

TRENDS AND PATTERNS IN DIGITAL PAYMENT SYSTEM RESEARCH: A BIBLIOMETRIC OVERVIEW FROM SCOPUS DATABASE

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Abstract: In the contemporary technological landscape, digital payment systems have been instrumental in transforming traditional payment methodologies. Globally, with a focus on countries like India, most nations are actively incorporating digital payment systems into their economic frameworks. Given the widespread acceptance and diverse dimensions of digital payment systems, numerous academicians have enriched this field through a variety of research papers, articles, and other form of publications. This research utilizes the SCOPUS database to conduct a bibliometric analysis of publications related to keyword “digital payment system”. The aim of this paper is to achieve a more comprehensive insight into the current trends and patterns in research in this field. The analysis reveals important aspects such as key terms, authors, and collaborative networks present in literature concerning digital payment systems. The results enhance the overall understanding of the academic landscape concerning digital payment systems, providing valuable insights into the evolving trends and patterns influencing research in this area.

Key Words: *Author, Bibliometric Analysis, Digital Payment System, Publication, SCP, MCP.*

1. Introduction: Digital payment, also known as e-payment, involves the electronic transfer of funds between a payer and a payee. Both parties utilize digital methods to carry out the transaction (Pandey, 2022). The increasing use of the internet and the advancements in information technology have transformed the way things are exchanged within human society. This has led to a significant increase in the variety of digital payment methods. (Dadhich, Pahwa, & Rao, 2018). The transition from traditional to digital payment systems is underway, as conventional methods such as cheques, withdrawals, drafts, money orders, letters of credit, and travel cheques are gradually being replaced. The shift towards electronic payment systems facilitated by computers and the internet is driven by various factors. One prevalent reason for this transition is the identification of leakages and inefficiencies in the traditional system, which are effectively addressed by the digital payment system. (Babulal, 2019). When transactions occur digitally, they become easily traceable. Every payment from a customer to a merchant is meticulously recorded, eliminating the possibility of illicit transactions. By discouraging cash transactions and promoting the use of digital payments exclusively, the government can effectively eradicate the black economy (Rameshkumar, 2023). The global pandemic has spurred a heightened adoption of digital payment methods. In economies with lower to middle incomes (excluding China), over 40% of adults engaging in in-store or online merchant transactions through cards, phones, or the internet have embraced these methods for the first time since the pandemic's onset. Similarly, more than a third of adults in all low- and middle-income economies, who directly paid utility bills from a formal account, experienced this for the first time during the pandemic (World Bank, 2022). According to (Chaudhary, Joshi, Bhardwaj, Annu, & Dhiman, 2023) The essential element in all banking transactions is the Digital Payment System. To stay competitive with developing nations and address the requirements of the modern world, the country must undergo a digital transformation, particularly in expanding the financial sector.

2. Research methodology: This research entails an extensive bibliometric examination concentrated on the digital payment system. To collect pertinent information, a search was carried out within the Scopus database utilizing the term "digital payment system." The data retrieved from Scopus underwent scrutiny using the BiblioShiny interface within the R Studio software.

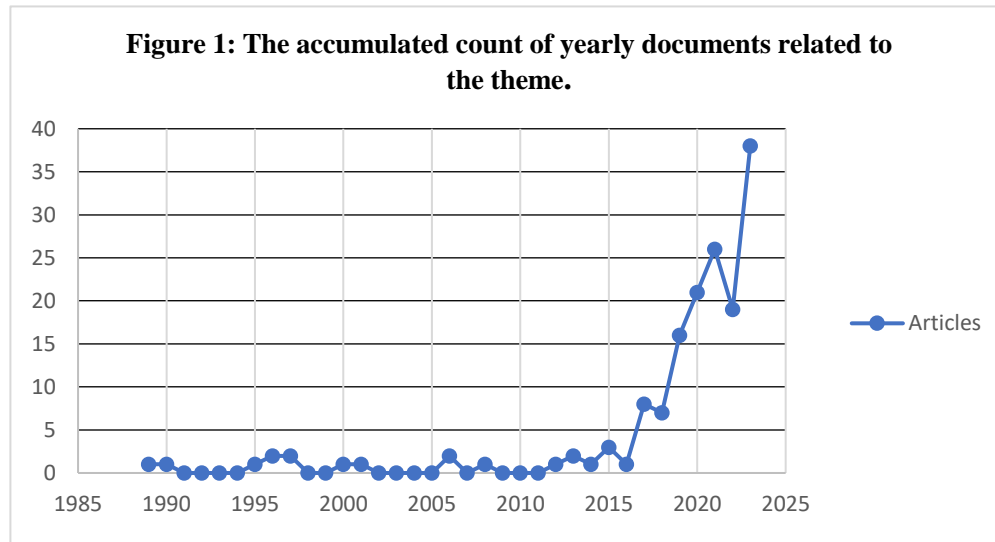
2.1 Database description: This section of the paper outlines the methodology employed in preparing the data for bibliometric analysis. The identification of relevant papers was accomplished by delving into the scientific literature using the specific keyword phrase "digital payment system". These selected papers were sourced from the Scopus database. The primary aim of this study is to conduct a descriptive-quantitative analysis, spanning the years 1989 to 2023, to assess the prevalence and evolution of the concept of "digital payment system."

Table 1: Key details of extracted documents by Scopus Database	
Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	1989:2023
Sources (Journals, Books, etc)	132
Documents	155
Annual Growth Rate %	11.29
Document Average Age	5.17
Average citations per doc	16.64
References	0
DOCUMENT CONTENTS	
Keywords Plus (ID)	608
Author's Keywords (DE)	466
AUTHORS	
Authors	449
Authors of single-authored docs	22
AUTHORS COLLABORATION	
Single-authored docs	23
Co-Authors per Doc	3.01
International co-authorships %	15.48
DOCUMENT TYPES	
Article	78
Book	2
book chapter	19
conference paper	51
conference review	2
Review	3

It is noteworthy that most documents are in the form of journal articles, totalling 78. Additionally, conference papers contribute significantly with 51 entries. In another category, there are 19 book chapters. According to Scopus records, a total of 449 authors are associated with this theme (Digital payment system). The collaboration among authors, as measured by Co-Authors per Document, is relatively low at 3.01. Enhancing collaboration among authors on this theme could potentially lead to an increased production of publication.

3. Bibliometric Analysis:

3.1 Documents and Sources



In the initial years spanning from 1989 to 2012, the theme of "digital payment system" saw a publication range of 0-2 articles. However, in the most recent five-year period (2019-2023), there has been a notable surge. On average, during these last five years, the theme has been the subject of more than 24 papers annually. This increase in publications clearly indicates a growing interest in the academic community towards the digital payment system. Figure 1 illustrates that over the past five years, academia has consistently produced a substantial number of noteworthy publications each year.

3.2 Most relevant authors

Table 2: Most contributing authors and different index						
Author details	H index	G index	M index	Total citations	NP	PY_start
AKANFE O	3	3	0.6	28	3	2020
RAO HR	3	3	0.6	28	3	2020
VALECHA R	3	3	0.6	28	3	2020
AL-OKAILY M	2	2	0.4	87	2	2020
ALAM W	2	2	0.333	14	2	2019
BÜRK H	2	2	0.056	68	2	1989
CAMENISCH J	2	2	0.067	272	2	1995
CHAIYASOONTHORN W	2	2	0.5	56	2	2021
CHAVEESUK S	2	2	0.5	56	2	2021
GUPTA R	2	2	0.286	18	2	2018
KHALID B	2	2	0.5	56	2	2021
PFITZMANN A	2	2	0.056	68	2	1989

PY_start = production year of 1st document

Table 2 provides details about authors engaged in the digital payment theme with an H index of 2 or higher. The table also includes information on their H index, G index, and M index.

3.3 Most relevant affiliations

Table 3: Most relevant affiliations on the theme (Digital Payment System)	
Affiliation	Articles
WORLD HEALTH ORGANIZATION	8
LOVELY PROFESSIONAL UNIVERSITY	7
UNIVERSITY OF ECONOMICS AND LAW	6
DEEMED-TO-BE UNIVERSITY	5
AMERICAN UNIVERSITY IN DUBAI	4
CHRIST (DEEMED TO BE UNIVERSITY)	4
FLORIDA INTERNATIONAL UNIVERSITY	4
INSTITUTE FOR DEVELOPMENT AND RESEARCH IN BANKING TECHNOLOGY	4
JADARA UNIVERSITY	4
SHANGHAI UNIVERSITY OF INTERNATIONAL BUSINESS AND ECONOMICS	4
UNIVERSITI BRUNEI DARUSSALAM	4

Table 3 presents publications and their affiliations within the Digital Payment System theme. Upon analyzing the table, it becomes evident that among the publications associated with this theme, a maximum of 8 publications are affiliated with the World Health Organization, followed by 7 publications linked to Lovely Professional University. The University of Economics and Law is the next leading affiliation with 6 publications. Additional affiliations and their corresponding publication counts are also mentioned in table 3.

3.4 Most important Sources

The inquiry revolved around identifying the primary contributors to published works, prompting the establishment of criteria necessitating a minimum of two publications from each source (refer to table 2 for specific details). A total of 12 sources met this criterion, each having produced more than two documents.

Table 4: Most relevant sources on the theme (Digital payment system)	
Sources	Articles
Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	6
Contributions To Finance and Accounting	4
AIP Conference Proceedings	3
Computers And Security	3
IFIP Advances in Information and Communication Technology	3
Lecture Notes in Networks and Systems	3
International Journal of Innovative Technology and Exploring Engineering	2
International Journal of Intelligent Systems and Applications in Engineering	2
Journal of Advanced Research in Dynamical and Control Systems	2
Journal of International Money and Finance	2
Journal of Payments Strategy and Systems	2
Lecture Notes in Electrical Engineering	2
Technology In Society	2

Illustrated in Figure 2 is the cumulative development of key contributors within the digital payment systems theme, providing insights into their growth patterns.

3.5 Word cloud

[illegible]

3.6 Author affiliations and the respective countries involved in collaborations.

Country	Articles	SCP	MCP	Freq	MCP_Ratio
INDIA	27	25	2	0.174	0.074
USA	7	4	3	0.045	0.429
UNITED KINGDOM	6	5	1	0.039	0.167

INDONESIA	4	4	0	0.026	0
CHINA	3	3	0	0.019	0
JORDAN	3	0	3	0.019	1
SAUDI ARABIA	3	2	1	0.019	0.333
SERBIA	3	3	0	0.019	0
AUSTRALIA	2	2	0	0.013	0

Figure 4: Graphical depiction of nations and their collaboration indices.

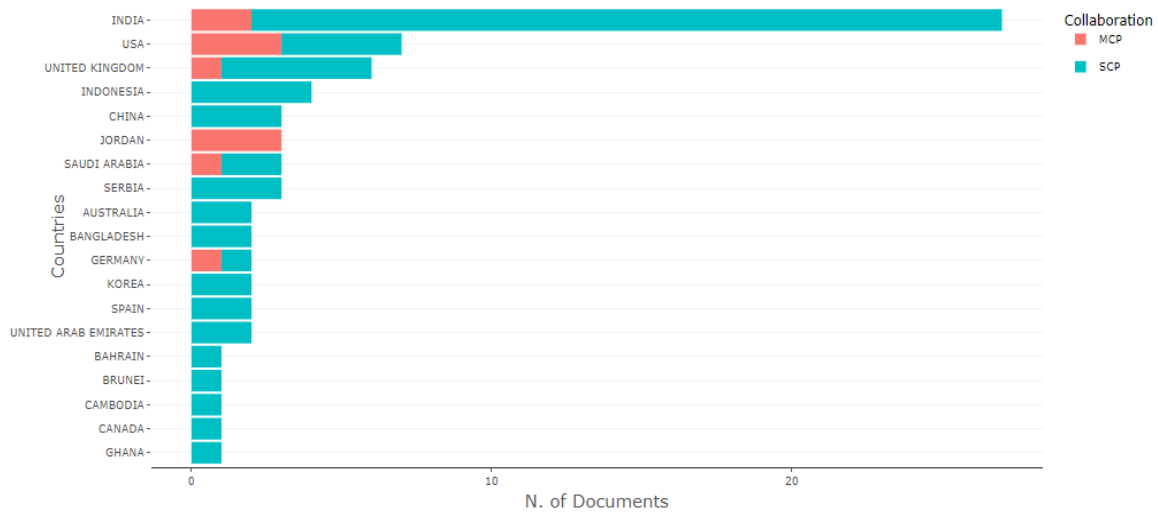


Table 5
and
Figure 4
present data

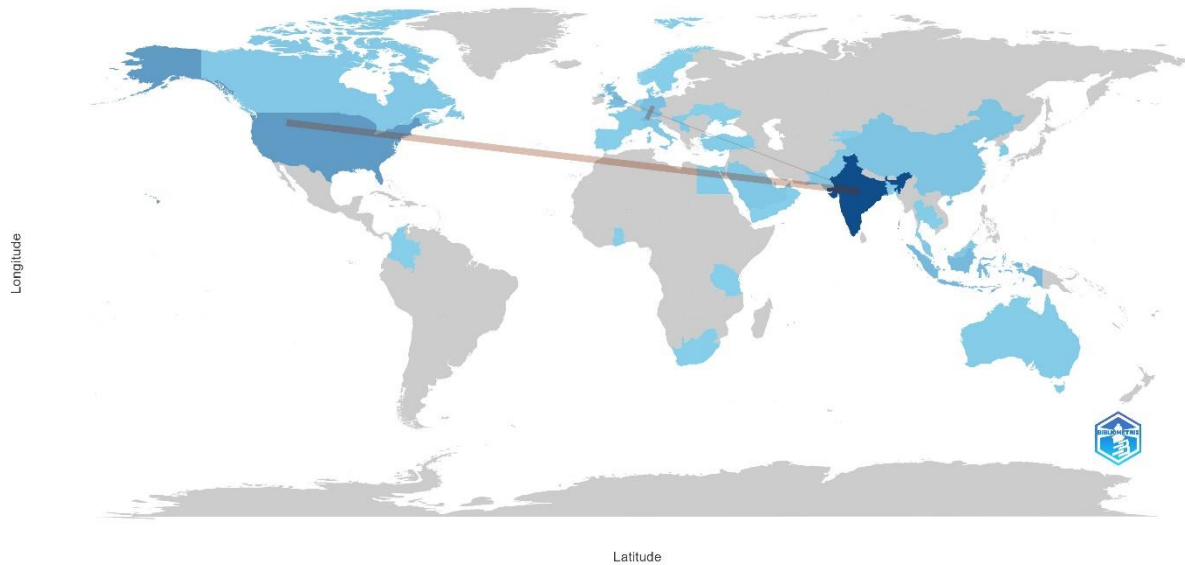
regarding the countries and their correspondence authors in terms of single-country publications (SCP) and multiple-country publications (MCP). Upon analyzing the data, it is evident that the majority of publications under the theme of Digital Payment System, specifically 27 articles, have been published by authors affiliated with India. In this context, India has a higher Single-Country Publication Index and a lower Multiple-Country Publication Index, indicating a greater prevalence of intra-country publications in India related to the theme. Other countries, such as the United Kingdom, Indonesia, and others, also have relevant data showcased in Table 5 and Figure 4.

3.7 Country Collaboration

Figure 5: Map illustrating global collaboration of data on the theme “Digital payment system”

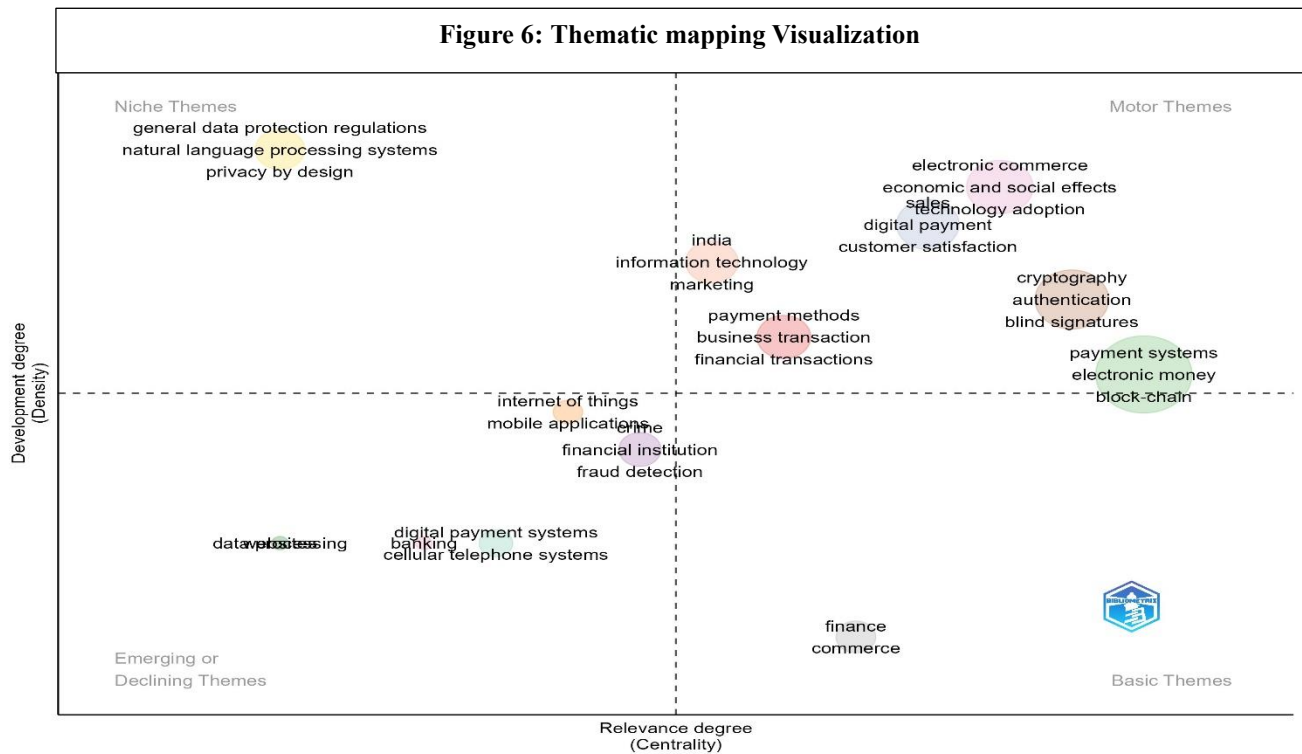
As

Country Collaboration Map



illustrated in Figure 5, a significant number of countries have contributed publications on digital payment systems. Nevertheless, the preponderance of published articles is concentrated in a select few countries. The study of world collaboration data reveals that there is the highest collaboration on the theme of digital payment between India and the USA, with 7 collaborations, followed by Switzerland and Germany with 4 collaborations. Additionally, there have been 2 publications each between India and the United Kingdom in this domain.

3.8 Research themes analysis



Illustrated in Figure 6, the thematic map was created and organized into four distinct themes: niche (top left), motor (top right), emerging or declining (bottom left), and basic themes (bottom right).

Within the motor themes, well-developed research themes are situated in the top right quadrant, encompassing Cluster 1: electronic commerce, economic and social impact, technology adaptation; Cluster 2: sales, digital payment, customer satisfaction; Cluster 3: cryptography, authentication, blind signature; Cluster 4: payment system, electronic money, blockchain; Cluster 5: payment methods, business transactions, financial transactions; and Cluster 6: India, information technology, marketing.

2: Niche themes, characterized by high density and low centrality, indicating limited relevance, are clustered in the top left quadrant. This cluster comprises themes such as general data protection regulation, natural language processing systems, and privacy by design.

3: Emerging themes, marked by low centrality and low density (third quadrant, left bottom), reflecting minimal development and marginal significance, are spread across three clusters. Cluster 1 includes Internet of things, mobile applications; Cluster 2 encompasses crime, financial institutions, fraud detection; and Cluster 3 involves digital payment systems, banking, and cellular telephone systems.

4: In the basic themes (bottom right quadrant), research themes with high centrality and low density are plotted. These themes are crucial for transdisciplinary research issues. Only one cluster is present in the basic theme, focusing on finance and commerce.

Thematic mapping facilitates the identification of trends, whether ascending or descending, within each theme. A trajectory toward the upper right over time signifies a growing trend, while a path toward the lower left indicates a declining trend (Alkhamash, 2023).

4. Conclusion: This paper undertakes a comprehensive analysis of major publishers, their publication growth, key authors contributing to the theme of digital payment systems, and various metrics such as collaboration indices between countries etc., The objective of the study is to derive meaningful conclusions by examining the landscape of scientific publications related to the digital payment system theme. The study employs thematic analysis, research keyword analysis, and explores dimensions like global collaboration to provide a thorough understanding of the scientific publications within the domain of digital payment systems. The primary goal of this study was to conduct a bibliometric analysis of the scholarly publications concerning digital payment systems. Additionally, the paper aims to discern the extent to which research on digital payment systems addresses the questions of how much, who, what, where, and how, providing insights into the nature and distribution of research in this thematic area.

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