of Crypto-Assets..
Massaro, M., Dumay, J., Guthrie, J., 2016. On the shoulders of giants: Undertaking a structured literature review in accounting. Account., Audit. Account. J.
Milian, E.Z., Spinola, M. de M., Carvalho, M.M. de, 2019. Fintechs: a literature review and research agenda. Electron. Commer. Res. Appl. 34, 100833. https://doi.org/10.1016/j.elerap.2019.100833.
Moher, D., Liberati, A., Tetzlaff, J., Altman, D, G., Group*, the P, 2009. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. Ann. Intern. Med. ⟨https://www.acpjournals.org/doi/10.7326/0003-4819-151-4-200908180-00135⟩.
Morgan, P.J., 2022. Fintech and Financial Inclusion in Southeast Asia and India (Scopus). Asian Econ. Policy Rev. 17 (2), 183–208. https://doi.org/10.1111/aepr.12379.
Mulgan, R., 2000. Accountability': an ever-expanding concept? Public Adm. 78 (3), 555–573. https://doi.org/10.1111/1467-9299.00218.
Nguyen, B.K.Q., Pham, D.T.N., 2025. Investing during a Fintech revolution: the hedge and safe haven properties of Bitcoin and Ethereum. Res. Int. Bus. Financ. 73, 102599. https://doi.org/10.1016/j.ribaf.2024.102599.
Nienaber, R., 2016. Banks Need to Think Collaboration Rather Than Competition. 20–21. https://doi.org/10.1002/9781119218906.ch4.
Novelli, C., Taddeo, M., Floridi, L., 2023. Accountability in artificial intelligence: What it is and how it works. AI Soc. 1–12. https://doi.org/10.1007/s00146-023-01635-y.
Noy, C., 2008. Sampling knowledge: The hermeneutics of snowball sampling in qualitative research. Int. J. Soc. Res. Methodol. 11 (4), 327–344. https://doi.org/10.1080/13645570701401305.
Ntanos, S., Asonitou, S., Karydas, D., Kyriakopoulos, G., 2020. Blockchain technology: a case study from greek accountants. Scopus 727–735. https://doi.org/10.1007/978-3-030-36126-6_80.
Office of Financial Research, 2018. Annual Report to Congress 2018.
Okoli, C., 2015. A guide to conducting a standalone systematic literature review. Commun. Assoc. Inf. Syst. 37.
Omarova, S.T., 2020. Technology v technocracy: fintech as a regulatory challenge. JThe J. Financ. Regul. 6 (1), 75–124.
Oppioli, M., Sousa, M.J., Sousa, M., de Nuccio, E., 2023. The role of artificial intelligence for management decision: a structured literature review. *Manag. Decis., Ahead–Print.*(Ahead–Print.). https://doi.org/10.1108/MD-08-2023-1331.
Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., Shamseer, L., Tetzlaff, J.M., Akl, E.A., Brennan, S.E., Chou, R., Glanville, J., Grimshaw, J.M., Hróbjartsson, A., Lalu, M.M., Li, T., Loder, E.W., Mayo-Wilson, E., McDonald, S., Moher, D., 2021. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ n71. https://doi.org/10.1136/bmj.n71.
Pandey, D.K., Hunjra, A.I., Hassan, M.K., Rai, V.K., 2023. Venture capital financing during crises: A bibliometric review. Res. Int. Bus. Financ. 64, 101856. https://doi.org/10.1016/j.ribaf.2022.101856.
Pandey, D.K., Lucey, B.M., Kumar, S., 2023. Border disputes, conflicts, war, and financial markets research: a systematic review. Res. Int. Bus. Financ. 65, 101972. https://doi.org/10.1016/j.ribaf.2023.101972.
Paul, J., Criado, A.R., 2020. The art of writing literature review: what do we know and what do we need to know? Int. Bus. Rev. 29 (4), 101717.

Paul, J., Lim, W.M., O'Cass, A., Hao, A.W., Bresciani, S., 2021. Scientific procedures and rationales for systematic literature reviews (SPAR-4-SLR). Int. J. Consum. Stud. 45 (4). O1–O16.
Philippon, T., 2014. Has the U.S. Finance Industry Become Less Efficient? On the Theory and Measurement of Financial Intermediation..
Pilkington, M., 2015. Blockchain Technology: Principles and Applications. https://papers.ssrn.com/abstract= 2662660.
Pocher, N., Veneris, A., 2021. Privacy and Transparency in CBDCs: A Regulation-by-Design AML/CFT Scheme. IEEE Int. Conf. Block Cryptocurrency (ICBC) 2021, 1–9. https://doi.org/10.1109/ICBC51069.2021.9461090.
Prowse, S.D., 1994. the United States, the United Kingdom, Japan and Germany. Corp. Gov. Int. Perspect.: A Surv. Corp. Control Mech. Large firms. ⟨https://www.bis.org/publ/econ41.htm⟩.
Prux, P.R., Momo, F. da S., Melati, C., 2021. Opportunities and challenges of using blockchain technology in government accounting in Brazil. BAR - Braz. Adm. Rev. 18. https://doi.org/10.1590/1807-7692bar2021200109.
Regulation (Eu) 2016/679 of the European Parliament and of the Council (2016). https://doi.org/10.5040/9781782258674.
Rerung, A., Paranita, E., AY, R., Salamah, F., Tandililing, E., 2024. The influence of fintech innovations, ESG reporting, and blockchain technology on financial transparency and accountability. J. Acad. Sci. 1. https://doi.org/10.59613/fb73ds14.
Riedl, J., 2013. Crowdfunding technology innovation. Computer 46 (3), 100–103. https://doi.org/10.1109/MC.2013.89.
Robbins, S., 2020. AI and the path to envelopment: knowledge as a first step towards the responsible regulation and use of AI-powered machines. AI Soc. 35 (2), 391–400. https://doi.org/10.1007/s00146-019-00891-1.
Rozario, A., Thomas, C., 2019. Reengineering the audit with blockchain and smart contracts. J. Emerg. Technol. Account. 16. https://doi.org/10.2308/jeta-52432.
Sadraei, R., Biancone, P., Lanzalonga, F., Jafari-Sadeghi, V., & Chmet, F. (2022). How to increase sustainable production in the food sector? Mapping industrial and business strategies and providing future research agenda. *Business Strategy and the Environment*.
Schloesser, T., Schulz, K., 2022. Distributed Ledger Technology and Climate Finance. In: Taghizadeh-Hesary, In.F., Hyun, S. (Eds.), Green Digital Finance and Sustainable Development Goals. Springer Nature, pp. 265–286. https://doi.org/10.1007/978-981-19-2662-4_13.
Schmidt, C.G., Wagner, S.M., 2019. Blockchain and supply chain relations: a transaction cost theory perspective. J. Purch. Supply Manag. 25 (4), 100552. https://doi.org/10.1016/j.pursup.2019.100552.
Secinaro, S., Brescia, V., Calandra, D., Biancone, P., 2020. Employing bibliometric analysis to identify suitable business models for electric cars. J. Clean. Prod. 264, 121503. https://doi.org/10.1016/j.jclepro.2020.121503.
Secinaro, S., Dal Mas, F., Brescia, V., Calandra, D., 2021. Blockchain in the accounting, auditing and accountability fields: a bibliometric and coding analysis. Account., Audit. Account. J. 35 (9), 168–203. https://doi.org/10.1108/AAAJ-10-2020-4987.
Secinaro, S., Calandra, D., Lanzalonga, F., Ferraris, A., 2022. Electric vehicles' consumer behaviours: mapping the field and providing a research agenda. J. Bus. Res. 150, 399–416. https://doi.org/10.1016/j.jbusres.2022.06.011.
Secinaro, S.F., Oppioli, M., Demarchi, L., Novotny, O., 2025. Bridging borders and boundaries: the role of new technologies in international entrepreneurship and intercultural dynamics. Int. Entrep. Manag. J. 21 (1), 46. https://doi.org/10.1007/s11365-024-01061-6.
Secundo, G., Ndou, V., Del Vecchio, P., De Pascale, G., 2020. Sustainable development, intellectual capital and technology policies: a structured literature review and future research agenda. Technol. Forecast. Soc. Change 153, 119917.
Sharma, N., Sharma, A., Dutta, N., Priya, P., 2023. Showrooming: a retrospective and prospective review using the SPAR-4-SLR methodological framework. *Int. J. Retail Distrib. Manag.*, *Ahead–Print.*(Ahead–Print.). https://doi.org/10.1108/IJRDM-12-2022-0513.
Sheldon, M.D., 2019. A Primer for Information Technology General Control Considerations on a Private and Permissioned Blockchain Audit. Curr. Issues Audit. 13 (1), A15–A29. https://doi.org/10.2308/ciia-52356.
Shepherd, D.A., Souitaris, V., Gruber, M., 2021. Creating new ventures: a review and research agenda. J. Manag. 47 (1), 11–42. https://doi.org/10.1177/0149206319900537.
Sinclair, A., 1995. The chameleon of accountability: forms and discourses. Account., Organ. Soc. 20 (2–3), 219–237. https://doi.org/10.1016/0361-3682(93)E0003-Y.
Sironi, P. (2016). FinTech Innovation: From Robo-Advisors to Goal Based Investing and Gamification (1. edizione). John Wiley & Sons Inc.
Stoeckli, E., Dremel, C., Uebernickel, F., 2018. Exploring characteristics and transformational capabilities of InsurTech innovations to understand insurance value creation in a digital world (Scopus). Electron. Mark. 28 (3), 287–305. https://doi.org/10.1007/s12525-018-0304-7.
Tamang, M.D., Kumar Shukla, V., Anwar, S., Punhani, R., 2021. Improving business intelligence through machine learning algorithms. Scopus 63–68. https://doi.org/10.1109/ICIEM51511.2021.9445344.
Tang, M., Hu, Y., Corbet, S., Hou, Y. (Greg), Oxley, L., 2024. Fintech, bank diversification and liquidity: evidence from China. Res. Int. Bus. Financ. 67, 102082. https://doi.org/10.1016/j.ribaf.2023.102082.
Tetlock, P.E., 1983. Accountability and complexity of thought (Scopus). J. Personal. Soc. Psychol. 45 (1), 74–83. https://doi.org/10.1037/0022-3514.45.1.74.
Thakor, A.V., 2020. Fintech and banking: what do we know? J. Financ. Inter. 41, 100833. https://doi.org/10.1016/j.jfi.2019.100833.
Thiruma Valavan A, 2023. FinTech is enabler or disruptive to the Banking Industry: An analytical study. World J. Adv. Res. Rev. 17 (1), 067–072. https://doi.org/10.30574/wjarr.2023.17.1.1472.
Thynne, I., Goldring, J.L., 1987. Accountability and Control. Law Book Company.
Tian, Z., Zhong, R.Y., Vatankhah Barenji, A., Wang, Y.T., Li, Z., Rong, Y., 2021. A blockchain-based evaluation approach for customer delivery satisfaction in sustainable urban logistics. Int. J. Prod. Res. 59 (7), 2229–2249. https://doi.org/10.1080/00207543.2020.1809733.
Trotta, A., Rania, F., Strano, E., 2024. Exploring the linkages between FinTech and ESG: A bibliometric perspective. Res. Int. Bus. Financ. 69, 102200. https://doi.org/10.1016/j.ribaf.2023.102200.
Tsai, Y.C., Tso, R., Liu, Z.-Y., Chen, K., 2019. An improved non-interactive zero-knowledge range proof for decentralized applications. IEEE Int. Conf. Decentralized Appl. Infrastruct. (DAPPCON) 2019, 129–134. https://doi.org/10.1109/DAPPCON.2019.00025.
Tsiotsou, R.H., Boukis, A., 2022. In-home service consumption: A systematic review, integrative framework and future research agenda. J. Bus. Res. 145, 49–64. https://doi.org/10.1016/j.jbusres.2022.02.050.
Uhr, J., 1993. Redesigning accountability: from muddles to maps. Aust. Q. 65 (2), 1–16. https://doi.org/10.2307/20635716.
Uluyol, B., Secinaro, S., Calandra, D., Lanzalonga, F., 2021. Mapping waqf research: A thirty-year bibliometric analysis. J. Islam. Account. Bus. Res. https://doi.org/10.1108/JIABR-01-2021-0031.
United Nations. (2015).Transforming our world: The 2030 Agenda for Sustainable Development. United Nations. https://sdgs.un.org/2030agenda.
Vantage Market Research, 2022. Fintech Market—Global Industry Assessment & Forecast. Vantage Market Research. ⟨https://www.vantagemarketresearch.com⟩.
Vasquez, O., & San-Jose, L., 2022. Ethics and trust on Fintech platforms from an emerging markets perspective. Chapters, 479–491..
Yan, W., Hunt, L.A., Sheng, Q., Szlavnies, Z., 2000. R: Development Core Team (2005): R: a language and environment interaction for statistical computing. R Foundation for Statistical Computing. -Project. Org, *Vienna, Austria, Www. R*.
Zachariadis, M., Hileman, G., Scott, S.V., 2019. Governance and control in distributed ledgers: understanding the challenges facing blockchain technology in financial services. Inf. Organ. 29 (2), 105–117. https://doi.org/10.1016/j.infoandorg.2019.03.001.
Zavolokina, L., Dolata, M., Schwabe, G., 2016. FinTech – What's. a Name.
Zhang, H., Chen, W., 2019. Crowdfunding technological innovations: Interaction between consumer benefits and rewards (Scopus). *Technovation* 84–85, 11–20. https://doi.org/10.1016/j.technovation.2018.05.001.
Zhu, H., Zhou, Z.Z., 2016. Analysis and outlook of applications of blockchain technology to equity crowdfunding in China. Financ. Innov. 2 (1), 29. https://doi.org/10.1186/s40854-016-0044-7.
Zupic, I., Čater, T., 2015. Bibliometric methods in management and organization. Organ. Res. Methods 18 (3), 429–472.