

# Research Trends in Mobile Shopping Behavior: A Bibliometric Analysis

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## Systematic Review

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# Abstract

The mobile phone, with revolutionary smart capabilities, provided its users enormous benefits, especially the convenience of shopping through websites and applications from anywhere and anytime. There are several academic studies conducted to measure the adoption and usage behavior of consumers towards mobile shopping platforms, for more than a decade. However, the research on mobile shopping behavior had gained more attention only in the last few years. The purpose of this study is to conduct a detailed and systematic review of mobile shopping literature (from the consumer behavior perspective) and perform quantitative analysis, with the help of bibliometric analysis. The study examined 158 academic articles that was obtained from Scopus, to perform bibliometric analysis, and the analysis revealed that the research on mobile shopping behavior had gained more attention between 2012 and 2018. The paper identifies the key contributions in terms of the most productive journals, countries, institutions, papers, and authors in research on consumers' mobile shopping behavior. The co-citation reference analysis, keyword co-occurrence analysis and word cloud technique had been used, to identify the evolution of various themes focused in this area. This study's results will make researchers and scholars to have better understanding about the knowledge structure of academic research on mobile shopping through bibliometrics and visualization techniques.

## 1. Introduction

The mobile communications technology has undergone drastic changes in the last forty years. Although the mobile network had been introduced in the late seventies of 20<sup>th</sup> century, the mobile phones were commercialized only in the early eighties. The significant milestones in the history of mobile phones are many including the introduction of GSM (Global System for Mobile Communications), 2G Network, GPRS (General Packet Radio Service), EDGE (Enhanced Data rates for GSM Evolution), Multimedia capabilities (camera), Smart features (gesture controls, fingerprint scanner) etc. The widespread usage of feature phones for more than a decade had shifted toward touch screen devices being introduced in 2007. The total number of mobile phone users across the globe was expected to cross five billion in 2019 from 4.15 billion in 2015 (eMarketer, 2016). The mobile phones have taken new avatar, from bulky, simple features in small screen with limited benefits, to highly sophisticated, large, and interactive screens resulting in better usage experience via more personalized features. The smartphones, with advanced computing and connectivity, have provided the users with infinite capabilities such as live information, gaming, social networking, shopping, bill payments, and ticketing., and not limited to mere communication features. It is estimated that the total smartphones users worldwide will grow to 3.8 billion by 2021 from 2.5 billion in 2016 (Newzoo, 2019).

Introducing www (world wide web) had created new avenues (including electronic commerce) for businesses, provided with increased opportunities to generate more profits at lower costs per order. The e-commerce websites enabled users to order own choice of products and services conveniently from their work/home computers. Despite the Dot-com bubble burst (miserable failure of many e-commerce firms in U.S. because of unrealistic valuations) in the late 1990s, the demand for online shopping had been continued to grow faster (Van Slyke et al. 2002). With advanced (wireless and mobile network) capabilities, the mobile phone had become most significant channel for global businesses to provide personalized communication, promote standard and customized products and services, and engage their target customers anytime anyplace. Initially, the mobile shopping was restricted to websites in micro-browsers of mobile phones, until introducing smart applications that resulted in accelerating the users' experience.

There are many reasons for the users' adoption and usage of mobile shopping, which has been studied widely in the academic literature. For instance, a study conducted by Wu et al. (2004) revealed that the three important reasons for choosing a mobile site were the availability of right products (merchandise), enabling functions (for customers to easily search, compare and buy) and assurance (return policies, guarantees for wrong products etc.). Similarly, the

intention to use mobile shopping websites was positively affected by users' perceived enjoyment, usefulness and compatibility and negatively affected by their perceived level of anxiety (Lu and Su, 2009). Yang (2010) found that the hedonic or entertainment features of mobile shopping services is an important determinant of consumers' adoption of mobile shopping. The number of research studies that are focusing on the mobile shopping was found to be limited (Groß, 2015). The users' trust beliefs have been identified to be a significant factor influencing the consumers' mobile shopping behavior (Ibid.). The perceived ease of use and satisfaction was found to have a positive influence on users' intentions to continue using mobile shopping services (Shang and Wu, 2017). Finally, the users' intention to continue using mobile shopping applications and word-of-mouth intention was influenced strongly by their satisfaction (Sarkar and Khare, 2019). The above discussion, as a preview, have focused on variables related to changing consumer behavior in mobile shopping evolution and development, necessitating the need for systematic review of literature.

Groß (2015) reviewed 81 research articles published between 2000 and 2012 on mobile shopping literature and classified them into three categories viz. online distribution channels, advanced technology for in-store shopping and technology perspectives. This study further identified the significant gaps in the literature with respect to each of these categories. Marriott et al. (2017) had done a review of research papers on mobile shopping acceptance behavior, with a focus on factors leading to its adoption. They have also identified various limitations of existing research on mobile shopping behavior. A systematic review of literature on mobile shopping has been conducted Tyrväinen & Karjaluoto (2019), based on 94 articles published between 2010 and 2018, emphasized the importance of utilitarian and hedonic factors during various stages of mobile retailing adoption. As it is clear, there were very few studies, available in the literature, reviewing the trends and significant developments of mobile shopping literature from the consumers' perspective.

Bibliometrics is a tool that applies quantitative analysis to define the patterns of research studies available in a particular academic field, based on metrics such as citations (Tartaglione & Granata 2019). According to Lancaster (1977), bibliometrics is "the application of various statistical analyses to study patterns of authorship, publication, and literature use". It consists of "a review of the literature, indicating the number, evaluation and main trends of publications concerning a specific subject" (Rey-Martí et al. 2020). The traditional qualitative literature reviews are complemented and enhanced with the usage of bibliometric analysis and with the help of computer software programs, they can provide scientific mappings and visualization to evaluate the evolution of an academic research field.

The purpose of this study is to conduct a detailed and systematic review of mobile shopping literature (from the consumer behavior perspective) and perform quantitative analysis, with the help of bibliometric analysis. This study attempts to fulfil the gaps available in the mobile shopping behavior literature i.e. coverage of trends in the mobile shopping behavior and quantitative analysis of research publications such as the number of papers published over the period of time, the most productive journals, and the most influential research papers. This paper highlights the key developments in the mobile shopping behavior literature, by presenting the quantitative analysis and scientific mappings of the academic research between 2004 and 2019.

## **2. Literature Review**

The available academic literature has been covering the various trends and developments of shopping via mobile phones for about 20 years. As this research focuses on consumers' mobile shopping behavior, only review and empirical papers explaining such behavior has been taken into consideration. It was found that various popular theoretical frameworks have been applied in the context of mobile shopping behavior such as TAM (Technology Acceptance Model), TPB (Theory of Planned Behavior), UTAUT (Unified Theory of Acceptance and Use of Technology)

etc. The analysis of literature has been classified into categories based on adoption stage (pre-adoption and post-adoption) and shopping platform (mobile sites and mobile applications). The description of the significant research papers on mobile shopping literature has been provided in Table 1., based on the above classification.

Table 1 – Summary of Key research papers on mobile shopping behavior

Category	Author & Year	Mobile Shopping Platform	Aim	Country	Method	Sample Size	Key Findings
<b>Mobile Shopping Pre-adoption Behavior</b>	Wu et al. (2004)	Website	To measure the evaluation criteria for choosing a particular mobile shopping site	Taiwan	Survey	183	Three factors viz. right quality of <b>merchandise</b> , <b>enabling functions</b> for easy and convenient shopping and <b>assurance</b> , were found to influence consumers' choice
-	Aldas-Manzano et al. (2009)	Website	To explore the factors influencing the adoption of mobile shopping	Spain	Survey	470	<b>Affinity</b> with mobile phones, <b>ownership</b> of ICT and <b>compatibility</b> with mobile shopping were key drivers of adoption of mobile shopping.
-	Lu and Su (2009)	Website	To identify the factors that motivates or hinders the adoption of mobile shopping	Taiwan	Survey	369	<b>Skillfulness</b> with mobile, perception of mobile shopping being <b>enjoyable</b> and <b>useful</b> , and <b>compatibility</b> were encouraging customers intentions to adopt mobile shopping, while <b>anxiety</b> was a barrier to adoption.
-	Ko et al. (2009)	Website	To explore the mediating effect of perceived value in the context of mobile fashion shopping	Korea	Survey	511	The positive effect of <b>perceived usefulness</b> , <b>enjoyment</b> , and <b>ease of use</b> on intentions to adopt mobile shopping sites was mediated by <b>perceived value</b> .
-	Yang (2010)	Website	To examine the important determinants of consumers' intentions to adopt mobile shopping services	U.S.	Survey	400	The key predictors of consumers' adoption of mobile shopping were— <b>utilitarian performance expectancy</b> , <b>hedonic performance expectancy</b> , <b>social influence</b> and <b>facilitating conditions</b> .
-	Yang (2012)	Website	To test the moderating effect of technology traits on the	U.S.	Survey	400	The effects of <b>perceived enjoyment</b> and <b>perceived usefulness</b> on

			predictors of mobile shopping, based on extended Theory of Planned Behavior (TPB)				attitude; and <b>attitude, subjective norm, and perceived behavioral control</b> on adoption of mobile shopping were significantly moderated by three consumer traits viz. <b>self-efficacy, experience, and innovativeness.</b>
-	Hillman et al. (2012)	Website	To explore the importance of trust on mobile shopping adoption	Canada	Diary and Interview	17	The existing relationship with companies and influence of <b>friends' network</b> had been found to enhance customers' <b>trust</b> on mobile shopping sites.
-	Yang & Forney (2013)	Website	To examine the moderating effect of consumers' anxiety on the adoption of mobile shopping	U.S.	Survey	400	The influence of <b>facilitating conditions</b> on <b>utilitarian performance expectancy</b> and <b>hedonic performance expectancy</b> were significant and moderated by anxiety. <b>Utilitarian performance expectancy, hedonic performance expectancy, and social influence</b> were significant predictors of <b>behavioral intention</b> to use mobile shopping sites. The effect of <b>social influence</b> on behavioral intention was also <b>moderated by anxiety.</b>
-	San-Martín et al. (2013)	Application	To determine the various segments of mobile shopping adopters	Spain	Survey	471	Three different clusters had been identified viz. <b>"thoughtful", "motivated" and "reluctant"</b> , and found to be significantly different in their acceptance of mobile shopping.
-	Yang et	Application	To examine	China	Survey	298	The <b>perceived</b>

	al. (2014)		the factors influencing consumers' adoption behavior in multi-channel context				mobile service quality and flow in mobile services were found to significantly impact intention to use mobile shopping application. Highlights the importance of web service quality, perception of web-mobile integration and consistency in the acceptance of mobile shopping behavior.
-	Holmes et al. (2014)	Website & Application	To explore the usage of mobile phone during various consumer decision making stages.	UK	Survey	1005	The mobile phones, with its unique benefits like convenience and accessibility, were primarily used for searching information about products and their comparisons. Such involvement was found to be greater for higher involvement products and preferred location for mobile shopping was consumers' home.
-	Park et al. (2015)	Application	To examine the smart shopper feelings in mobile shopping	South Korea	Survey	400	It was reported that the purchase experience using applications and based on promotional messages had a significant impact on smart shopper feelings, which had a positive impact on price dependence and impulse buying behavior.
-	Wong et al. (2015)	Website & Application	To determine the factors influencing the intention to adopt mobile shopping from the emerging markets perspective	Malaysia	Survey	190	It was found that perceived usefulness, compatibility and perceived ease of use had significant influence on customers' intentions to adopt mobile shopping.
-	Yang	Application	To explore	China	Survey	192	The trust in web-

	(2016)		the factors that are affecting the initial trust in mobile shopping				<b>based shopping services, and functional consistency</b> along with mobile information and <b>service quality</b> were found to influence initial trust in mobile shopping.	
-	Gupta and Arora (2017)	Application	To determine the important factors motivating and inhibiting the adoption of mobile shopping	India	Survey	237	<b>Price saving orientation, variety and convenience</b> are the motivators of adoption; <b>relative advantage, consumer anxiety and self-efficacy</b> are the barriers to adoption of mobile shopping.	
-	Chen et al. (2018)	Application	To study the impact of flow dimensions in mobile shopping environment	Taiwan	Survey	310	<b>Flow (enjoyment and concentration)</b> was found to play a key role in intentions to adopt mobile shopping.	
-	Al-Adwan et al. (2019)	Application	To explore the factors that stimulate consumers' intentions to move from e-commerce to m-commerce	Jordan	Survey	451	The <b>differences in perceptions</b> of technology and value influenced consumers' behavioral intentions to move to m-commerce from e-commerce.	
	<b>Mobile Shopping Post-Adoption Behavior</b>	San-Martin & López-Catalán (2013)	Website	To identify the determinants of satisfaction of mobile shopping customers	Spain	Survey	447	The mobile shopping vendors should focus on <b>trust and involvement</b> , which had a positive influence on the customers' satisfaction.
-	Al-Dmour et al. (2014)	Application	To examine the influence of mobile application quality and mobile phone attributes on intentions to continue using mobile shopping	Jordan	Survey	250	<b>Trust and perceived usefulness</b> were found to mediate the influence of <b>mobile application quality</b> on continuance intention. The relationship between <b>mobile attributes</b> and <b>continuance</b>	

							<b>intention</b> was also mediated by perceived usefulness and enjoyment.
-	Groß (2015)	Application	To identify the key factors influencing the mobile shopping adoption among smartphone users	Germany	Survey	128	<b>Perceived ease of use</b> was found to be positively related to <b>perceived enjoyment</b> , <b>perceived usefulness</b> , and <b>attitude</b> towards mobile shopping. <b>Perceived usefulness</b> , <b>ease of use</b> and <b>enjoyment</b> were having a significant influence on <b>attitude</b> . Attitude and <b>trust</b> had a positive influence on <b>behavioral intention</b> , which had an influence on <b>usage behavior</b> .
-	Kim et al. (2015)	Application	To explore the influence of personality factors on mobile shopping usage mediated by perceived mobile shopping value	Korea	Survey	403	<b>Personalization</b> , <b>self-efficacy</b> , <b>simplicity</b> , and <b>mobile connectivity</b> had significant influence on <b>utilitarian value</b> of mobile shopping. <b>Similarly</b> , <b>personalization</b> , <b>simplicity</b> , <b>mobility</b> and <b>mobile connectivity</b> had a positive influence on <b>hedonic value</b> of mobile shopping. Finally, both hedonic and utilitarian value had significant influence on mobile shopping usage.
-	Agrebi & Jallais (2015)	Website	To identify the determinants of mobile shopping adoption	France	Survey	400	<b>Perceived usefulness</b> , <b>perceived enjoyment</b> and <b>ease of use</b> had positive influence on <b>satisfaction</b> , whereas only <b>perceived usefulness</b> had significant influence on <b>intention</b> to use mobile shopping.

-	San-Martin et al. (2015)	Website	To explore the influence of age on the post-adoption behavior of mobile shopping	Spain	Survey	447	The impact of <b>entertainment</b> on <b>satisfaction</b> was positive only for <b>young adults</b> , but the influence of this variable on <b>word-of-mouth</b> has been significant for both adults and young adults. <b>Subjective norms</b> were found to have a positive influence on <b>satisfaction</b> only for adults' group. The relationship between <b>satisfaction</b> and <b>word-of-mouth</b> was positively significant for both groups.
-	Hubert et al. (2017)	Application	To study the moderating effects of location sensitivity, time criticality and extent of control on the perceived benefits and risks involved in usage intentions and behavior	UK	Survey	410	The effects of <b>moderators</b> were found to be significantly influencing the users' <b>perceived benefits</b> and <b>risk</b> involved in mobile shopping intentional and behavioral outcomes.
-	Natarajan et al. (2017)	Application	To examine the influence of intention to use mobile shopping and its effect on price sensitivity	India	Survey	675	The <b>moderating</b> effect of <b>gender</b> , <b>experience</b> and <b>frequency</b> had been confirmed. <b>Personal innovativeness</b> and <b>perceived risk</b> had significantly influenced the intention to use mobile shopping applications. The customers' intentions and satisfaction had a positive impact on <b>price sensitivity</b> .
-	Shang and Wu (2017)	Application	To identify the determinants of mobile shopping continuance intention	China	Survey	203	<b>Perceived ease of use</b> and <b>satisfaction</b> had been significant factors for two distinct segments (food and non-food shoppers). Another

							significant factor exerting influence was <b>Value for Money</b> .
-	Thakur (2018)	Application	To examine the relationship between self-efficacy, satisfaction and loyalty of mobile shopping	India	Survey	424	The post-adoption <b>self-efficacy</b> and <b>satisfaction</b> had a significant impact on <b>loyalty</b> towards mobile shopping.
-	Lee & Kim (2019)	Application	To investigate the repurchase intentions of mobile apparel shoppers based on the impact of mobile app atmospherics	U.S.	Survey	216	<b>Hedonic shopping orientation, consumers' need for mobile app atmospherics and entertainment gratification</b> were the significant factors leading to <b>repurchase intentions</b> of mobile shopping

### 3. Method

In order to identify various publications for performing bibliometric analysis, the data were extracted from the *Scopus* database, “a comprehensive, curated abstract and citation database with enriched data and linked scholarly content”, with over 24,000 peer reviewed titles from 5,000 publishers across the world (Scopus, 2020). The publications data were collected for the period of 16 years i.e. from 2004 to 2019, by searching with the keywords: “m-shopping”, “mobile shopping”, “smartphone shopping”, “mobile shopping website”, “m-commerce”, and “mobile shopping application”. Only publications (empirical and review), that are focusing on mobile shopping behavior, were included in this study, which resulted in 158 academic articles. The data analysis was performed by using various software applications including Microsoft Excel, Bibexcel, VOSviewer and Scientopy. The citation analysis of most influential authors, publications, sources, countries, and institutions were performed with the help of Microsoft Excel and Bibexcel. The VOSviewer was used specifically for co-citation and co-occurrence of keywords analysis. Finally, Scientopy was used to construct word cloud of keywords of research in mobile shopping behavior.

### 4. Findings

#### 4.1 Research in Mobile Shopping Behavior

#### 4.2 Most productive publications

There were more than 90 unique sources on which the study’s sample of research articles had been published. Table 2 shows the list of journals or conferences which had the highest number of citations with a minimum count of **50**. The table reveals that *Journal of Retailing and Consumer Services* was the top-most journal with 14 publications and the highest number of citations (423), followed by *International Journal of Retail and Distribution Management* as the

second-most prominent journal with 6 publications (239 citations), followed by other leading journals such as *Psychology and Marketing* (226 citations), *Industrial Management and Data Systems* (210 citations), *Internet Research* (199 citations), *Journal of Consumer Marketing* (132 citations), *Computers in Human Behavior* (130 citations), *Journal of Retailing* (130 citations), and *Journal of Interactive Marketing* (102 citations).

Table 2  
– Most Productive Publications on Mobile Shopping Behavior from 2004 to 2019

Journal/Source	No. of Publications	Total Citations	CiteScore 2019	SJR 2019	SNIP 2019
Journal of Retailing and Consumer Services	14	423	7.40	1.330	2.660
International Journal of Retail and Distribution Management	6	239	4.50	0.725	1.344
<b>Computers in Human Behavior</b>	5	130	<b>12.10</b>	<b>2.173</b>	<b>3.079</b>
Psychology and Marketing	4	226	4.00	1.347	1.309
Industrial Management and Data Systems	4	210	7.90	1.390	2.502
<b>International Journal of Mobile Communications</b>	3	86	<b>8.90</b>	<b>1.871</b>	<b>2.760</b>
<b>Journal of Interactive Marketing</b>	2	102	<b>9.50</b>	<b>3.289</b>	<b>2.683</b>
Journal of Electronic Commerce Research	2	71	4.00	0.665	0.963
Journal of Computer Information Systems	2	61	3.70	0.637	1.201
<b>Internet Research</b>	1	199	<b>7.90</b>	<b>1.607</b>	<b>2.213</b>
Journal of Consumer Marketing	1	132	2.60	0.751	1.043
<b>Journal of Retailing</b>	1	130	<b>8.70</b>	<b>3.146</b>	<b>2.965</b>
<b>International Journal of Information Management</b>	1	75	<b>14.10</b>	2.881	<b>3.773</b>

The CiteScore values highlight the relative importance of journals based on their citation impact. The SCImago Journal and Country Rank (SJR), another important metric available in Scopus, helps researchers to weigh the journals not only based on several citations received but, also the importance or popularity of the journals where the citations come from. The Source Normalized Impact per Paper (SNIP), another important metric, used to measure the contextual citation impact of a journal by weighting citations based on the total number of citations in a subject field. According to CWTS (Center for Science and Technology Studies), “SNIP corrects for differences in citation practices between scientific fields, allowing for more accurate between-field comparisons of citation impact.” The CiteScore, SJR, and SNIP value of top-most publication sources are also provided in Table 2, which explains the relative significance of these journals with each other. For instance, the journal *International Journal of Information Management* had received higher weightage in the field of Information Systems research, followed by *Computers in Human Behavior*. Similarly, based on this metrics, *Journal of Interactive Marketing* and *Journal of Retailing* were the highly rated journals in marketing. Finally, the journals *International Journal of Mobile Communications* and *Internet Research* were the most influential journals in ICT (Information and Communications Technology).

## 4.3 Most productive countries

Table 3  
 – Most productive countries in publishing research on Mobile Shopping Behavior from 2004 to 2019

Country	Total Publications	Total Citations	Citations per Publication	h-index
<b>USA</b>	29	898	<b>30.97</b>	<b>17</b>
India	28	199	7.11	9
<b>Taiwan</b>	20	357	<b>17.85</b>	<b>9</b>
China	18	126	7.00	6
South Korea	16	160	10.00	7
<b>Germany</b>	12	267	<b>22.25</b>	<b>9</b>
<b>UK</b>	10	257	<b>25.70</b>	<b>7</b>
Spain	10	148	14.80	5

There were totally 30 countries across the world had been contributing to research on mobile shopping behavior. Table – 3 lists the most productive countries in mobile shopping behavior research, with a minimum count of 10 publications, along with other metrics such as total citations, citations per paper and h-index. With 29 publications and 898 citations, the USA had topped the list with the highest score of 30.97 citations per paper and h-index of 17. There are seven papers from USA that had been cited more than 50 times and two of them being cited more than 100 times. Although, the second-most productive country was India with 28 papers, its performance in terms of total citations, total citations per paper and h-index were not satisfactory, implying that most of the research papers did not receive enough attention among the global researchers. The publications in UK were cited 25.70 cites per paper, with three articles having received over 50 citations. The other countries, which made substantial quality of contribution, were Germany, Taiwan, Spain, and South Korea.

## 4.4. Most productive institutions

Although, there were over 100 institutions around the world have published articles in mobile shopping behavior, only few of them had made significant contributions in terms of total citations, citations per papers and h-index as given in Table 4. The list of institutions that had published a minimum of 3 articles are presented in the following table, while the focus of this analysis would be on the quality of publications. The University of North Texas (USA), with only 6 publications, found to have received highest citations per paper (49.00), followed by other leading institutions such as Brandenburgische Technische Universität Cottbus (29.80), Chungbuk National University (17.17), National Institute of Technology (15.83) and Universidad Pablo de Olavide (13.75)

Table 4

– Most productive institutions in publishing research on Mobile Shopping Behavior from 2004 to 2019

Institution	Country	Total Publications	Total Citations	Citations per Publication	h-index
Universidad de Burgos	Spain	9	90	10	4
<b>Chungbuk National University</b>	South Korea	6	103	<b>17.17</b>	3
<b>National Institute of Technology, Tiruchirappalli</b>	India	6	95	<b>15.83</b>	5
<b>University of North Texas</b>	USA	6	294	<b>49.00</b>	5
<b>Brandenburgische Technische Universität Cottbus</b>	Germany	5	149	<b>29.80</b>	5
I-Shou University	Taiwan	5	28	5.60	3
National Sun Yat-Sen University	Taiwan	4	23	5.75	4
<b>Universidad Pablo de Olavide</b>	Spain	4	55	<b>13.75</b>	4
Korea University	South Korea	3	24	8.00	2
Hankuk University of Foreign Studies	South Korea	3	24	8.00	2

## 4.5 Most cited papers

The list of the most significant papers in mobile shopping behavior (with a minimum citation of 50) had been presented in Table 5. The most cited research paper was authored by Lu, H.-P., Su, P. Y.-J. was published in *Internet Research* in 2009. The four articles out of top five had been published before 2010. There were only six papers which had received over 100 citations till 2019. A research article written by Wang, R.J.H., Malthouse, E.C., Krishnamurthi, L., published in the *Journal of Retailing* in 2015, had got highest citations per year (32.50). The other prominent papers, with the highest ratio of citations per year, were written by Shankar, V., Kleijnen, M., Ramanathan, S., Rizley, R., Holland, S., & Morrissey, S. (2016), Agrebi, S., Jallais, J. (2015), and Hubert, M., Blut, M., Brock, C., Backhaus, C., Eberhardt, T. (2017).

Table 5  
The most cited papers in mobile shopping behavior from 2004 to 2019

Rank	Author(s) & Year of Publication	Source	Title	Total Citations	Citations per Year
1	Lu and Su (2009)	Internet Research	Factors affecting purchase intention on mobile shopping web sites	200	20.00
2	Ko et al. (2009)	Psychology and Marketing	Modeling consumer adoption of mobile shopping for fashion products in Korea	149	14.90
3	Yang (2010)	Journal of Consumer Marketing	Determinants of US consumer mobile shopping services adoption: Implications for designing mobile shopping services	132	14.67
4	Wang et al. (2015)	Journal of Retailing	On the Go: How Mobile Shopping Affects Customer Purchase Behavior	130	<b>32.50</b>
5	Aldas-Manzano et al. (2009)	Industrial Management & Data Systems	Exploring individual personality factors as drivers of M-shopping acceptance	123	12.30
6	Agrebi and Jallais (2015)	Journal of Retailing and Consumer Services	Explain the intention to use smartphones for mobile shopping	112	<b>28.00</b>
7	Shankar et al. (2016)	Journal of Interactive Marketing	Mobile Shopper Marketing: Key Issues, Current Insights, and Future Research Avenues	91	<b>30.33</b>
8	Yang (2012)	Journal of Retailing and Consumer Services	Consumer technology traits in determining mobile shopping adoption: An application of the extended theory of planned behavior	88	12.57
9	Ozturk et al. (2016)	International Journal of Information Management	What keeps the mobile hotel booking users loyal? Investigating the roles of self-efficacy, compatibility, perceived ease of use, and perceived convenience	75	<b>25.00</b>
10	Groß, M. (2015)	International Journal of Retail and Distribution Management	Mobile shopping: A classification framework and literature review	75	18.75
11	Pantano and Priporas (2016)	Computers in Human Behavior	The effect of mobile retailing on consumers' purchasing experiences: A dynamic perspective	72	<b>24.00</b>
12	Yang and Forney (2013)	Journal of Electronic Commerce Research	The moderating role of consumer technology anxiety in mobile shopping adoption: Differential effects of facilitating conditions and social influences	71	11.83
13	Yang and Kim (2012)	International Journal of Retail and Distribution Management	Mobile shopping motivation: An application of multiple discriminant analysis	69	9.86

Rank	Author(s) & Year of Publication	Source	Title	Total Citations	Citations per Year
14	Holmes et al. (2014)	International Journal of Retail and Distribution Management	Mobile shopping behaviour: Insights into attitudes, shopping process involvement and location	62	12.40
15	Hubert et al. (2017)	Psychology and Marketing	Acceptance of Smartphone-Based Mobile Shopping: Mobile Benefits, Customer Characteristics, Perceived Risks, and the Impact of Application Context	51	<b>25.50</b>

## 4.6 Most productive authors

The most influential and productive author in publishing research on mobile shopping behavior has been listed in Table 6. The top 10 authors with a minimum contribution of three research articles had been considered for analysis. It is found that the total number citations exceeded 50 only for six authors. Kiseol Yang was found to be the most productive and influential author in mobile shopping behavior in terms of citations per paper, citations per author and placed second in citations per author per year. One more influential author was Michael Groß, taking a second position in terms of total citations, citations per paper and citations per author, but had got highest score of citations per author per year and h-index.

Table 6  
– Most productive authors in research on mobile shopping behavior

Author	No. of Papers	Citations	Years	Citations per Paper	Citations per Author	Citations per Author per Year	h-index
Yang K.	5	<b>272</b>	9	54.4	213	<b>23.67</b>	4
Groß, M.	5	<b>149</b>	4	29.8	149	<b>37.25</b>	5
San-Martin	5	<b>66</b>	6	13.20	23.33	3.89	4
Lopez-Catalan B.	4	<b>74</b>	6	18.50	32.66	5.44	4
Chopdar	4	33	1	8.25	9	9.00	3
Yang S.	3	<b>75</b>	5	25.00	40.33	8.07	3
Wei J.	3	<b>69</b>	5	23.00	21.58	4.32	3
Pradanova J.	3	43	4	14.33	14.33	3.58	2
Marriott H.R.	3	39	3	13.00	16.67	5.56	3
Jimenez N.	3	34	4	11.33	12.33	3.08	2

## 4.7 Co-citation reference analysis

To identify how the research on mobile shopping behavior had been developed and structured over the period, the reference co-citation analysis was done. This study had chosen the references, which had at least 10 citations, thus there were 314 references cited in the mobile shopping research. The visual representation of co-citation networks of the references in mobile shopping behavior is given Fig. 2. From the co-citation network analysis, it is clear there were

four clusters (Table 7) formed, and these clusters were provided with suitable names based on most references belonging to them.

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The first cluster was explaining the factors influencing the initial adoption of technology by users in general and mobile shopping in particular, hence, it was named as '*Modeling the Pre-Adoption Behavior of Technology*'. The second cluster was, identified as '*Influence of Personality Factors in Technology Adoption and Usage*', directing on the impact of users' demographic and personality characteristics on the adoption and usage of technology. The third cluster was concentrating on the factors that lead to the continued usage and satisfaction of a technology; thus, it was described as '*Modeling the Post-Adoption Behavior of Technology*'. Finally, the last cluster was defined labeled as '*Research Methodology*', because it focused on various statistical techniques such as Covariance Based Structural Equation Modeling, Partial Least Squares Structural Equation Modeling and Multivariate Data Analysis.

Table 7  
– Clusters of Co-citation network analysis

Clusters	Illustrative citations
Modeling the <b>Pre-Adoption Behavior</b> of Mobile Technology	Davis (1989) Nysveen et al. (2005) Yang (2010)
Modeling the Influence of <b>Personality factors</b> in Mobile Technology Adoption and usage	Agarwal and Prasad (1989) Goldsmith (2002) Thakur and Srivastava (2014)
Modeling the <b>Post-Adoption Behavior</b> of Mobile Technology	Bhattacharjee (1998) Venkatesh et al. (2003) Yang et al. (2015)
<b>Research Methodology</b>	Fornell & Larcker (1981) Anderson & Gerbing (1988) Hair et al. (2010)

#### 4.8 Keyword co-occurrence analysis

There was a total of 753 keywords and only ten of them have satisfied the minimum number of occurrence threshold of 10. As given in Fig. 3, there were two clusters formed. The two clusters were named appropriately based on the group of keywords belonging to them (Table 8).

The first cluster, named as '*Diffusion of e-Commerce*', had four keywords namely, electronic commerce, shopping activity, TAM, and technology adoption. The second cluster, labeled as '*Evolution of m-Commerce*', contained six keywords, including mobile shopping, m-Commerce, consumer behavior, commerce, mobile telecommunications system, and trust.

Table 8  
– Clusters of Keywords of research on Mobile Shopping Behavior

Clusters	Keywords	Frequency	Total Link Strength
Diffusion of e-Commerce	Electronic Commerce	17	35
	Shopping Activity	15	25
	TAM (Technology Adoption Model)	13	27
	Technology Adoption	12	23
Evolution of m-Commerce	Mobile Shopping	78	91
	M-Commerce	41	41
	Consumer Behavior	21	31
	Commerce	12	27
	Mobile Telecommunications Systems	10	24
	Trust	10	16

The 'Word Cloud', a novel way of representing the key topics in the field of mobile shopping behavior, by analyzing their patterns and trends, was used in this research. This analysis was performed in *Scientopy*, an open source scientometric software. The result of word cloud analysis is given in Fig. 4. The keywords, 'Mobile shopping', 'm-commerce', 'Electronic commerce', and 'Consumer behavior' appear bigger than others, meaning that they have been most frequently stated in the literature.

## 5. Discussion And Conclusions

The objective of this research study is to shed light on the trends of publications in mobile shopping behavior. From the detailed and systematic review of literature, there are many factors found to measure the consumers' pre-adoption and post-adoption behavior towards mobile shopping, a summary of this is given in Table 9.

Table 9  
– Summary of Key factors studied in Mobile shopping behavior literature

Adoption Stage	Key dimensions
Pre-adoption of mobile shopping	<p><b>Motivating Factors:</b> Quality of merchandise, Assurance, Perceived Usefulness, Perceived Ease of Use, Hedonic Motivation, Perceived Value, Social Influence, Facilitating Conditions, Attitude, Trust, Service quality, Flow, Price Saving Orientation, Behavioral Intention</p> <p><b>Barriers:</b> Anxiety, Relative Advantage, Perceived Risk</p> <p><b>Personal Characteristics:</b> Innovativeness, Compatibility, Affinity, Skillfulness, Self-Efficacy, Experience, Impulsiveness</p>
Post-adoption of mobile shopping	<p><b>Motivating Factors:</b> Perceived Usefulness, Perceived Ease of Use, Perceived Enjoyment, Trust, Involvement, Mobile Application Quality, Attitude, Personalization, Subjective Norms, Mobile Application Atmospherics, Simplicity, Satisfaction, Continuance Intention, Loyalty</p> <p><b>Barriers:</b> Perceived Risk, Price Sensitivity</p> <p><b>Personal Characteristics:</b> Gender, Experience, Personal Innovativeness, Self-Efficacy</p>

Since, the previous literature had extensive coverage on various reasons for customers intentions to accept or continue using mobile shopping services, the **emerging research areas** in mobile shopping behavior need to be identified. Most of the studies are cross-sectional in nature, there is a need for conducting **longitudinal studies**, to measure the dynamic behavior of mobile shoppers (Al-Adwan, 2019). As suggested by Chen et al. (2019), the research on mobile shopper's **discontinuance behavior** is very limited and need to be studied in different cultural contexts. Mobile shopping applications had become more sophisticated and provide both utilitarian and hedonic benefits to the shoppers. There is a requirement of more research on how various **features of shopping applications** such as color, background music, menus, and lighting, would have significant effect on shopper's behavior (Lee and Kim, 2019). The review of literature signified the need for determining the varying preferences and behavior of shoppers across the **product categories** like fashion, electronics, groceries etc. As the mobile commerce market is growing with intensified competition, there could be motivators and barriers for the mobile vendors to sell various products and services through mobile platforms in various markets (Tan and Ooi, 2018). The question of "How does mobile vendor's market outlook affect the mobile shopper's behavior?" need to be examined. Further, the future research should focus on impact of **emerging technologies** in the context of mobile shopping behavior. For instance, the integration of Augmented Reality (AR), Virtual Reality (VR), Voice Search, Chatbots, Mobile Image Recognition (MIR) Technology and 5G technology on mobile shopping applications, as this could bring significant changes in shoppers' behavior.

The study adopted various bibliometric techniques (citation analysis, co-citation analysis, keyword co-occurrence analysis) to examine 158 mobile shopping research papers published between 2004 and 2019. The paper provided a summary of the most productive journals, countries, institutions, papers, and authors in research on consumers' mobile shopping behavior. This analysis offered valuable contributions in understanding the evolution and current state of research on consumers' behavior towards mobile shopping platforms (mobile websites and mobile applications). It was found that majority of the research into this area started in less than a decade and the last five years witnessed a rapid increase in publications, meaning the growth period of research. The analysis revealed that the *Journal of Retailing and Consumer Services* was the top-most journal with most publications and the highest number of citations. The most productive country contributing to research on mobile shopping behavior was the United States of America. The Universidad de Burgos, Spain lead the most productive Institution's rankings. The research paper authored by Lu, H.-P., Su, P. Y.-J. had received the highest citations till 2019, and an article written by Wang, R.J.H., Malthouse, E.C., Krishnamurthi, L., had got highest citations per year. Kiseol Yang was found to be the most productive and influential author in mobile shopping behavior. The co-citation reference analysis, using VOSviewer, uncovered the pillars of theoretical foundations of research on mobile shopping behavior, which resulted in four clusters. These clusters were appropriately named as 'Pre-adoption of Technology', 'Personality Factors', 'Post-adoption of Technology' and 'Research Methodology'. The thematic evolution of mobile shopping behavior research had been visualized, using VOSviewer, resulted in two major themes identified as 'Diffusion of e-Commerce' and 'Evolution of m-Commerce'. Finally, a unique contribution of this paper is the word cloud, which represents the most frequently used keywords in research on mobile shopping behavior.

The results of this paper have implications for various stakeholders. For academic researchers and scholars, this paper provides valuable insights on choosing the right journals for reference as well as publishing their research work. It also provides them an overview of most cited papers and authors, co-citation and keyword analysis that could help them in understanding the pillars of theoretical foundations of mobile shopping research. Finally, the emerging research topics in mobile shopping behavior could offer future research directives. The Administrators and Policy makers of Institutions and Nations can have valuable insights from the quantitative analysis of various journals, authors, and institutions to make strategic decisions in improving the quality contributions of their research community.

There were few limitations of this paper. First, the data for bibliometric analysis were taken only from one citation database (Scopus), and others such as Web of Science, Google Scholar have not been considered. The future studies may consider these and can perform the comparisons among the titles in databases. Although, bibliometric techniques are objective in nature, there many decisions such as selection of period, choice of analysis and labeling of themes were subjective. Finally, the study was limited to understanding the trends in mobile shopping research from the consumer behavior perspective, which did not consider the mobile shopping firms, technology and other network partners. There is a scope for understanding the mobile shopping research from a holistic (all stakeholders) point of view. Through the results of this study, the researchers and scholars would have better understanding about the knowledge structure of academic research on mobile shopping through bibliometrics and visualization techniques.

## Declarations

Competing interests: The author declares no competing interests.

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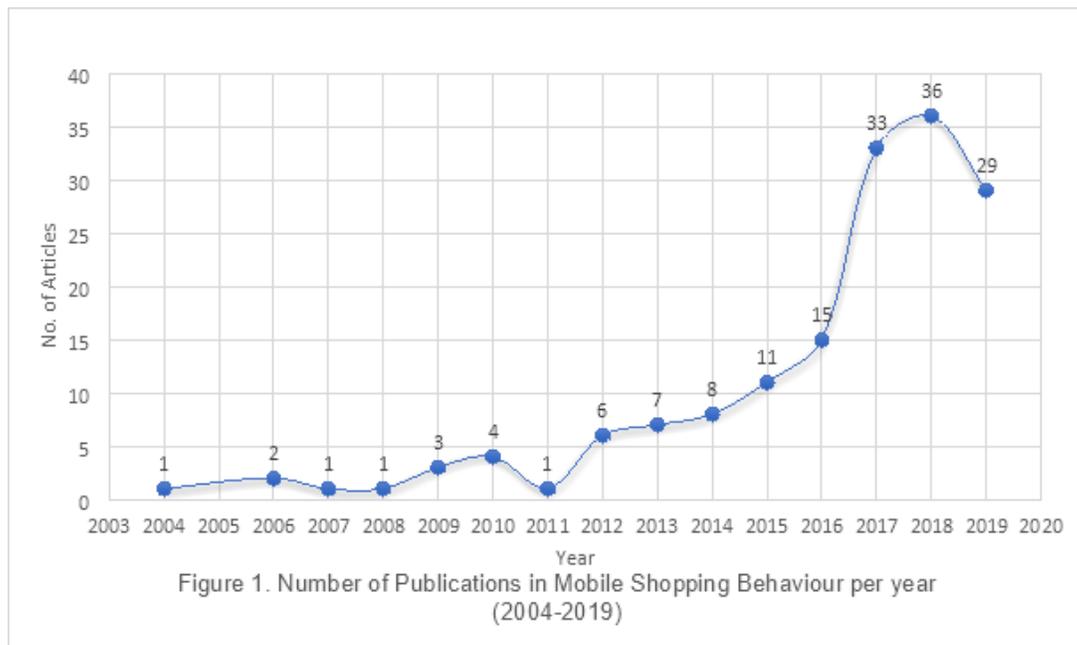
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## Figures



**Figure 1**

Number of Publications in Mobile Shopping Behaviour per year (2004-2019)





Word cloud for mobile shopping behavior, articles from 2004 to 2019