


## Theory of Planned Behavior: A Bibliometric Analysis from 2009 to 2022

Fawz Manyaga<sup>1</sup> 

Planlı Davranış Teorisi: 2009'dan 2022'ye Bibliyometrik Bir Analiz	Theory of Planned Behavior: A Bibliometric Analysis from 2009 to 2022
<p><b>Özet</b></p> <p>Planlı davranış teorisi, insan davranışları içindeki varyasyonları incelemek için geliştirilmiştir. Teori, pazarlama araştırmaları, tatil ve konaklama, politika, eğitim, sağlık ve eğlence gibi farklı sektörlerdeki insanların davranış değişikliklerini anlamada önemli bir rol oynamıştır. Bu çalışma, yazarların, dergilerin ve kurumların planlı davranış teorisine katkılarını anlamlı bir şekilde analiz etmeyi amaçlamaktadır. Analiz için Scopus veri tabanından alınan belgeler, yayınlanma yılları 2009-2022 ile sınırlıdır. Analiz için belge türü araştırma makaleleriyle sınırlıdır. Bibliyometrik analiz VOSviewer yazılımı kullanılarak gerçekleştirilmiştir. Yazarlar ve ortak yazarlar arasındaki ilişkiyi ve ülke bazında dağılımı kapsayan yayın eğilimleri analiz edilmektedir. Çalışmanın bulguları, planlı davranış teorisinde artan bir yayın eğilimi olduğunu öne sürmektedir. Çalışma ayrıca, yayınların en çok Amerika Birleşik Devletleri, Çin ve Malezya'da yoğunlaştığını bildirmektedir.</p>	<p><b>Abstract</b></p> <p>The theory of planned behavior is developed to study variations within human behavior. The theory has played an important role in understanding the behavioral changes of people in different sectors such as marketing research, leisure and hospitality, politics, education, health, and entertainment. The current study aims to significantly analyze the contributions of authors, journals, and institutions in the theory of planned behavior. Documents retrieved from the Scopus database with years of publication limited to 2009-2022 for analysis. The document type for analysis was limited to research articles. Bibliometric analysis was carried out using VOSviewer software. Publication trends covering the relationship between authors and co-authors, and country-based distribution were analyzed. The findings of the study suggested that there is a growing trend of publications in the theory of planned behavior. The study further reported that publications concentrated most in the United States of America, China, and Malaysia.</p>
<p><b>Anahtar Kelimeler:</b> Planlı davranış teorisi, gerekçeli eylem teorisi, tüketiciler, bibliyometrik analiz</p>	<p><b>Keywords:</b> Theory of planned behavior, theory of reasoned action, consumers, bibliometric analysis</p>
<p><b>JEL Kodları:</b> D11, D91, M31</p>	<p><b>JEL Codes:</b> D11, D91, M31</p>

<sup>1</sup>Independent Author, Anadolu University, manyagafawz1@gmail.com, ORCID: <https://orcid.org/0000-0003-2497-9762>

## 1. Introduction

Explaining human behavior has never been easy. This is so because humans experience swings in their moods, making it difficult for easy monitoring. Even when the situation mooted exists, the theory of planned behavior (TPB) has been applied in health, consumer behavior, and technology over the years to study, analyze, and effectively predict volatile human behavior.

TPB was developed by (Ajzen, 1991) as an extension of the theory of reasoned action (TRA) by (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) after finding out that the assumption of volitional control in TRA had several limitations in predicting behaviors that seemed to have toiled in implementation. TRA suggests that intentions to perform a behavior are a determinant of volitional behavior. Hence, the stronger the intentions of a person to engage in an activity, the higher the behavior is likely to be executed.

TRA traditionally stood on two aspects to predict human behavior. The first is attitudes and the other subjective norms. Attitudes define a constellation of evaluations of behavior. Attitudes are also believed to be a function of presumed beliefs that evaluate the likely consequences of a behavior an individual is likely to engage in. Beliefs about behavior can echo both positive and negative outcomes. From a health perspective, for example, attitudes can be thought of as an individual using condoms (behavior) to prevent contracting human immunodeficiency virus (HIV), which is the outcome and whether using a condom while having sex is perceived as convenience or inconvenience by the user.

The expectancy-value formulation which forms attitudes towards behaviors is based on the strength of beliefs that individuals have and multiplying them with subjective evaluations of consequences. Also, while predicting human behavior, it is important to consider the sensory abilities of touch, feel, and observation of behavior.

In addition, the accessibility of an attitude exists to be strong if there is a strong association between objects depicting attitudes and evaluating responses. Since individuals do not always behave following their attitudes, subjective norms are considered to deal with cementing perceptions that people always have towards practicing a behavior. Subjective norms are assumed to assess pressures exerted by social circles on an individual to perform or not to perform a specific behavior. Nevertheless, normative beliefs account for an individual's beliefs about whether significant others think they should engage in a particular behavior.

To be specific, significant others can be friends, family, workmates, personal lawyers, or supervisors. In many scenarios, especially within adults in puberty

stages, important others can be club mates, friends they normally interact with at school, as well as their girlfriends they fall in love with. These people's preferences are most likely to influence an adult's behavior. According to Fishbein & Ajzen (2010), subjective norms are categorized into two. Injunctive and descriptive normative beliefs.

Injunctive normative beliefs refer to expectations that a group will allow or disallow the performance of the behavior. This constellation consists of people including spouses, friends, and family of an individual. Parents wouldn't allow their sons and daughters to engage in early sex because it would be subjected as defilement and a total shame to a family within the society. On the other hand, descriptive normative beliefs refer to whether groups themselves practice or perform a behavior. This definition significantly elucidates that if a circle of an individual allows behavior and none in the group performs it, an individual is most likely not to follow their advice.

Therefore, where dishonesty within the group of an individual exists, the performance of an approved behavior might not happen. Despite many behaviors being performed, some behaviors have difficulties in being executed. Problems can be internally inherited by a person while others might result from external environments. It is for this reason that volitional control that governed behavior performance had inefficiencies in controlling threats that blocked behavior accomplishments—hence a limitation of TRA. Ajzen added control in TPB to reduce these limitations.

Based on Bandura's (1997) self-efficacy construct, Ajzen postulated that behavioral control moderated the effects of attitudes, and subjective norms on intentions depending on the extent to which people had control over behavioral performance. An individual is likely to perform a behavior if he or she can perform it. Perceived behavioral control (PBC) states that the likelihood of performing a behavior is based on whether one has the resources and opportunities to successfully perform a behavior. Hence, the more opportunities and resources an individual possesses, the higher the chances an individual will have PBC. Based on the prior example, a man who has a condom (resource) and has the opportunity (to get sex), will control his behavior by using condoms in expecting results of preventing HIV.

A plethora of bibliometric studies of TPB and its impacts on different fields of studies such as in green energy, technology adoption, financial literacy, entrepreneurship, consumer behavior, and recycling have extensively been published in reputable journals. However, to the best knowledge of this study, no study has mainly focused on covering TPB using a bibliometric analysis for the period of 2009 to 2022. The study mainly concentrated on the period of 2009-2022 because the number of publications proliferated between this period and

2023 wasn't integrated because at the time data was collected, less articles were published. The current article, therefore, seeks to explore the contributions of authors, journals, and institutions in the theory of planned behavior as well as to present findings based on bibliometric analysis. To effectuate the target of this study, a bibliometric analysis was carried out to present the contributions of authors, institutions, and countries. Bibliometric analysis was carried out with the help of data from Scopus. The study is structured as follows: in the second section, a description of methods is presented. In the third section, findings and results from the analysis are presented. In the fourth section, a conclusion following the findings is presented.

## **2. Research questions**

To find out the most influential authors in the field of the study.

To find out the underlying patterns in cooperation among countries and authors.

To determine the underlying specialties in the field of the study.

## **3. Method**

### **3.1. Study design**

A bibliometric analysis was performed using articles from different journals indexed in Scopus. Publications from 2009 to 2022 were selected because publications in the field of TPB started to proliferate in 2009. Moreover, there was a developing interest in TPB research starting in 2009 as presented in figure 1. 2023 was excluded in the study because data search was carried out in January 2023 and the results only produced 3 published studies which had no citations thus irrelevant to the current study. Keywords were limited to TPB, and document type was limited to articles. The subject area was also limited to business management and accounting.

### **3.2. Source of Information and Search Strategy**

Several databases are available for carrying out bibliometric analysis including Wos, Google Scholar, and Scopus respectively. However, Scopus is preferred because of different reasons which will be highlighted here. Firstly, the Scopus database provides broad access to open-source content than other databases (Waltman, 2016). Secondly is that Scopus incorporates more journals and records of authors than other databases if a researcher at hand knows how to carefully instruct the database by entering keywords necessary for producing a final output. Following the above arguments, peer-reviewed literature consisting of social sciences, technology, and health was resourced from Scopus Year was specified from 2009 to current 2022.

A literature search was done using TITLE-ABS-KEY (theory AND of AND planned AND behavior), and language was limited to English. After doing this process, 1344 results were produced. The study excluded conference proceedings, book series, and books. The publication stage was limited to the final and several countries with less than 4 documents were excluded from the analysis because the research perceived them to have less value to the present study. After dropping for countries with less than 4 documents, 982 documents were yielded.

#### **4. Data analysis**

Bibliometric analysis was carried out using VOSviewer version 1.6.18 software developed by (Van Eck & Waltman, 2012). The main advantage of VOSviewer software is its ability to bestow defined maps that are easy to interpret hence enhancing research capabilities of research. The analysis was divided into performance analysis and science mapping. Performance analysis is represented by tables of journals, authors, institutions and countries contributions. Science maps include co-occurrence analysis, citation analysis, co-citation analysis, bibliometric coupling, and co-authorship analysis (Van Eck & Waltman, 2012). In a quest to have clear visualized maps, it is recommended to have substantial numbers of items; although there is no specified number of items a study should have. Also, the accuracy of bibliometric maps is governed by how nodes are not separate or distanced from others. Where two nodes are near each other, it signifies that the two are related to each other.

#### **5. Results and discussion**

##### **5.1. Distribution of publications per year and growth trends**

Any given increase in the number of publications in an area fairly stipulates a growing trend within articles published in the field. Indeed, the rising numbers of publications in TPB have shown growing concern for its importance in explaining different worldly phenomena that can't be explained by other theories in psychology. Figure 2 shows us a plot of the distribution of publications per year and growth to analyze research trends concerning TPB. TPB dates back to 1985 with the first presentation done by Ajzen following the development of TRA by Fisherman in the 1980s. However, it was until 2011 that researchers began to have an interest in publishing research articles in the field of TPB. In fact, it was in 2011 that the numbers of articles were above the average of 25 in number. Except in this current year (2023) where only 3 documents were published, previous years have seen an increase of at least 25 documents being published. Nevertheless, the plot suggests that more attention to TPB started in 2014 which suggests that roughly 49 articles were published.

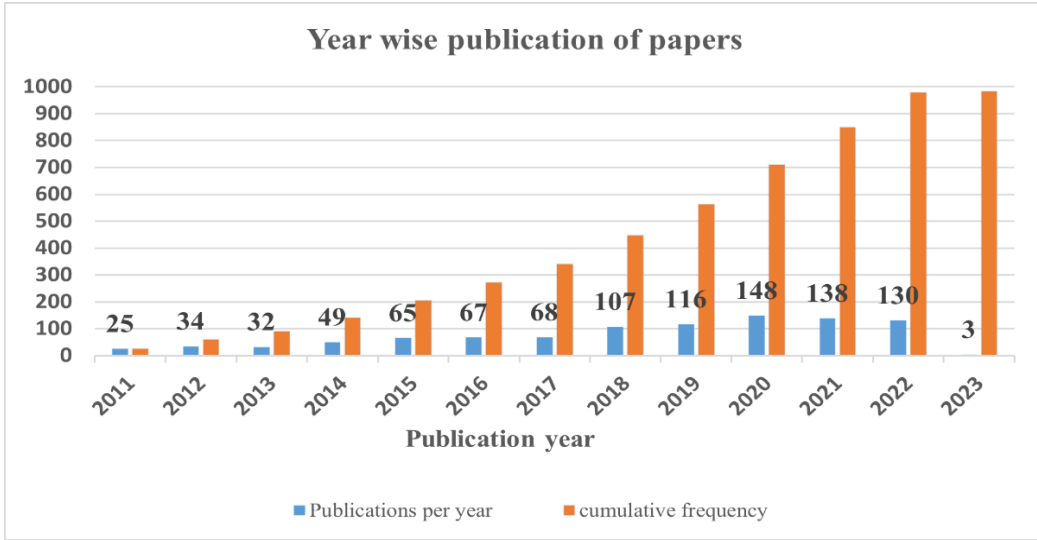


Figure 1: Distribution of publications per year and growth trends

### 5.2. Publication distribution of a country-by-country criteria

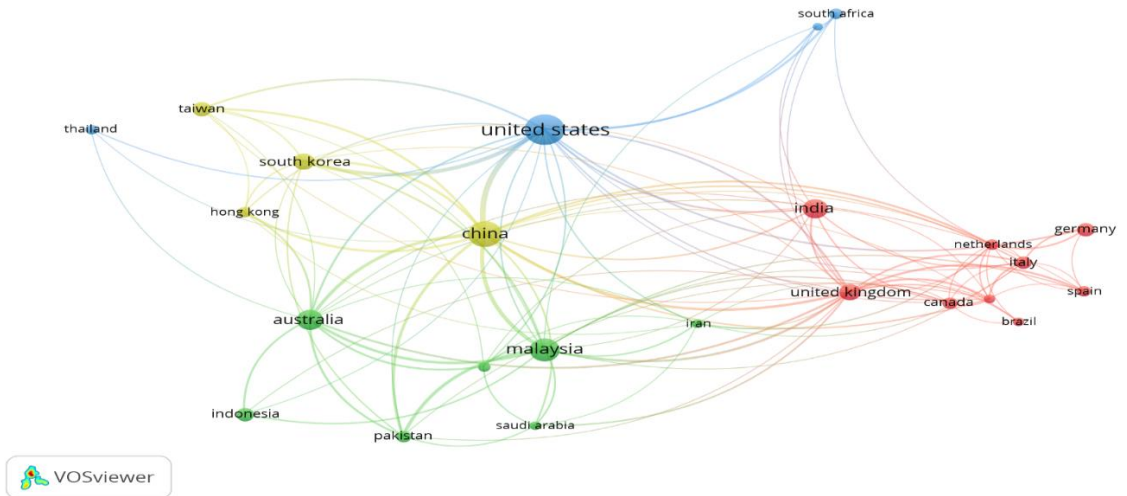
25 countries published 982 articles respectively. Out of these, the United States of America had the highest number of publications (213, or 53.25% of all articles). This was followed by China with 155 articles (38.75%). Malaysia was in third with 123 articles (30.75%) followed by Australia with 93 articles (23.25%). India seamlessly positioned fifth with 86 articles (21.5%) followed by the United Kingdom with 76 articles (16.75%). The other four groups of countries making it to the top ten list out of 25 countries were South Korea, Taiwan, Indonesia, and Germany. These produced articles ranging between 61-43. The rest of the countries on the list produced between 40-4 documents. When all articles produced by the 25 countries were summed, a total of articles totaled 1283, which is greater than 982. This is so because of the many collaborations, especially between the United States of America, China, and Malaysia that have published TPB voluminously as shown in Table 1.

Table 1: Countries with over five documents

	Country	Publication	% Publications	Citations	AV citations
1	United states	213	53.25	6995	32.8
2	China	155	38.75	5150	33.2
3	Malaysia	123	30.75	2049	16.7
4	Australia	93	23.25	2354	25.3
5	India	86	21.5	3340	38.8
6	United Kingdom	67	16.75	2042	30.5

7	South Korea	61	15.25	2936	48.1
8	Taiwan	49	12.25	1881	38.4
9	Indonesia	43	10.75	232	5.4
10	Germany	43	10.75	1436	33.4
11	Italy	40	10	1234	30.9
12	Canada	32	8	502	15.7
13	Pakistan	30	7.5	457	15.2
14	Netherlands	30	7.5	1104	36.8
15	South Africa	26	6.5	279	10.7
16	Hong Kong	26	6.5	647	24.9
17	Spain	26	6.5	1163	44.7
18	Vietnam	25	6.25	301	12.0
19	Thailand	22	5.5	211	9.6
20	Iran	20	5	379	19.0
21	Saudi Arabia	18	4.5	380	21.1
22	Brazil	18	4.5	403	22.4
23	France	18	4.5	542	30.1
24	Turkey	15	3.75	553	36.9
25	Finland	4	1	398	99.5

The United States of America received the highest number of citations from 213 published articles. Whereas United States of America received the highest number of citations; in terms of documents published, it is only United States of America, China, and Malaysia that had the majority with each publishing above 100 documents in the domain of TPB. The rest of the countries published below 93 articles. Table 1 shows us that in terms of average citations, Finland ranks the highest followed by South Korea. China ranked ninth while United States of America, Malaysia ranked tenth and nineteenth respectively. Therefore, it is likely that most research in TPB is concentrated in Europe and Asian countries. In addition, researchers from these countries collaborated on many articles under the theme of TPB. Distinguished researchers especially in subject areas of business management and accounting which was one of the search criteria were profoundly from United States of America, Australia, China, Malaysia, United Kingdom, Netherlands, India, Taiwan, South Korea, Germany as well as others (figure 2).



**Figure 2: Country collaboration network. (Country collaboration network was represented by data of co-authorship and both the maximum and minimum number of documents considered were ten)**

Moreover, this study also examined organizations that published more than three publications under the theme of TPB (table 2). Of the 2005 organizations; after limiting documents to 5, only eleven met the criteria. From these, it was found that the College of Hospitality and tourism management of Sejong University in South Korea was extracted twice and had different results. These were summed to realize a total of 10 organizations. Nevertheless, Beijing Institute of Technology from China had two schools. The first was School of Management and Economics. The second was the centre for Energy, and environmental policy research. Because this study was looking at organizations in the forms of universities and not schools, the author decided to sum the scores of the two schools to fall under one category. It should be noted that the school of management had six documents, 556 citations, and total link strength of 7. Centre for energy, and environmental policy research had 3 documents, 205 citations, and 2 total link strength. These were merged to form Beijing institute of technology.

Table 2 recommends that nine organizations generated at least three documents within the past years showing the relevance of TPB. Basing on continents, Asian continent had the highest number of organizations with China as the country holding the flagship and having the institution with the highest publication. Second in Asia is South Korea followed by Malaysia. The second and last continent in this category is North America with Canada and United



States of America with three documents each. Furthermore, it was found out that Beijing institute of technology from China had published 9 documents that received 761 citations. Second to this was Sejong university in South Korea with 7 documents receiving 949 citations. Third in a rank was Collaborative innovation centre of electric vehicles in Beijing of China with 4 documents having 314 citations.

The other group of universities were McMaster university of Canada receiving 229 citations and Sustainable development research institute for Economy and society of Beijing with 3 documents receiving 226 citations. The other group of universities had 3 documents all receiving less than 200 citations. The average citation per document index revealed South Korea having the highest (135.6) albeit having lesser documents with 949 citations. Basing on the analysis, it can be concluded that Sejong university, Beijing institute of technology, Collaborative innovation centre of electric vehicles in Beijing, McMaster university and Sustainable development research institute for the economy and society of Beijing had significant importance in the field of TPB.

**Table 2: Organizations with more than three papers**

Rank	Organization	Country	Documents	Citations	AV citations
1	Sejong University	South Korea	7	949	135.6
2	Beijing institute of Technology	China	9	761	84.6
3	Collaborative Innovation Center of electric vehicles in Beijing	China	4	314	78.5
4	McMaster university	Canada	3	229	76.3
5	Sustainable development research Institute for Economy and society of Beijing	China	3	226	75.3
6	Shanxi university	China	3	133	44.3
7	The University of Alabama	United states of America	3	131	43.7
8	University of science and technology of China	China	3	112	37.3
9	Universiti sains Malaysia	Malaysia	3	13	4.3

### 5.3. Co-author analysis

Co-authorship is carried out to find out interactions among authors and their impacts in the research area (Donthu et al., 2021). The number of documents and citations of authors were used to easily depict the most cited authors (highest contribution) who specifically published articles using TPB. These results are tabulated in Table 3. In terms of documents, Heesup H. and Edmund G all had the same number of documents (12). This asserts that there was no author with the highest number of documents under the criteria of citations. The next group of authors were Juanru W, Shanyong W, Lei W, Ling Z all with seven documents. The third group of authors consisted of Yang W, Bo M, Xiaoxin Z, Jun Li, Choong-K all with six published documents. The rest of the group had

five publications. According to Table 3, in terms of publications, two authors are the most active researchers in the study.

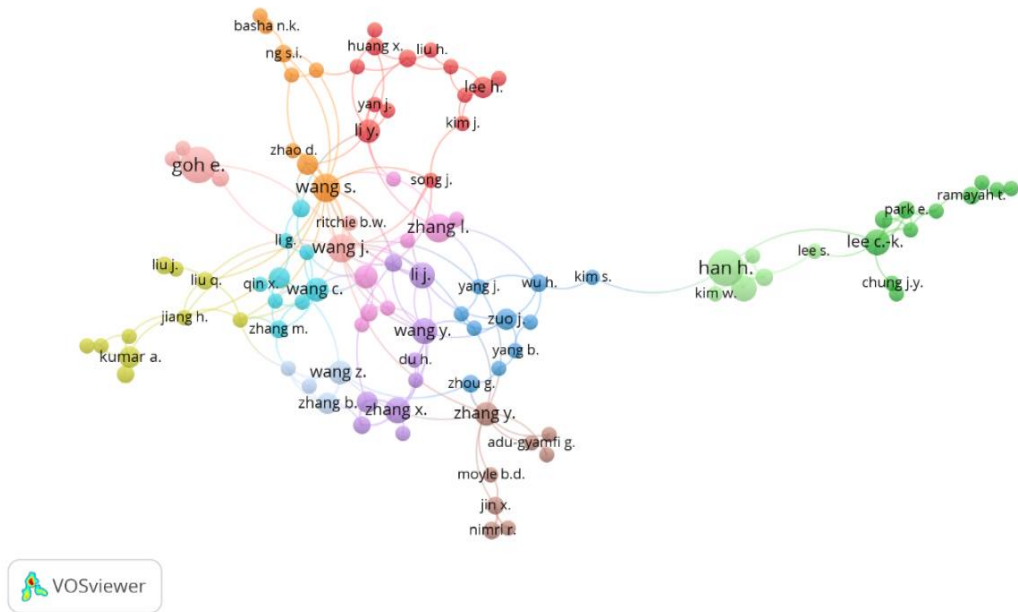
**Table 3: Researchers with the highest number of citations**

Rank	Author	Documents	Citations	AV citations	Total link strength
1	Heesup Han	12	927	77	39
2	Edmund Goh	12	484	40	11
3	Zhaohua Wang	5	445	89	14
4	Juanru Wang	7	413	59	23
5	Shanyong Wan	7	299	43	19
6	Chen Wang	5	288	58	10
7	Jinhe Zhang	5	288	58	7
8	Yixiang Zhang.	5	287	57	8
9	Yang Wang	6	279	47	8
10	Bo Meng	6	256	43	26
11	Xiaoxin Zhang	6	224	37	9
12	Sourabh Jain	5	223	45	1
13	Jun Li	6	208	35	17
14	Lei Wang	7	141	20	8
15	Denni Arli	5	140	28	2
16	Niladri Das	5	138	28	0
17	Ian Phau	5	121	24	1
18	Choong-Ki Lee	6	112	19	17
19	Ling Zhang	7	91	13	3
20	Yuan Li	5	62	12	3

*Note:* Authors with more than five documents were selected for analysis.

The average number of citations predicts information about the most prominent scholars in the field. In other words, average citations are useful in assessing the impact factor of an author. Heesup H had the highest number of citations (927: citations) followed by Edmund G (484: citations), and Zhaohua W in the third position with (445: citations) as well as Juanru W in the fourth place (927: citations). The rest of the pack had less than 300 citations (table 4). In terms of network strength and collaboration, Heesup H and Bo M had a total network strength of 39 and 26 respectively. Interestingly, even if Bo M was not among top authors with highest citations, his network strength suggested that collaboration with other researchers was higher (figure 3). Furthermore, results from author citation index suggested that Zhaohua W, and Heesup H had the

highest number of average citations. This implied that documents of Heesup H and Zhaohua W were impactful than others. It is worthy to note that regardless of Edmund G ranking second author in terms of publications and citations, his research did not cover a large area, and this was significantly reported by a low total link strength (11).



**Figure 3: Co-authorship analysis in the field of TPB. Note: Only authors with more than two documents were selected for analysis.**

#### 5.4. Co-citation relationship among journals

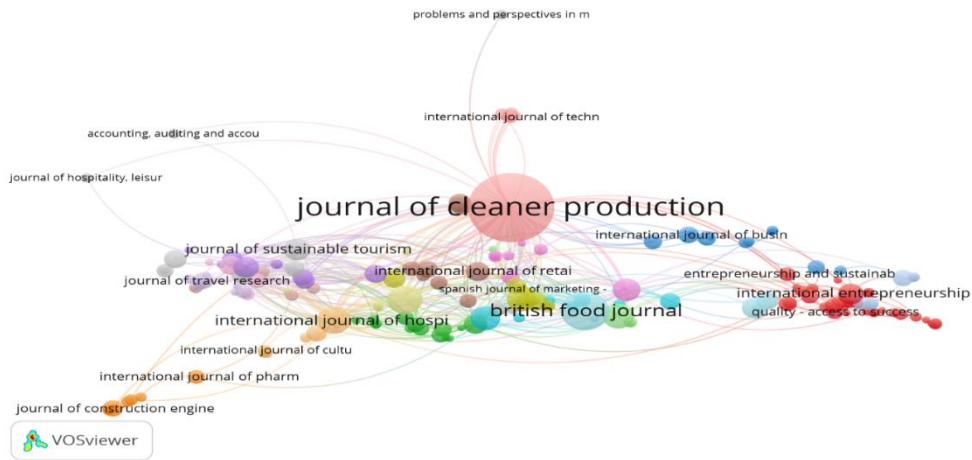
Journals provide space for researchers to publish their findings. It is important to note that there are differences between a quality journal that compete to be leaders in publishing, giving researchers reputable research as well as journals that are incompetent in publishing up-to-date research. Indeed, relationships between citations and sources indicate prominent journals where researchers are likely to publish their findings (figure 4).

**Table 4: Top ten publishing journals with more than five articles**

Rank	Source	Documents	Citations	AV. Citations	total link strength
1	Journal of cleaner production	100	5595	56	114
2	Journal of retailing and consumer services	17	1247	73.4	45
3	International journal of hospitality management	15	1213	80.9	69
4	Journal of business ethics	14	990	70.7	21
5	Tourism management	6	848	141.3	60
6	International entrepreneurship and management journal	9	773	85.9	6
7	Technological forecasting and social change	12	653	54.4	18
8	International journal of consumer studies	13	571	43.9	19
9	Current issues in tourism	9	556	61.8	13
10	British food journal	32	539	16.8	28

The above table shows journals having publications published in TPB. According to the table, the most desired journal was the journal of cleaner production. In this journal, 100 documents were published, receiving 5595 citations. British food journal was in the second position with 32 documents published all receiving 539 citations. The third most desired journal was journal of retailing and consumer services with 17 documents published all having 1247 citations. International journal of hospitality management was in the fourth with 15 documents receiving 1213 citations. The rest of the journals had less than 15 documents.

In terms of average citations, Journal of tourism management, Journal of International Entrepreneurship and management, International journal of hospitality management were among the top three journals with high average citations. Interestingly, Journal tourism management had 6 documents but had the highest average citations. It is also worth noting that the highest total link strength from the journal of cleaner production, International journal of hospitality management, tourism management and except tourism management, the two other journals had high documents published.



**Figure 4: Co-citation between journals in TPB.**

**Note:** Journals with more than five citations were selected.

### 5.5. Co-citation relationships among authors

The relationships between publications and co-citations are important to assess and quantify important authors and their research output that are cited together. The highly cited a published article by a researcher becomes, the more valuable it is in a specified field. Although in some instances, some publications are cited because it is a must for a junior researcher to include such a publication in his or her work for authenticity purposes--- hence, number of citations might not be a good parameter for measuring the quality of a paper if at all researchers are compelled to include a publication. Indeed, this dilemma is common in situations where a researcher must cite a publication that in most cases started a development of a theory, method, and model.

In this study, out of 982 documents, publications with at least 100 citations were considered for analysis. After instructing VOSviewer software to limit documents with over 100 citations, the results were truncated to 59 publications (table 5). The most cited publication was authored by (Paul et al., 2016). The next most cited document was published by (Yadav & Pathak, 2016) who received 591 citations. It is interesting that (Yadav & Pathak, 2016) integrated TPB in finding out the intention towards buying green Products among young consumers. Moreover, green consumption is a new area in research receiving a

breadth of attention and emphasis from sustainable development-aided researchers across the globe.

Third was Han (2015) whose publications in total received 518 citations. Total link strength highlights the relevance of collaborations among researchers. In addition, Han (2015) had 7 links of his publications. This means that Han had more collaborations than (Yadav & Pathak, 2016) and (Justin and Ashwin, 2016). The other remarkable researcher to have the highest collaborations with other researchers was Zhang et al. (2017).

**Table 4: Most cited documents with atleast 100 citations**

Rank	Document	Citations	Links	References
1	Paul j. (2016)	820	2	(Paul et al., 2016)
2	Yadav r. (2016)	591	4	(Yadav & Pathak, 2016)
3	Han h. (2015)	518	7	(Han, 2015)
4	Hu q. (2012)	314	0	(Hu et al., 2012)
5	Kamble s. (2019)	306	0	(Kamble et al., 2019)
6	Bae s.y. (2021)	265	1	(Bae & Chang, 2021)
7	Kim y.j. (2013)	261	3	(Yong JoongKim, David Njite, 2013)
8	Sánchez j.c. (2011)	245	0	(Sánchez, 2011)
9	Hameed m.a. (2012)	243	0	(Hameed et al., 2012)
10	Verma v.k. (2018)	222	2	(Verma & Chandra, 2018)
11	Moody g.d. (2018)	218	0	(Moody et al., 2018)
12	Chen m.-f. (2016)	212	4	(M. Chen, 2016)
13	Echegaray f. (2017)	204	1	(Echegaray & Valeria, 2017)
14	Shiau w.-l. (2016)	200	0	(Shiau & Chau, 2016)
15	Kang j. (2013)	190	0	(Kang et al., 2013)
16	Yoon c. (2011)	183	2	(Yoon, 2011)
17	Chou c.-j. (2012)	176	0	(Chou et al., 2012)
18	Albayrak t. (2013)	164	2	(Albayrak, 2013)
19	Hassan l.m. (2016)	163	0	(Hassan et al., 2016)
20	Teng y.-m. (2015)	162	3	(Teng, 2015)
21	Yang h. (2017)	159	0	(Yang et al., 2017)
22	Xiao j.j. (2011)	156	0	(Xiao et al., 2011)
23	Soyez k. (2012)	154	0	(Soyez, 2012)
24	Kautish p. (2019)	152	3	(Kautish et al., 2019)
25	Lortie j. (2015)	151	0	(Lortie & Castogiovanni, 2015)
26	Mondéjar-jiménez j.-a. (2016)	149	0	(Mond, 2016)
27	Wang y. (2013)	142	0	(Y. Wang et al., 2013)
28	Shi h. (2017a)	140	1	(Shi, Fan, et al., 2017)
29	Wang z. (2016)	136	1	(Z. Wang et al., 2016)
30	Zapkau f.b. (2015)	132	0	(Zapkau et al., 2015)
31	Haus i. (2013)	132	1	(Haus et al., 2013)
32	Goh e. (2018)	129	1	(Goh & Lee, 2018)
33	Shi h. (2017b)	128	2	(Shi, Wang, et al., 2017)

34	Shin y.h. (2018)	126	2	(Ho et al., 2018)
35	Mital m. (2018)	124	0	(Mital et al., 2018)
36	Uhlaner l.m. (2012)	124	0	(Berent-braun et al., 2012)
37	Sánchez-cañizares s.m. (2021)	123	0	(Sánchez-cañizares et al., 2021)
38	Tsai k.-h. (2016)	121	1	(Tsai et al., 2016)
39	Kim e. (2013)	121	2	(Kim et al., 2013)
40	Li j. (2018)	120	0	(Li et al., 2018)
41	Arunrat n. (2017)	120	1	(Arunrat et al., 2017)
42	De clerq d. (2013)	120	0	(Clercq et al., 2011)
43	Han h. (2017)	118	4	(Han et al., 2017)
44	Chen s.-c. (2016)	118	0	(S. Chen & Hung, 2016)
45	Wang j. (2012)	118	1	(J. Wang & Ritchie, 2012)
46	Zhang x. (2017)	117	7	(X. Zhang et al., 2017)
47	Chang v. (2020)	114	0	(Chang et al., 2020)
48	Huang x. (2020)	111	2	(Huang et al., 2020)
49	Huang x. (2019)	110	4	(Huang & Ge, 2019)
50	Irfan m. (2021)	109	1	(Irfan et al., 2021)
51	Zhao l. (2016)	109	0	(Zhao et al., 2016)
52	Lülf s r. (2013)	109	0	(Lülf s & Hahn, 2013)
53	Wang z. (2017)	106	2	(Z. Wang et al., 2017)
54	Zhang y. (2018)	104	0	(Y. Zhang et al., 2018)
55	Goh e. (2017)	103	1	(Goh et al., 2017)
56	Swaim j.a. (2014)	103	0	(Swaim et al., 2014)
57	Fan b. (2019)	101	0	(Fan et al., 2019)
58	Fu j.-r. (2015)	101	0	(Fu et al., 2015)
59	Hajli n. (2015)	100	0	(Hajli et al., 2015)

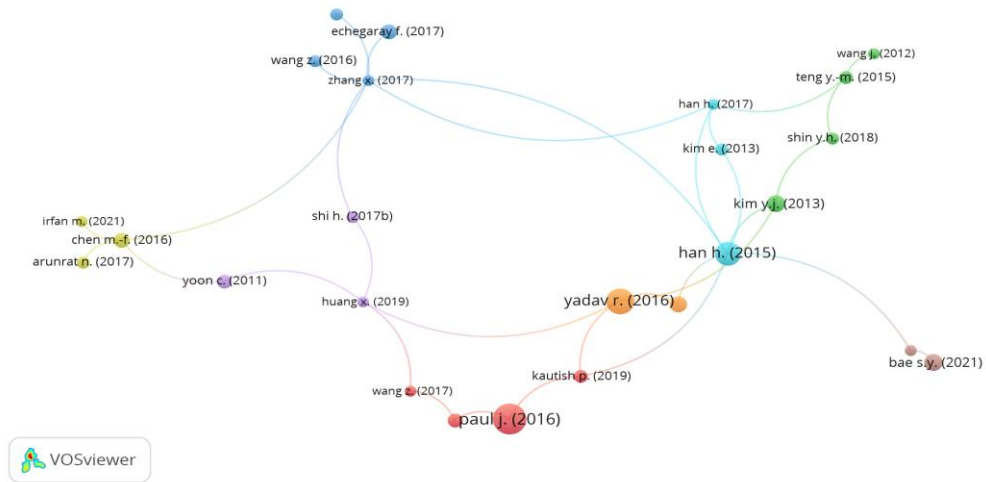
In terms of cluster analysis (figure 5), there were eight clusters in total and each cluster covered a specific theme. Cluster one included Albayrak t. (2013), Kautish p. (2019), Paul j. (2016), Wang z. (2017). This cluster had a total of 1242 citations and 9 links. This implies that these four researchers were involved in collaborative research to form the first group. The research collaboration covered green purchasing behavior and environmental concerns among consumers before engaging in making a consumption of a product. The second cluster of researchers included kim y.j. (2013), shin y.h. (2018), teng y.-m. (2015), wang j. (2012) respectively (667: total citations, 9: network links). One interesting thing to note is that all these prominent researchers had Asian origins. This implies that tremendous amounts of research using TPB are more vibrant in the Asian continent. The second cluster combined studies looking at the theme of the hospitality industry. Articles from this cluster critically analysed customer intentions of buying meals after reading menus in restaurants as well as accommodation planning.

**Table 5: Clusters with their respective citations and total links**

CLUSTERS	CLUSTER 1	CLUSTER 2	CLUSTER 3	CLUSTER 4	CLUSTER 5	CLUSTER 6	CLUSTER 7	CLUSTER 8
<b>THEMES</b>	Green purchasing behavior	Accomodation planning	Electronic Waste	Energy and Climate	Digital Privacy	Bicycle tourism	Green products	Corona Virus
	albayrak t. (2013)	kim y.j. (2013)	echegaray f. (2017)	arunrat n. (2017)	huang x. (2019)	han h. (2015)	verma v.k. (2018)	bae s.y. (2021)
	kautish p. (2019)	shin y.h. (2018)	shi h. (2017a)	chen m.-f. (2016)	shi h. (2017b)	han h. (2017)	yadav r. (2016)	huang x. (2020)
	Paul et al., (2016)	teng y.-m. (2015)	wang z. (2016)	irfan m. (2021)	yoon c. (2011)	kim e. (2013)		
	wang z. (2017)	wang j. (2012)	zhang x. (2017)					
<b>TOTAL CITATIONS</b>	<b>1216</b>	<b>667</b>	<b>597</b>	<b>347</b>	<b>421</b>	<b>757</b>	<b>813</b>	<b>376</b>
<b>TOTAL LINKS</b>	<b>9</b>	<b>9</b>	<b>10</b>	<b>2</b>	<b>8</b>	<b>13</b>	<b>6</b>	<b>3</b>

The third cluster of researchers included echegaray f. (2017), shi h. (2017a), wang z. (2016), zhang x. (2017). Under this cluster, electronic waste was the central theme. The cluster also extended its studies to recycling because issues to do with preserving the environment was crucial. The total number of citations in this cluster was 597 and had a total network link strength of 10, thus becoming the highest among clusters. The fourth cluster comprised of arunrat n. (2017), chen m.-f. (2016), irfan m. (2021) with (347 citations, and network links). This implies that publications of this cluster don't cover larger areas. However, it is sad that the fourth cluster contributed less to the bibliometric analysis regardless of articles from this cluster focusing on the theme of energy and climate change. The rest of the clusters have researchers less than four in number as tabulated in Table 6. Bibliometric analysis considers how researchers in a cluster are closely related to each other. Clusters 8 and 1 were closely related meaning that collaborations and links between researchers were high. This was followed by clusters 6 and 2 also closely related. Given this closeness of clusters, it implies and confirms that the highly cited researchers were from these clusters (the big nodes in Figure 5) paul j. (2016), han h. (2015), yadav r. (2016), and kim y.j. (2013).





**Figure 1: Association between documents and citations for publications cited at least 100 times**

### 5.6. Co-word analysis

Whereas the above techniques depend on publications as a unit for science mapping, the plausible unit for analysis of co-word analysis is “words”. To epitomize this argument, other techniques like co-citation, co-authorship, and citation employ publications cited as a medium. On the other hand, the co-word analysis itself uses content from the articles/publications for analysis. These words are recurrently generated from keywords of articles. However, in some cases, past research has resourced words from texts or rather abstracts. In addition, co-word analysis allows for uncovering of main topics and theories that are commonly used in a field of research (Donthu et al., 2021). Out of 4032 keywords, the minimum number of occurrences per keyword was limited to 10, and out of that, 103 met the threshold.

To create an integrated science map for this study, the total strength of the co-word link with other keywords was calculated. Not surprisingly, the most frequently occurring words were “theory of planned behavior” (596 times), and “theory of planned behavior” 407 times. The structural equation model ranked third occurring 74 times showing for empirical method widely employed in TPB. Consumer behavior ranked fourth (48) indicating the main topic in the research of marketing. Perceived behavioral control ranked fifth (45 times) indicating the main predictor of TPB. Nevertheless, the rankings of keywords followed the



**Table 6: Co-words with their respective clusters**

CLUSTER ONE	CLUSTER TWO	CLUSTER THREE	CLUSTER 4	CLUSTER FIVE	CLUSTER SIX
<i>Research methods***</i>	<i>Entrepreneurship**</i>	<i>Tourism***</i>	<i>Climate change***</i>	<i>Consumer behavior***</i>	<i>Trade***</i>
Behavior control	Attitude	Consumption behavior	Climate change	Adults	Commerce
Behavioral intention	Attitudes	Covid-19	Consumer behavior	Article	Economic and social effects
Behavioral research	Culture	Eco-tourism	Economics	Behavior	Malaysia
China	Entrepreneurship intention	India	Energy utilization	Consumer	Motivation
Construction industry	Entrepreneurship intentions	Modeling	Environmental concern	Consumer behavior	
Decision making	Entrepreneurship	Norm activation model	Environmental concerns	Female	
Design/methodology/approach	Entrepreneurship education	Numerical model	Environmental protection	Human	
Knowledge	Gender	Perceived risk	Factor analysis	Human experiment	
Knowledge management	Green purchase intention	Perception	Green products	Major clinical study	
Least squares approximations	Indonesia	Planning Theory	Pro-environmental behavior	Male	
Partial least square	Innovation	Prediction	Purchase intention	Marketing	
Perceived behavioral control	Intention	risk Perception	Purchasing	Questionnaire	
Questionnaire survey	Perceived behavioral control	Technology adoption	Regression analysis	Social marketing	
Questionnaire surveys	Pls-Sem	Theoretical study	Sales	Trust	
Recycling	Religiosity	Tourism	Sustainability		
Structural equation model	Students	Tourist behavior	Sustainable development		
Structural equation modeling	Subjective norm	Tourist destination	Theory of planned behavior		
Structural equation modeling	Subjective norms	Travel behavior	Theory of planned behavior (tpb)		
Structural equation models	Theory of planned behavior	United States			
Survey	Theory of planned behavior	Willingness to pay			
Waste management	Theory of reasoned action				

\*\*\* Themes of the respective clusters

## 6. Conclusion and limitations

In this paper, I have provided a holistic overview of TPB from 2009 to 2022 using bibliometric analysis. In an attempt to sieve content from Scopus database, I carried out a bibliometric analysis to capture the contributions of authors, countries as well as institutions under the theme of TPB. To my understanding, this has been the first attempt to digest available data on the topic of TPB between 2009 to 2022, and results suggest that there is a growing interest in publishing research in the field of marketing under the topic of TPB. While there is a growing number of studies from the Asian continent, the United States of America is said to contribute the highest number of publications of all countries.

There were a couple of research questions that were addressed. Findings for RQ 1 highlighted the most influential authors in the field of the study. The findings presented that Heesup Han, Edmund Goh, Zhaohua Wang, and Juanru Wang emerged as the most proliferated researchers based on the number of citations they received in their publications portfolios. In addition, it should be noted that the majority of the influential researchers represented the Asian continent which justifies spikes within the budgets meant for research and development. It is also believed that the spikes in budgets are meant for competing with global researchers who reign from the United States of America and Europe.

Findings from the country collaboration network indicated high cooperation among participating countries as well as researchers to answer RQ 2. Figure 2 reported that the United States of America had the biggest collaboration with other countries, followed by China, and Malaysia respectively. This not only means that these countries collaborate immensely in the field of TPB but that researchers from these countries have a higher probability of their output being cited globally. Also, the current phenomenon exists because of the increase in both psychological and marketing research in China. This not only has developed China's research capability but has relentlessly increased its collaboration with other countries. The author collaboration network described how researchers located in the same territories are actively engaged in collaborative work. Both country and collaboration networks suggested that cooperation exists and that research in the field of TPB is expected to increase in the future.

To address RQ 3, co-word analysis was used to explore common themes of research in the field of TPB. Among the keywords under the theme of research methods was data collection. Researchers collected data using questionnaire surveys, and Structural equation modeling proved to be the most preferred technique for validating the fitness of research models. Nevertheless, among constructs of TPB, keyword analysis reported Perceived behavioral control to be

the best predictor of actual behavior. In addition, keyword analysis reported climate change and consumption behavior to be the major concentration of research.

Also, findings suggested that TPB has extensively been used in different backgrounds. The theory has been explored in the tourism and hospitality industry, electronic waste as well as green purchase behavior. In fact, this aligns with (Si et al., 2019) whose results affirmed that the USA was among the best-performing country in terms of publications. Nevertheless, their study found that green purchasing consumption and waste management were among the primary research topics.

Whereas the study has sufficiently contributed to insights into TPB, some limitations have to be considered. The first limitation was the source of content used. Scopus is known to be the best source of scientific publications with over a million in its database. However, there are numerous databases from which data can be collected to carry out a bibliometric analysis. Future studies should consider exploring other databases such as WOS, CiteSeer, Mathematical Reviews, Chemical abstracts as well as Pubmed for the collection of data. The second limitation was the selection of the keyword (s) to be used. The present research depended on one keyword which can exclude important publications for the study.

Therefore, future studies should be able to explore content based on multiple keywords to give concrete research. In addition, the author believes that limiting TPB as the keyword in this study omitted articles that would facilitate carrying out a better analysis. Nevertheless, since the data analyzed is checked several times, there might have occurred some errors during the process. Also, the present study recommends future research to conduct bibliometric analysis exploring different theories to contribute to the literature and to find major developments in terms of institutional, author, and country contributions. Finally, the study intended to analyze data from the period of 2009 to 2022. Future studies are recommended to explore the topic from its first publication to present for better results.

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