Understanding Online Users Behavior in e-Commerce: A Bibliometric Study and Systematic Literature Review

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Abstract. This research critically examines the existing literature on e-commerce user behavior, specifically focusing on knowledge and cluster trends. A total of 310 items were collected on October 21, 2023. The dataset comprises 82 scholarly articles from the Scopus database, covering 2014 to 2023. As a first step, bibliometric analysis was carried out to highlight the growth of literature in publications, fields of study, authors, and countries according to the research topic. Next, Biblioshiny and VOSviewer were used to visualize the research results and findings. Bibliometric analysis reveals that e-commerce user behavior covers interdisciplinary fields of study. Literature studies show four research clusters related to e-commerce. Literature analysis obtained five key findings. This research highlights that trust is the most crucial predictor of e-commerce use. This research concludes that the TAM model is still relevant and flexible enough to be elaborated on with other models or theories regarding e-commerce user behavior. The results of this study make a valuable contribution to the advancement of scientific knowledge and provide recommendations for future research on the behavior of users in the context of e-commerce.

Keywords: TAM model, e-commerce, m-commerce, bibliometric analysis, user behavior

1 Introduction

The swift development of e-commerce has brought about significant changes in how customers participate in online buying. Firms need to have a solid understanding of user behavior in e-commerce to target customers and engage them appropriately. A complete examination of previous research on user behavior in e-commerce can be obtained through a systematic literature review. This review paves the way for a more in-depth comprehension of the aspects influencing customer adoption and continuance intention.

Several studies have examined the elements that affect the adoption of mobile commerce (m-commerce) applications. For example, the research examined the factors influencing consumers' intention to continue using mobile purchasing services [1]. The researchers found potential ramifications for scholars and professionals in technology acceptance and post-adoption behavior within mobile commerce. The researchers noted a favorable correlation between the continuance intention of consumers engaged in mobile shopping and their chance of persisting in the use of mobile shopping. Similarly, an additional scholarly investigation will be attempted

to analyze the variables that influence the adoption and utilization of mobile commerce applications inside the specific setting of Cameroon [2]. This study illuminated the aspects that impact adoption within different cultural contexts.

The Technology Acceptance Model (TAM) theory has played a crucial role in enhancing comprehension of consumer behavior within electronic commerce. Previous studies have utilized the Technology Acceptance Model (TAM) to investigate the acceptance of online purchases within different cultural contexts [3]. The study conducted by the researchers shed light on customers' pivotal role in adopting e-commerce and put forth potential avenues for further investigation in this area. Furthermore, existing scholarly works have examined the various aspects contributing to the outcomes of mobile app engagement, particularly emphasizing the impact of engaging with a retailer's proprietary mobile application on consumer behaviors [4].

Moreover, scholarly research has prioritized the examination of several facets of user behavior within the realm of electronic commerce. An example of this is a study on m-shopping and technology adoption, which offers valuable insights into the distinct m-shopping patterns exhibited by customers in Malaysia [5]. Another study investigated the utilization of mobile applications within the hotel business. In doing so, they expanded upon the TAM model by incorporating the experience construct [6]. These studies contribute to the current literature by investigating the diverse factors that impact user behavior in specific contextual environments.

A comprehensive examination of existing research about using electronic commerce platforms elucidates crucial insights into the determinants influencing customers' inclination to adopt and sustain their usage. The introduction highlights the importance of several factors in the research, including perceived ease of use, perceived usefulness, cultural context, and engagement with mobile applications. By understanding these elements, businesses may effectively tailor their strategies to target and engage consumers in the dynamic e-commerce market. This study aims to investigate the following research questions (RQ):

RQ1: How many publications, based on their level of relevance to the topic of e-commerce user behavior?

RQ2: How is the growth of publications on e-commerce user behavior from 2014-2023?

RQ3. Who are the most relevant authors and sources for research on e-commerce user behavior?

RQ4: What are the keywords and the co-occurrence network of keywords?

RQ5. What are the future plans for the study of e-commerce user behavior?

This study aims to conduct a complete analysis of e-commerce user behavior from a broad perspective. In order to address the inquiries at hand, it is imperative to undertake a comprehensive examination of existing literature through a systematic review, along with the application of cluster analysis. The analysis findings will serve as a foundation for future scholarly investigations.

2 Method

2.1 Research Method

The basis of this research uses bibliometric analysis. Bibliometric analysis is used to explore the bibliometric and intellectual structure of a literature collection [7]. The bibliometric analysis incorporates structural interactions between several research elements, such as domain, author, institution, and even country of origin [8]. The process of bibliometric analysis can be replicated scientifically and transparently [9]. This research methodology was carried out in the sequence as in Fig 1.
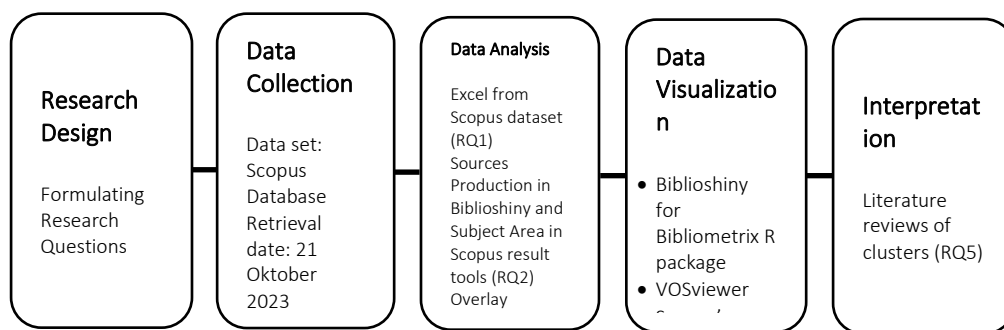

Figure 1: Methodological Procedures

2.2 Data Collection

This study used the Scopus database. Until now, Scopus has been the primary citation source for papers published in scientific publications [10]. The sample criteria used are:

    i.   These terms (behavioral OR "behavioral intention" OR "behavioral continuance" OR "use behavior" OR "adoption") AND ("electronic commerce" OR "digital commerce" OR "e-commerce" OR "online commerce" OR "virtual commerce" OR "mobile commerce" OR "m-commerce" OR "virtual shopping" OR "online shopping" OR "mobile shopping") AND ("sor" OR "stimulus organism response" OR "s-o-r" OR "stimulus-organism-response" OR "tam" OR "technology acceptance model") were used to identify all published articles. Finding keywords and their synonyms is the main strategy for a thorough literature search [7]. To identify various topics from various research streams, the keywords chosen in this research are related to e-commerce.

    ii.   In an effort to maintain the reliability of the results, the article search was limited to journals and conference proceedings. Journal articles and conference proceedings are published after going through a strict review process [8].

    iii.   This analysis was restricted to English-language publications due to the larger number of publications in this language

With these search parameters, 310 articles were found. However, filters are still needed for further research. In the end, the data that was ready to be processed was 82 articles (Table 1).

Table 1: Search from Scopus Database

Step	Filtering Criteria	Query	Documents Count
1	First search result (according to search terms)	TITLE-ABS-KEY (behavioral OR "behavioral intention" OR "behavioral continuance" OR "use behavior" OR "adoption") AND TITLE-ABS-KEY ("electronic commerce" OR "digital commerce" OR "e-commerce" OR "online commerce" OR "virtual commerce" OR "mobile commerce" OR "m-commerce" OR "virtual shopping" OR "online shopping" OR "mobile shopping") AND TITLE-ABS-KEY ("tam" OR "technology acceptance model")	310
2	Limit	Language (English); Source Type (Journal & Conference Proceeding); Publication Stage (Final); Document Type (Article & Conference Paper)	270
3	Filter Year	2014-2023	131
4	Metadata completeness	Data cleaning	82

3 Result and Analysis

3.1 Publications Trend and Growth

The annual distribution of document counts indicates research trends [8]. The quantity of publications serves as an indicator of the degree of interest in a specific subject matter. Fig. 2 depicts the upward trajectory in the number of publications sourced from the Scopus database. The scope of data collection for this article is confined to 2014, indicating that it falls within the timeframe of the recent decade and pertains to e-commerce user behavior. Nevertheless, there is a discernible upward trajectory in the number of articles over successive years.
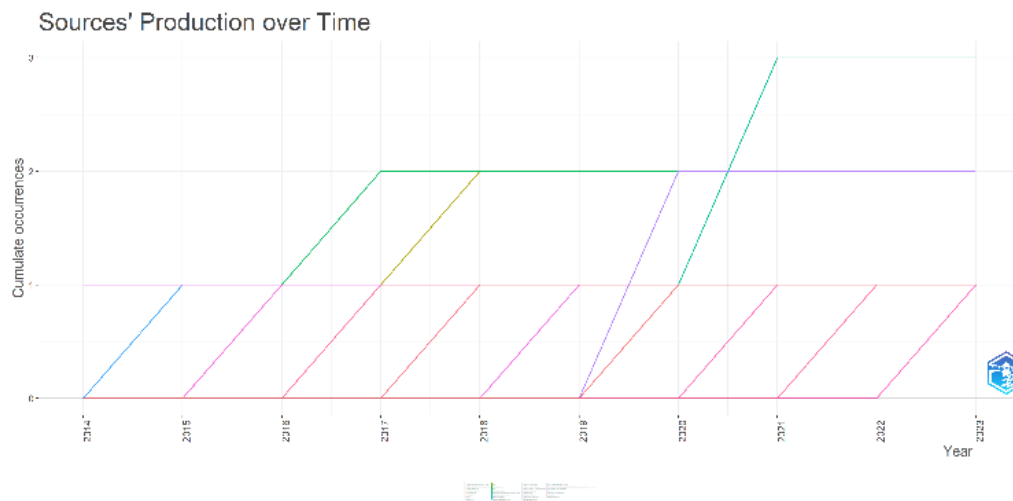
Figure 2: Sources' Production Over Time Between 2019-2023

The current quantity of research is constrained, with a varied annual publication output. Fig. 2 and Fig. 3 indicates that research on this topic was carried out in various domain. International Journal of Business Information Systems contributed the most publications, with three documents. Subsequently, Fig. 3 shows that almost half of the total publications related to the topic of e-commerce user behavior are located in the domain of Science and Business, Management, and Accounting.
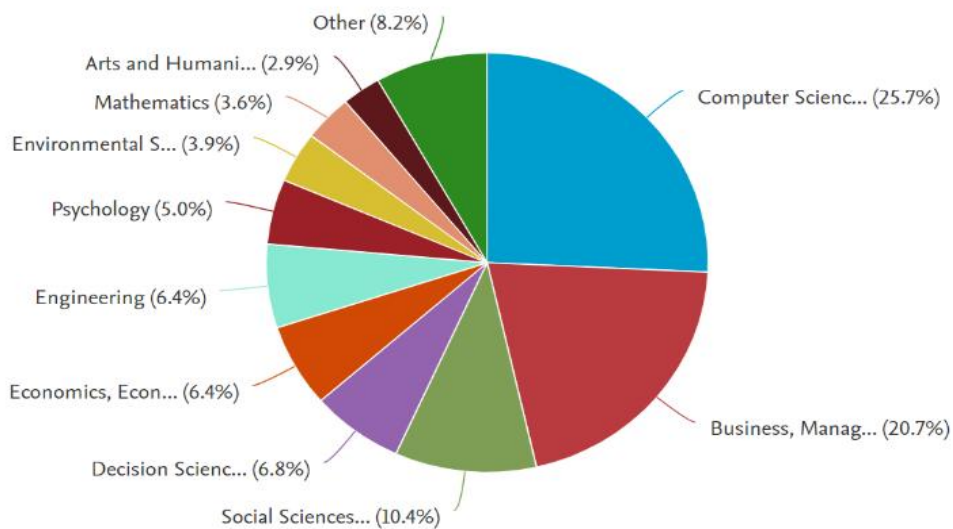

Figure 3: Documents by Subject Area

3.2 The Most Influential Sources

Fig. 4 indicates the correlation between the degree of connection and the quantity of publications originating from each nation, with the publication's relevance determined by the source document. According to the data presented in Fig. 4, it is evident that the majority of publications originate from China, with Malaysia ranking second in terms of publishing output. Additionally, the most recent publishing originates from Thailand and Pakistan. Furthermore, Table II presents a comprehensive overview of the foremost five writers who have contributed significantly to the body of literature about e-commerce user behavior. This analysis was based on fractionalized articles retrieved from Biblioshiny for Bibliometrics.
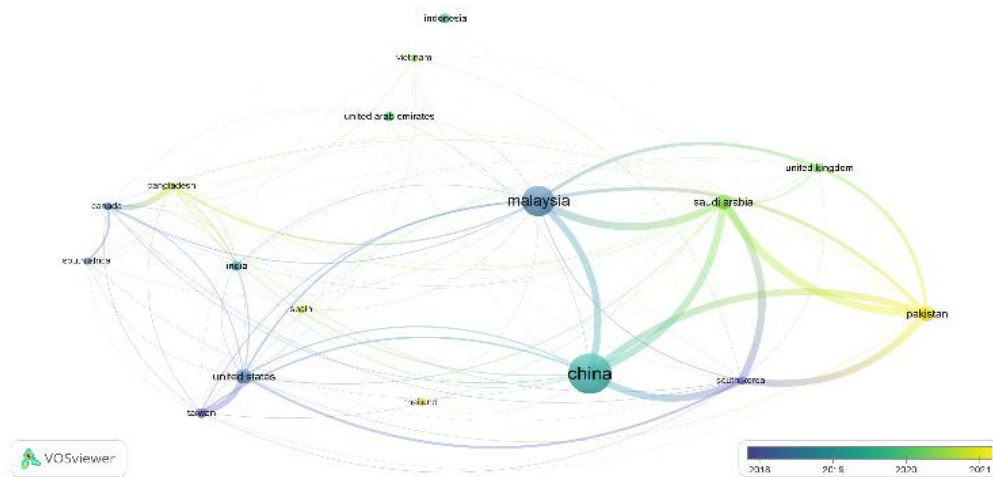

Figure 4: Association Strength and Document of E-Commerce User Behavior

Table 2: Top-5 relevant authors

Authors	Number of Publication	Articles Fractionalized
Yuhang Zhang; Jun Wang; Yani Wang, Yichao He [11]	2	1.03
Phaninee Naruetharadhol; Sasichakorn Wongsaichia; Shenying Zhang; Chanchai Phonthanukitithaworn; Chavis Ketkaew [12]	2	0.70
Deepshikha Aggarwal [13]	1	1.00
Md Al Amin [14]	1	1.00

Chenxing Wang; Sayed Fayaz Ahmad; Ahmad Y.A Bani Ahmad Ayassrah [15]	1	0.11

3.3 Most Relevant and Influential Articles

The researchers employed the citation analysis methodology to examine the impact of publications based on the number of citations received [9]. This paper shows the scholarly connections between publications that others may have referenced. One of the references in Table III that has garnered significant attention is a recent work published in 2014. This article, "The Application of the Technology Acceptance Model under Different Cultural Contexts: The Case of Online Shopping Adoption," has been cited 185 times [3]. The paper in question, which has received significant attention, can be found in the Journal of International Marketing. However, it should be noted that this particular source has a lower number of citations.

Table 3: Top-10 Global Cited Document

Title/Author(s)	DOI	Year	TC
The Application of the Technology Acceptance Model under Different Cultural Contexts: The Case of Online Shopping Adoption [3]	10.1509/jim.14.0065	2014	185
Understanding mobile shopping consumers' continuance intention [1]	10.1108/IMDS-02-2016-0052	2017	158
Utilitarian and Hedonic Motivations for Live Streaming Shopping [16]	10.1145/3210825.3210837	2018	134
Factors influencing the adoption of mobile commerce applications in Cameroon [2]	10.1016/j.tele.2018.04.012	2018	132
Determinants of users' intention to adopt m-commerce: an empirical analysis [17]	10.1007/s10257-015-0287-2	2016	102
Examining the determinants and outcomes of mobile app engagement - A longitudinal perspective [4]	10.1016/j.chb.2018.03.015	2018	85
Examining an extended technology acceptance model with experience construct on hotel consumers' adoption of mobile applications [6]	10.1080/19368623.2019.1580172	2019	78

Do consumers want mobile commerce? A closer look at M-shopping and technology adoption in Malaysia [5]	10.1108/APJML-05-2017-0093	2018	72
An extended online purchase intention model for middle-aged online users [18]	10.1016/j.elerap.2016.10.005	2016	53
Insights into individual's online shopping continuance intention [19]	10.1108/IMDS-07-2014-0201	2014	50

Notes: DOI= Digital Object Identifier, TC=Total Citation

3.4 Analysis of Affiliations and Origin Country

The study topic has been distributed among multiple organizations in Malaysia, China, Indonesia, Taiwan, and Wales (Figure 5). The affiliates that feature the highest number of article connections from the Asian continent are Universiti Malaysia Terengganu, Harbin Institute of Technology, Universitas Indonesia, Asia University, Bina Nusantara University, Universiti Teknologi Mara, and National Taiwan University. And The National Chang Hua University of Education (NP=25). There is also an affiliate from the continent of Europe, namely Swansea University (NP=2).
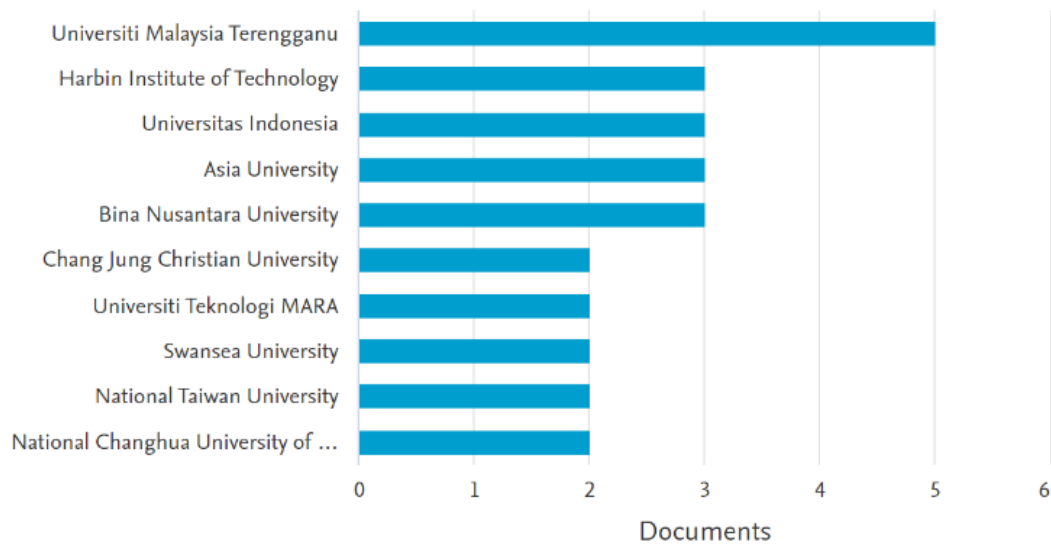

Figure 5: Document by Affiliations

3.5 Co-occurrences of Keywords

The keyword analysis technique was applied to make predictions about forthcoming research endeavors within the specified domain [20]. The occurrence of terms results in clusters being formed. These assumptions argue that frequent co-occurrence of phrases implies a thematic relationship between them. The terms mentioned above have been created from a combination of "author keywords," "article titles," "abstracts," and "keyword plus." As indicated by previous scholarly investigations, the term "Keyword Plus" has been identified as a highly effective keyword for doing bibliometric research " [21]. A line serves as a visual representation of the connection or correlation between two distinct terms. The width of the line will increase proportionally with the presence of more keywords. A term is visually represented by a circular node, where the diameter of the node corresponds to the number of connections it has, and the node's color corresponds to the cluster to which it is assigned.

Co-occurring keywords are identified and visualized via Biblioshiny or VOSviewer for Bibliometrix. Keyword combination, as shown in Fig. 6, resulted in five significant clusters of various keywords listed in Table IV. This cluster implies a similar research concentration, defined by different colors for each cluster.

 i. The First Cluster (red) in the technological acceptance model focuses on the e-commerce industry's adoption of perceived utility and simplicity of use as independent variables.

 ii. The Second Cluster 2 (green) highlights how crucial trust is while using the internet for buying.

 iii. Cluster 3 (blue) focuses on adopting mobile technology to support online transactions or shopping.

 iv. Cluster 4 (yellow) emphasizes consumer purchasing behavior influenced by social media.

Table 4: Clusters from the co-occurrence of keywords analysis

Cluster	Keywords
1 (Red)	technology acceptance model*, e-commerce*, m-commerce, online purchase intention, behavioral intentions, perceived ease of use, perceived usefulness
2 (Green)	trust*, online shopping, e-shopping, perceived risk, enjoyment
3 (Blue)	mobile commerce*, mobile shopping, technology adoption
4 (Yellow)	purchase intention*, social media, social commerce

Notes: *= betweenness centrality

In order to identify research topics that can help advance science, it is necessary to use effective keywords [8]. According to the network map, "technology acceptance model" is the most significant keyword with a total of 19 link strengths. This indicates that these keywords form a research cluster in this field. As shown in Figure 6, the four clusters are interconnected.

The first cluster, the red cluster, collects the most significant number of publications. Previous research used two antecedent variables from the TAM model to measure e-commerce user behavior: perceived ease of use and usefulness [3][22]. E-commerce user behavior is defined most concerning online purchase intention [23]. This red cluster also includes studies not only from e-commerce but also some from m-commerce [24].

The green cluster further highlights the psychological and attitudinal aspects of online buyers. Trust is the keyword that appears most often in previous research [22][25]. Previous research models compared trust and perceived risk, which have contradictory effects on online buyer behavior [26]. Apart from that, previous research findings show that enjoyment is one of the attitudes of e-shopping users that encourages further behavior [19].

In the next cluster, namely the blue cluster, previous research focused more on how technology adoption drives the development of e-commerce itself [2][5]. In this area, mobile commerce and mobile shopping are starting to be introduced [4]. The subjects and objects of previous research discussed many issues regarding the features provided by smartphones when making purchases or sales online [2].

The yellow cluster is the last area, where the number of publications is still tiny and the newest. In this section, we get the latest methods in online shopping behavior [27]. The utilization of social media platforms has a discernible influence on the development and proliferation of social commerce. The current literature explores an innovative approach to electronic commerce, including live-streaming technology [16][28].
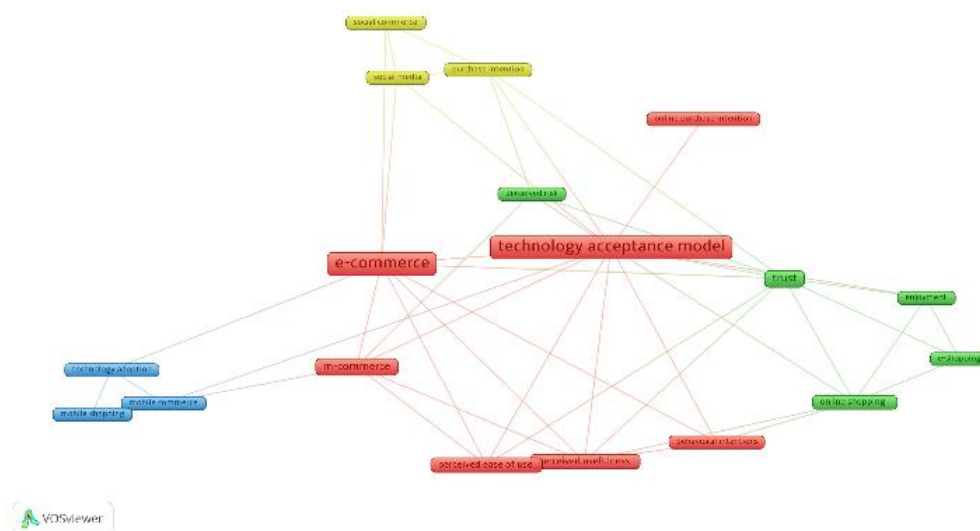

Figure 6: Network Visualization of Keywords Co-occurrence

4   Discussion

The increasing volume of scientific literature on e-commerce is being discussed in an interdisciplinary field of study. Most research subjects fall under computer science and business management and accounting, with these fields being related theoretically since the existence of e-commerce depends on IT and business development at the social level [4].

The Scopus database indicates that scholarly discourse about electronic supermarkets, which served as a precursor to the development of e-commerce, was initially documented in 1998 [29]. In a second investigation, the TAM model was employed to incorporate perceived ease of use and usefulness factors to forecast user behavior within the context of electronic supermarkets [30]. The utilization of the Technology Acceptance Model (TAM) has a strong correlation with the evolution of the electronic commerce (e-commerce) concept throughout its historical progression [6]. Asia, specifically Thailand and Pakistan, emerged as the primary contributors to regional publications about the field of e-commerce. In the future, scholars will have the prospect of engaging in collaborative endeavours with academics from various institutional backgrounds throughout global areas.

The issue of human behavior in e-commerce is a vast area of thought. The TAM model underwent several changes or modifications to suit various situations and conditions [3]. Often, previous researchers also elaborated the TAM model with other theories or models, such as TAM-TTF (task technology fit) [31][32], TAM-ECM (expectation confirmatory model) [1], TAM-TPB (theory planned behavior) [33][34], and TAM-SET (social exchange theory) [35].

We found that "trust" is frequently encountered when modifying the TAM model [25]. Trust is an essential attitude for e-commerce users [22]. Trust was believed to be the key to e-commerce success, but perceived risk often decreases individual e-commerce intentions [26][24]. Another attitude of e-commerce users is related to the emotions they feel, such as enjoyment [36] or flow [37]. The TAM model proved flexible, and future research could consider using other variables.

The subsequent finding relates to the concept of social commerce [35][38]. The intensity of social media use is driving changes in purchasing patterns in e-commerce on a broader scale. Social influence has contributed to individual purchasing decisions in e-commerce [39]. As stated previously, many previous researchers elaborated on the TAM model in comparison with the UTAUT (unified theory of acceptance and use of technology) model [40][2].

5   Conclusion

This study presents a bibliometric examination of user behavior in e-commerce, m-commerce, and online purchasing. The present study categorises research groups from scholarly papers in the Scopus database. In the preliminary findings, a total of 131 documents were found. After applying specified criteria, 82 documents were selected for further investigation in the present study. Biblioshiny, VOSviewer, and Scopus, search results analysis tools, were employed to represent the data visually.

This analysis reached several conclusions after answering all the research questions. First, we succeeded in identifying 82 publications on e-commerce based on the TAM model. Second, based on the Scopus database, our research findings show the development of publications in

the e-commerce realm. Third, we found that researchers and sources of scientific publications relevant to e-commerce user behavior come from the Asian continent. Fourth, the TAM model is still very flexible and can be combined or elaborated with other models and theories. The results of our analysis provide four research clusters identified based on co-occurring keywords. Finally, we can suggest future research directions and objectives, especially in the e-commerce domain.

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