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Research Article

Bibliometric Mapping of Unified Theory of Acceptance and Use of Technology

Birleştirilmiş Teknoloji Kabul ve Kullanım Teorisinin Bibliyometrik Haritası

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Abstract

The unified theory of acceptance and use of technology has been cited more than 40000 by numerous studies since its emergence. However, no detailed research has yet been conducted to analyze and compare the reasons for citing reference articles in detail. For this reason, this model, which is getting more interesting, should be examined in detail. In this context, bibliometric analysis and mapping methods were used to systematically examine a total of 1560 studies related to UTAUT. With these data, general citation trends, application areas, journals, countries, institutions, and authors with the most studies were analyzed. In this way, the effectiveness of these titles has been revealed. After that, terms were extracted from the keywords. Hence, effective terms and titles in the field were obtained. The findings are shown with visuals and tables to increase intelligibility. Thus, a structure was created that everyone can easily understand. Such a systematic review of the UTAUT model can inform researchers and guide the appropriate future use of these theories. In study, a detailed examination of this model is presented and information about its scope is given.

Keywords: *UTAUT, Technology Acceptance, Bibliometric, Mapping, Term Extraction*

Jel Codes : *C80, C88, D83, D85.*

Öz

Birleştirilmiş Teknoloji kabulü ve kullanımına ilişkin teori, ortaya çıkışından bu yana çok sayıda çalışmada 40000'den fazla alıntılanmıştır. Ancak, referans makalelere atıfta bulunma nedenlerini ayrıntılı olarak analiz etmek ve karşılaştırmak için henüz ayrıntılı bir araştırma yapılmamıştır. Bu nedenle her geçen gün daha da ilgi çeken bu modelin detaylı olarak incelenmesi gerekmektedir. Bu bağlamda, UTAUT ile ilgili toplam 1560 çalışmayı sistematik olarak incelemek için bibliyometrik analiz ve haritalama yöntemleri kullanılmıştır. Bu verilerle; genel atıf eğilimleri, uygulama alanları, yayınlanan dergiler, en çok araştırma yapılan ülkeler, en çok araştırma yapılan kurumlar ve yazarlar üzerinde analizler yapılmıştır. Bu sayede bu konu başlıkların etkinlikleri ortaya konulmuştur. Daha sonra ise anahtar kelimelerden terim çıkarımı yapılmıştır. Böylece, alanda etkili terim ve başlıklar elde edilmiştir. Elde edilen bulgular, anlaşılırlığın artırılması için görseller ve tablolar ile gösterilmiştir. Bu sayede, herkesin rahatlıkla anlayabileceği bir yapı oluşturulmuştur. UTAUT modelinin böyle sistematik bir incelemesi, araştırmacıları bilgilendirebilir ve bu teorilerin gelecekteki uygun kullanımına rehberlik edebilir. Bu çalışma ile bu modelin detaylı bir incelemesi sunulmakta ve kapsamları hakkında bilgi verilmektedir.

Anahtar Kelimeler: *UTAUT, Teknoloji Kullanımı, Bibliyometri, Haritalama, Terim Çıkartma*

Jel Kodları : *C80, C88, D83, D85.*

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1. Introduction

The unified theory of acceptance and use of technology (UTAUT) emerges by combining the theory created with the research on the intention to use technology in information technology, psychology, and sociology. Venkatesh et al., (Venkatesh et al., 2003), in studies in the literature for the technology adoption, proposed a unified model in technology acceptance and use research because the selection of one of the models ignored the different contributions of the others. UTAUT was developed by reviewing and combining the structures of eight main theories and models used to explain information systems usage behavior. These theories and models are Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1975), Technology Acceptance Model (TAM) (Davis, 1989), Motivation Model (MM) (Davis et al., 1992), Theory of Planned Behavior (TPB) (Ajzen, 1991), Model of Personal Computer Utilization (MPCU) (Goodhue & Thompson, 1995), Innovation Diffusion Theory (IDT) (Rogers, 1995), Social Cognitive Theory (SCT) (Bandura, 1982) and Combined Technology Acceptance Model and Theory of Planned Behavior (C-TAM-TPB) (Taylor & Todd, 1995). UTAUT, which was developed by Venkatesh et al. (Venkatesh et al., 2003) by evaluating the strengths and weaknesses of eight different models and theories, gave better results than each of them, with the regression value explaining approximately 69 percent of behavioral intention in organizational contexts (Venkatesh et al., 2012).

In the process of creating the model, behavioral intention (BI), performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), and behavioral intention are factors that directly determine user behavior. On the other hand, attitude, self-efficacy, and technology anxiety are not directly determining factors. UTAUT includes a unified explanatory source and key regulatory usage and contributes to technology acceptance literature by preserving the basic structure (Venkatesh et al., 2003).

Venkatesh et al. (Venkatesh et al., 2003), in their research, state that different factors that explain the technology use intention can also be added to the model. Figure 1 shows the basic factors of the model. A structure was created in which performance expectation, effort expectation, social influence, and facilitating conditions influence behavioral intention, and behavior is explained by behavioral intention in this model. The variables of gender, age, experience, and voluntary use in the model have a regulatory effect between the factors explaining behavioral intention and behavioral intention.

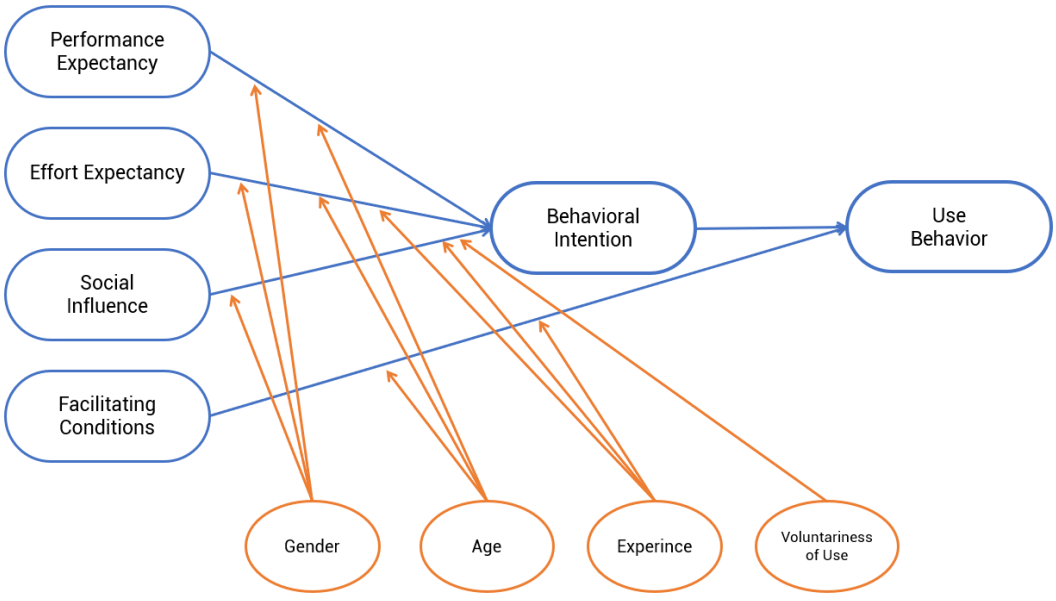

Figure 1: Unified theory of acceptance and use of technology (UTAUT)

The study's results using UTAUT revealed the need for a transformation from technology acceptance and use of individuals working in institutions to the acceptance and use of consumers. Meta-analysis studies, especially on the findings of experimental studies in social sciences, show that UTAUT factors are questionable and weaken the model accuracy (Taiwo & Downe, 2013).

Since the publication of the UTAUT model, UTAUT has been widely used in technology adoption research for many years as a theoretical framework for researchers to conduct experimental research on user intentions and behaviors. Research on UTAUT has been cited more than 40000 in total. It also focuses on different control factors (such as age, gender, experience, volunteer use, income, and education) and various user groups (such as students, professionals, and general users) (Zeebaree et al., 2022; Wang et al. 2022).

This study, in addition to previous systematic literature studies, focuses on bibliometric, text and citation analysis. In this context, bibliometric analysis is the numerical analysis of the publications produced by individuals/institutions in a specific area/region and the relations between these publications (Özköse, 2020; Aytekin et al., 2022). Bibliometric analyzes were performed on the data obtained from the Web of Science Core Collection (WoS) database. WoS consists of multidisciplinary citation indexes belonging to Clarivate Analytics, which covers scientific journals with high impact. WoS provides a list of cited articles (Garfield, 1964). WoS is also used in the most common journals for text and citation analysis of research dealing with a particular topic.

Bibliometric analyzes focused on the following study topics (Özköse & Gencer, 2017). These issues;

1. Determining the relations of countries with each other,
2. Determining the relationships of the authors according to the studies they have done,
3. Co-citation analysis of the cited authors,
4. A co-occurrence analysis according to the keywords given by the authors.

The study aims to reveal the general lines of the field by analyzing the articles about the UTAUT model. This article can be valuable in helping researchers understand previous findings on UTAUT, recognize possible future research issues and guide future research efforts. This article is crucial to understand the development status and trends of the UTAUT model in technology acceptance and use.

2. Data and Methodology

2.1. Data

The study examines UTAUT research from 2003 to February 2022. In this study, the Science Citation Index Expanded (SCI-EXPANDED), Social Science Citation Index (SSCI), and Emerging Science Citation Index (ESCI) indexes in the WoS Core Collection database were searched according to the constraints in Table 1. As a result of the search code execution, 1560 academic studies on UTAUT were reached. For bibliometric analysis studies, the bibliometric data were downloaded in plain text format.

Table 3: Search string

Scope	Source Title
UTAUT	TS = ("UTAUT" OR "Unified Theory of Acceptance and Use of Technology" NOT ("UTAUT 2" OR "UTAUT-2" OR "UTAUT2" OR "Unified Theory of Acceptance and Use of Technology 2" OR "Unified Theory of Acceptance and Use of Technology2" OR "Unified Theory of Acceptance and Use of Technology-2")) OR TI = ("UTAUT" OR "Unified Theory of Acceptance and Use of Technology" NOT ("UTAUT 2" OR "UTAUT-2" OR "UTAUT2" OR "Unified Theory of Acceptance and Use of Technology 2" OR "Unified Theory of Acceptance and Use of Technology2" OR "Unified Theory of Acceptance and Use of Technology-2")) OR AK = ("UTAUT" OR "Unified Theory of Acceptance and Use of Technology" NOT ("UTAUT 2" OR "UTAUT-2" OR "UTAUT2" OR "Unified Theory of Acceptance and Use of Technology 2" OR "Unified Theory of Acceptance and Use of Technology2" OR "Unified Theory of Acceptance and Use of Technology-2")) OR AB = ("UTAUT" OR "Unified Theory of Acceptance and Use of Technology" NOT ("UTAUT 2" OR "UTAUT-2" OR "UTAUT2" OR "Unified Theory of Acceptance and Use of Technology 2" OR "Unified Theory of Acceptance and Use of Technology2" OR "Unified Theory of Acceptance and Use of Technology-2")) AND LANGUAGE: (English) AND DOCUMENT TYPES: (Article)

Note: TS: Topic; TI: Title; AK: Author Keywords; AB: Abstract.

2.2. Method

Data blocks were combined with the help of the Bibexcel program. As a result of the merge, a file named UTAUT was created. This file, called UTAUT, contains the bibliometric data of 1560 articles. After the merging process, the data was divided into relevant parts. As a result of the division process, a file was created for each question item. Then, the visualization of the data and the creation of relationship maps were initiated. In these processes, VosViewer, a free program developed by Nees Jan van Eck, was used (Van Eck & Waltman, 2012). The obtained maps and associations were interpreted. After that term extraction process was done using Vosviewer. Findings from term extraction are given by figures and tables.

The following analyzes were made with the obtained data, respectively;

1. Distribution of studies on UTAUT by years and the total number of citations by years,
2. Most cited publications in UTAUT,
3. Fields of studies on UTAUT,
4. Journals in which UTAUT studies were published the most and bibliographic coupling of journals,
5. Countries in which UTAUT studies were published the most and bibliographic coupling of countries,
6. Institutions in which UTAUT studies were published the most and bibliographic coupling of institutions,
7. Authors who published most articles on UTAUT and bibliographic coupling of authors,
8. Extracting terms from keywords

2.3. Limitations of the Study

In the study, Web of Science Core Collection database was used. The study can be expanded by adding other resources. Also, different criteria can be added to the search query. In this way, an analysis of a specific area related to the use of UTAUT can also be made. In this study, no special criteria were set to look at the area from a wider perspective. Apart from these, only SSCI, SCI-exp, and E-SCI indexes were used to make the study results clearer. Proceedings and books can also be added to the work. In addition, only English articles were used in the study to ensure consistency. Other languages can also be added to the study.

3. Results

3.1. Distribution of Studies on UTAUT by Years and Total Number of Citations by Years

The number of articles about UTAUT is presented in Table 2 according to the publication year and citation numbers.

When Table 2 is examined, although the first publication was in 2003, there was no other study in the field until 2007. Studies on UTAUT were revived in 2007 and subsequently increased continuously. The reason for the decrease in 2022 is that the data were collected at the beginning of the relevant year.

The article, "User Acceptance of Information Technology: Toward a Unified View" published by Venkatesh, V. colleagues in 2003 and which forms the basis of the subject, was cited 12636 times. This article draws attention as the most cited publication among UTAUT studies. The reason why the number of citations in 2012 is higher than in other years is the introduction of the UTAUT2 approach. Since this published article is a consumer-oriented version of UTAUT, it has been also included in UTAUT studies. Although UTAUT studies received more citations in total in the following years, the citation rate is decreasing. Because the publications have low recognition when they are first published, it is hard to get citations. Therefore, the rate of citation counts increases over time. This reduction is considered natural. Although it is the beginning of the relevant year, it is remarkable that 35 studies on UTAUT have been carried out in 2022.

Table 2: Total number of publications by year from 2003 to 2022

Years	Total Number of Publications	Total Citations	Citation/Article Count
2003	1	12636	12636.00
2004	0	-	-
2005	0	-	-
2006	0	-	-
2007	8	559	69.88
2008	12	1508	125,67
2009	18	2039	113,28
2010	35	2834	80,97
2011	37	2274	61,46
2012	42	5325	126,79
2013	52	2268	43,62
2014	54	2394	44,33
2015	82	3283	40,04
2016	92	3310	35,98
2017	110	2953	26,85
2018	133	2508	18,86
2019	203	2993	14,74
2020	266	1817	6,83
2021	380	457	1,20
2022	35	0	0

3.2. Most Cited Publications in UTAUT

Tablo 3 ve 4'te UTAUT yaklaşımı hakkında en çok atıf yapılan yayınların bilgileri verilmektedir. Tablo 3'te en çok atıf alan yayınların başlıkları verilmektedir. Tablo 4'te bu yayınların yazarları, kaynak adları, yayın yılları ve atıf sayısı bilgileri verilmektedir.

Table 3: Most cited publications

No	Title
U-1	User acceptance of information technology: Toward a unified view
U-2	Consumer acceptance and use of informatıon technology: extending the unified theory of acceptance and use of technology
U-3	Integrating TTF and UTAUT to explain mobile banking user adoption
U-4	Investigating the determinants and age and gender differences in the acceptance of mobile learning
U-5	Understanding the Internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application
U-6	The acceptance and use of a virtual learning environment in China
U-7	Unified theory of acceptance and use of technology: a synthesis and the road ahead
U-8	Understanding Web-based learning continuance intention: The role of subjective task value

U-9	Re-examining the Unified Theory of Acceptance and Use of Technology (UTAUT): towards a revised theoretical model
U-10	Assessing acceptance of assistive social agent technology by older adults: the almere model
U-11	Extending the two-stage information systems continuance model: incorporating UTAUT predictors and the role of context
U-12	Mobile banking adoption: A literature review
U-13	An international comparison of technology adoption Testing the UTAUT model
U-14	Extending the understanding of mobile banking adoption: When UTAUT meets TTF and ITM
U-15	Factors affecting individuals to adopt mobile banking: empirical evidence from the utaut model
U-16	Gain more insight from your PLS-SEM results The importance-performance map analysis
U-17	Understanding mobile banking: The unified theory of acceptance and use of technology combined with cultural moderators
U-18	Information technology (IT) in Saudi Arabia: Culture and the acceptance and use of IT
U-19	Factors influencing health information technology adoption in Thailand's community health centers: Applying the UTAUT model
U-20	The unified theory of acceptance and use of technology (UTAUT): a literature review

Table 4: Necessary information about the most cited publications

No	Authors	Source Title	Publication Year	Citation Count
U-1	Venkatesh, V; Morris, MG; Davis, GB; Davis, FD	MIS Quarterly	2003	12636
U-2	Venkatesh, Viswanath; Thong, James Y. L.; Xu, Xin	MIS Quarterly	2012	3313
U-3	Zhou, Tao; Lu, Yaobin; Wang, Bin	Computers in Human Behavior	2010	617
U-4	Wang, Yi-Shun; Wu, Ming-Cheng; Wang, Hsiu-Yuan	British Journal of Educational Technology	2009	520
U-5	Martins, Carolina; Oliveira, Tiago; Popovic, Ales	International Journal of Information Management	2014	475
U-6	van Raaij, Erik M.; Schepers, Jeroen J. L.	Computers & Education	2008	426
U-7	Venkatesh, Viswanath; Thong, James Y. L.; Xu, Xin	Journal of the Association for Informatıon Systems	2016	413
U-8	Chiu, Chao-Min; Wang, Eric T. G.	Informatıon & Management	2008	397
U-9	Dwivedi, Yogesh K.; Rana, Nripendra P.; Jeyaraj, Anand; Clement, Marc; Williams, Michael D.	Information Systems Frontiers	2019	368
U-10	Heerink, Marcel; Krose, Ben; Evers, Vanessa; Wielinga, Bob	International Journal of Social Robotics	2010	358
U-11	Venkatesh, Viswanath; Thong, James Y. L.; Chan, Frank K. Y.; Hu, Paul Jen-Hwa; Brown, Susan A.	Information Systems Journal	2011	329
U-12	Shaikh, Aijaz A.; Karjaluoto, Heikki	Telematics and Informatics	2015	314
U-13	Im, Il; Hong, Seongtae; Kang, Myung Soo	Information & Management	2011	299
U-14	Oliveira, Tiago; Faria, Miguel; Thomas, Manoj Abraham; Popovic, Ales	International Journal of Information Management	2014	297
U-15	Yu, Chian-Son	Journal of Electronic Commerce Research	2012	297
U-16	Ringle, Christian M.; Sarstedt, Marko	Industrial Management & Data Systems	2016	294

U-17	Baptista, Goncalo; Oliveira, Tiago	Computers in Human Behavior	2015	294
U-18	Al-Gahtani, Said S.; Hubona, Geoffrey S.; Wang, Jijie	Information & Management	2007	294
U-19	Kijsanayotin, Boonchai; Pannarunothai, Supasit; Speedie, Stuart M.	International Journal of Medical Informatics	2009	285
U-20	Williams, Michael D.; Rana, Nripendra P.; Dwivedi, Yogesh K.	Journal of Enterprise Information Management	2015	282

The "User Acceptance of Information Technology: Toward a Unified View" study, published by Venkatesh et al. in 2003 in MIS Quarterly, comes first. The consumer-focused version of UTAUT proposed by Venkatesh et al. takes second place. This study which is named "Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology" published in MIS Quarterly journal in 2012 is also considered the beginning of UTAUT2. The publications given in Table 3 and Table 4 are presented as a guide for researchers who want to understand how UTAUT works and its principles. In addition, when the journals in which the most cited publications are examined, the journals named "Information & Management (3)", "MIS Quarterly (2)", "Computers in Human Behavior (2)" and "International Journal of Information Management (2)" draws attention. Almost half of the studies (9) in the top 20 were published in these journals. In addition, journals published by UTAUT-related publications are highly compatible with the field of Management Information Systems. Some studies may include both UTAUT and UTAUT2 methods. Both initial publications of UTAUT and UTAUT2 studies were published in the "MIS Quarterly" journal, and in total these two studies have now received 15949 citations. For this reason, the number of citations in the “MIS Quarterly” journal is far higher than in other journals.

3.3. Fields of studies on UTAUT

In Figure 2, the research fields of the articles published about UTAUT are given. You can find information about the first 15 fields in Figure 2.

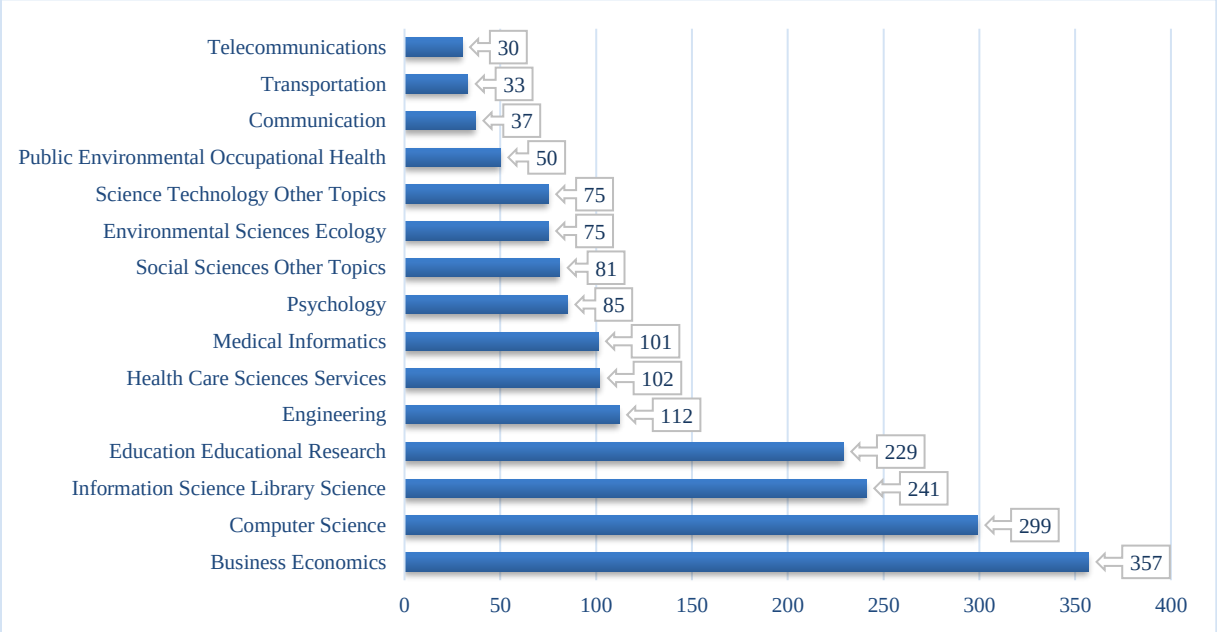

Figure 2: Research fields of UTAUT

When Figure 2 is examined, the categories of "Business Economics (357)", "Computer Science (299)", "Information Science & Library Science (241)", "Education & Educational Research (229)" and "Engineering (112)" draw attention. Although the "Engineering" category is in the top five, it contains less than half of the "Education & Educational Research" category, in fourth place. Since UTAUT is about explaining usage behavior and intentions of information systems, it is not surprising that the

"Computer Science" field comes second. Since an academic study is included in more than one category, the total number of publications in the categories will be more than the actual publications count. Despite this, each of the first three categories contributes to more than 15% of the area. Therefore, these three working areas constitute the working center of UTAUT.

3.4. Journals in which UTAUT Studies were Published the most and Bibliographic Coupling of Journals

Figure 3 contains information about 15 journals in which UTAUT was published the most. When the journals that publish studies on UTAUT are examined (Figure 3), "Sustainability (37)" is the journal that includes the most articles. "Computers in Human Behavior (33)", "Education and Information Technologies (27)", "Journal of Medical Internet Research (17)", "International Journal of Information Management (14)", "International Journal of Mobile Communications (14)", "Behavior Information Technology (16)" follow this journal respectively. Sustainability is an international, cross-disciplinary open access journal on the environmental, cultural, economic, and social sustainability of human beings. Therefore, it is not surprising that it comes first on UTAUT. On the other hand, "Computers in Human Behavior" is a scientific journal devoted to examining the use of computers from a psychological point of view and comes to the fore in the field of UTAUT with many studies. The UTAUT studies of "Shin (2009)", "Zhou, Lu, and Wang, (2010)" and "Baptista and Oliveira (2015)" in this journal are quite remarkable and they are the most cited publications in this journal. In addition, in the CHB Reports journal, which has been accompanying the Computers in Human Behavior (CHB) journal as of 2020, the studies on UTAUT by "Ayaz and Yanartaş, 2020" and "Jung, Kwon, and Kim, 2020" highlight. "Education and Information Technologies" is a scientific journal that reunions information, technology, and education. These journals are the leading journals in this field and are important sources for identifying current research issues.

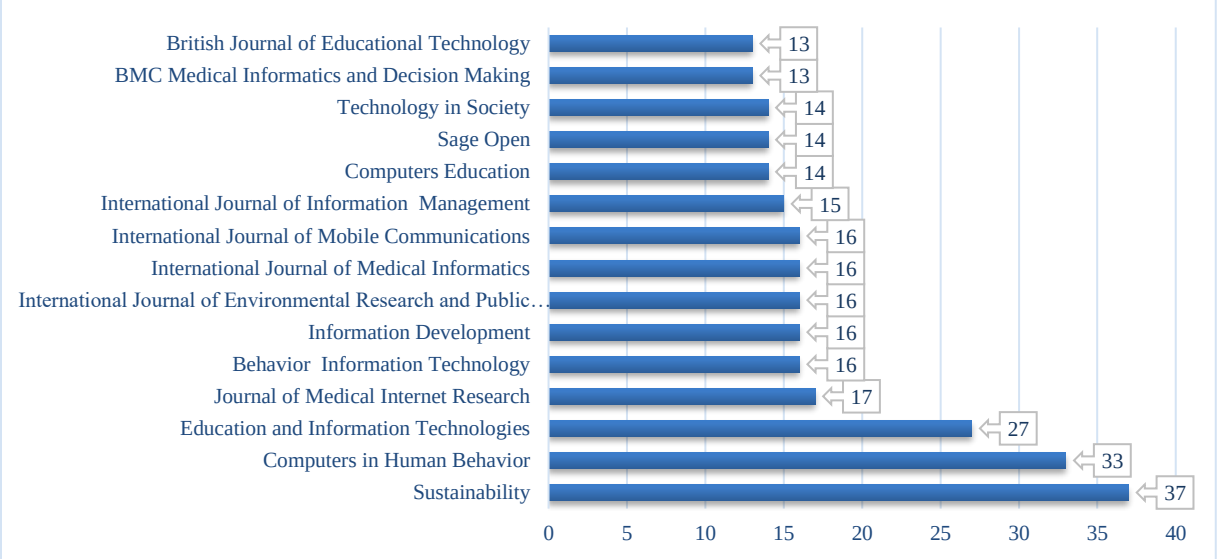

Figure 3: Published journals of UTAUT

For more understanding, the bibliographic coupling of countries must be examined. "Bibliographic coupling, which takes place when two articles reference a common third article in their bibliographies, indicating that a probability exists that the two articles treat a related subject matter – the "coupling strength" of two given articles is higher the more citations to other articles they share" (Ferreira, 2018; Kessler, 1963; Martyn, 1964). Bibliographic relationships between countries, authors, or works can be better understood and important points can be revealed in this way.

In Figure 4, there is a bibliographic pairs map based on journals. A visual has been created for the 45 journals in Table 5.

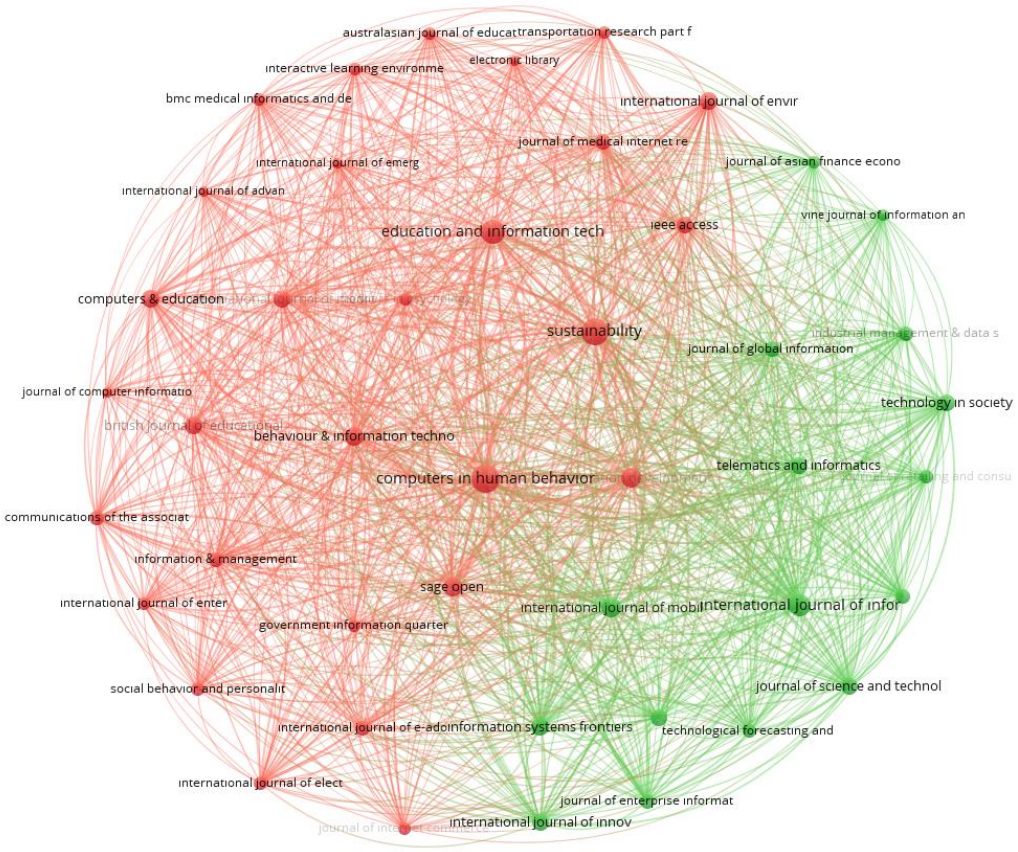

Figure 4: Bibliographic coupling of journals

Two clusters were seen in Figure 4. Each cluster is shown in a different color. The relationships among the journals in the same cluster are stronger than their relationships with the journals in other clusters. In addition, the dimensions of the circles were created according to the total connection strength values of the journals. “The Total link strength attribute indicates the total strength of the co-authorship links” (Van Eck & Waltman, 2012).

The journal with the highest total link strength value is "Computers in Human Behavior" with 51670. That is why the largest circle belongs to it. " International Journal of Emerging Technologies in Learning" which has 9 documents and 57 citations on UTAUT, has the minimum total link strength value of 6,788. Therefore, the journal with the smallest area is “International Journal of Emerging Technologies in Learning”.

Table 5 contains data about how many elements of the clusters and which clusters the journals are in. When Figure 4 is examined with Table 5, " Computers in Human Behavior" is the leader of the red cluster and it has close relations with “Sustainability” which is in second place with 46366 total link strength, “Education and Information Technologies” which is in the third place with 37,534 total link strength. It has also a powerful connection with “Sage Open” and “Behaviour & Information Technology”. The red cluster has 29 items and 3 of them are in the first three places according to total link strength and document counts. On the other hand, the green cluster has 16 items. “International Journal of Information Management” which is in fourth place in general, takes the first place with 32,208 total link strength. It has a strong relationship with the “International Journal of Mobile Communications” which is in fifth place with 25,160 total link strength. These journals which are in table 5, are the pioneer of this field.

Table 5: Bibliographic coupling of journals by clusters.

Cluster	Items	Countries
Red	29	Australian Journal of Educational Technology, Behaviour & Information Technology, BMC Medical Informatics and Decision Making, British Journal of Educational Technology, Communications of the Association for Information Systems, Computers & Education,

		Computers in Human Behavior, Education and Information Technologies, Electronic Library, Frontiers in Psychology, Government Information Quarterly, IEEE Access, Information & Management, Information Development, Interactive Learning Environments, International Journal of Advanced Computer Science And Applications, International Journal of E-Adoption, International Journal of Electronic Government Research, International Journal of Emerging Technologies, International Journal of Enterprise Information Systems, International Journal of Environmental Research and Public Health, International Journal of Medical Informatics, Journal of Computer Information Systems, Journal of Interner Commerce, Journal of Medical Internet Research, Sage Open, Social Behavior and Personality, Sustainability, Trasportation Research Part F-Traffic Psychology and Behaviour
Green	16	Industrial Management & Data Systems, Information Systems Frontiers, Information Technology & People, International Journal of Bank Marketing, International Journal of Information Management, International Journal of Innovation and Technology Management, International Journal of Mobile Communications, Journal of Asian Finance Economics and Business, Journals of Enterprise Information Management, Journal of Global Information Management, Journal of Retailing and Consumer Services, Journal of Science and Technology Policy Mangement, Technological Forecasting and Social Change, Technology in Society, Telematics and Informatics, Vine Journal of Information and Knowledge Management Systems

3.5. Countries in which UTAUT Studies were Published the most and Bibliographic Coupling of Countries

Table 6 contains information on the 20 countries that publish the most in UTAUT. The cut-off value for countries was accepted as 13. When Table 6 is examined, among 104 countries that publish on UTAUT, "USA" takes the first place with 267 publications, 25.695 citations, and 96.24 citations per publication. The country that has the most studies, the most citations, and the number of citations per publication is "USA". In terms of the number of publications, "Peoples R. China" follows "USA" with 193 publications. While "Peoples R. China" ranked second in terms of total citations, it fell behind "Wales (67.92)", and "Portugal (57.18)" respectively, with 39.38 citations per publication. Although "Wales" ranks 26th with 24 publications in the number of publications, it is noteworthy that it ranks second in the number of citations per publication. Likewise, the fact that Portugal is in the third rank with 57.18 citations per publication is an indicator of how important the publication quality is. It will be useful for researchers working in this field to have a look at the studies of these countries.

Table 6: Countries with the highest number of publications and citations

No	Countries/Regions	Article Count	%	Citations	Citation/ Article Count
1	USA	267	17.115	25,695	96.24
2	Peoples Republic China	193	12.372	7,600	39.38
3	Malaysia	143	9.167	2,140	14.97
4	India	102	6.538	1,288	12.63
5	Taiwan	99	6.346	3,612	36.48
6	England	94	6.026	2,528	26.89
7	Australia	84	5.385	1,491	17.75
8	Saudi Arabia	69	4.423	867	12.57
9	South Korea	68	4.359	2,116	31.12
10	Germany	56	3.590	1,264	22.57
11	South Africa	53	3.397	400	7.55
12	Spain	50	3.205	1,261	25.22
13	Netherlands	42	2.692	1,534	36.52
14	Canada	40	2.564	1,318	32.95

15	Bangladesh	38	2.436	915	24.08
16	Pakistan	38	2.436	460	12.11
17	Turkey	38	2.436	500	13.16
18	France	35	2.244	624	17.83
19	Indonesia	34	2.179	138	4.06
20	Portugal	33	2.115	1,887	57.18

In Figure 5, there is a bibliographic pairs map created for UTAUT based on countries. In this map, a visual has been created for the 43 countries in Table 7.

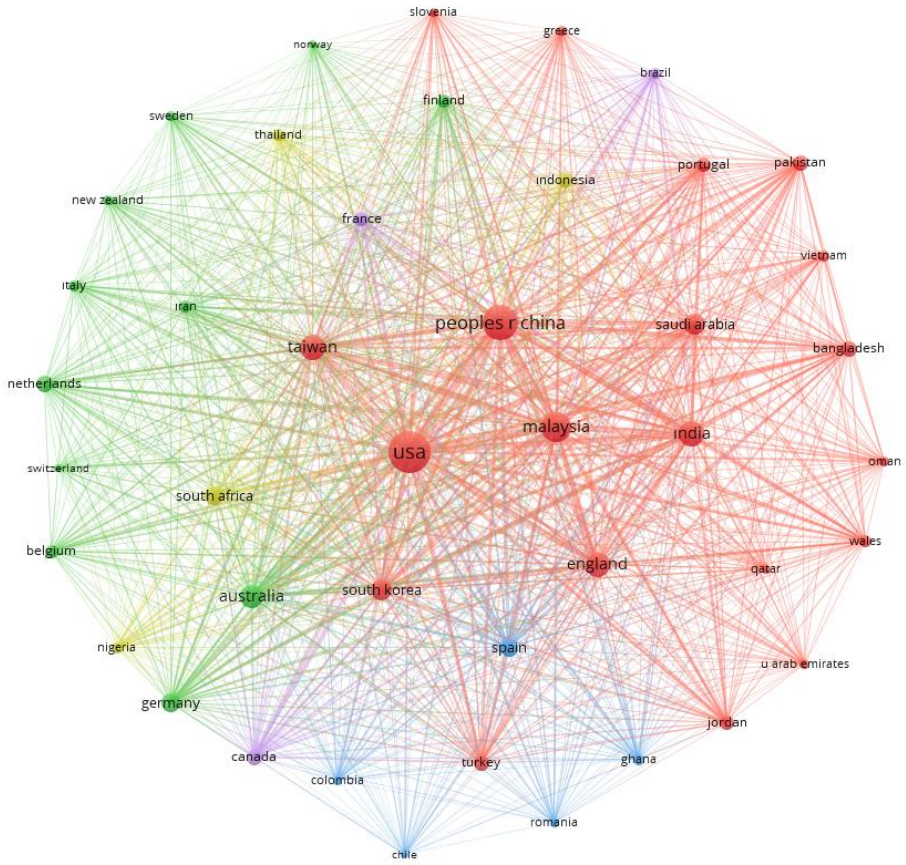

Figure 5: Bibliographic coupling of countries

Five different clusters are seen in the figure. The country with the highest total link strength value is "USA" with 1,068,086. That is why the largest circle belongs to it. "Chile" which has 10 documents on UTAUT, has a minimum total link strength value of 40,100. Therefore, the country with the smallest area is “Chile”.

Table 7 contains data on how many elements the clusters have and in which clusters the countries are located.

Table 7: UTAUT—Bibliographic coupling of countries by clusters.

Cluster	Items	Countries
Red	20	Bangladesh, England, Greece, India, Jordan, Malaysia, Oman, Pakistan, Peoples R. China, Portugal, Qatar, Saudi Arabia, Slovenia, South Korea, Taiwan, Turkey, U. Arab Emirates, USA, Vietnam, Wales

Green	11	Australia, Belgium, Finland, Germany, Iran, Italy, Netherlands, New Zealand, Norway, Sweden, Switzerland
Blue	5	Chile, Colombia, Ghana, Romania, Spain
Yellow	4	Nigeria, South Africa, Indonesia, Thailand
Purple	3	Brazil, Canada, France

When figure 5 is examined with Table 7, "USA" is the leader of the red cluster and it has close relations with “Peoples R. China”, “Taiwan”, “Malaysia”, “England” and “India”. In addition, it should not be forgotten that these six countries have the highest number of publications. Although Australia is the leader of the green cluster, it does not have an absolute advantage. Its close relationship with “Germany” and “Netherlands” is noticeable. The third cluster consists of “Nigeria”, “South Africa”, “Indonesia” and “Thailand”. South Africa’s total link strength value is higher than others. Although “Canada” is the strongest total stretch of the purple cluster, “France” is at the center of this triple cluster and acts as a bridge between “Brazil” and “Canada”. It is understood from the figure, “USA”, “Peoples R. China”, “Malaysia” and “Taiwan” have an important role in UTAUT studies.

3.6. Institutions in which UTAUT Studies were Published the most and Bibliographic Coupling of Institutions

1822 different institutions have contributed to the studies on UTAUT. Table 8 contains data on the number of publications and citations of the 20 institutions that publish the most on UTAUT. The cut-off value for organizations was accepted as 11.

When Table 8 is examined, the institution with the highest number of publications (25) is "The State University System of Florida". "State University System of Florida" is one of the 12 state universities in "Florida, USA". These publications have received 925 citations. With this number of citations, it has become the fifth most cited institution in the field of UTAUT. “Universiti Malaya” which is in the Kuala Lumpur region of Malaysia, contributed to 23 of 143 studies conducted in Malaysia and received 475 citations from these studies. In terms of several publications, “Universiti Sains Malaysia (21)”, “Swansea University (20)”, “King Abdulaziz University (17)” and “Universidade Nova De Lisboa (17)” follow these two institutions. "Swansea University" is a state university located in the "Wales" region of the "United Kingdom". It contributed to 20 of the 24 studies conducted in "Wales". This institution made up 83% of the UTAUT studies carried out in “Wales” and these studies have achieved be the fourth most cited institution in this field with a total of 1,197 citations. “Universidade Nova De Lisboa” is a public university located in Lisbon, the capital city of Portugal. This institution conducted 17 of the 33 studies, which is conducted in Portugal, and they became the third most cited institution in this field with 1,258 citations. The number of citations they receive per publication is also an indication that their publications are valuable.

Table 8: Institutions with the highest number of publications and their number of citations

No	Organizations	Article Count	Citation	Citation/Article Count
1	State University System of Florida	25	925	37.00
2	Universiti Malaya	23	475	20.65
3	Universiti Sains Malaysia	21	122	5.81
4	Swansea University	20	1,197	59.85
5	King Abdulaziz University	17	296	17.41
6	Universidade Nova De Lisboa	17	1,258	92.35
7	Monash University	16	214	13.38
8	University of Kwazulu Natal	15	108	7.2
9	Multimedia University	14	287	20.5
10	Brunel University	13	836	64.31

11	Laval University	13	298	22.91
12	North South University	13	417	32.08
13	Sultan Qaboos University	13	443	34.08
14	University Of Dhaka	13	406	31.23
15	Huazhong University of Science Technology	12	789	65,75
16	Jiangxi University of Science Technology	12	38	3.17
17	Queensland University of Technology	12	226	18.83
18	Hong Kong Polytechnic University	11	3,828	370.64
19	Indian Institute of Management IIM System	11	148	13.55
20	University of Sevilla	11	146	13.27

When examined in terms of the citations, “University of Arkansas (17,726)” and “Hong Kong Polytechnic University (3828)” draw attention with their high citation rates. "University of Arkansas" is a research university located in the Fayetteville region of “Arkansas, USA". Viswanath Venkatesh, one of the developers of UTAUT, is at this university explaining the high number of citations. "Hong Kong Polytechnic University" is a public research university located in “Hum Hong, Hong Kong”, accentuate with 3,828 citations and 370.64 citations per publication. All these examined institutions are state-supported universities is another factor that makes a difference.

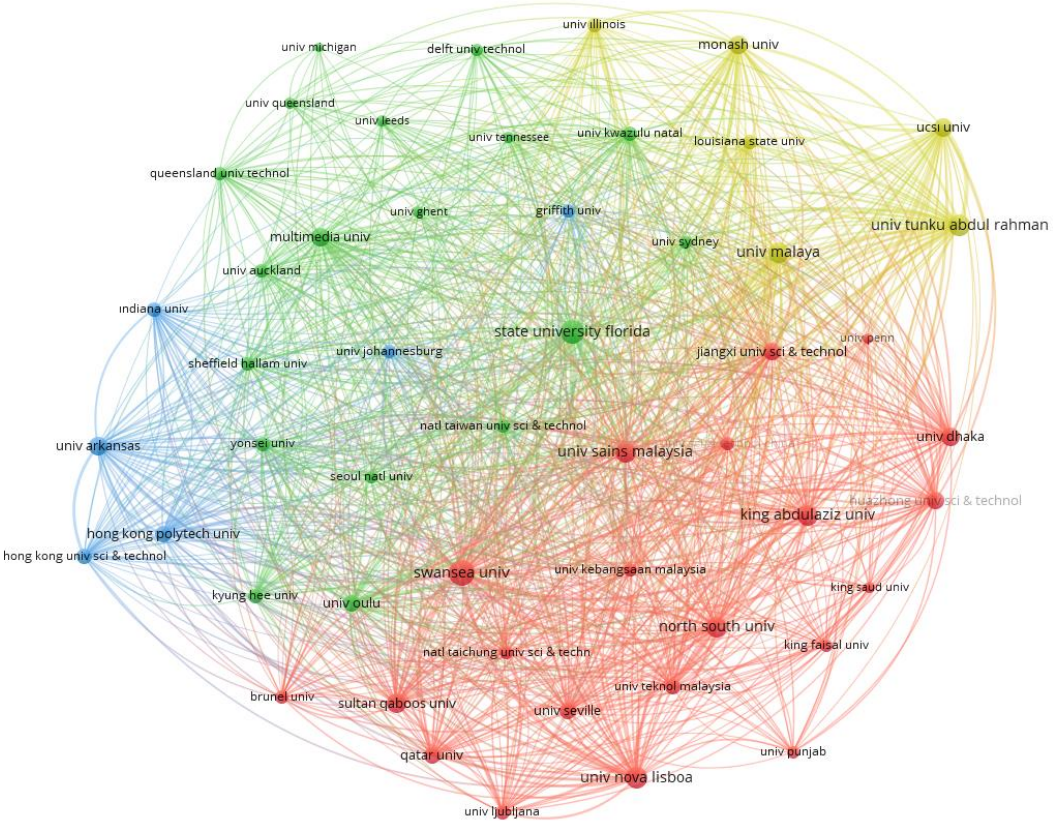

Figure 6. Bibliographic coupling of institutions

In Figure 6, there is a bibliographic pairs map created for UTAUT based on institutions. In this map, a visual has been created for the 51 institutions given in Table 9. When the figure was examined, four different clusters were formed. The institution with the highest total link strength value is "Swansea University" with 34,539. That is why the largest circle belongs to it. “State University Florida” with 30,084, “Univ Lova Lisboa” with 24,764, “Univ. Tunku Abdul Rahman” with 23,897, and “Univ. Malaya” with 22,782 follow “Swansea University” respectively according to the total link strength.

"University Michigan" which has 7 documents and 131 citations on UTAUT, has the minimum total link strength value of 4,836. Therefore, the institution with the smallest area is “The University of Michigan”.

Table 9 contains data about how many elements of the clusters and which clusters the institutions are in.

Table 9: Bibliographic coupling of institutions by clusters

Cluster	Items	Countries
Red	21	Brunel Univ, Huazhog Univ. Sci&Tech., Jiangxi Univ. Sci&Tech., King Abdulaziz Univ, King Faisal Univ., King Saud Univ., Natl. Taichung Univ. Sci&Tech., North South Univ., Qatar Univ., Sultan Qaboos Univ., Swansea Univ., Univ. Dhaka, Univ. Kebangsaan Malaysia, Univ. Ljubljana, Univ. Nova Lisboa, Univ. Penn, Univ. Punjab, Univ. Sains Malaysia, Univ. Sci&Tech China, Univ. Sevilla, Univ. Tech. Malaysia
Green	18	Delft Univ. Tech., Kyung Hee Univ., Multimedia Univ., Natl. Taiwan Univ. Sci&Tech., Queensland Univ. Tech., Seoul Natl. Univ., Sheffield Hallam Univ., State Univ. Florida, Univ. Auckland, Univ. Ghent, Univ. Kwazulu Natal, Univ. Leeds, Univ. Michigan, Univ. Oulu, Univ. Queensland, Univ. Sydney, Univ. Tennessee, Yonsei Univ.
Blue	6	Griffith Univ., Hong Kong Polytech Univ., Hongkong Univ. Sci&Tech., Indiana Univ., Univ. Arkansas, Univ. Johannesburg
Yellow	6	Lousiana State Univ., Monash Univ., UCSI Univ., Univ. Illinois, Univ. Malaya, Univ. Tunku Abdul Rahman

When figure 6 is examined with Table 9, "Swansea University" is the leader of the red cluster and has close relations with “Univ. Sains Malaysia”, “Sultan Qaboos Univ.”, “King Abdulaziz Univ.” and “Univ. Nova Lisboa”. In addition, these four institutions are in the top six according to document counts. “State University Florida” is the leader of the green cluster, it has an absolute advantage and is superior to this cluster. Its close relationship with “Multimedia Univ.” is noticeable. Although “Univ. Arkansas” is the strongest total strength of the blue cluster, the total strengths of “Hong Kong Polytech Univ” and “Hong Kong Univ. Sci.&Tech.” are so close to “Univ. Arkansas”. The power of this cluster is divided almost equally among all institutions. The yellow cluster consists of “Univ. Malaya”, “Univ. Tunku Abdul Rahman” and “Monash Univ”. “Univ. Malaya”’s total link strength value is higher than others. These institutions have strong relations with each other. It is understood from the figure and clusters, “Swansea University”, “State University Florida”, “Univ Lova Lisboa”, “Univ. Tunku Abdul Rahman” and “Univ. Malaya” have an important role in UTAUT studies.

3.7. Authors who Published most Articles on UTAUT and Bibliographic Coupling of Authors

4174 different authors have contributed to the studies on UTAUT. Table 10 contains data on the publication and field contribution percentages of 23 authors who made the most publications on UTAUT. The reason for choosing 23 authors is that the cut-off value is set as six. There are too many authors with five or fewer publications.

The developers of the UTAUT model are "Venkatesh, V", "Morris, MG", "Davis, GB" and "Davis, FD". It is remarkable that only "Venkatesh, V" among these authors is in the first 23 in terms of the number of publications. Other authors do not have any other publications on UTAUT in the Web of Science database. “Venkatesh, V” ranked fourth in terms of the number of publications with eleven studies. However, the author with the highest number of citations is "Venkatesh, V". When Table 10 is examined, "Dwivedi, Yogesh K." is in first place with 17 publications. "Oliveira, Tiago (14)”, “Mensah, Isaac Kofi (12)”, “Venkatesh, Viswanath (11)” and “Rana, Nripendra P. (9)” follow “Dwivedi, Yogesh K.”, respectively. The total contribution of these authors to the field is 4%. These authors contribute to approximately 4 out of 100 studies on UTAUT.

Table 10: Authors with the highest number of publications and their contribution rates

No	Authors	Article Count	Citations	Citation/Article Count
1	Dwivedi, Yogesh K.	17	1,441	84.76
2	Oliveira, Tiago	14	1,500	107.14
3	Mensah, Isaac Kofi	12	36	3
4	Venkatesh, Viswanath	11	17,716	1,476.33
5	Rana, Nripendra P.	9	681	75.67
6	Ooi, Keng-Boon	8	600	75
7	Khechine, Hager	8	167	20.88
8	Tarhini, Ali	8	447	55.88
9	Nisha, Nabila	8	61	7.63
10	Thong, James Y. L.	7	4,421	631.57
11	Williams, Michael D.	7	850	121.43
12	Tan, Garry Wei-Han	7	443	63.29
13	Lakhal, Sawsen	7	155	22.14
14	Kaye, Sherrie-Anne	7	135	19.29
15	Hoque, Md. Rakibul	7	144	20.57
16	Iqbal, Mehree	7	45	6.43
17	Rifat, Afrin	7	45	6.43
18	Lai, Ivan Ka Wai	6	53	8.83
19	Pynoo, Bram	6	338	56.33
20	Zhou, Min	6	55	9.17
21	Rahi, Samar	6	110	18.33
22	Bao, Yukun	6	144	24
23	Zeng, Guohua	6	20	3.33

In Figure 7, there is a bibliographic pair's map for UTAUT based on authors.

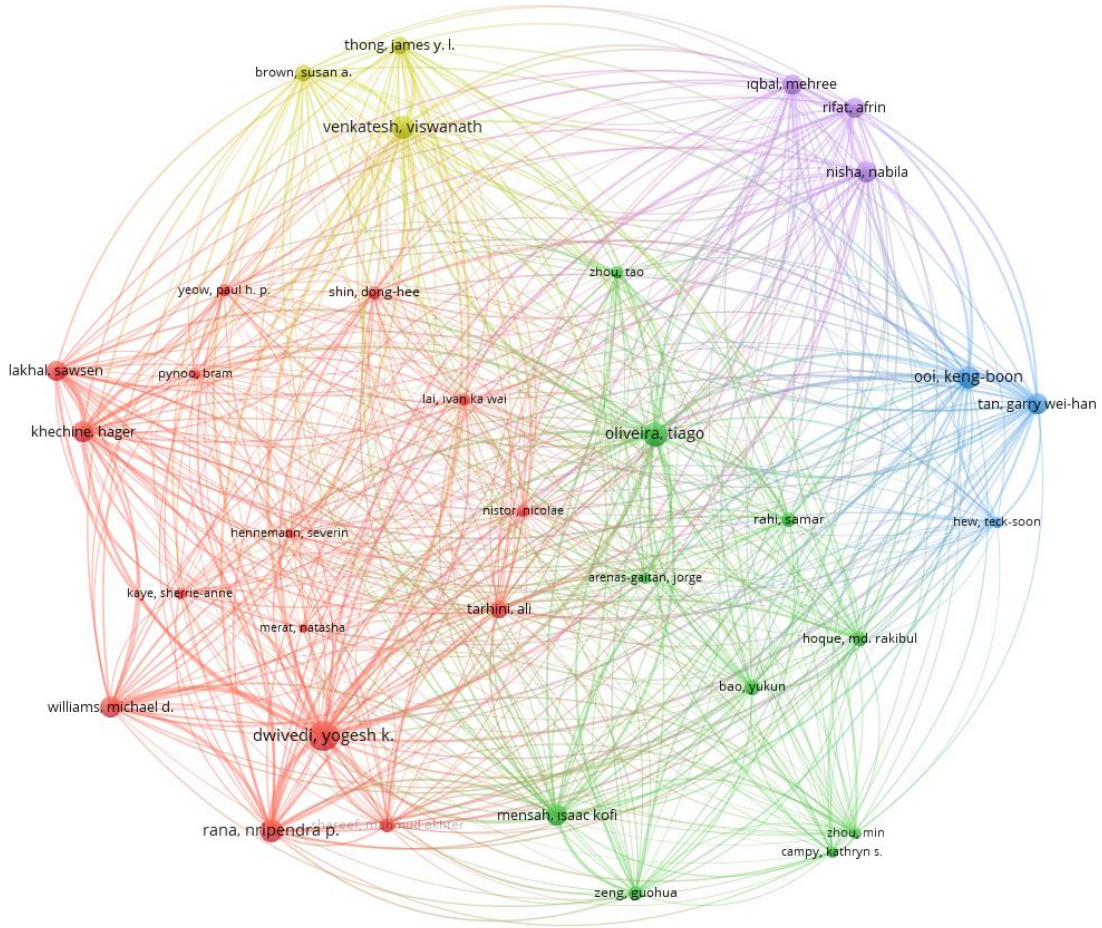

Figure 7: Bibliographic coupling of authors

A visual has been created for the 34 authors over four publications. Among these authors, the author with the highest total link strength value is "Dwivedi YK" with 18,147, while the author with the least total link strength value is "Merat, Natasha" with 1836. When the figure was examined, five different clusters were formed. The data about these clusters are given in Table 11.

Table 11: Bibliographic coupling of authors by clusters

Cluster	Items	Authors
Red	15	"Dwivedi, Yogesh K.", "Hennemnann, Severin", "Kaye, Sherrie-Anne", "Khechine, Hager", "Lai, Ivan Ka Wai", "Lakhal, Sawsen", "Merat, Natasha", "Nistor, Nichole", "Pynoo, Bram", "Rana, Nripendra P.", "Shareef, Mahmud Akhter", "Shin, Dong-Hee", "Tarhini, Ali", "Williams, Michael D.", "Yeow, Paul H. P."
Green	10	"Arenas-Gaitan, Jorge", "Bou, Yukun", "Campy, Kathryn S.", Haoque, Md. Rakibul", "Mensah, Isaac Kofi", "Oliveira, Tiago", "Rahi, Samar", "Zeng, Guohua", "Zhou, Min", "Zhou, Tao"
Blue	3	" Hew, Teck-Soon", "Ooi, Keng-Boon", "Tan, Garry Wei-Han"
Yellow	3	"Brown, Susan A.", "Thong, James Y.L.", "Venkatesh, Viswanath",
Purple	3	"Iqbal, Mehree", "Nisha, Nabila", "Rifat, Afrin"

When Figure 7, Table 10, and Table 11 are examined together, the red cluster has a great advantage in terms of a network of relationships. The four out of ten authors who publish the most in the field are in the red cluster and have a strong relationship of this authors with each other. Also, we can say that almost

half of the authors are in the red cluster based on Figure 6. The dominance of the red cluster is seen in this study area. On the other hand, the green cluster draws attention to “Oliveira, Tiago” and “Mensah, Isaac Kofi” who are the second and the third in the field respectively by article count. The green cluster is the second most powerful cluster by total link strength in the field. In the blue cluster, two authors, “Ooi, Keng-boon (10,886)” and “Tan, Garry Wei-Han (9,560)”, have almost the same total link strength. These two authors show a strong unity with “Hew, Teck-Soon” who has 2,771 total link strength. In the yellow cluster, the pioneer of the field, “Venkatesh, Viswanath”, draws attention to “Brown, Susan A.” and “Thong, James Y.L.”. “Venkatesh, Viswanath” has “11,047” total link strength and takes fourth place in the field based on total link strength. “Brown, Susan A.” and “Thong, James Y.L.” show a strong relationship via “Venkatesh, Viswanath”. In the purple cluster, the total link strength values of the authors are close to each other. It is obvious that there is a balanced relationship between them.

3.8. Extracting Terms from Keywords

In this study, the term extraction process was applied from the keywords of the publications written by the authors. In this context, co-occurrence analysis was used. Co-occurrence is an above-chance frequency of occurrence of two terms from a text corpus alongside each other in order. Before the analysis, firstly, all keywords were transformed into one form. For example, mobile learning, m learning transformed into m-learning. Also, UTAUT was spelled in many ways. All these spellings are accepted as UTAUT. In this study, attention has been paid to the use of abbreviations of the terms. On the other hand, country names are not used on term extraction graphs. After that, the term extraction process was done by using VosViewer. In the word extraction process, 3734 terms were obtained as a result. Since it is not possible to visualize 3734 terms, the threshold value has been determined as 10 and 54 words have crossed this threshold. Among the threshold value, the most relevant 54 terms according to the "relevance score" were used for analysis, and network visualization of terms is given in Fig. 9. Also, the "occurrences" and "relevance score" of these terms are given in Table 12.

As can be seen from the table, “UTAUT (810)”, “TAM (227)”, “Technology Adoption (218)”, “SEM (136)”, “E-Learning (69)” and “Behavioral Intention (63)” are the most used keywords in UTAUT studies. When the relationship scores of the terms are examined, the term “TAM – Technology Acceptance Model” takes the first place. Considering that UTAUT is a proposed theory to examine the use and behavior of information and communication technologies, it is quite normal and understandable that this value appears first after UTAUT. In addition, various structures of UTAUT such as “Performance expectancy”, “Effort expectancy”, “Social influence” and “Facilitating condition” are among the 54 most important terms. Based on terms such as “e-learning”, “m-learning” “higher education”, “education”, “students”, “distance education”, “learning” and “blended learning”, we can say that UTAUT highly focuses on researching the adoption and use of technology in the education. At the same time, it attaches great importance to the health sector. In the health sector, “covid-19”, “m-health”, “e-health”, “healthcare” and “telemedicine” terms attract a lot of attention. In addition, banking, payment, and e-commerce systems are also very important for UTAUT studies. SEM and PLS are also in the top 54 terms. SEM is in the 4th place among these terms. “SEM (Structural equation modeling) is a set of statistical techniques used to measure and analyze the relationships of observed and latent variables. Similar but more powerful than regression analyses, it examines linear causal relationships among variables, while simultaneously accounting for measurement error” (Beran, 2010). On the other hand, PLS (Partial Least Squares) is in 11th place among the top 54 terms. PLS was generally used in studies with SEM. “PLS is a method for constructing predictive models when the factors are many and highly collinear. Note that the emphasis is on predicting the responses and not necessarily on trying to understand the underlying relationship between the variables” (Tobias, 1995). It should not be forgotten that UTAUT studies will not be very important without statistical analysis.

Table 12: Extracted terms from keywords

Id	Keyword	Occurrences	Total link strength	Id	Keyword	Occurrences	Total link strength
1	utaut	810	1186	**28**	information technology	23	49
2	tam	227	393	**29**	attitude	21	46
3	technology adoption	218	363	**30**	technology	24	46
4	sem	136	290	**31**	e-health	32	45
5	e-learning	69	144	**32**	e-banking	17	43
6	behavioral intention	63	136	**33**	education	19	42
7	m-learning	53	114	**34**	technology acceptance	34	42
8	trust	56	112	**35**	smartphone	18	34
9	covid-19	56	111	**36**	gender	11	32
10	higher education	46	107	**37**	students	11	30
11	pls	41	103	**38**	hedonic motivation	11	29
12	e-government	43	90	**39**	age	11	27
13	utaut-2	57	90	**40**	user acceptance	23	26
14	developing countries	40	87	**41**	distance education	10	24
15	social influence	37	86	**42**	learning	10	22
16	intention to use	37	73	**43**	perceived usefulness	13	22
17	performance expectancy	25	72	**44**	satisfaction	13	21
18	perceived risk	36	70	**45**	self-efficacy	10	21
19	m-banking	42	65	**46**	internet of things	10	21
20	m-health	31	61	**47**	cloud computing	11	20
21	m-payment	24	59	**48**	healthcare	12	19
22	acceptance	36	58	**49**	technology use	14	18
23	facilitating conditions	20	54	**50**	blended learning	11	17
24	e-commerce	26	53	**51**	consumer behaviour	10	17
25	effort expectancy	19	51	**52**	artificial intelligence	10	14
26	social media	37	50	**53**	telemedicine	11	14
27	m-commerce	24	49	**54**	task-technology fit	10	13

The most influential terms in the UTAUT research area are shown in Figure 8. The red, green, blue, and yellow colors indicate different clusters within the map. In this way, relationships between terms can be revealed. Expert knowledge is required for the analysis of these clusters. The names of the clusters should be determined by examining all the elements in detail and considering. When the contents of the clusters are examined in Table 13, the following conclusions are reached;

- The red cluster has 25 terms. The red cluster generally focuses on using information technologies such as e-learning, m-learning, e-government, and e-health. UTAUT studies try to measure the perceptions of these sectors' stakeholders about adopting technology. In these evaluations, SEM and PLS are generally used.
- The green cluster which has 12 terms, focuses more on UTAUT structures such as “Effort expectancy”, “Performance Expectancy”, “Social Influence” and “Facilitating Conditions”. These structures are also used in UTAUT-2. “Hedonic Motivation” is also a structure of UTAUT-2. Venkatesh, Thong, and Xu (2012) restructured UTAUT by putting the consumer in the focus and developed the UTAUT-2. So, “consumer behavior” inevitably stands in this cluster.

- The blue cluster contains 10 terms such as “internet of things”, “artificial intelligence” and “cloud computing”. These terms are developing terms in technology and affect mobile or electronic systems like e-commerce, e-banking, and m-payment.
- The yellow cluster focuses on UTAUT moderator variables such as “gender” and “age”. “Gender”, “age”, “experience” and “voluntariness of use” are generally used as mediators in UTAUT studies. Only “experience” and “voluntariness of use” did not find a place in the 54 most important terms.

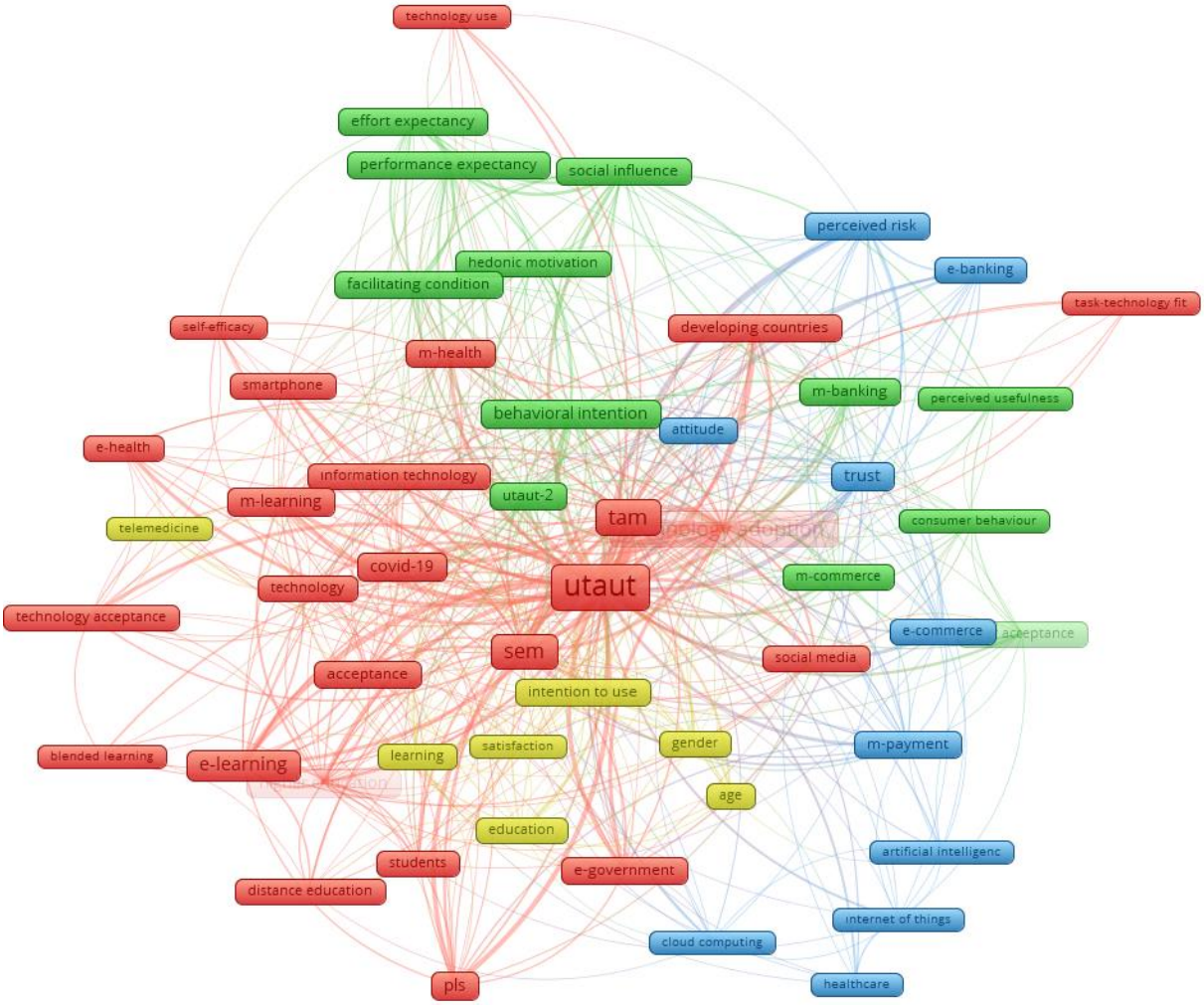

Figure 8: The network visualization of terms which were extracted from author keywords

Table 13: Clusters of extracted terms

Cluster	Items	Authors
Red	25	“acceptance”, “blending learning”, “covid-19”, “developing countries”, “distance education”, “e-government”, “e-health”, “e-learning”, “higher education”, “information technology”, “m-health”, “m-learning”, “pls”, “self-efficacy”, “sem”, “smartphone”, “social media”, “students”, “tam”, “task-technology-fit”, “technology”, “technology acceptance”, “technology adoption”, “technology use”, “utaut”
Green	12	“behavioral intention”, “consumer behavior”, “effort expectancy”, “facilitating conditions”, “hedonic motivation”, “m-banking”, “m-commerce”, “perceived usefulness”, “performance expectancy”, “social influence”, “user acceptance”, “Utaut-2”
Blue	10	“artificial intelligence”, “attitude”, “cloud computing”, “e-banking”, “e-commerce”, “healthcare”, “internet of things”, “m-payment”, “perceived risk”, “trust”
Yellow	7	“age”, “education”, “gender”, “intention to use”, “learning”, “satisfaction”, “telemedicine”

4. Conclusion

Our aim in this article is to make a comprehensive review of UTAUT studies. In this context, bibliometric data of publications on UTAUT were taken from the Web of Science database. Data from 1560 studies on UTAUT were used for the study. With these data, it is aimed to present an overview of the current situation of the studies on UTAUT. The results are presented in eight main directions: (1) distribution of studies on UTAUT by years and the total number of citations by years, (2) most cited publications in UTAUT, (3) fields of studies on UTAUT, (4) journals in which UTAUT studies were published the most and bibliographic coupling of journals, (5) countries in which UTAUT studies were published the most and bibliographic coupling of countries using VosViewer, (6) institutions in which UTAUT studies were published the most and bibliographic coupling of institutions., (7) authors who published most articles on UTAUT and bibliographic coupling of authors using VosViewer, (8) extracting terms from keywords. This study can be a useful and usable resource for future research.

UTAUT was developed and tested by researchers using existing models by adding variables in various settings and exploring alternative relationships between main variables. In this way, it can be used in different study areas. While business economics and computer science are prominent in UTAUT studies.

The results reveal that there are many journals, which publish UTAUT research. It has been determined that the leading journals are of British origin. However, in many countries, UTAUT studies are conducted and published. It is seen that studies are carried out in many countries, especially in the "USA" and "People R. China". Thanks to the studies conducted in many fields and many countries, UTAUT emerge effective study area for researchers. The number of citations that UTAUT studies receive also attracts researchers.

When the results of extracting terms from the abstracts are examined, the technology acceptance of students and teachers in educational environments generally come to the fore. In addition, electronic and mobile banking, health, and commerce systems were also examined in detail by UTAUT. In addition, "Effort expectancy", "Performance Expectancy", "Social Influence" and "Facilitating Conditions" are the main structures of UTAUT which are seen in figure 8. These structures with "Hedonic Motivation" are also the main structures of UTAUT-2. UTAUT-2 has two main structures. These are "Price Value" and "Habit". However, these two main structures could not find a place among the most important keywords.

This article is a useful source of information for readers who want to learn more about various aspects of published UTAUT research. This article strengthens the general field of UTAUT research by highlighting aspects that require further research as well as laying out productive research areas. It should be noted that the study has some limitations and that readers should interpret the study in terms of these limitations. However, UTAUT studies are considered sufficient to provide a representative reflection of the current situation.

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Araştırma Makalesi

Bibliometric Mapping of Unified Theory of Acceptance and Use of Technology

Birleştirilmiş Teknoloji Kabul ve Kullanım Teorisinin Bibliyometrik Haritası

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Genişletilmiş Özet

Giriş

Birleştirilmiş Teknoloji Kabul ve Kullanımı Teorisi (UTAUT), bilgi teknolojisi, psikoloji ve sosyoloji alanlarında teknolojiyi kullanma niyeti üzerine yapılan araştırmalarla oluşturulan teorilerin birleştirilmesiyle ortaya çıkmaktadır. Venkatesh vd., (Venkatesh vd., 2003), literatürde teknoloji benimsemeye yönelik çalışmalarda, modellerden birinin seçilmesi diğerlerinin farklı katkılarını göz ardı ettiği için teknoloji kabulü ve kullanımı araştırmalarında birleşik bir model önermiştir. UTAUT, bilgi sistemleri kullanım davranışını açıklamak için kullanılan sekiz önemli teori ve modelin yapılarını gözden geçirerek ve birleştirerek geliştirilmiştir. Bu teori ve modeller, Mantıklı Eylem Teorisi (TRA) (Ajzen ve Fishbein, 1975), Teknoloji Kabul Modeli (TAM) (Davis, 1989), Motivasyon Modeli (MM) (Davis ve diğerleri, 1992), Planlı Davranış Teorisi (TPB) (Ajzen, 1991), Kişisel Bilgisayar Kullanımı Modeli (MPCU) (Goodhue & Thompson, 1995), Yenilik Yayılım Teorisi (IDT) (Rogers, 1995), Sosyal Bilişsel Teori (SCT) (Bandura, 1982) ve Kombine Teknoloji Kabul Modeli ve Planlı Davranış Teorisi'dir (C-TAM-TPB) (Taylor & Todd, 1995). Venkatesh ve diğerleri tarafından sekiz farklı model ve teorinin güçlü ve zayıf yönlerini değerlendirerek geliştirilen UTAUT (Venkatesh ve diğerleri, 2003), örgütsel bağlamlarda davranışsal niyetin yaklaşık yüzde 69'unu açıklayan regresyon değeri ile her modelden daha iyi sonuçlar vermiştir (Venkatesh ve diğerleri, 2012).

UTAUT, araştırmacıların kullanıcı niyetleri ve davranışları üzerinde deneysel araştırmalar yürütmeleri için teorik bir çerçeve olarak uzun yıllardır teknoloji benimseme araştırmalarında yaygın olarak kullanılmaktadır. UTAUT ile ilgili araştırmalar toplamda 40000'den fazla atıf almıştır ve farklı kontrol faktörlerine (yaş, cinsiyet, deneyim, gönüllü kullanımı, gelir ve eğitim gibi) ve çeşitli kullanıcı gruplarına (öğrenciler, profesyoneller ve genel kullanıcılar gibi) odaklanmaktadır.

Bu çalışma, önceki sistematik literatür çalışmalarına ek olarak, bibliyometrik, metin ve atıf analizine odaklanmaktadır. Bu bağlamda bibliyometrik analiz, kişi veya kurumlar tarafından belirli bir alanda ve belirli bir bölgede üretilen yayınların ve bu yayınlar arasındaki ilişkilerin sayısal analizi olarak ifade edilmektedir (Özköse, 2020). Bu çalışma kapsamında, Web of Science Core Collection (WoS) veri tabanından elde edilen veriler üzerinde ilk olarak bibliyometrik analizler yapıldı. WoS'un seçilmesinin nedeni, etkisi yüksek bilimsel dergileri kapsayan Clarivate Analytics'e ait çok disiplinli atıf dizinlerinden oluşmasıdır. WoS ayrıca belirli bir konuyla ilgili araştırmada metin ve alıntı analizi için de kullanılmaktadır.

Bibliyometrik analizlerin aşağıdaki çalışma konularına odaklandığı görülmüştür (Özköse ve Gencer, 2017). Bu konular;

1. Ülkelerin birbirleriyle olan ilişkilerini belirlemek,
2. Yazarların yapmış oldukları çalışmalara göre ilişkilerini belirlemek,

3. Atıf yapılan yazarların ortak atıf analizi,
4. Yazarlar tarafından verilen anahtar kelimelere göre bir birliktelik analizi.

Bu çalışmanın amacı, UTAUT ile ilgili makaleleri inceleyerek alanın genel hatlarını ortaya koymaktır. Bu makale, araştırmacıların UTAUT ile ilgili önceki bulguları anlamalarına, gelecekteki olası araştırma konularını tanımalarına ve gelecekteki araştırma çabalarına rehberlik etmede değerli olabilir. Bu makale, UTAUT modelinin teknoloji kabulü ve kullanımı alanındaki gelişme durumunu ve eğilimlerini anlamak için önemlidir.

Yöntem

Bu çalışmada, 2003-Şubat 2022 tarihleri arasında UTAUT araştırmaları incelenmektedir. Bu kapsamda, WoS Core Collection veri tabanında bulunan Science Citation Index Expanded (SCI-EXPANDED), Social Science Citation Index (SSCI) ve Emerging Science Citation Index (ESCI) dizinleri taranmıştır. Kısıtlara göre yapılan arama sonucunda UTAUT ile ilgili 1560 akademik çalışmaya ulaşılmıştır.

Bibliyometrik analiz çalışmaları için, akademik çalışmaların bibliyometrik verileri ilgili veri tabanından düz metin formatında parçalar halinde indirilmiş ve daha sonra BibExcel programı yardımıyla birleştirilmiştir. Birleştirme işleminden sonra veriler ilgili bölümlere ayrılmıştır. Bölme işlemi sonucunda BibExcel yardımı ile her soru maddesi için bir dosya oluşturulmuştur. Ardından verilerin görselleştirilmesi ve ilişki haritalarının oluşturulması sürecine geçilmiştir. Bu işlemlerde Nees Jan van Eck tarafından geliştirilen ücretsiz bir program olan VosViewer kullanılmıştır (Van Eck ve Waltman, 2012). Elde edilen haritalar ve ilişkilendirmeler yorumlanmıştır. Daha sonar, Vosviewer kullanılarak terim çıkarma işlemi yapılmıştır. Terim çıkarımından elde edilen bulgular şekil ve tablolarla verilmiştir.

Elde edilen verilerle sırasıyla aşağıdaki analizler yapılmıştır;

1. UTAUT ile ilgili çalışmaların yıllara göre ve toplam atıf sayılarının yıllara göre dağılımı,
2. UTAUT'ta en çok atıf alan yayınlar,
3. UTAUT ile ilgili çalışma alanları,
4. UTAUT çalışmalarının en çok yayınlandığı dergiler ve dergilerin bibliyografik eşleşmeleri,
5. UTAUT çalışmalarının en çok yayınlandığı ülkeler ve ülkelerin bibliyografik eşleşmeleri,
6. UTAUT çalışmalarının en çok yayınlandığı kurumlar ve kurumların bibliyografik eşleşmeleri
7. UTAUT ile ilgili en çok makale yayınlayan yazarlar ve yazarların bibliyografik eşleşmeleri,
8. Anahtar kelimelerden terimleri çıkartılması ve yorumlanması.

Bulgular

Yayın Sayısı Bakımından

UTAUT ile ilgili ilk yayının 2003 yılında yapılmasına rağmen 2007 yılına kadar başka bir çalışmanın olmadığı görülmektedir. UTAUT ile ilgili çalışmalar 2007 yılında yeniden canlanmış ve sonrasında sürekli bir artış göstermiştir. 2022'deki yayın sayısının düşük olmasının nedeni, ilgili yılın başında verilerin toplanmasıdır.

Atıf sayılarına bakacak olursak, 2003 yılında Venkatesh, V. meslektaşları tarafından yayınlanan ve konunun temelini oluşturan "User Acceptance of Information Technology: Toward a Unified View" makalesine 12636 kez atıf yapılmıştır. Bu makale, UTAUT çalışmaları arasında en çok atıf alan yayın olarak dikkat çekmektedir. 2012 yılında atıf sayısının diğer yıllara göre yüksek olmasının nedeni, UTAUT2 yaklaşımının ilk kez tanıtılmış olmasıdır. Yayınlanan bu makale UTAUT'un tüketici odaklı bir versiyonu olduğu için UTAUT çalışmalarında da yer almıştır. UTAUT çalışmaları sonraki yıllarda daha fazla atıf almasına rağmen atıf oranlarının ise düşük olduğu görülmektedir. Bunun nedeni, yeni yayınlara ilk yayınlandığında atıf yapılmamakta ve atıf oranları zaman içinde artış göstermektedir. Atıf oranındaki azalma doğal kabul edilir. İlgili yılın başı olmasına rağmen, 2022 yılında UTAUT ile ilgili 35 çalışmanın gerçekleştirilmiş olması ise dikkat çekicidir.

En Fazla Atıf Alan Yayınlar Bakımından

Venkatesh ve ark. tarafından 2003 yılında MIS Quarterly dergisinde yayınlanan ve alanın öncüsü olarak kabul edilen makaleleri en fazla atıf alan yayın olarak dikkat çekmektedir. Venkatesh ve diğerleri tarafından önerilen UTAUT'un tüketici odaklı bir versiyonu ise ikinci sırada yer almaktadır. 2012 yılında MIS Quarterly dergisinde yayınlanan "Consumer Acceptance and Use of Information

Technology: Extending the Unified Theory of Kabul ve Kullanım Teknolojisi" isimli bu çalışma UTAUT2'nin başlangıcı olarak kabul edilmektedir. Ayrıca en çok atıf yapılan yayınların bulunduğu dergiler incelendiğinde, “"Information & Management (3)", "MIS Quarterly (2)", "Computers in Human Behavior (2)" ve "International Journal of Information Management (2)" dikkat çekmektedir. İlk 20'de yer alan çalışmaların neredeyse yarısı (9) bu dergilerde yayınlanmış. Ayrıca UTAUT ile ilgili yayınların yayınladığı dergiler de Yönetim Bilişim Sistemleri alanı ile oldukça uyumludur. Bazı çalışmalar hem UTAUT hem de UTAUT2 yöntemini içerebilir. UTAUT ve UTAUT2 çalışmalarının ilk yayınları "MIS Quarterly" dergisinde yayınlandı ve toplamda bu iki çalışma 16.000’nin üzerinde atıf aldı. Bu nedenle “MIS Quarterly” dergisinin atıf sayısı diğer dergilere göre çok daha fazladır.

Araştırma Alanları Bakımından

"Business Economics (357)", "Computer Science (299)", "Information Science & Library Science (241)", "Education & Educational Research (229)" ve "Engineering (112)" kategorileri araştırma alanları bakımından dikkat çekmek. " Engineering " kategorisi ilk beşte yer almasına rağmen dördüncü sırada yer alan "Education & Educational Research" kategorisinin yarısından az makaleyi içermektedir. UTAUT, bilgi sistemlerinin kullanım davranışlarını ve kullanım amaçlarını açıklamakla ilgili olduğundan, " Computer Science " alanının ikinci sırada gelmesi şaşırtıcı değildir. Bir akademik çalışma birden fazla kategoride yer aldığından kategorilerin toplam yayın sayısı gerçek yayın sayısından fazla olacaktır. Buna rağmen, ilk üç kategorinin her birinin alanın %15'inden fazlasına katkı sağladığı söylenebilir. Dolayısıyla bu üç çalışma alanı UTAUT'un çalışma merkezini oluşturmaktadır.

Dergiler Bakımından

UTAUT ile ilgili yayın yapan dergiler incelendiğinde “Sustainability (37)” en fazla makale yayınlayan dergidir. "Computers in Human Behavior (33)", "Education and Information Technologies (27)", "Journal of Medical Internet Research (17)", "International Journal of Information Management (14)", "International Journal of Mobile Communications (14)" ve "Behavior Information Technology (16)” yayın sayısı bakımından bu dergiyi sırasıyla takip etmektedir.

"Bibliographic coupling - Bibliyografik eşleşme" sayesinde ülkeler, yazarlar veya eserler arasındaki bibliyografik ilişkiler daha iyi anlaşılabilir ve önemli noktalar ortaya çıkarılabilir. Toplam link gücü değeri en yüksek dergi 51.670 ile "Computers in Human Behavior" dergisidir. Bu yüzden alandaki en güçlü dergi olarak nitelenebilir. 9 yayın ve toplam 57 atıfı bulunan "International Journal of Emerging Technologies in Learning" 6.788 ile minimum toplam bağlantı gücü değerine sahiptir. Doğal olarak listelenen 45 dergi içerisinde en küçük güce sahiptir.

Ülkeler Bakımından

UTAUT'ta yayın yapan 104 ülke arasında, 267 yayın, 25.695 atıf ve yayın başına 96.24 atıf ile "ABD" ilk sırada yer almaktadır. Yayın sayısı bakımından ise ABD'yi 193 yayınla "Peoples R. China" izlemektedir. Toplam atıf açısından "Peoples R. China" ikinci sırada yer alırken, yayın başına 39,38 atıf ile sırasıyla "Galler (67,92)" ve "Portekiz (57,18)"in gerisinde kalmıştır. "Galler" yayın sayısında 24 yayın ile 26. sırada yer alırken, yayın başına atıf sayısında ikinci sırada yer alması dikkat çekicidir. Aynı şekilde Portekiz'in yayın başına 57,18 atıf ile üçüncü sırada olması yayın kalitesinin ne kadar önemli olduğunun bir göstergesidir.

Toplam bağlantı gücü değerinin en yüksek olduğu ülke 1.068.086 ile "ABD"dir. UTAUT’la ilgili 10 çalışması bulunan "Şili", 40.100 ile minimum toplam bağlantı gücü değerine sahiptir. Doğal olarak listelenen 47 ülke içerisinde “Şili” en küçük güce sahiptir.

Kurumlar Bakımından

En fazla yayına sahip kurum “State University System of Florida (25)”’dır. Bu yayınlar, toplamda 925 atıf almıştır. Bu atıf sayısı ile UTAUT alanında en çok atıf alan beşinci kurum olmuştur. Malezya'nın Kuala Lumpur bölgesinde bulunan “Universiti Malaya”, Malezya'da yapılan 143 çalışmanın 23'üne katkıda bulunmuş ve bu çalışmalardan 475 atıf almıştır. Bu iki kurumu yayın sayısı bakımından “Universiti Sains Malaysia (21)”, “Swansea University (20)”, “King Abdulaziz University (17)” ve “Universidade Nova De Lisboa (17)” takip etmektedir. Atıflar açısından bakıldığında, “University of

Arkansas (17.726)" ve "Hong Kong Polytechnic University (3828)" yüksek atıf oranları ile dikkat çekmektedir.

Toplam bağlantı gücü değeri en yüksek olan kurum 34.539 ile "Sweansea Üniversitesi"dir. Toplam bağlantı gücüne göre "Sweansea University"'i sırasıyla 30.084 ile "State University Florida", 24.764 ile "Univ Lova Lisboa", 23.897 ile "Univ Tunku Abdul Rahman" ve 22.782 ile "Univ Malaya" takip etmektedir. 7 yayını ve toplamda 131 atıfı bulunan "University Michigan" 836 toplam bağlantı gücü ile 51 kurum arasındaki en düşük değere sahiptir.

Yazarlar Bakımından

UTAUT modelinin geliştiricileri "Venkatesh, V", "Morris, MG", "Davis, GB" ve "Davis, FD" dir. Bu yazarlardan sadece "Venkatesh, V"nin yayın sayısı bakımından ilk 23'te yer alması dikkat çekicidir. Diğer yazarların Web of Science veri tabanında UTAUT ile ilgili başka yayınları bulunmamaktadır. "Venkatesh, V" 11 yayın ile yayın sayısı açısından dördüncü sırada yer almaktadır. Ancak en çok atıf alan yazar "Venkatesh, V" dir. "Dwivedi, Yogesh K." 17 yayın ile ilk sırada yer almaktadır. "Oliveira, Tiago (14)", "Mensah, Isaac Kofi (12)", "Venkatesh, Viswanath (11)" ve "Rana, Nripendra P. (9)" "Dwivedi, Yogesh K."'yı yayın sayısı bakımından sırası ile takip etmektedirler.

Dörtten fazla yayını bulunan 34 yazar için oluşturulan görsel göz önüne alındığında, toplam bağlantı gücü değeri en yüksek olan yazar 18.147 ile "Dwivedi YK" olurken, toplam bağlantı gücü değeri en düşük olan yazar 1.836 ile "Merat, Natasha" olmuştur.

Anahtar Kelimeler Bakımından

"UTAUT (810)", "TAM (227)", "Teknoloji Benimseme (218)", "SEM (136)", "E-Öğrenme (69)" ve "Davranışsal Niyet (63)" en çok kullanılan anahtar kelimelerdir. UTAUT çalışmalarında terimlerin ilişki puanları incelendiğinde ilk sırayı "TAM – Teknoloji Kabul Modeli" almaktadır. Bu değerin UTAUT'tan sonra ilk ortaya çıkması normal ve anlaşılırdır. Ayrıca "Performans beklentisi", "Çaba beklentisi", "Sosyal etki" ve "Kolaylaştırıcı durum" gibi UTAUT'un çeşitli yapıları en önemli 54 terim arasındadır. "e-learning", "m-learning" "yükseköğretim", "eğitim", "öğrenciler", "uzaktan eğitim", "öğrenme" ve "harmanlanmış öğrenme" gibi araştırma konularına UTAUT'un yüksek oranda odaklandığını söyleyebiliriz. UTAUT'un eğitimde teknolojinin benimsenmesi ve kullanılması konusunda araştırmalara ağırlık verdiğini söyleyebiliriz. Sağlık sektöründe ise "covid-19", "m-sağlık", "e-sağlık", "sağlık" ve "teletıp" terimleri oldukça ilgi görmektedir. Ayrıca UTAUT çalışmaları için bankacılık, ödeme ve e-ticaret sistemleri de oldukça önemlidir.

Sonuç

Bu makaledeki amacımız, UTAUT çalışmalarının kapsamlı bir incelemesini yapmaktır. Bu kapsamda UTAUT ile ilgili 1560 yayının bibliyometrik verileri Web of Science veri tabanından alınmıştır. Bu verilerle UTAUT ile ilgili çalışmaların mevcut durumuna genel bir bakış sunulması amaçlanmaktadır. Sonuçlar sekiz ana başlıkta sunulmaktadır: (1) UTAUT ile ilgili çalışmaların yıllara göre dağılımı ve yıllara göre toplam atıf sayısı, (2) UTAUT'ta en çok atıf yapılan yayınlar, (3) UTAUT ile ilgili çalışma alanları, (4) hangi UTAUT çalışmalarının en çok yayınlandığı ve dergilerin bibliyografik eşleşmesi, (5) UTAUT çalışmalarının en çok yayınlandığı ülkeler ve VosViewer kullanan ülkelerin bibliyografik eşleşmesi, (6) UTAUT çalışmalarının en çok yayınlandığı kurumlar ve kurumların bibliyografik eşleşmesi, (7) UTAUT hakkında çoğu makaleyi yayınlayan yazarlar ve VosViewer kullanarak yazarların bibliyografik eşleşmesi, (8) anahtar kelimelerden terimler çıkarma.

Bu makale, yayınlanmış UTAUT araştırmasının çeşitli yönleri hakkında daha fazla bilgi edinmek isteyen okuyucular için faydalı bir bilgi kaynağıdır. Bu makale, üretken araştırma alanlarını ortaya koymanın yanı sıra daha fazla araştırma gerektiren yönleri vurgulayarak UTAUT araştırmasının genel alanını güçlendirir. Çalışmanın bazı sınırlılıkları olduğu ve okuyucuların çalışmayı bu sınırlılıklar çerçevesinde yorumlaması gerektiği unutulmamalıdır. Ancak UTAUT çalışmaları mevcut durumun temsili bir yansımasını sağlamak için yeterli görülmektedir. Bu çalışma gelecekteki araştırmalar için de yararlı ve kullanılabilir bir kaynak olabilir.