

## UNLOCKING HRM POTENTIAL WITH BLOCKCHAIN: SYSTEMATIC LITERATURE REVIEW

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### ABSTRACT

The world has become interconnected and modernized thanks to various technological innovations, including advancements in human resource management (HRM). With growing demand for HR processes to be secure, efficient and effective, blockchain emerges as a solution to this transformative need. To this end, the paper examines the role of blockchain in improving data security and operational efficiency along with increased transparency in recruitment and payroll process including managing employee records. The decentralized and immutable ledger system of Blockchain provides strong solutions against data privacy concerns as well as making human resource operations smarter using it for background verification and contract management. It shows promise, but is coming with challenges such as scalability, legal compliance and the integration of existing HR systems. Based on a systematic literature review (SLR) of 88 articles sourced from the Scopus database, this study uncovers major gaps and trending factors for HR applications of blockchain. Results show substantial potential for blockchain to disrupt current HR practices but less so in the interplay between worker organisations and public policy. Finally, the article concludes by suggesting areas for further work to facilitate the incorporation of blockchain into human resources and considers directions for realistic implementations leading up to new HR analytic instruments.

### Keywords

Blockchain Technology, Human Resource Management (HRM), Data Security, Recruitment Automation, Operational Efficiency

### INTRODUCTION

The technological breakthroughs have interconnected the entire world more closely than ever before, enabling people to achieve remarkable innovations across various disciplines. In recent decades, technological developments within the organizations have sparked increased scholarly interest, as businesses recognize the potential of technology to foster creativity and overall success in performance (Mariani et al., 2023; Beilin et al., 2019; Musiolik et al., 2020).

Globalization promotes global awareness and cross-border technology exchange by making it easier to access foreign expertise and intensifying international competition through the rise of emerging market firms, as well as encouraging innovation and the adoption of foreign advancements (Aslam et al., 2018). In the contemporary internet era, Human Resources (HR) faces numerous challenges, devoting substantial time to responsibilities such as engaging with applicants, assessing resumes, validating

credentials, and completing background checks to reduce the risk of poor hiring decisions (Yi et al., 2020).

Blockchain technology was first introduced by Satoshi Nakamoto in the article Bitcoin: A P2P E-cash Payment System, offering innovative technical solutions to address the consistency challenges of distributed systems (Han and Liu, 2017).

Blockchain technology is a database system that allows for transparent information sharing across business networks. Its implementation enables people to conduct secure and trustworthy transactions. As a result, blockchain presents a significant opportunity for use in HR, allowing HR Practitioners to take more strategic methods that benefit the organization and its internal and external stakeholders (Madhani, 2023). Blockchain, artificial intelligence (AI), and other technological innovations are revolutionising various sectors of society, resulting in significant adjustments in HR practices in both for profit and nonprofit organizations. These technological innovations have a significant impact on employment patterns and how organizations handle hiring and workforce management, ultimately redefining HR practices and employee management strategies (Michailidis, 2018).

According to experts, utilising blockchain to verify credentials can cut costs and delays, boost confidence, and automate the hiring process (Han and Liu, 2017). Blockchain technology has the potential to revolutionize human resource management methods by enhancing recruitment, training, compensation, and employee relations (Chen, 2023).

Blockchain technology is presently being actively adopted in mainstream corporate processes, with the rate of acceptance projected to grow and encompass practically all aspects of our lives. The deployment of blockchain provides benefits in a variety of HR-related operations, including professional development, career guidance, remuneration, and cost reductions (Koncheva et al., 2019).

Blockchain technology offers a wide range of applications in HR, enhancing security, transparency, and efficiency across multiple areas. In the fields of recruiting and talent acquisition, it confirms the legitimacy of individuals' credentials and work experience, reducing the likelihood of fraud (Dwivedi et al., 2020). It also simplifies employee background verification by providing immutable records, which accelerates the recruiting process (Schumacher et al., 2019). It can enhance payroll and compensation management by enabling cross-border payments and automating operations via smart contracts (Min & Lambert, 2021). Furthermore, it improves employee data management by safeguarding personal information, providing employees greater authority, and eliminating privacy violations (Silva et al., 2021). Blockchain delivers an immutable audit trail, assuring adherence to labour laws and workplace norms (McKinsey & Company, 2018). It also simplifies employee benefit administration by providing for real-time tracking and transparency (Agarwal et al., 2020), as well as securely storing training and development records to provide an accurate view of worker skills (O'Leary, 2020).

Blockchain technology has the ability to transform traditional HR administration by increasing efficiency, security, and justice. However, technical, legal, and organizational challenges must be overcome before completely deploying blockchain-based HR practices. Many blockchain concepts are still in the early phases of development. As a result, the report emphasises the value of HR leaders working with technical architects to develop blockchain that enables seamless integration of all employees, clients, vendors, and organizations (Chillakuri, and Attili, 2022).

The aim of this research is to understand the use of Blockchain in the field of HR. A systematic literature review is significant to provide valuable insight to support in further research efforts. This systematic review will focus on the following research questions:

### **RQ1: How to examine the availability of Blockchain in HR?**

**RQ2: What are the gaps in the Blockchain HR field?**

**RQ3: Which are the factors more popular in HR?**

**RQ4: What are the findings and suggestions for future research?**

The second study question looks for gaps in the Block chain HR industry, while the first one looks at the availability of Block chain in the HR domain. , wherein we will identify the areas where much is researched already and where there is scope for writing further, the third research question will probe into the factors which are more popular in HR which uses blockchain technology and last research question will give the findings and suggestions for the researchers to do future research. To answer these research questions, to determine the future course of research on the use and acceptance of block chain in human resources, a Systematic Literature Review (SLR) and Bibliometric Analysis were conducted. To use the SLR approach the sample of the review was drawn from Scopus database wherein N = 88 articles. The structure of the paper is as follows: it begins with a discussion of the theoretical background in the Introduction, after bibliometric analysis and a systematic literature review (SLR), it looks at the implications for theory and practice and offers recommendations for future research areas.

## **LITERATURE REVIEW**

Blockchain technology has rapidly gained recognition for its potential to disrupt traditional business processes with applications ranging from finance to supply chain management in the context of human resource HR management blockchain offers the possibility of improving KHR functions such as recruitment payroll processing employee data management and performance evaluations despite this growing interest in blockchain technology its applications in HR remains an under explored area in an academic research.

One of the primary reasons this study is required is the need to address critical challenges related to data privacy and security HR departments handle vast amounts of sensitive employee information and blockchains decentralized and immutable Ledger system could provide A solution to safeguarding this data however there is a gap in the literature on how blockchain can be systematically adopted in HR especially regarding legal compliance and scalability in large organizations.

1: Keyword Literature Review (Scopus Database)

Citation	year	Keyword	Paper Title	Methodology	Citation	year
		Blockchain In HR	Potential uses of Blockchains in Human Resources	The methodology used in this study was a meta-analysis of available publications related to the relationship between blockchain technology and human resources. The meta-analysis likely reviewed the potential applications and benefits of block chain in areas such as employee data management, financial transactions and workflow optimization.	0	2024
		Blockchain In HR	Trends in the thematic landscape of HR analytics research: Structural topic modeling approach	Latent Dirichlet Allocation(LDA) topic modeling approach to identify significant themes in the HR analytics literature and review of portfolio of 503 articles collected from the Scopus database Framework -based literature review	9	2023
		Blockchain In HR	Blockchain in Human Resource Management: A Systematic Review & Bibliometric Analysis	A Systematic Literature review of 126 publications identified 25 relevant records, bibliometric analysis using VOS viewer software, identification of four thematic clusters, and development of two theoretical themes (Employee - Systems interaction and Blockchain Framework for HR)	26	2022
		Blockchain In HR	Blockchain in HRM: Application & Future Perspective	This methodology used in this study was a literature review of articles published in the Scopus and web of science databases between 2018 and 2022, focusing on the application of blockchain technology in human resources and data security.	2	2022
		Blockchain In HR	The role of blockchain technology in the process of decision-making in human resource management: a review and future research agenda	Use of the 6 W-Framework developed by Callahan (2014) to develop a conceptual framework on BT and HRM	15	2022

### **Blockchain in HR: Enhancing Security, Privacy, and Efficiency in Recruitment, Payroll, and Employee Management**

The above Table1 shows literature on the blockchain in HR highlights its transformative potential in various HR functions, including recruitment, payroll, employee data management and employee evaluation. One of the most significant advantages of blockchain technology is its ability to enhance security and data privacy, as highlighted in studies by Mohammad Saif et al. (2022) and Ahmed & Jafar (2021). Blockchain's decentralized in nature ensures that employee records are immutable tamper proof and accessible only to authorized individuals, thereby significantly reducing the risk of data breaches.

### **Enhancing HR Efficiency: Blockchain's Role in Automating Payroll, Verification, and Contract Management**

In addition to security, blockchain has the potential to improve operational efficiency within HR departments. As explored by Meharwal et al. (2022) and Wong & Li (2023), blockchain can automate processes such as payroll, background verification, and contract management, leading to faster, more accurate outcomes. By reducing reliance on intermediaries and manual processing, blockchain can streamline HR operations and reduce costs, ultimately leading to improved employee satisfaction.

### **Challenges to Blockchain Adoption in HR: Scalability, Integration, and Regulatory Compliance**

Despite its advantages, there are challenges to blockchain's adoption in HR that cannot be overlooked. One of the key issues is scalability. Studies like Nagy (2023) point out that while blockchain offers many theoretical benefits, there are significant barriers to implementing it at the enterprise level. These barriers include the high costs of adoption, the complexity of integrating blockchain with existing systems and

the lack of clear regulatory frameworks that govern blockchain use in HR. Moreover, blockchains decentralized in nature many may pose challenges in meeting legal requirements for data privacy and compliance, particularly in regions with stringent labor laws.

**Blockchain in HR: Bridging Gaps and Unlocking Future Potential for Data-Driven Workforce Management**

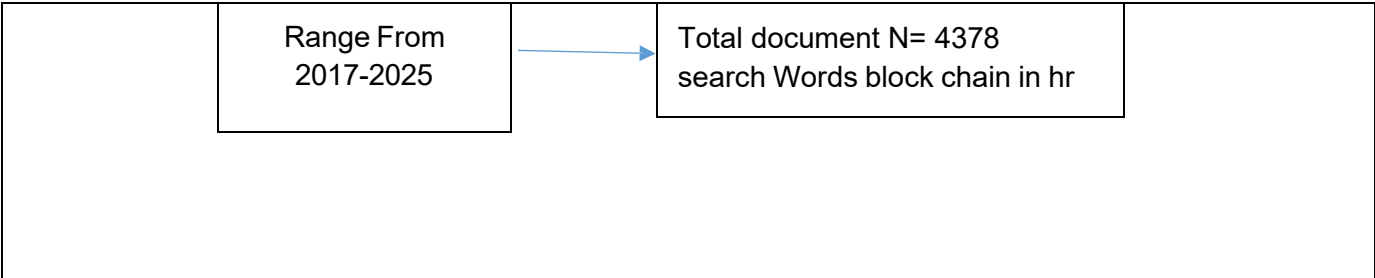
Future studies must concentrate on resolving these issues and investigating fresh approaches to combining blockchain technology with HR data. As HR becomes increasingly data-driven, the combination of blockchain’s secure data management with advanced HR analytics tools can offer unprecedented insights into workforce performance and development. While blockchain is still in its early stages within HR, its promise of improving transparency, data security, and efficiency makes it a critical area for future exploration and practical application.

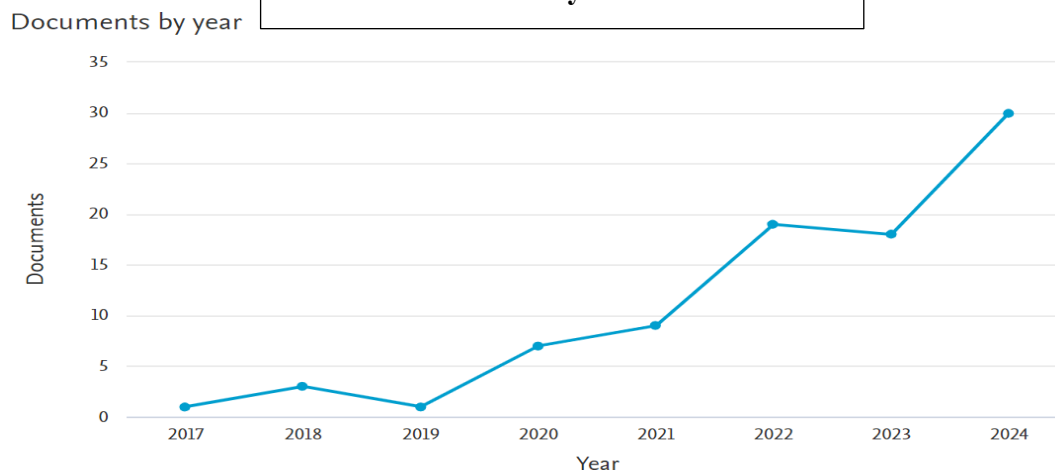
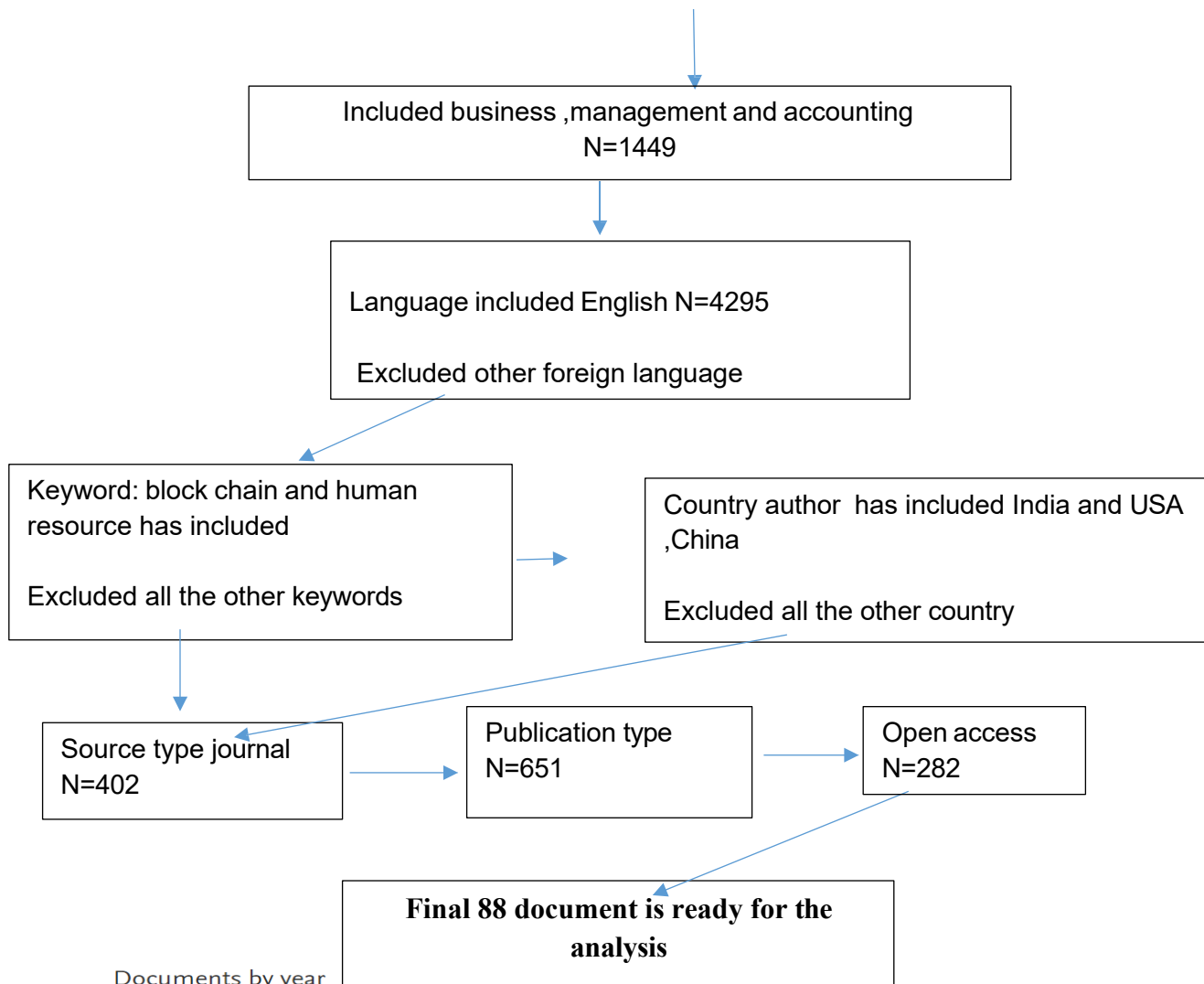
In conclusion, the literature reviewed in this study paints a promising picture of a blockchain's potential in HR, but also emphasizes the need for further research and real-world case studies to fully realize its benefits. By addressing the current gaps and challenges blockchain could become a cornerstone technology in future of the HR management.

**Methodology**

The Prisma explains 88 documents regarding blockchain in HR, from the period between 2017 and 2025 were analysed where the basis is on articles, reviews and open-access journals. Originally, 4,378 documents were retrieved from Scopus, and after filtering to only those that fit the business, management, and accounting disciplines (n = 1,449). The search does not include areas such as computer science, engineering, sciences and economics. One filter was to include papers only in English (4,295 documents). The analysis covers countries such as India, the USA, and China. Our final dataset consists of 402 journal papers, 651 types of publications and 282 articles in open access, which can serve as a solid foundation for conducting additional research on blockchain within the field of HR.

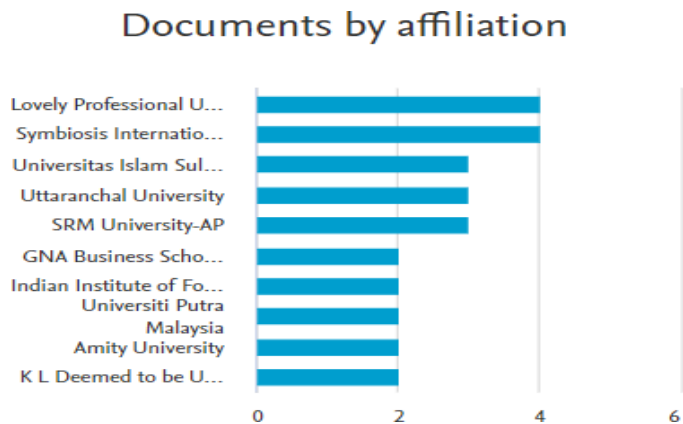
**PRISMA : FLOWCHART AUTHORS OWN SOURCE SCOPUS DATABASE**





**Graph 1: Source from Scopus database years of document for the study**

The line graph titled "Documents by Year" shows the number of documents published each year from 2017 to 2024. Starting with a low point in 2017, with only 1 document, there is a small peak in 2018 with 3 documents. The number drops to 1 document again in 2019. From 2019 onward, the trend rises steadily, with a significant increase between 2021 and 2022, reaching about 19 documents. A slight dip occurs in 2023, dropping to around 18 documents, followed by a sharp increase in 2024, peaking at 30 documents. Overall, the graph indicates an increasing trend in document production.

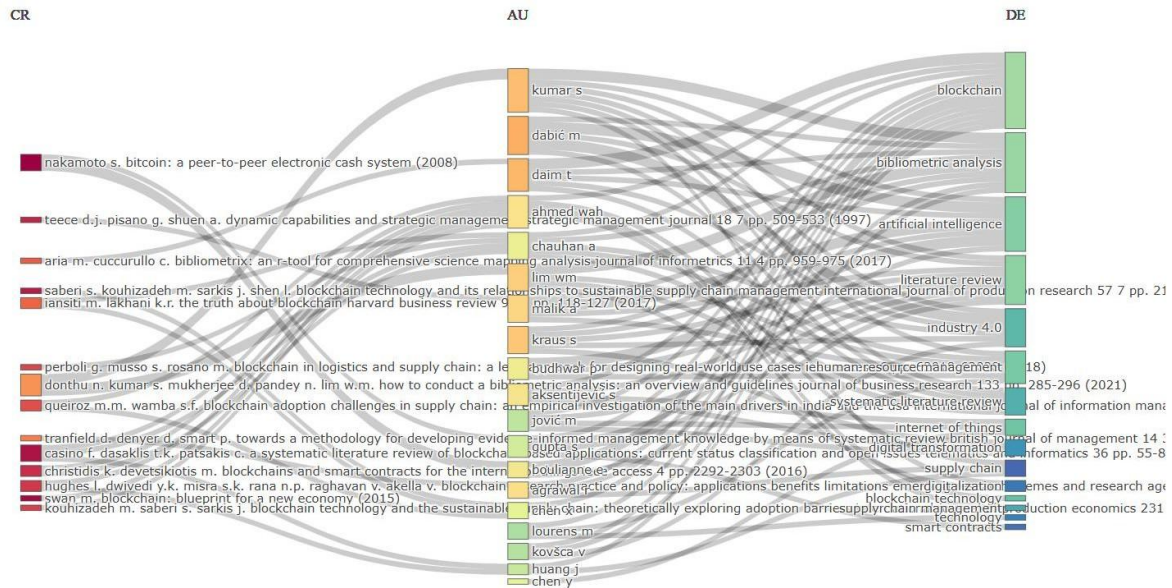


**Authors affiliation table :1**

The "Documents by Affiliation" bar chart captures the number of academic documents originating from or produced by a corresponding institution. These names include Lovely Professional University, Symbiosis International, Universitas Islam Sultan Agung, Uttaranchal University and more such names- SRM University-AP (Amaravati Campus), GNA Business School, Indian Institute of Foreign Trade (IIFT),University Putra Malaysia Amity University K L Deemed to be university. The vertical and the horizontal axis is simply the document count with frequency between 0 to 6 as per each bar. This is what this chart communicates and compares – a visualization of these institutions' research productivity, or academic output, which gives an overview on the differences on their scholarly engagement.

**AVERAGE CITATIONS PER YEAR**

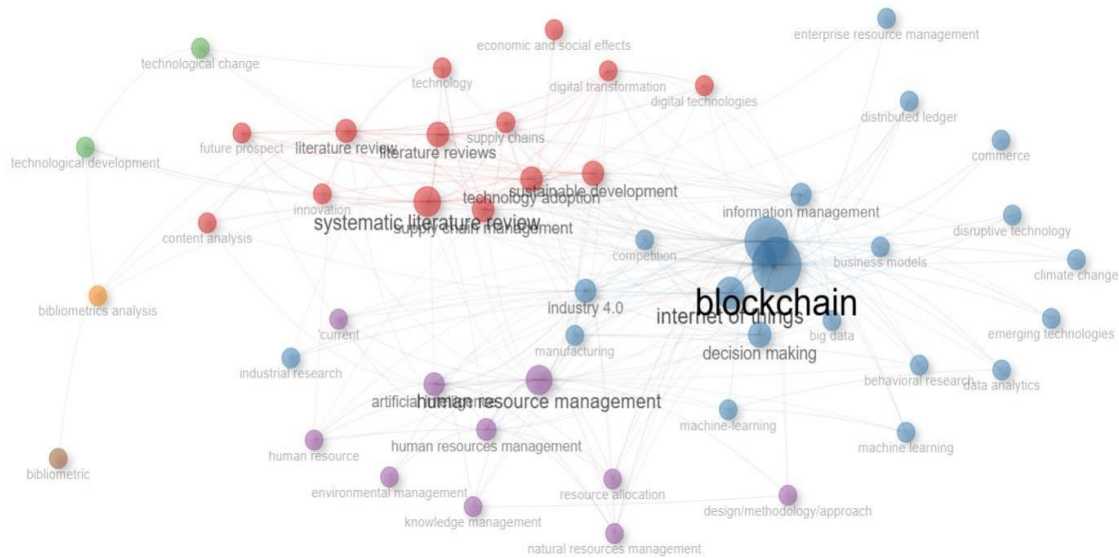




**Citation Per Year Figure :2**

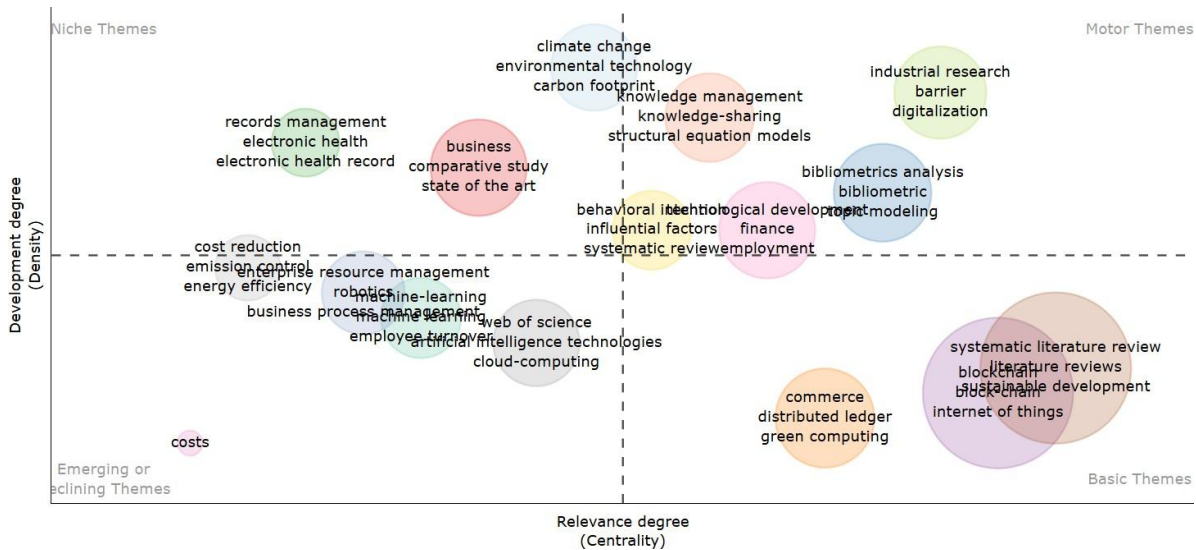
We illustrate a citation map in which deeper networks and collaborations and citations between authors and their works can be explored in detail in the field of blockchain research. The nodes, organized by names or titles (eg Satoshi Nakamoto's seminal paper on Bitcoin), denote authors or landmark papers. The lines connecting the nodes represent citation strength between each pair of papers, and their thickness is correspondent to the frequency with which these papers have cited each other. CR, AU and DE — such as 'blockchain or industry 4.0' are dividable into columns [one]. Thematic areas are characterized with color coding and sectioning, which illustrates that the stance of blockchain is one of the most prominent themes here. The map highlights cross-disciplinary connections between domains like AI and smart contracts, visually displaying the interrelated topics shaping blockchain investigation.

## CO-OCCURRENCE NETWORK



**Diagram 1: IOT Blockchain author's own work**

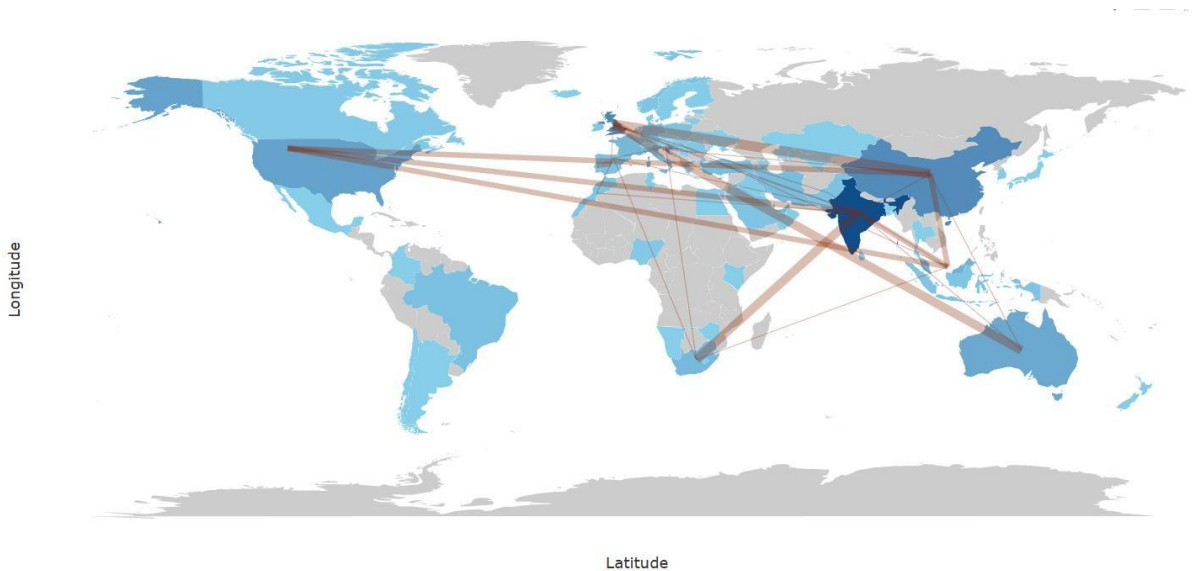
Diagram description: Topics relate to blockchain-related places and ecosystem. In the middle is the largest node blockchain (in blue) and around it, nodes are coded by color to represent dominant themes. Systematic literature review (red), human resource management (purple), Industry 4.0 (blue), Internet of Things (blue), artificial intelligence and machine learning (purple) digital transformation, and technology adoption. Red Each node tells about the importance/frequency of the topic and size shows how important or frequent. Closer look: gray lines between nodes emphasize the relationships between themes, and nodes with similar colors group together (thematic commonality presence). This visualization is largely a map of the relative importance and relationships between concepts across technology, management, and research methods.



**Coupling map 1: authors own source**

The concept map categorizes a range of topics according to the “Degree of Development” (y-axis) and “Centrality Degree” (x-axis), placing them within four quadrants. In the top left quadrant are Niche Themes, with high developmental potential but low centrality topics such as climate change, environmental technology and carbon footprint. Motor Themes (top right quadrant) are both mature and dominate the field, including aspects of Industrial research, digitalization and bibliometric analysis. Emerging or Declining Themes (bottom left quadrant), these themes have a low development and centrality and include cost saving, emission control and energy efficiency. These include systematic literature review, blockchain and the Internet of Things. Basic Themes (bottom right quadrant) are those ideas that have very little seen development but are nevertheless central ones. The third thing to note here is that the orientation of the two terms across quadrants shows a warm, blurry and fuzzy research landscape with lots of interconnections between emails being served (see Figure 1). This visualization provides insights into the shifting themes and relevance of research areas over time while signposting directions for future work, thus serving to effectively illustrate the latent themes in a dataset.

## THEMATIC MAP



**World Map 1: Source from Scopus analysed by R shiny**

Here is a virtual representation of an international connection that could easily correspond to the trade or alternate more conceptual relations in data flows derived from above out global network map. This notation using varying shades of blue and vary thickness in lines illustrates different levels of engagement or importance among countries, with India given a particularly prominent color. This lends itself both to the portrayal of interdependence of nations, as well as nations in amongst that interdependence.

## WORD COUNT



**Word Count 1: Source from Scopus database used R Shiny**

Key words associated with trends in business and technology today, including a larger emphasis on supply chain management and the digital landscape, appear in this word cloud image. Key Words: Supply Chain Management, Artificial Intelligence, Systematic Literature Review, Sustainable Development,



Blockchain, Internet of Things (IoT), Human Resource Management, Technology Adoption Information Management and Industry 4.0 The following is a representation of the main sectors stimulating innovation at the convergence of tech and sustainability. It nicely encapsulates major themes shaping modern business practice, making a point about how digital technologies and intelligent systems are altering the very nature of supply chain operations and management more broadly.

### **Analysis and Discussion**

Blockchain technology is becoming one of the biggest opportunities to evolve traditional Human Resource (HR) administration around the management, storing, and processing of employee data. Due to its most crucial characteristics, such as decentralization and immutability, blockchain enables adequate protection of personal data and increases the sense of safety and equality in human resource processes. Herein we present an overview of blockchain applications in the domain of human resources and map current research patterns, gaps and opportunities for future research.

Using a broad overview of 4,378 documents retrieved from the Scopus database between 2017–2024 work. The main search terms were "Blockchain in HR", and the academic scope was also limited to appropriate disciplines, specifically business, management and accounting that produced 1449 research articles. Other subject areas including computer science, engineering, economics and pure sciences were intentionally excluded to allow the research topic to remain relevant for HR practices. In addition, to focus the study on peer-reviewed journal articles to maintain scientific rigor, only certain types of publications were included, resulting in 458 identified relevant articles (note: conference papers, book chapters and books were excluded).

Linguistic criteria were applied, and preference was given to publications in English. A total of 4,295 were English documents, while non-English documents were eliminated from the original set of records. After a stringent process of identifying and selecting relevant literature, its final analysis covered 88 journal articles. This edition gives you all the aims for a clear picture of regarding blockchain exposure in HR process.

Table 1 and Graph 1, labelled as "Documents by Year 2017 to 2024," show the historical evolution of interest in blockchain for HR related papers. The data suggests that only very few studies were conducted as the field was quite underdeveloped back in 2017. During the following years, interest increased gradually until it peaked in 2024 with 30 publications. The increase indicates a more awareness of the use cases for Blockchain as it relates to important issues faced in HR management. The growing scholarly output signifies a relatively new focus area, validating the potential transformation that blockchain may bring to the HR field.

As shown in Figure 2, a detailed co-occurrence network diagram provides the interconnected themes of literature on blockchain and HR. This image provides a visual of how certain research areas are related, indicating where particularly important gaps exist. In particular, the grey-colored lines in the network diagram indicate largely uncharted regions of business management, technology and HR intersection. The mapping suggests that some of the themes are well-endowed than others, especially on business and technology integration which has not been much explored. From our findings we determine that there remains an attractive area for future research into the adoption and scalability of blockchain across HR functions.

It further lays out strategic recommendations for future research. Figure 3: Clustering Analysis: Research themes grouped by degree of development (vertical axis) and amount of engagement/relevance for furthering scrutiny (horizontal axis) This framework separates these themes into quadrants. Niche themes, located in the top-left quadrant, have a high degree of development potential space but low

centrality at this time. Some of these themes are climate change, environmental technology and carbon footprint management. These are emerging areas in which blockchain technology may have an important role and should be further investigated.

In the upper-right quadrant entitled "Motor Themes," on the other hand, are topics that are well developed and important to the field. Subsequently, focus on essential domains like industrial research, digitalization, and bibliometric analysis. This clustering indicates a need for a more in-depth exploration on the intersection of blockchain with HR analytics and technology adoption within the development phase, focusing its applications to industrial processes and data-driven decision-making.

Low relatedness and low development degree; focus on themes emerging or declining) Those will be declining or understudied themes, such as cost curtailment, emission management and energy efficiency. Lastly, in the quadrant of the right-hand side at the bottom, labelled "Basic Themes," are fundamental topics like literature review, systematic reviews, blockchain and IoT. These themes are important, but they have not yet been sufficiently advanced indicating that underpinning research is needed here as well. Mapping the literature of blockchain in human resource research globally shows a noticeable lack of studies attempting to link supply chain management with digital technology, artificial intelligence (AI), and the Internet of Things (IoT). We still require broader research into how to best integrate these emerging technologies as part of an HR framework that delivers efficiency, transparency and data security.

All in all, blockchain can be a game changer for the way HRs work by solving some of the greatest challenges when it comes to data management, privacy and efficiency. That said, the study also underscores that for AI to take the next steps there are formidable obstacles to be overcome — scalability, integration concerns and regulatory requirements among them. However, the distributed nature of blockchain technology has been noted as problematic in meeting legal requirements, especially for data protection rules than can be particularly strict in certain regions.

## Conclusion

The blockchain has the potential to change aspects of HR functions such as payroll processing, employee verification and data security, but more empirical evidence and case studies are needed. Closing these gaps will be important in realizing the full power of blockchain and simplifying its integration into HR processes. Hence, research in the future should develop integrated frameworks of blockchain, HR analytics and other emergent technologies to guide researchers towards new avenues of HR transformation.

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