Creating Sustainable Fintech Eco- System: Way forward for Future Research

Abstract

Fintech provides tools and technologies that financial institutions increasingly use to track customer transactions and drive sustainable spending. This also encourages the development of innovative and sustainable products and services. The Open Network for Digital Commerce (ONDC) is a network based on open protocols that makes local commerce discoverable on any network across segments such as mobility, grocery, meal ordering and delivery, hotel booking and travel increase. Used - Activated applications. The platform aims to curb digital monopolies, support micro-enterprises, SMEs, and small traders, and create new opportunities to facilitate entry into digital platforms. This is an initiative of the Department of Industry and Internal Trade Promotion (DPIIT). Ground breaking innovations that have brought major changes in every sector include –IoT (Internet of Things), digital commerce, Blockchain, E-Commerce. Blockchain-based platforms use behavioral cryptography protocols to enforce user rights and provide an adequate level of protection from malicious attackers. This paper uses systematic literature reviews combined with bibliometric analysis to understand how ONDC is a way forward for fintech companies.

Keyword: Block Chain, Open System, Fintech, Internet of Things, Data Privacy, Commerce, Sustainability.

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1. Introduction

Open Network for Digital Commerce (ONDC) is a technology-enabled infrastructure for open networks that enables a multitude of e-commerce offers across domains, improves location discoverability, and interacts via any network-enabled application. is. This goes beyond the current platform-centric digital commerce model, which requires buyers and sellers to use the same platform/application to transact business. In this system, so long as platforms/applications are connected to the open network, buyers and sellers will be able to transact no matter what platform/application they use to be digitally visible/available(*INDIA'S COMMERCE ECOSYSTEM,* n.d.). In the Maritime supply chain (MarSC), block chain-based solutions have thus a high potential to change these types of information sharing practices and even to incorporate with new technologies like IoT(Carlan et al., 2022a). Blockchain technology, which has become mainstream in the financial sector in the last decade due to its wide proven capabilities, now is spreading its application to the military and other sectors, helping to leverage security in critical systems(Freire et al., 2022). Fintech in its initial applications involves "technologies used and applied in the financial services sector, chiefly used by financial institutions themselves on the back end of their businesses" but its applications have enlarged "to represent technologies that are disrupting traditional financial services, including mobile payments, money transfers, loans,

fundraising, and asset management"(Nassiry, 2018). Anonymous accounts are stored on the backend and device. Anonymous accounts are also activated each time you open the app. If the participant completes a daily task, the results are stored inside the user study object and updated on the server(Konigorski et al., 2022). Blockchain consensus mechanism establishment and mobile-based machine learning services are equally dependent on communication networks(Rong et al., 2022).Blockchain supports an environment where both parties do not need to trust each other, thus reducing market barriers, as trust is a priority when choosing a service provider(Rong et al., 2022). Blockchain-based platforms use cryptographic protocols to enforce correct user behavior and adequately protect against malicious attackers. Cryptography is, however, an ever-evolving discipline, and any breakthrough would have immediate consequences on the security of blockchain-based applications(Longo et al., 2022). This infrastructure and affordable technology are critical to creating sustainable, unique financial innovation, although Fintech development often occurs in economies where access to loans is more difficult(Vergara & Agudo, 2021). Fintech "allows performing business transactions from anywhere at any time, which gives flexibility to all actors"(Vergara & Agudo, 2021). The time-consuming consensus process is a major bottleneck in adopting blockchain technology for IoT applications. The IoT systems are varied in terms of the number of generated requests where applications generate thousands of transactions per second(Pajooh et al., 2022). In a blockchain setup, we need to consider a significant amount of time to wait for transaction receipts that ensure the correct processing of the data(Zade et al., 2022). Blockchain is a decentralized distributed ledger technology, which ensures that the data on the chain cannot be tampered with and forged through mechanisms such as

encryption and consensus(Zhang et al., 2022).Blockchain is a distributed ledger technology supported by computer technologies such as distributed data storage, peer-to-peer network transmission, encryption algorithms, and consensus mechanisms, and is essentially a distributed database(Zhang et al., 2022). Demonstrated how blockchain technology can also contribute to social and environmental sustainability for example, by reducing chemical product usage in agriculture and manufacturing or increasing the level of customer trust(Kraft & Kellner, 2022). Blockchain technology does not only have a high potential in finance, but also a high ability to overcome challenges associated with supply chains such as lack of trust, risk of fraud, and counterfeiting(Kraft & Kellner, 2022). A web interface is used to facilitate trading through smart contracts on a private Ethereum blockchain, while monitoring and controlling energy consumption is performed via an IoT platform(Baig et al., 2022). The way blockchain is built eliminates the need for a central authority to control or regulate the network. Data authenticity can be controlled, and thus, it can be shared securely across partners that do not trust each other, backed by cryptographic security(Carlan et al., 2022b). On the contrary, this security system cannot give protection against internal attacks. This is because of the fact that compromised nodes contain keys and security algorithms(Bhavadharini & Karthik, 2023). The integration of all these technological resources constitutes an ecosystem called the IoT. Different wireless technologies and protocols connect smart devices to Internet protocols(Mora-pascual & Díaz-lajara, 2022) . The blockchain paradigm can help achieve traceability and transparency in the value chain of agricultural products, from planting and monitoring the crop until the product reaches the consumer through logistics and conservation(Mora-pascual & Díaz-lajara, 2022).

Research Questions

RQ1: What are the trends in publication in Sustainable Fintech Eco- System?
RQ 2: Who are the most contributing (authors, institutions, and countries) in System?

RQ 4: How have the themes covering various aspects of Sustainable Fintech Eco- System?

Sustainable Fintech Eco- System?
RQ 3: What are the most influential publications in Sustainable Fintech Eco-

2. Methodology:

According to (Broadus,1987), bibliometrics deals with measurement of science, scientists or scientific activity based of data derived from other than publication(R. N, 1987). Measurement of these items are called bibliometrics. We retrieved metadata from Scopus database for bibliometric analysis. Scopus is a larger database with peer revied articles and offers bibliometric information is various domains. We extract information on sustainable fintech ecosystem using research keywords Block Chain, Open System, Fintech, Internet of Things, Data Privacy, Commerce and Sustainability, We got total 1012 documents in our search query.

Table 1 Comparison of earlier Studies on Bibliometric Analysis Of sustainability fintech Eco-system Literature review:

Basis of comparison	Study 1:((Rong et al., 2022))	Study 2:((Longo et al., 2022))	Study 3: ((Zade et al., 2022))	Our study
Focus of the study	Our vision seeks to augment existing Cloud Computing and Networking solutions with support for multiple cloud infrastructures and seamless integration of cloud-based microservices	We propose a novel approach for the management of cryptographic primitives in smart-contract-based ledgers, discussing how it fits in both a (partially) permissioned and a fully permissionless setting.	In this work, the authors present LEM-specific, technology agnostic infrastructure requirements, present Solidity and Python toolboxes that allow computation of comparative performance analysis between blockchain-based and core LEMs, and present the blockchain Assign added value. The base implementation is evaluated against the legacy reference implementation.	Trends in sustainability fintech eco-system publications, most prolific contributors ,most influential publications, themes, research directions
Keywords	5G and beyond, Infrastructure-as-code, Zero trust architecture, Decentralized identifier, Blockchain	Blockchain, Distributed Ledger, Smart Contracts, Post-Quantum Cryptography, Digital Signature.	Blockchain technology, data security, open source, energy system	Block Chain, Open System, Fintech, Internet of Things, Data Privacy, Commerce, Sustainability
Time period	2010-2021	1987-2022	1990–2021	2000-2022

Methodology	Our proposed approach has the potential to provide a path for developing new platforms, business models, and a modernized information ecosystem necessary for 5G networks	Novel approach	Comparative Performance: Quantitative performance evaluation,	Descriptive, cluster analysis, network analysis

3. Publication Trends, Citation Record and Authorship Patterns in the sustainable fintech eco- system

To get answer for our RQ1,RQ2 and RQ3 we have to analyse recent publication trends and most influential publications in sustainable fintech eco -system. We would have to analyse contributing authors, institutions, and countries in this domain to validate their contribution . These question will be answered in this section and will help us understand research contribution under various heads.

aTable 2 Annual citation

Year	N	MeanTCperArt	MeanTCperYear	CitableYears
2010	4	1.75	0.15	12
2011	12	18.83	1.71	11
2012	13	9.38	0.94	10
2013	20	14.55	1.62	9
2014	27	12.11	1.51	8
2015	32	12.09	1.73	7
2016	45	28.98	4.83	6
2017	55	24.07	4.81	5
2018	103	31.46	7.86	4
2019	157	9.89	3.30	3
2020	183	6.91	3.45	2
2021	197	3.64	3.64	1
2022	105	0.91		0

Table 2 represents the number of citation per year which is 12 in 2010 and subsequently declined to 0 in 2022. Total citation mean per year which is peaked in year 2018 which is 7.86 and lowest in year 2022 where no mean total citation per year . in year 2018 mean TC per art is 31.46 which is higher and lowest in year 2022 which is 0.91.Total publication and citation over the 13 years of its latest journey. This manifests itself as an upward trend in annual publications, but as a marked fluctuation in annual citation trends.

Table 3 Main information

Description	Results

MAIN INFORMATION ABOUT DATA

Timespan	2000:2022
Sources (Journals, Books, etc)	646
Documents	1012
Annual Growth Rate %	23.56
Document Average Age	3.87
Average citations per doc	14.4
References	1
DOCUMENT CONTENTS	
Keywords Plus (ID)	5723
Author's Keywords (DE)	2569
AUTHORS	
Authors	3200
Authors of single-authored docs	81
AUTHORS COLLABORATION	
Single-authored docs	123
Co-Authors per Doc	3.77
International co-authorships %	22.63
DOCUMENT TYPES	
article	303
book	6
book chapter	34
conference paper	602
conference review	40
editorial	1
note	1
review	23
short survey	2

Table 3 Represent the main information about the data where it shows the time period it shows the data of 2000-2022,in this table we used 646 sources and 1012 documents and its annual growth rate is 23.56 ,average age of the document is 3.87 average citation per docs is 14.4 and reference is one ,keywords used in this table is 5723 and author's keywords are 2569 , in all these docs there are
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3200 authors works and 81 single authored used, authors collaboration when single authored docs are 123 and co authors per docs 3.77 and international co -authorship 22.63 % and there are 303 articles ,6 book,34 book chapter, 602 conference paper used , 1 editorial ,1 note,23 review and 2 short survey used in this analysis

Table 4 Most Relevant Sources

Sources	Articles
Lecture Notes In Computer Science (Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics)	69
ACM International Conference Proceeding Series	28

Communications In Computer And Information Science	19
IEEE Access	17
IFIP Advances In Information And Communication Technology	15
Advances In Intelligent Systems And Computing	11
Proceedings Of The ACM Conference On Computer And Communications Security	11
Computers And Security	8
Lecture Notes In Business Information Processing	8
Journal Of Medical Internet Research	7

In table 4 there are most relevant sources are used where 69 articles used in source of Lecture Notes In Computer Science (Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics), 28 articles in ACM International Conference Proceeding Series,19 articles in Communications In Computer And Information Science,17 in IEEE Access,15 in IFIP Advances In Information And Communication Technology, 11 in Advances In Intelligent Systems And Computing,11 in Proceedings Of The ACM Conference On Computer And Communications Security,8 in Computers And Security,8 in Lecture Notes In Business Information Processing and 7 in Journal Of Medical Internet Research.

Table 5 Source Impact

Element	H_Index	G_Index	M_Index	Tc	Np	Py_Start
Lecture Notes In Computer Science (Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics)	11	16	0.579	362	69	2004
Proceedings Of The Acm Conference On Computer And Communications Security	9	11	0.529	505	11	2006
Ieee Access	6	17	1.2	464	17	2018
Acm International Conference Proceeding Series	5	12	0.313	150	28	2007
Computers And Security	5	8	0.238	103	8	2002
Ieee Internet Of Things Journal	5	6	1.667	93	6	2020
Journal Of Medical Internet Research	5	7	1.25	110	7	2019
Proceedings - 2019 2nd Ieee International Conference On Blockchain, Blockchain 2019	5	5	1.25	170	5	2019
Sensors (Switzerland)	5	6	0.833	181	6	2017
Sustainability (Switzerland)	5	6	0.833	148	6	2017

Table 5 presents

source impact where in this H index is 11,M index is 0.579, G index is16 and total citation is 362 and net publication is 69 and published year is 2004 in Lecture Notes In Computer Science, H index is 5,M index is0.833, G index is 6 and total citation is 148 and net publication is 6 and published year is 2017 Sustainability (S

witzerland).

Table 6 Most cited countries

Country	TC	Average Article Citations
USA	3471	47.55
China	723	8.31
Italy	570	31.67
Germany	289	7.61
Slovenia	281	70.25
Australia	243	27.00
Canada	203	15.62
United Kingdom	192	17.45
France	190	31.67
India	164	5.47

Table 6 Presents most cited countries in USA total citation is 3471 and its average article citation is 47.55, in China there are (723) TC, (8.31) AAC, in Italy there are (570)TC (31.67) AAC and in India there are 164 total citation and AAC is 5.47.

Table 7 Most Relevant Authors

Authors	Articles	Articles Fractionalized
Na Na	41	41.00
Chen X	11	2.33
Li X	11	2.24
Zhang J	11	2.64
Li Y	9	1.72
Wang X	8	1.71
Zhang Y	8	1.75
Chen Z	7	1.06
Liu Y	7	1.31
Prasser F	7	1.64
Wang Y	7	1.10
Yang Y	7	1.20
Li Z	6	1.13
Liu X	6	1.47
Wang L	6	1.63
Zhang Q	6	1.16
Zhang X	6	1.12
Bild R	5	1.18
Chen Y	5	0.88
Costa C	5	0.84
Kuhn Ka	5	1.27
Kumar N	5	1.23
Wang J	5	0.81
Wang Z	5	1.48
Zhang H	5	0.92

Table 7 presents 25 authors list where its shows some articles and there are articles fractionalized were there , where Na Na has (14) articles and (41) articles fractionalized , Chen X has issued (11) articles (2.33) articles fractionalized, Li X has issued (11) articles (2.24) articles fractionalized, and at last Zhang H has issued (5) articles and (0.92) articles fractionalized.

Table 8 Most Prolific Institutions

Affiliation	Articles
Sun Yat-Sen University	17
University Of California	16
Technical University Of Munich	10
Notreported	9
Tsinghua University	9
University Of Chinese Academy Of Sciences	9
Beijing Technology And Business University	8
Beijing University Of Posts And Telecommunications	8
Stanford University	8
Aalto University	7

Table 8 presents most prolific Institutions or we can say most affiliation institutions and there are some articles name as (17)articles Sun Yat-Sen University,(16) University Of California,(10) Technical University Of Munich,(9) Notreported, (9) Tsinghua University, (9) University Of Chinese Academy Of Sciences, (8) Beijing Technology And Business University, (8) Beijing University Of Posts And Telecommunications, (8) Stanford University,(7) Aalto University these all are most affiliated universities.

Table 9 Result from Thematic Structure Analysis

From	To	Words	Weighted Inclusion Index	Inclusion Index	Occurrences	Stability Index
computer crime--2000-2019	blockchain--2020-2022	financial transactions	0.03	0.05	4	0.01
computer crime--2000-2019	human--2020-2022	mobile applications	0.04	0.05	6	0.02
computer crime--2000-2019	open source software--2020-2022	computer crime; android (operating system);mobile security; mobile telecommunication systems; malware; privacy protection; smartphones; cyber security; quality of service	0.30	0.05	16	0.01
confidentiality--2000-2019	human--2020-2022	computer security; confidentiality	0.07	0.06	11	0.02

confidentiality--2000-2019	privacy--2020-2022	privacy; anonymization; health care; technology; metadata	0.32	0.06	12	0.03
cryptography--2000-2019	blockchain--2020-2022	security of data; security; internet of things; authentication; computer operating systems; internet protocols; security and privacy; network architecture; open source platforms; internet of thing (Iot); design and implementations; intrusion detection; public key cryptography; data transfer; electronic voting; costs; data communication systems	0.25	0.02	49	0.01
cryptography--2000-2019	open source software--2020-2022	cryptography; access control; advanced encryption standard; computer architecture; distributed database systems; encryption algorithms; economic and social effects; homomorphic encryptions; design	0.13	0.02	64	0.01
cryptography--2000-2019	privacy--2020-2022	cloud computing	0.04	0.05	32	0.01
data mining--2000-2019	human--2020-2022	algorithms; information dissemination; data integration; bio informatics	0.12	0.06	14	0.02
data mining--2000-2019	open source software--2020-2022	quality control	0.04	0.06	5	0.01

Table 9 Presents the result from thematic structure analysis where it shows the words and there year starting and end ,weighted inclusion index ,inclusion index, occurrences and its stability index , now the word is computer crime in year 2000-2019 and blockchain is used in year 2020-2022 for financial transactions and its WII (0.03),(0.05)II,(4) occurrence, (0.01)SI, from 2000-2019 word used computer crime and 2020- 2022 human privacy is used for mobile applications its WII (0.04), II (0.05),(6) occurrence, (0.02) SI, from 2000-2019 data mining is used and open source software 2020-2022 the word quality control is used where (0.04)WII, (0.06) II, (5) occurrence and (0.01) is the stability index is used.

4. **Exploring Prominent themes for research in sustainable fintech eco- system**
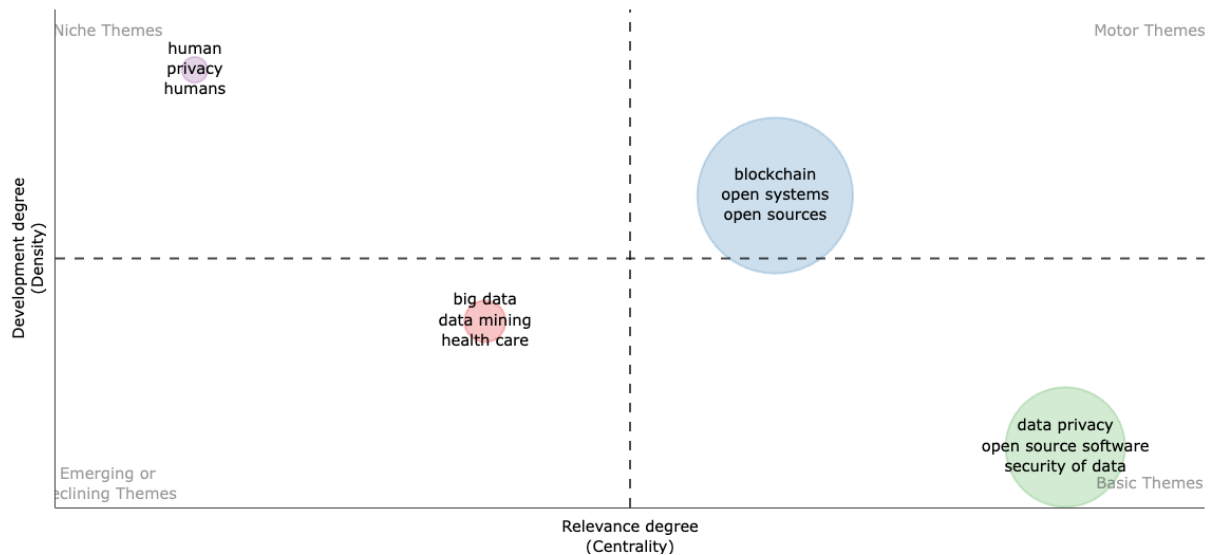
4.1 Clustering by Coupling

Figure 1. Shows the 4 cluster and 4 themes

Cluster 1 in light blue colour shows the bigger cluster name as blockchain ,open source, open system in this cluster blockchain occurrence level (343),open system (301),open source(125).

Cluster 2 in light green colour shows the lesser in size of cluster one its name as data privacy, open source software, security of data in this cluster occurrence level is data privacy(418),open source software(262),security of data(60).

Cluster 3 in peach colour shows the lesser size according to the cluster 2 name as big data, data mining, health care in this cluster occurrence level is big data(37),data mining(26),health care(23).

Cluster 4 in violet colour shows the lower cluster according all 3 cluster ,name as human, privacy in this cluster occurrence level is human (44), privacy(36).

Table 10 Thematic map

Cluster	Call on Centrality	Call on Density	Rank Centrality	Rank Density	Cluster Frequency
big data	5.878191853	14.24569189	2	2	449
blockchain	5.961871548	17.35132098	3	3	2970
data privacy	6.557952848	14.09607924	4	1	1637
human	2.793744633	34.23220904	1	4	347

Table 10 Presents 4 clusters name as big data whose call on centrality is (5.878191853),call on density(14.24569189),rank centrality (2),rank density (2),cluster frequency(449).blockchain call on centrality(5.961871548),call on density(17.35132098),rank centrality(3),rank density(3),cluster frequency(2970),data privacy call on centrality (6.557952848),call on density(14.09607924),rank centrality(4),rank density(1),cluster frequency (1637),human privacy call on centrality (2.793744633),call on density(34.23220904),rank centrality(1),rank density(4),cluster frequency(347).

4.2 Word dynamic:
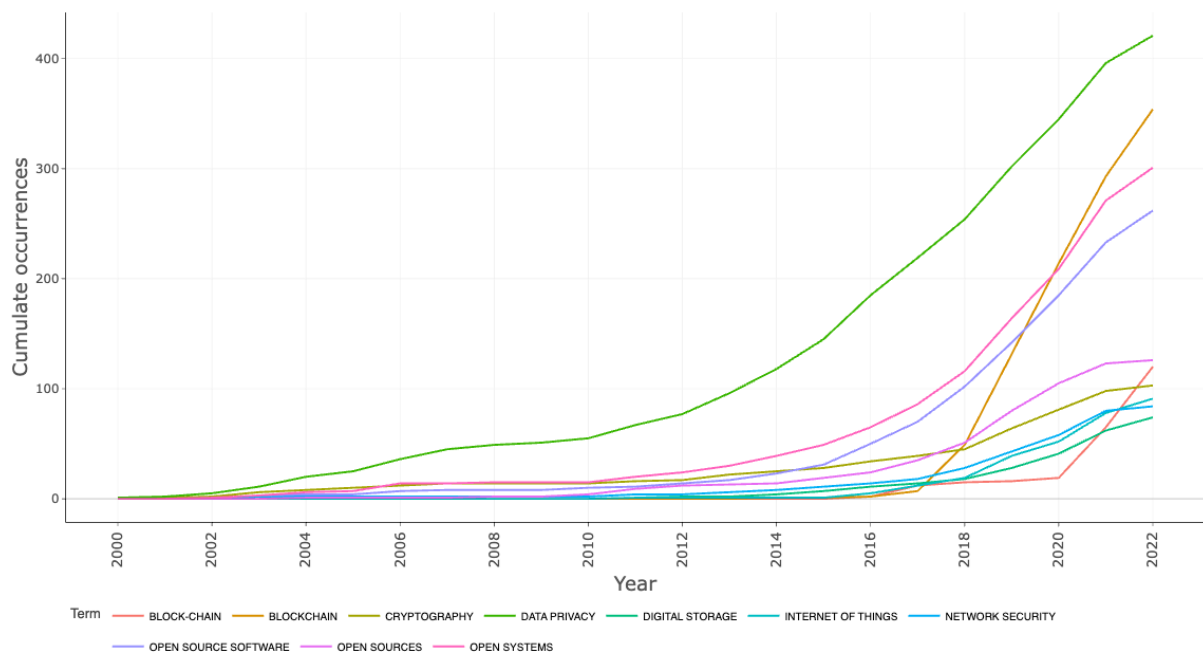
Figure.2 Represents few keywords which use more frequently in these year they are blockchain, cryptography, data privacy, digital storage, internet of things ,network security, open source software, open source, open system these all are shows in this graph with different lines such as red, mehndi color, light green, green, blue ,light blue, violet ,pink, purple these different color shows the different keyword and their occurrence level in different citable year such as data privacy which is in green color shows higher level of occurrence level in year 2022 where as digital storage as light green color shows the lower occurrence level in year 2022.
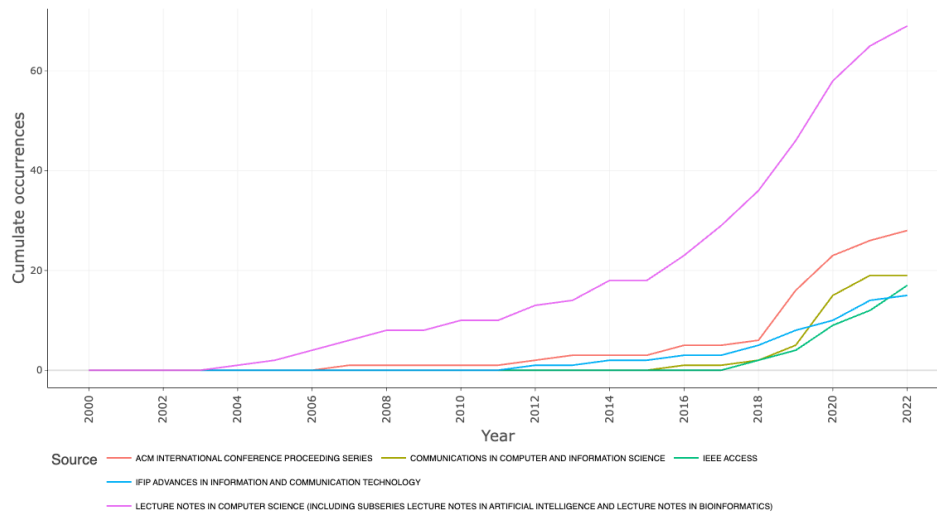
4.3 Source impact:

Figure. 3 Presents the sources and their citation where ACM international conferences proceeding series shows the red line , IFIP advances in information and communication technology show blue line , Communication in computer and information science shows mehndi color line, IEEE access sows light green line , Lecture notes in computer science shows the violet line under this figure or graph it shows the violet line is more citable in year 2022 where its occurrence level is above 60 where as light blue line shows lower occurrence level which is less than 15 in year 2022.

4.4 Factorial analysis:
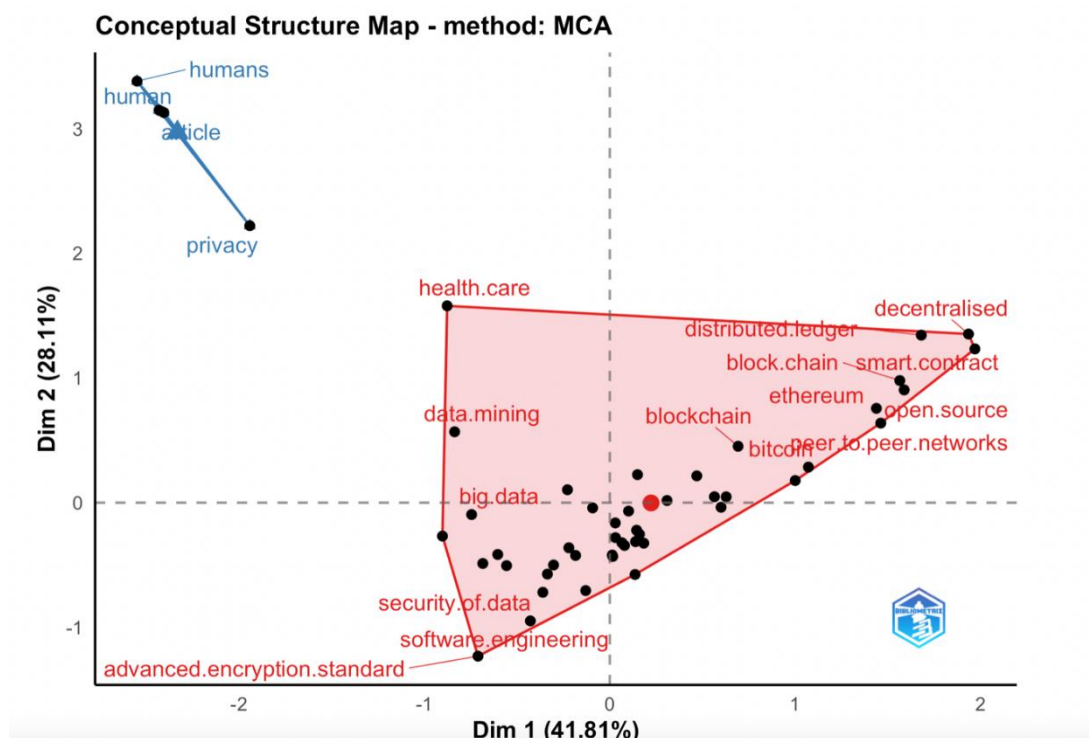
In this figure 4 it shows the factorial analysis structure where red line shows the more keywords connected and blue shows less red line shows more citation words like blockchain, big data, data mining, bitcoin, open sources, security of data, distributed ledger, peer to peer networks, health care these all are connected with the red line which shows the bigger cluster line and humans, articles, privacy are connected with blue line which shows the shorter cluster lines.
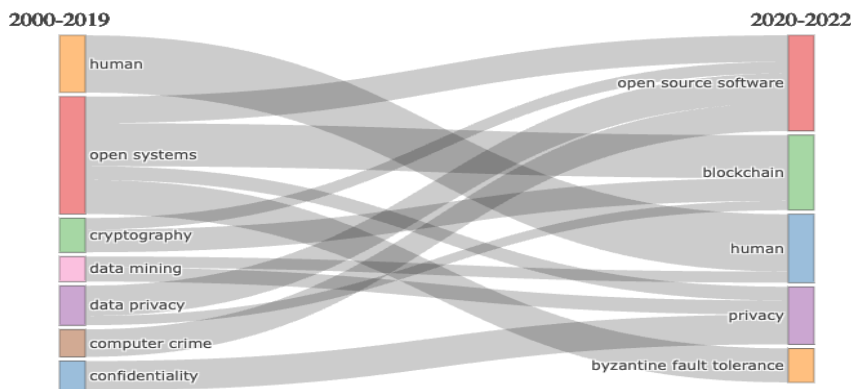
4.5 Thematic Evolution

Figure 5. Based our analysis on Scopus database between 2000 to 2022 , in figure 4 we present major themes in different time frame . These themes are human ,open systems, cryptography, data mining, data privacy, computer crime, confidentially which were among 7 major research themes between 2000-2019. 2020 onwards we can see change in themes for research to open source software, blockchain, human, privacy, byzantine fault tolerance.

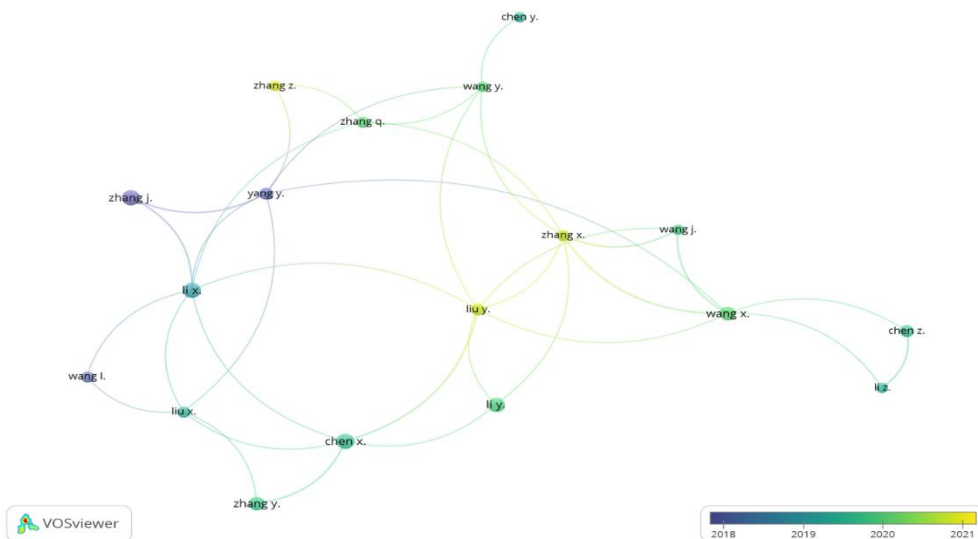## 4.6 Co-authorship network overlay:

Figure .6 Presents the co-authorship in sustainable fintech eco- system between 2000 and 2022 are presented in figure. This data is used from Vos viewer Scopus database where at the last there is time period shows about the authors who work on this in these different time period where they all are interconnected with each other this yellow line shows the currently authors are working and this green line shows the authors works in this time period of 2020 and this violet line shows that authors works in 2018 and light blue shows the authors works on this in year 2019. In this figure 16 authors works on this domain and cited .
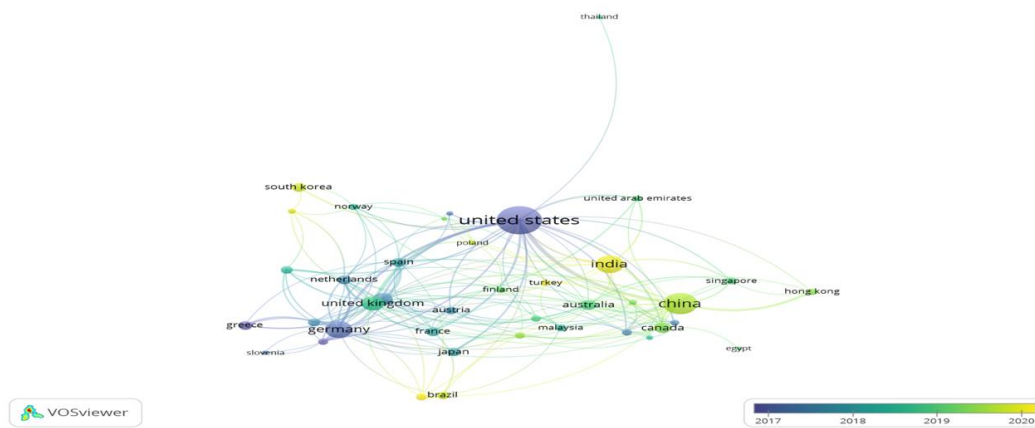
4.7   Co-authorship overlay countries:

Figure 7 . Presents a research topic network using Vos viewer to investigate the current research topics and future research topic in this area of study. At least 5 citation and they have 5 papers for themes these authors work majorly .In this 28 countries works on this domain and cited ,this timeline shows the countries and there citation where they all are interconnected with each other this yellow line shows the currently authors are working and this green line shows the authors works in this time period of 2020 and this violet line shows that authors works in 2018 and light blue shows the authors works on this in year 2019.

5.   Conclusion:

This study presents a data of 2000 to 2022 sustainable fintech eco- system. Several research questions were proposed and pursued the use of a bibliometrics methodology consisting of performance analysis and technological know-how mapping (e.g. co-authorship, bibliographic coupling, trending key-word analysis).Our first 3 research questions -i.e. RQ1 to RQ3 are concentrated on the courses and citations traits of sustainable fintech eco- gadget. Through performance analysis, we found that creating sustainable fintech eco- system has grown exponentially in terms of its publications and citations. There are the 3 research questions RQ1:What are the trends in publication in disruptive technologies for sustainable development? RQ2: Who are the most contributing (authors, institutions, and countries) in disruptive technologies for sustainable development? RQ 3: What are the most influential publications in disruptive technologies for sustainable development? Under these 3 questions we need to get answer for our RQ1,RQ2 and RQ3 we analysed recent publication trends and most influential publications in sustainable fintech eco- system. We also analysed contributing authors, institutions, and countries in this domain to validate their contribution . These

question are answered and will help us understand research contribution under various heads. Our 4th research question : How have the themes covering various aspects of disruptive technologies for sustainable development, helped to throw light on future direction for research in the area of creating sustainable fintech eco-system. This question covered all the themes and the other domains identified to contribute in research sustainable fintech eco- system. Most of these emerging themes were focusing research involving with use of new technology such as Block chain and IOT. To research further in the domain of creating sustainable fintech eco- system researchers have to combine use of technology in solving problem in sustainability. Artificial intelligence and green energies are another area where disruptive technologies will help to create ecosystem for sustainable development. First, this study relies on the Scopus for bibliometric information.Though the data- base has its merits, as laid out in the technique segment, the bibliographic facts isn't always created for the cause of bibliometric evaluation. this may result in mistakes within the statistics supply. thru facts cleaning, we've got attempted to limit errors, however any final blunders inside the source records, which we might have overlooked, could have an impact at the final analysis, even though we agree with that the margin for such mistakes would be exceedingly small, if not, negligible. sooner or later, the medical insights that would be exposed via a bibliometric method, although rich, remain restricted. specially, bibliometric critiques together with ours do not delve into professional data, consisting of the theories, contexts, and methods employed to create new know-how on digital trade inside the developing sustainable fintech eco- device Scopus. This, in turn, makes it tough for bibliometric critiques to put forth a complete set of statistics-informed proposals for future research. With an overview of the contribution of major authors and upcoming area for research this research will surely give researcher an edge to dip deeper in the area of research of sustainable fintech eco- system.

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