

RETAILERS' TECHNOLOGY ADOPTION - A BIBLIOMETRIC REVIEW ON THE WEB OF SCIENCE DATABASE

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A b s t r a c t

Purpose- The purpose of the study is to identify the published articles, literature, and future directions for research in the adoption of technology in the field of management and business. It is based on the comprehensive review of articles using the bibliometric review technique.

Design/methodology/approach- Fifty papers were selected for content analysis and using VOS viewer software, the network visualization and bibliometric analysis was done. The database is the Web of Science database, focusing on the articles from the year 1990- 2021.

Findings: This study helped identify the significant research areas: 1. Emerging technology and adoption in the unorganized retail segment, 2. Innovation and technology in retail segment and expectations of merchants-Technology use and risk of service failure 3. Comparative study of user and non-user of technology in the unorganized sector. 4. Significant questions to develop a future research agenda from the published literature.

Practical implications- Future research framework will guide the researchers and other stakeholders to develop various strategies to make technology adoption more sustainable.

Originality and value- The study proposed to identify the literature on technology adoption in the retail segment and also a future research framework to discover further on this topic. The present work is unique as this covers a bibliometric review and content analysis in the subject area, and very little work is done on this segment.

Keywords- Retail, Technology adoption, TAM, Bibliometric analysis, VOS viewer.

Paper type- Review Paper

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1. Introduction

Technology adoption and its usage have been gaining importance in recent years, especially after the demonetization in 2016 and the Corona Virus Disease pandemic hit in 2020. Adoption of information technology is universal, and the same is reflected in the retail segment as well. Various technologies in payments, ordering and self-services have emerged over time. Covid has become an accelerator for technology adoption by various users across the country (Rafidinal & Senalasari, n.d.). The purpose of this paper is to create a better understanding of the literature published in the Web of Science Database and proceed with future research directions on technology adoption by retailers. The methodology used here is the bibliometric analysis technique.

India's unorganized retailing segment constitutes one-third of the entire retail industry (*India: Retail Industry Distribution by Structure 2021 | Statista*, n.d.). Digital payments and mobile payments have seen steady growth in the past five years, post demonetization in 2017, and the pandemic Covid in 2020.

According to the world payment report last year, the digital payments volume has significantly increased and is likely to reach one trillion transactions in the next couple of years. This further got boosted after the pandemic, and the rise in the use of digital payments is likely to increase even after the covid pandemic is contained. (Roncancio, 2020) Digital payments are set to become the most preferred payment mechanism in the coming years, as per the above report.

However, research that focuses on the unorganized retail sector and its adoption of technology are very few. Thus, this study aims to investigate the comprehensive literature and review the possible gap in this research area. Once these objectives are achieved, they will contribute to the existing studies in the following way. Firstly, the content analysis will help identify the prospective areas and theories of technology adoption for conducting the research. Second, Bibliometric and network analysis will suggest the most influential and discussed areas in the technology adoption in Retail. And third, the analysis will contribute to future research questions in retail and technology adoption.

Starting with the comprehensive literature on information technology adoption, using the Web of Science, maximum relevant articles were collected for the present study. This has become a challenge here in a way as relying on only one database, and there might be relevant articles in other databases such as Scopus, which covers articles from the 1960s. However, WOS covers the world's leading journals, books, and conference proceedings in various subject areas and the full citation network.

Thus, the present paper has only covered articles published in the past three decades in the WOS database. Figure 1 demonstrates the articles published over the years in WOS. The bibliometric analysis helped to find out the articles as basic units and establish a relation between them based on the citation analysis.

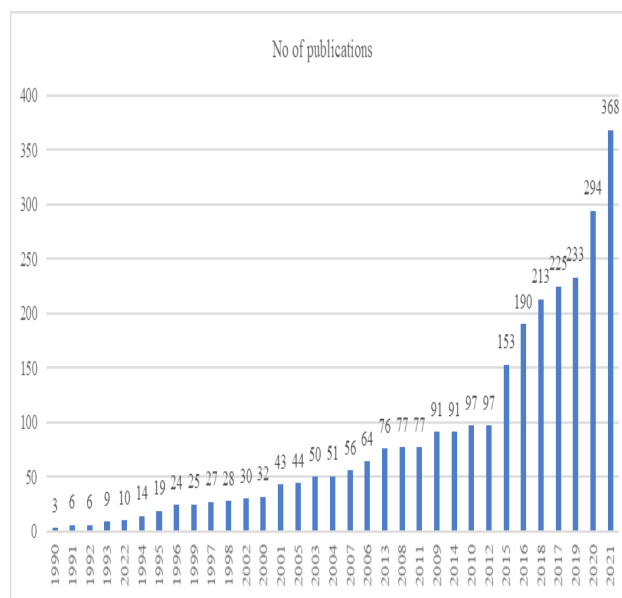


Fig 1 Articles published over thirty years

In the past three decades, there has been a steady growth of articles published in WOS on technology adoption. From 2015, the number of articles published per year started growing beyond a hundred articles a year, and the same is improving from thereon. Here, out of the articles searched, the review papers on technology adoption published are included in table 1.

Authors	Article Title	Framework
(Chen et al., 2021)	Augmented reality in Retail: a systematic review of research foci and future research agenda	systematic literature review of seventy-six papers published between 1997-2020
(Varadarajan et al., 2010)	Interactive Technologies and Retailing Strategy: A Review, Conceptual Framework, and Future Research Directions	examining the (1) effects of interactive technologies on consumers; (2) retailers' capabilities; and (3) business models. Also, a process model on the direct and indirect effect of technology
(H. Kumar, 2021)	Augmented reality in online retailing: a systematic review and research agenda	systematic literature review of fifty-three papers
(Srichookiat & Jindabot, 2017)	Small family grocers' inherent advantages over chain stores: a review	Resource- Advantage theory
(Gunasekaran et al., 2006)	Information technology and systems justification: A review for research and applications	Literature review of articles of 12 years
(D. H. Nguyen et al., 2018)	Consumer Behaviour and Order Fulfilment in Online Retailing: A Systematic Review	A systematic review of literature on the online behaviour of consumers and order-fulfilment, 44 articles published between 2000 and 2015
(Cavalinhos et al., 2021a)	The use of mobile devices in-store and the effect on shopping experience: A systematic literature review and research agenda	46 papers published between 2007 and 2020
(Montoya-Torres et al., 2021)	Mapping research in logistics and supply chain management during COVID-19 pandemic	literature review of peer-reviewed articles published in 2020

Table 1: Review papers published.

Out of the review papers, Major studies are customer-centric, and all are systematic literature reviews based on selected papers published in a specific period selected by authors. Most of the papers are systematic literature reviews and meta-analyses.

2. Methodology/approach

This study combines bibliometric analysis and content analysis of articles published from 1990 to 2021 on technology adoption. Many milestones are covered during these three decades of technology adoption, especially in the retail segment. The process flow chart of the methodology is given in Figure 2.

For Bibliometric analysis, VOS viewer software is used. Bibliometric analysis is now a widely used method for quantitative analysis based on the similarity of articles and bibliographic databases. Web of Science was chosen to excerpt the data, and the search was refined by language. English, and type of documents such as journal articles and reviews. No time limit

was selected, and the time limit was 1990- 2021 as per the WOS database.

2.1. Selection of the database:

The adoption and utilization of technology and digital payments have been a topic of study across various disciplines over the years. The Web of Science database is selected to facilitate a wide coverage of articles. Around 8485 articles are available in the Web of Science database in technology in the retailing area, which was further refined using subject criteria. This was again refined using exclusion criteria of selecting only research articles from the subject area of Business management, commerce, business finance, and economics.

2.2 Keywords used for search

A set of keywords were selected for the search process in the WOS database. A combination of keywords was used for the comprehensive search, and the most suitable synonyms were also included, and the same was incorporated with "OR" Boolean

operators. All keywords were identified based on the author's judgment on the topic. "Adoption" OR "Technology adoption" OR "Adoption of technology" OR "Technology acceptance" OR "Technology Acceptance Model" OR "mobile payment" OR "digital payment" OR "technology adoption model" OR "merchant adoption" OR "technology diffusion" OR "diffusion of innovation" OR "intention to use" OR "ICT" OR "mobile wallets" OR "digital payments" OR "mobile payments" OR "information communications technology" OR "small business" OR "rural".

2.3 Selection of research articles

Using the selected keywords, 8485 articles were extracted from the Web of Science database. After eliminating notes, letters, undefined articles, articles in the press, and filtering with WOS categories, 2823 articles were finalized for scrutiny. The data were then downloaded as metadata on bibliographic materials, keywords, citation information, among others, as CSV file format. All the articles shortlisted were managed with Mendeley software, and the duplicated were removed manually.

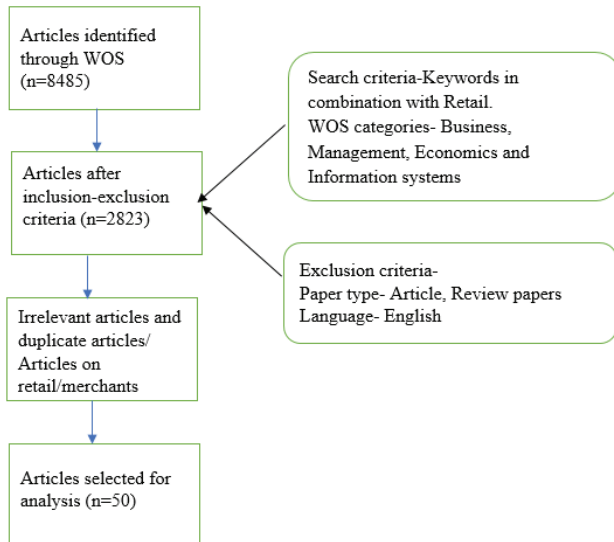


Fig 2 Selection of articles for review

Table 2 represents the number of articles published in the various Web of Science categories in technology adoption.

Web of Science Categories	Record Count	% Of 2,823
Business	1750	61.9
Management	1060	37.6

Computer Science	304	10.8
Information Systems		
Operations Research	286	10.1
Management Science		
Economics	252	8.9
Business Finance	213	7.6
Information Science		
Library Science	128	4.5

Table 2 Data Statistics

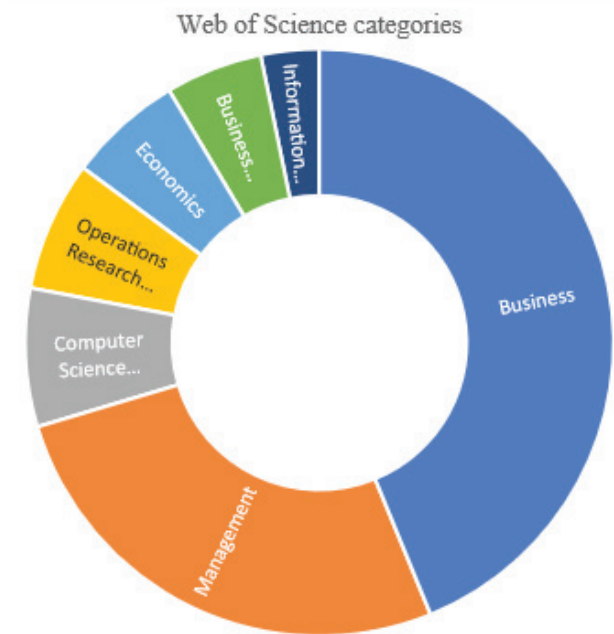


Figure 3 Web of Science categories

2. 3 Research questions

RQ 1- Which were the major theories used to study the adoption of ICT and technology in retailing at the merchant level. Significance of Technology Acceptance Model in the study of technology adoption in the retail segment.

RQ 2- Which is the most discussed/popular area in technology adoption among the articles selected?.

RQ 3- What is the most significant aspect of technology adoption in the retail segment?

RQ 4- Who are the leading authors and the journals and publishing countries in technology adoption? Which were the most used keywords?

RQ 5- What are the possible areas for developing a research program?

2.4 Identifying and selection criteria

The method followed for refining articles-steps were:

Step 1: Scrutinizing and refining the articles from the web of science database.

Step 2: Identification and analysis of the key research articles on the adoption and application of mobile payments and technology specifically by merchants in different settings.

Step 3: Identify the commonly used methodological aspects and categorize them as per the TAM approach and other techniques.

Step 4: Identifying key focus areas and, finally, research gap in the existing literature which is yet to address the adoption of technology and ICT from a retailer perspective.

3. Analysis of Bibliometric Data

The bibliometric data helped to bring about the most influential aspects of the technology adoption literature. Table 4 depicts the strategy applied in searching and refining the sources for the literature review. Below are the steps for arriving at the final articles for analysis.

Literature search -rule applied	
Document	Research article
Database	Web of Science
Technique	Bibliometric analysis
Tool	VOS viewer
Articles collection	From 1990-2021
Articles selected for study	50

Table 3 Summary

From the above-mentioned search query, for scrutiny, these details are extracted.

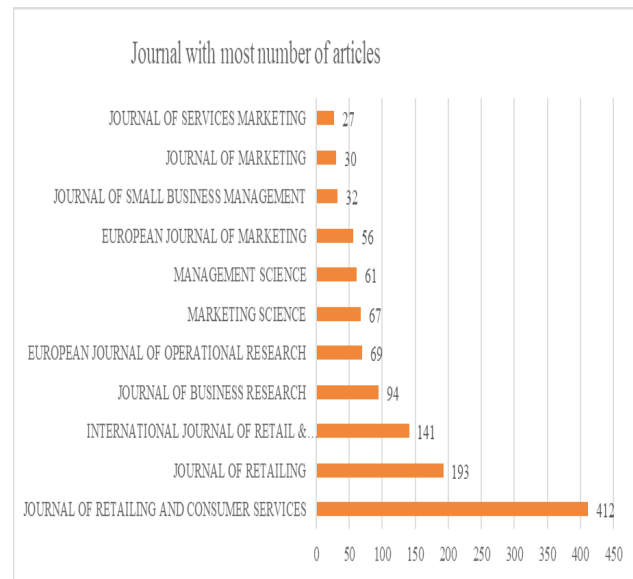


Figure 4 Articles published on technology adoption in Journal

Details	Results
Publications	359
Research papers	2823
Authors	6433
Organizations	2171
Total keywords	10404
Author keywords	7402
cited countries	89

Table 4 Search Protocol Applied

3.1 Data Analysis

Various theoretical models and frameworks were used in the study of technology adoption over the years. Various models and theories have evolved around technology adoption. Theory of reasoned action and game theory are other popular theories. Technology Acceptance Model and Unified theory of acceptance have been the most extensively studied theories out of the articles selected.

Theory	Developed by	Explanation	Selected articles
Diffusion of innovation	Everett Rogers (1962)	DOI proposes five elements- innovation, adopters, communication channels, time, and social system. Also, categories of adopters-innovators, early adopters, early majority, late majority, and laggards.	(Alexander & Kent, n.d.)
Theory Of Planned Behaviour (TPB)	Icek Ajzen (1985)	Attitude, subjective norms, and perceived behavioural control together form an individual's behavioural intention.	(Kureshi & Thomas, n.d.)
Expectation confirmation theory	Richard L. Oliver (1977)	ECM proposed the continuance intention- confirmation, perceived usefulness, and satisfaction, perceived usability, along with the habit. The model is used to study the adoption and continuance of the use of technology.	(Nascimento et al., 2018)
Technology acceptance model (TAM)	Davis (1989)	Behavioural intention led to the acceptance of technology, perceived ease of use, perceived usefulness influenced the decision.	(Kaushik & Rahman, n.d.)
Task technology Fit	Goodhue and Thompson (1995)	The positive impact of IT on individual performance,	(Wang et al., 2021)
Extended TAM	Venkatesh and Davis (2000)	Subjective norm, Image, Voluntariness, Job relevance, Output quality, and Result demonstrability.	
The unified theory of acceptance and use of technology (UTAUT)	Venkatesh (2003)	User intention and subsequent behaviour. Four constructs: 1) performance expectancy, 2) effort expectancy, 3) social influence, and 4) facilitating conditions.	(Giovanis et al., 2019)
UTAUT2	Venkatesh (2012)	Adding three constructs to the UTAUT model- hedonic motivation, price value, and habit	(Christino et al., 2019)

Table 5 popular theoretical models

3.1.1 Top influential authors on technology adoption.

Out of the articles selected, the co-authorship, 6433 authors meeting the threshold of minimum two documents, the threshold which met the criteria was 851. For the selected 851 authors, the authors with co-authorship links were as below;

As per the network diagram, there are twelve clusters formed out of the criterion. Here the authors Verhoef, Peter C. have more than 1500 citations with seven documents published, and they belong to cluster four of the network diagram with a total of 10 link strengths. Dhruv Grewal has published eleven articles with more than 600 citations.

Author	Documents	Citations	Total Link Strength
Grewal, Dhruv	11	647	31
Perrigot, Rozenn	11	121	7
Dwivedi, Yogesh K.	10	529	20

De Ruyter, Ko	9	1020	17
Dhir, Amandeep	9	341	21
Breugelmans, Els	8	94	13
Pramatari, Katerina	8	282	8
Campo, Katia	7	98	14
Gijsbrechts, Els	7	237	8
Kaur, Puneet	7	266	18
Verhoef, Peter C.	7	1582	10
Maier, Erik	6	73	6
Molinillo, Sebastian	6	103	8
Neslin, Scott A.	6	885	7
Park, Eunil	6	76	4
Rana, Nripendra P.	6	327	15
Talwar, Shalini	6	234	15
Venkatesh, Viswanath	6	106	11
Wetzels, Martin	6	2562	14
Zhou, Wei	6	95	5

Table 6 Authors list and documents

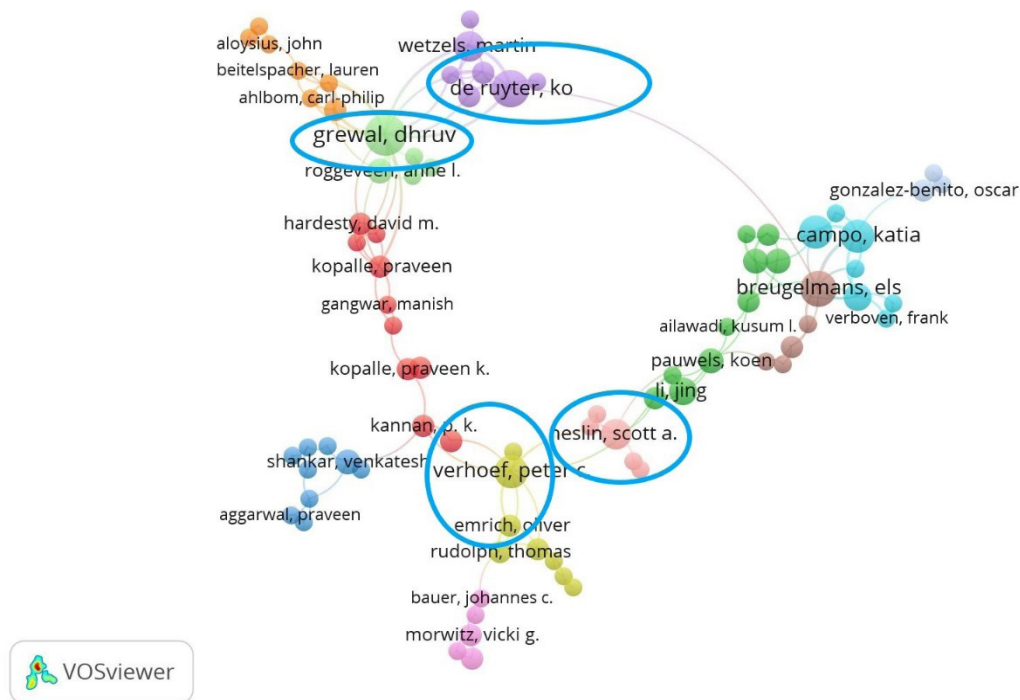


Fig 5 Co-authorship map

3.1.2 Top used and discussed keywords

There are 10,404 keywords selected from the selected articles, and with the minimum threshold limit being five keywords, 958 keywords with co-occurrence links are stated in table 3. The highest connected keywords

3.1.3 Top journals with a greater number of articles published in WOS

From the Web of Science database, 359 Journals were identified publishing articles in technology adoption. The network analysis is done with a minimum of 2 articles from a journal; 228 met the threshold limit. Journal of retailing and consumer services has published more than 400 articles with 7500 citations. Journal of retailing articles were cited more than 16,000 times from 193 articles in the selected time.

Sl no	Source	Documents	Citations	Total Link Strength
1	Journal of Retailing and Consumer Services	412	7514	973
2	Journal of Retailing	193	16187	979
3	International Journal of Retail & Distribution Management	141	1285	463
4	Journal of Business Research	94	3434	329
5	European Journal of Operational Research	69	2379	94
6	Marketing Science	67	5597	310
7	Management Science	61	4894	196
8	European Journal of Marketing	56	1363	122
9	Journal of Small Business Management	32	1233	57
10	Journal of Marketing	30	5990	223

Table 8 Journal list

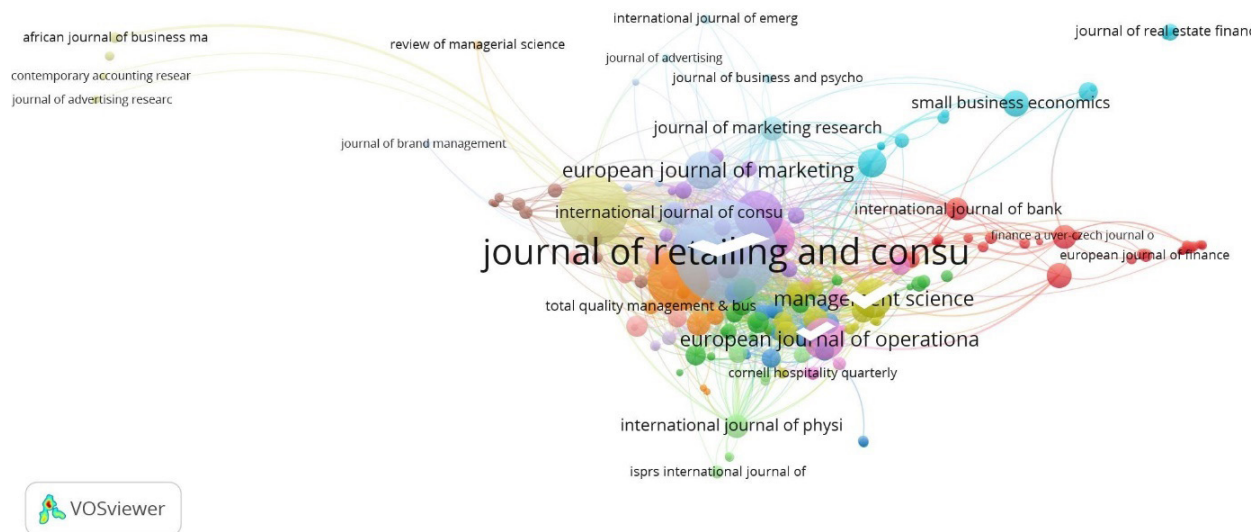


Fig 7 Most cited journal network map

3.1.4 Top countries with the maximum number of articles

89 countries have contributed to research on technology adoption in various subject categories. Here keeping the minimum published articles being 2, 75 countries met the threshold limit. The United States of America has published the greatest number of articles based on the search criteria with more than 50,000 citations. India has published 138 publications and stands at the seventh position in the list.

Sl no	Country	Documents	Citations	Total Link Strength
1	USA	1125	56223	495
2	England	297	7934	245
3	Peoples R China	234	4192	185
4	Australia	193	7375	146
5	Germany	181	3760	150
6	France	146	3304	141
7	India	138	2652	82
8	Spain	127	1889	75
9	Canada	116	3929	110
10	Netherlands	112	7324	117
11	South Korea	111	1855	75
12	Taiwan	79	1557	33
13	Italy	74	1000	54
14	Sweden	59	906	23
15	Belgium	54	1305	44

Figure 8 represents the network diagram of the greatest number of publications in the area of technology adoption in the past three decades. All the 75 countries are grouped in eleven clusters in the Vos viewer software.

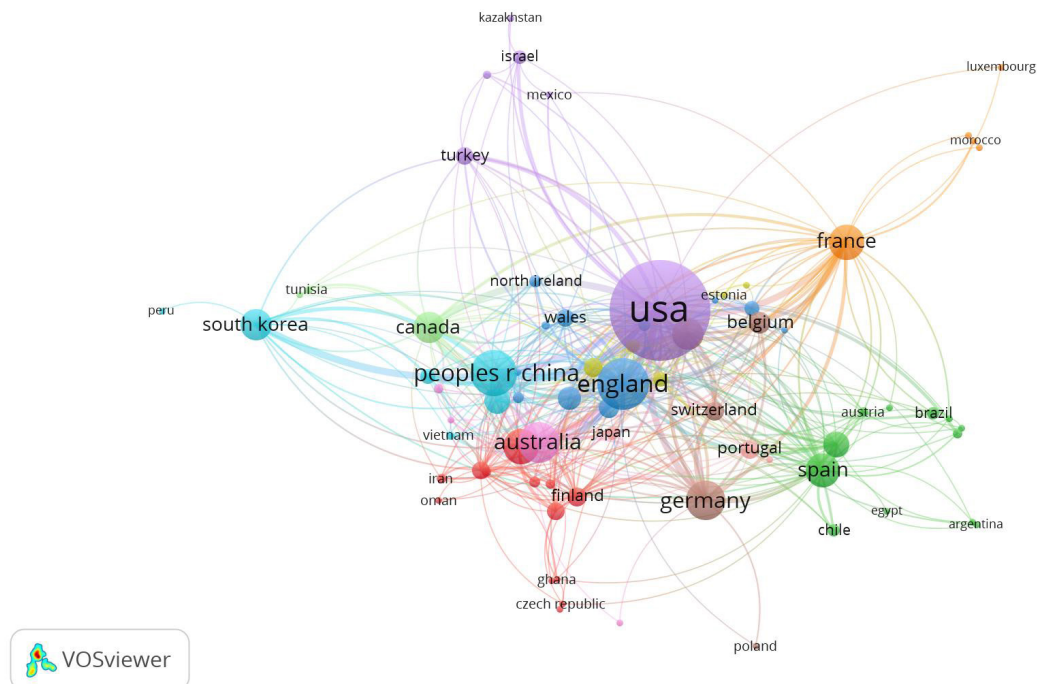


Fig 8 Countries with the highest number of publications

According to an online platform (• *India: Retail Industry Distribution by Structure 2021* | Statista, n.d.), the Kirana stores that adopted payment technologies in India have almost exceeded one million. The pandemic covid that hit the globe in 2020 had accelerated the need for technology adoption across various industries and sectors.

There are quite a few articles published in the technology adoption and adoption of information technology in the past three decades. Many facets and factors are covered in these articles, whether empirical papers or conceptual papers. Most articles stressed technology adoption with diffusion theory, technology adoption model, and UTAUT models. The table below suggests the theoretical model used in the published articles.

Out of the articles selected for the content analysis, TAM and modified technology adoption model are the most used technology adoption theories. TAM- The technology acceptance model was introduced by Davis in 1989. This theory explains the use and acceptance of technology by users. UTAUT- unified theory of acceptance and use of technology- a theory proposed by Venkatesh explains Information Technology acceptance by users. Major theories and their framework are:

TAM studies on technology adoption in the retail segment	1990-2021 (WOS)
mobile banking	24
m-wallets	2
Near Field communication payment	3
e- payments	2
m-payments	23
e- commerce	19
m-commerce	9
e- government	8

Table 10 TAM papers

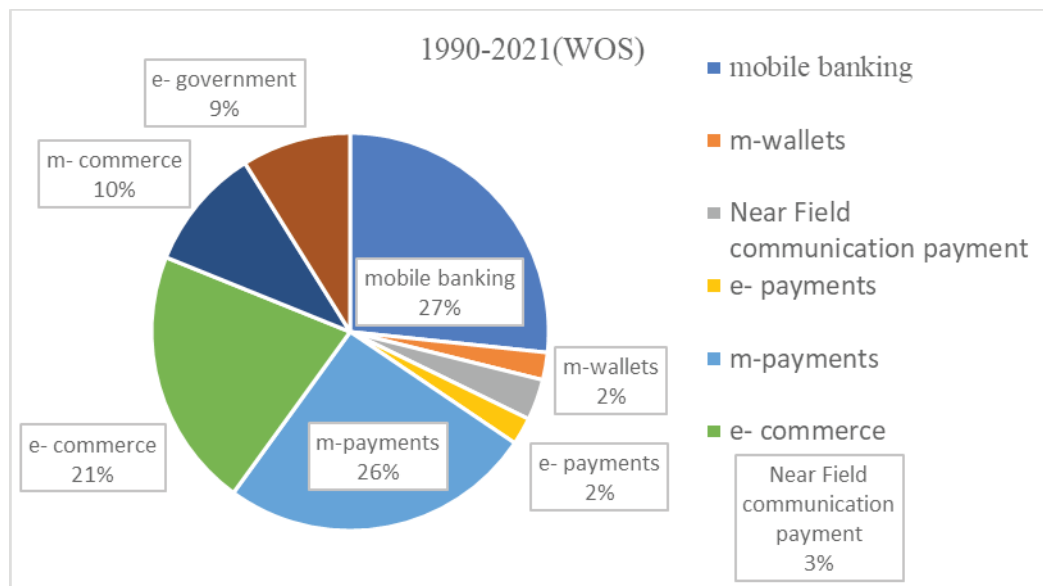


Fig 9 Chart of TAM papers

Technology Acceptance Model is one of the most used theoretical framework in technology adoption. Apart from TAM, extended TAM and TAM 2 theories are also widely used along with newer concepts. Figure 9 here depicts the areas in which the Technology acceptance model is applied in the technology adoption of the retail segment, with m wallets with 27% articles published and used with TAN frameworks. The keyword "technology acceptance model" belongs to cluster 2 and has 71 occurrences with a total link strength of 677. This is the most significant theory based on the keywords used in the bibliometric analysis.

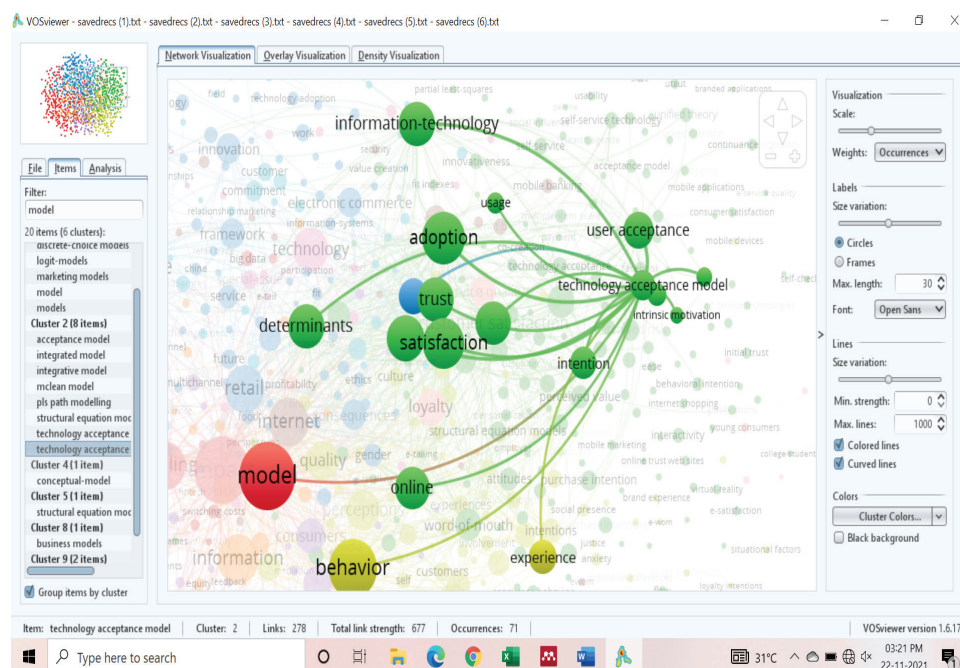


Figure 10 Technology acceptance model keywords cluster

4. Content Analysis

In bibliometric analysis, visualization of various aspects such as most influential country, USA, with 406 articles followed by India with 383 articles; "adoption" being the most used keyword followed by "impact", "behaviour" and "information technology". Therefore, there is a significant contribution of Indian authors to technology adoption literature. For the content analysis, selected fifty research articles based on the author's judgment. The papers are narrowed down based on the WOS journals with ABDC, A, and A* ranking journals. No specific time frame is set as the original search had a time frame starting from 1990 covering three decades.

The whole process of review can be depicted in figure 10 as to how the topic was finalized, searching articles for study, and the methodology for analysis and review. Finally, the key insights and future research questions were also incorporated in the figure.

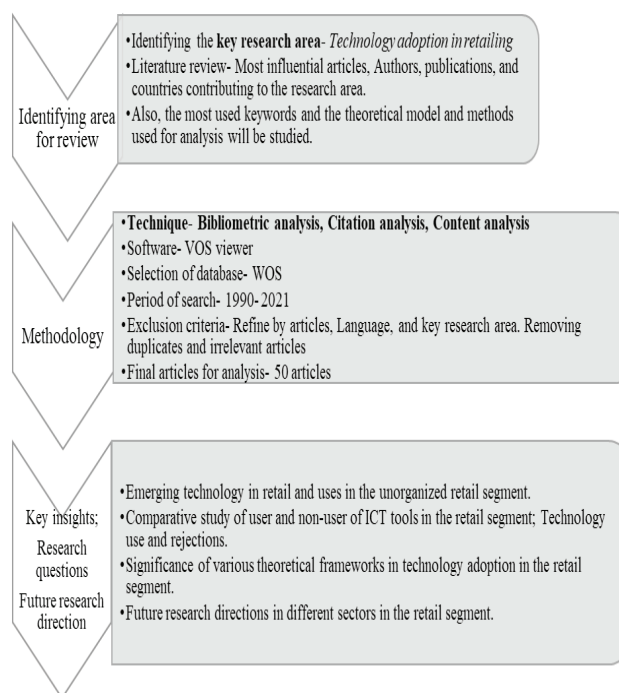


Fig 11 Structure of Review method

4. 1 Summary of final articles

There are fifty papers selected for the detailed review. Articles published in ABDC, A, and A* rated journals only were selected, with a reasonable number of citations. Table 10 shows the selected fifty articles, with the methodology used and the retailer or customer group in which the study is conducted. The selected articles include empirical studies, conceptual papers, exploratory study and review papers. Selected articles belong to all three decades. However, more articles are published in the past three years are selected as this will bring about recent developments and research agenda of the area. Structural equation modelling is the most used analysis tool among the selected articles. Also, the target group selected include retailers/merchants, users and consumers. Out of the target group selected, 32 articles were based on retailers' adoption of various technologies. Rest is based on the user on consumer aspect of technology adoption.

No	Author	Title	Adoption-customer/ Retailer	Methodology
1	(Iyer et al., 2018)	Investigating the effectiveness of retailers' mobile applications in determining customer satisfaction and patronage intentions? A congruency perspective	Users	Proposed model-effect on patronage intentions
2	(Kaatz, 2020)	Retail in my pocket- replicating and extending the construct of service quality into the mobile commerce context	Retailer	Quasi-experimental approach
3	(Gupta & Jain, 2014)	Adoption of Mobile Telephony in Rural India: An Empirical Study	Customer/ Retailer	Extended TAM
4	(T. H. Nguyen et al., 2015)	Technology adoption by small businesses: An exploratory study of the interrelationships of the owner and environmental factors	Retailer	SBTAM
5	(Heidenreich & Handrich, 2015)	Adoption of technology-based services: the role of customers' willingness to co-create	Customer	SEM
6	(Alkhowaiter, 2020)	Digital payment and banking adoption research in Gulf countries: A systematic literature review	Customer	Meta-analysis, literature review
7	(Ligon et al., 2019)	What explains the low adoption of digital payment technologies? Evidence from small-scale merchants in Jaipur, India	Retailer	TAM
8	(Apanasevic et al., 2016)	Stakeholders' expectations of mobile payment in Retail: lessons from Sweden	Customer/ Retailer/Bank	TAM, DOI, network externalities
9	(Falk et al., 2016)	How mobile payment influences the overall store price image	Customer	Quantitative, ANOVA
10	(Adhikary et al., 2021)	How does the adoption of digital payment technologies influence unorganized retailers' performance? An investigation in an emerging market	Retailer	Multimethod
11	(Lee et al., 2019)	A study on the reciprocal relationship between user perception and retailer perception on platform-based mobile payment service	Customer/ Retailer	Consumer acceptance intention model and the provider acceptance intention model

12	(Moghavvemi et al., 2021)	Drivers and barriers of mobile payment adoption: Malaysian merchants' perspective	Retailer	DOI
13	(T. H. Nguyen et al., 2015)	Information technology adoption in small business: Confirmation of a proposed framework	Retailer	Nguyen IT adoption framework
14	(Taylor, 2016)	Mobile payment technologies in Retail: a review of potential benefits and risks	Retailer	Review paper
15	(V. Kumar et al., 2019)	Driving growth of M-wallets in emerging markets: a retailer's perspective	Retailer	Qualitative
16	(Liébana-Cabanillas et al., 2014)	The moderating effect of experience in the adoption of mobile payment tools in Virtual Social Networks: The m-Payment Acceptance Model in Virtual Social Networks (MPAM-VSN)	Users	TAM
17	(Sharma et al., 2018)	Mobile wallet inhibitors: Developing a comprehensive theory using an integrated model	Users	ISM, fussy MIMAC
18	(Aloysius et al., n.d.)	Exploiting big data for customer and retailer benefits A study of emerging mobile checkout scenarios	Retailer	<i>posthoc</i>
19	(Yan et al., 2021)	QR code and mobile payment: The disruptive forces in Retail	Retail	MTAM
20	(Plouffe, Hulland, et al., 2001)	Richness versus parsimony in modelling technology adoption decisions-understanding merchant adoption of a smart card-based payment system	Retailer	TAM&PCI
21	(Crittenden et al., 2019)	Empowering women micro-entrepreneurs in emerging economies: The role of information communications technology	Retailer	TAM
22	(Purohit & Arora, 2021)	Adoption of mobile banking at the bottom of the pyramid: an emerging market perspective	Customer	TAM
23	(Inman & Nikolova, 2017)	Shopper-Facing Retail Technology: A Retailer Adoption Decision Framework Incorporating Shopper Attitudes and Privacy Concerns	Retailer	Equity Theory Perspective of Retail Technology Adoption
24	(Rafidinal & Senalasari, n.d.)	Predicting the adoption of mobile payment applications during the COVID-19 pandemic	Users	TAM, TRI, IPMA
25	(Kaushik & Rahman, n.d.)	An alternative model of self-service retail technology adoption	Customer	TAM, SEM
26	(de Kerviler et al., 2016)	Adoption of in-store mobile payment: Are perceived risk and convenience the only drivers?	Customer	Theory of perceived value
27	(Shankar et al., 2021)	How Technology is Changing Retail	Users	Multimethod

28	(Alexander & Kent, n.d.)	Tracking technology diffusion in-store: a fashion retail perspective	Users	Quasi-experimental approach
29	(Plouffe, Vandenbosch, et al., 2001)	Intermediating technologies and multi-group adoption: A comparison of consumer and merchant adoption intentions toward a new electronic payment system	Customer/ Retailer	TAM, PCI
30	(Peltier et al., 2009)	Understanding the Antecedents to the Adoption of CRM Technology by Small Retailers Entrepreneurs vs Owner-managers	Retailer	TAM+DOI
31	(Kwon et al., 2021)	External pressure or internal culture? An innovation diffusion theory account of small retail businesses' social media use	Retailer	Innovation-decision process model from DOI & TRA
32	(Vize et al., 2013)	Technology readiness in a B2B online retail context: An examination of antecedents and outcomes	Retailer	Technology readiness in B2B
33	(Gil-Saura et al., n.d.)	Store equity and behavioural intentions: the moderating role of the retailer's technology	Retailer	BI model-proposed,
34	(Singh & Sinha, 2020)	How perceived trust mediates merchant's intention to use a mobile wallet technology	Retailer	TAM, online survey
35	(Romero & Martínez-Román, 2015)	Determinants of technology adoption in the retail trade industry - the case of SMEs in Spain	Retailer	Econometric method
36	(Weijters et al., 2016)	Determinants and outcomes of customers' use of self-service technology in a retail setting	Retailer	a process model for understanding the antecedents and consequences of SST
37	(Lorente-Martínez et al., 2020)	Analysis of the adoption of customer facing In-Store technologies in Retail SMEs	Retailer	TOE framework and TAM
38	(Immonen & Sintonen, n.d.)	Evolution of technology perceptions over time	Users	TAM
39	(Shareef et al., 2018)	Consumer Adoption of Mobile Banking Services: An Empirical Examination of Factors According to Adoption Stages	Consumer	GAM
40	(Kureshi & Thomas, n.d.)	Online grocery retailing – exploring local grocers' beliefs	Retailer	TPB
41	(Demoulin, n.d.)	An integrated model of self-service technology (SST) usage in a retail context	Users	TAM
42	(Varadarajan et al., 2010)	Interactive Technologies and Retailing Strategy: A Review, Conceptual Framework, and Future Research Directions	Retailer	Process model-competitive enhancement framework

43	(Cavalinhos et al., 2021b)	The use of mobile devices in-store and the effect on shopping experience: A systematic literature review and research agenda	Users	TCCM framework (Theory, Context, Characteristics and Methods)
44	(Morimura & Sakagawa, 2018)	Information technology use in retail chains: Impact on the standardization of pricing and promotion strategies and performance	Retailer	A proposed new model, SEM
45	(Liao & Yang, 2020)	Mobile payment and online to offline retail business models	Retailer	Qualitative-datamining
46	(Park et al., 2019)	Examining the role of anxiety and social influence in multi-benefits of mobile payment service	Users	Mental accounting theory
47	(Adhikary et al., 2021)	How does the adoption of digital payment technologies influence unorganized retailers' performance? An investigation in an emerging market	Retailer	Resource-based view
48	(Van Everdingen et al., 2011)	Towards a Further Understanding of the Antecedents of Retailer New Product Adoption	Retailer	Conceptual model
49	(Giovanis et al., 2019)	Adoption of mobile self-service retail banking technologies. The role of technology, social, channel, and personal factors	Users	UTAUT
50	(Al-Nabhani et al., 2021)	Examining consumers' continuous usage of multichannel retailers' mobile applications	Retailer	ECT

4. 2 Adoption of Technology in Retail

Technology in the retail segment is not confined only to digital payments in a different mode. The organized retail segment is coming up with novel ideas for attracting and retaining the market share in the industry. This is in the form of Virtual Retail, Self-service technologies along with different options for payments, including own platform for payments which essentially is reward and loyalty programs. The analysis of papers started with mobile payments and mobile banking (Apanasevic et al., 2016). It moved to mobile payments and digital payment platforms (Lee et al., 2019). Also, the growth and inhibitors of mobile wallets and payments (Yan et al., 2021) have studied the QR code from the retail perspective in with usefulness of mobile and the ease of convenience of carrying out transactions. However, privacy concerns were a major aspect of various studies (Inman & Nikolova, 2017). (Sharma et al., 2018) In this paper, the authors have studied the inhibitors of the adoption of mobile wallets. Also (Plouffe, Vandenbosch, et al., 2001), Plouffe and others have studied both the customers and

merchants' adoption of electronic payments systems with the Technology Acceptance Model. There are various studies associated with electronic payments and digital wallets. Self Service technology has also been studied with the Technology acceptance model (Demoulin, n.d.). Small business has also been an area of study for technology adoption (T. H. Nguyen et al., 2015). Major studies on the small business technology adoption had stressed the need to expand the business and improve the customer base (Peltier et al., 2009).

4.3 Covid as an accelerator for technology adoption

Covid has undoubtedly played as an accelerator for adopting the technology in various walks of life, including the retail segment. Adopting technological change has never been a challenge for large organized retailers. The unorganized, small retailers faced difficulties at the beginning of the country-wide lockdown following the Covid outbreak. Customers are well versed with touchless and virtual shopping

during this era. Digital payments and various digital wallets were already gaining importance post demonetization (Chaurasia et al., 2019).

Anxiety has been used as a variable in the Covid related studies on technology adoption (Rafidinal & Senalasar, n.d.). Discomfort, perceived use, perceived ease of use were also studied in the past two years with the theoretical frameworks of TAM, Diffusion of innovation and others (Shankar et al., 2021).

5. Contribution for future research work

First, this paper contributes to the suitability of the TAM model in studying the technology adoption of retail merchants in the pandemic scenario. Second, the paper verified the importance of technology adoption in the retail sector and the possible research areas post the pandemic.

Also, a comparative study of the technological adoption theories holds potential for future research.

The period of the database is only the last three decades of articles published in the public domain. Unpublished work and the date range before 1989 were unavailable as the database selected is the web of science database, and it covers the research articles from 1989. Third, the expansion of the database and the addition of new journals and articles might affect the number of citations.

Therefore, future studies may focus on covering more articles with a greater period. Also, new software, covering a great number of articles from other databases such as Scopus, Google, JSTOR, and others, evaluates this area of study and may significantly contribute to future research.

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