

VISUALIZING THE SCIENTIFIC LANDSCAPE ON SUSTAINABLE CONSUMPTION RESEARCH IN WEB OF SCIENCE

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Abstract:

Sustainable Consumption is a research field that has surged in popularity over the years, as the need, and demand, for more sustainable practices becomes apparent with time. To study the current state of sustainable consumption research, we conducted a bibliometric analysis with 2168 articles from the Web of Science Core Collection using VOSviewer software.

Our findings suggest England is the most productive country regarding sustainable consumption research. The most popular keywords are those related to the field of “sustainability” such as “sustainable development” and “sustainable production”; and “consumption”, such as “consumer behavior” and “food”. The most cited article of the sample is “The sharing economy: Why people participate in collaborative consumption” by Hamari, J; Sjöklint, M; and Ukkonen, A (2016). The article from the sample most cited by other articles from the sample is “Sustainable Consumption: Green Consumer Behaviour when Purchasing Products” by Young, W; Hwang, K; McDonald, S; and Oates, CJ (2010). The most cited and productive source is “Journal of Cleaner Production”. The most productive institution with the most citations is the University of Leeds. Most of the institutions with the highest level of production in this field are from Europe. The author with the most citations is Hubacek, Klaus. The scientific article that shares the most references with other articles of the sample is “New Conceptions of Sufficient Home Size in High-Income Countries: Are We Approaching a Sustainable Consumption Transition?” by Cohen, MJ. The author most referenced by the authors of the sample is Ajzen, Icek.

Keywords: *Bibliometric Analysis, Sustainable Consumption, Vosviewer, Web of Science.*

JEL Classification: L83, Q01

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VISUALIZANDO EL PANORAMA CIENTÍFICO SOBRE EL CONSUMO SOSTENIBLE INVESTIGACIÓN EN WEB OF SCIENCE

Resumen:

El consumo sostenible es un campo de investigación que ha ganado popularidad a lo largo de los años, a medida que la necesidad y la demanda de prácticas más sostenibles se hacen evidentes con el tiempo. Para estudiar el estado actual de la investigación sobre el consumo sostenible, realizamos un análisis bibliométrico con 2168 artículos de la Colección principal de Web of Science utilizando el software VOSviewer.

Nuestros hallazgos sugieren que Inglaterra es el país más productivo en cuanto a la investigación del consumo sostenible. Las palabras clave más populares son las relacionadas con el campo de la “sostenibilidad” como “desarrollo sostenible” y “producción sostenible”; y “consumo”, como “comportamiento del consumidor” y “alimentos”. El artículo más citado de la muestra es “La economía colaborativa: por qué la gente participa en el consumo colaborativo” de Hamari, J; Sjöklint, M; y Ukkonen, A (2016). El artículo de la muestra más citado por otros artículos de la muestra es “Consumo sostenible: Comportamiento del consumidor ecológico al comprar productos” de Young, W; Hwang, K; McDonald, S; y Oates, CJ (2010). La fuente más citada y productiva es “Journal of Cleaner Production”. La institución más productiva y con más citas es la Universidad de Leeds. La mayoría de las instituciones con mayor nivel de producción en este campo son de Europa. El autor con más citas es Hubacek, Klaus. El artículo científico que más referencias comparte con otros artículos de la muestra es “Nuevas concepciones sobre el tamaño suficiente de la vivienda en países de altos ingresos: ¿nos acercamos a una transición hacia el consumo sostenible?” por Cohen, MJ. El autor más referenciado por los autores de la muestra es Ajzen, Icek.

Palabras clave: *Análisis Bibliométrico, Consumo Sostenible, Vosviewer, Web of Science*

1. Introduction

The field of sustainable consumption is a relatively new one (Reisch & Thøgersen, 2015), with the oldest indexed article in Web of Science being published in 1995. It is also a field that has gained popularity over the years, seeing a relatively constant increase in the number of published documents in said database (up to 364 in 2021).

Sustainable consumption is considered a key part of sustainable consumption and production, a research field introduced on the 1992 World Summit on Sustainable Development (Ma et al., 2019) regarded as one of the necessary factors required for achieving sustainable development (Wang et al., 2019). Sustainable consumption and production can be defined as the use of products and services that satisfy peoples' basic needs while minimizing the use of resources and waste (Caeiro, Ramos, & Huisingh, 2012; Cohen & Muñoz, 2016). Sustainable consumption and production eventually became the 12th goal in the United Nations sustainable development goals in 2015, becoming one of the main components in achieving sustainability (Ma et al. 2019). Sustainable consumption research aims to study consumption behaviors that are helpful to sustainable development (Reisch & Thøgersen, 2015).

By itself, sustainable consumption can be considered the part that is focused on increasing sustainability awareness and modifying consumer behavior toward healthier, “greener” choices and reducing material consumption levels (Barber, 2007; Cohen & Muñoz, 2016, Ma et al., 2019). Sustainable consumption has been studied from a variety of different perspectives, from studying sustainable consumption at the household level (Caeiro, Ramos, & Huisingh, 2012), to the study of factors that can contribute to the implementation of sustainable consumption or an increase in its efficiency (Liu, Oosterveer, & Spaargaren, 2016; Grabs et al. 2016), to consumers feelings on sustainable consumption (Coderoni & Perito, 2020;

Prothero et al. 2011), to its role in circular economy (Camacho-Otero, Boks, & Pettersen; 2018), or even its role in sustainable consumption and production (Barber, 2007; Cohen & Muñoz, 2016).

As the purpose of this research was to study some of the current “popular actors” in the field of sustainable consumption research, we believed the best tool for this endeavor was bibliometric analysis; a methodology that has increased in popularity over the years in business research for a myriad of reasons, such as the availability of software and databases, and the possibility of working with large volumes of data (Donthu et al. 2021).

Bibliometrics (or statistical bibliography as it was previously known) can be defined as the application of quantitative methods to books and other written media for the purpose of observing different facets of a discipline, such as trends, movements, general use, and other useful information (Donthu et al. 2021, Pritchard, 1969). It can also be defined as the use of statistical analyses with the purpose of retrieving measurable data from published research articles (Agarwal et al. 2016).

The rise of digital databases, such as Scopus, Web of Science, Google Scholar, PubMed, and many others; has made the access to scientific articles far easier than before. These databases, more often than not, allow the user to extract the articles themselves, in addition to their metadata and metrics used to measure their impact and performance.

Bibliometric analysis can be divided into two main techniques: Performance analysis and science mapping (Donthu et al. 2021). For the purposes of this research, we focused on science mapping, thus the methodology used in this article focused on the elaboration of bibliographic networks in order to observe how the items in these maps link with one another. As citation is one of the most popular topics in the field of bibliometrics, due to its usefulness as a measure of research performance (Moed, 2019); we elected to use VOSviewer software (van Eck & Waltman, 2010) given that the analyses that can be carried out with it have a heavy focus on citation. By using the available data, our bibliometric analysis allowed us to observe which are the most cited authors, documents, countries, sources, and organizations in the field of sustainable research found on Web of Science.

Sustainable consumption has been a subject of bibliometric research involving Vosviewer software recently (Corsini et al. 2019, De las Heras et al., 2021, Meseguer-Sánchez et al. 2020). To our knowledge, this is the first bibliometric mapping study that focuses specifically on sustainable consumption research itself in order to appreciate the most influential agents in its field.

2. Methodology

The articles that compose the sample used in this study were retrieved from the Web of Science Core Collection on March of 2022. The search term used was “sustainable consumption” under the category of “Topic”, which searches the articles’ title, abstract, and author defined keywords for the defined term. We restricted the search to only show scientific articles. Book chapters, working papers, conference papers and other types of documents were excluded from the search. In addition, we limited the search to articles from 1995 to 2021. All articles kept in the sample were required to be indexed in the Social Sciences Citation Index (SSCI), the Science Citation Index Expanded (SCI-EXPANDED), or the Emerging Sources Citation Index (ESCI). The results showed that 2168 articles met the search criteria. The full records and references of each article was extracted to use in VOSviewer.

The software used for the bibliometric analysis was VOSviewer, a software that allows the user to illustrate mappings of bibliometric networks from metadata extracted from well-known databases such as Web of Science, Scopus, or PubMed (van Eck & Waltman, 2010). VOSviewer has been used in many bibliometric analyses in the field of management for a wide variation of topics such as: Cause-related marketing (Bhatti et al., 2022), corporate governance (Maia & Di Serio, 2017), social entrepreneurship (Ferreira et al., 2017), female entrepreneurship (Ferreira et al., 2017), place branding (Lopes et al., 2018), etc. A more detailed list of published articles that used VOSviewer can be found on the VOSviewer website, where anyone can download the software for free.

The bibliographic mappings created in VOSviewer are formed by units of analyses (which can be articles, authors, countries, keywords, etc.) and the links between them. The possible types of units that can be used and what the links between them represent depends on the type of analysis. VOSviewer allows for 5 types of analyses: Co-authorship, Co-occurrence, Citation, Bibliographic coupling, and Co-citation.

A brief description of the analyses, as described by VOSviewer, is as follows:

- Co-authorship: The number of co-authored documents determines the relatedness between the items (authors, organizations, countries).
- Co-occurrence: The number of documents in which the items (keywords) occur together determines their relatedness.
- Citation: The number of times the items (documents, sources, authors, organizations, countries) cite each other determines their relatedness.
- Bibliographic coupling: The number of references shared by the items (documents, sources, authors, organizations, countries) determines their relatedness.
- Co-citation: The number of times the items (cited references, cited sources, cited authors) are cited together determines their relatedness.

The bibliographic mappings presented in this article are: Co-authorship between countries; co-occurrence of author selected keywords; citation of scientific articles, journals, organizations and authors; bibliographic coupling of scientific articles; and co-citation of cited authors. We performed all analyses using VOSviewer's predetermined values and implementing the full counting method. For convenience, the tables will only show the top 20 results of each analysis.

3. Results

The results of the Vosviewer analyses are presented in the tables and figures below. Tables 1 through 8 show the items used in the analysis and, depending on the type of analysis, will show the number of documents, citations, the citation per document ratio, occurrences, links or total link strength associated to the items. What the links and their total strength represent depends on the type of analysis performed.

All tables are accompanied by their respective bibliographic networks (Figures 1-8). The mappings show the items of the analyses, represented by the circles, and their links, represented by the curved lines. The size of the circle represents its total link strength, the bigger the circle, the higher the total link strength. The thickness of the line and the proximity between items represents the strength of their link. Vosviewer also groups the items into clusters, which are represented by the various colors that can be observed in the figure.

3.1 Co-authorship per country

The country co-authorship network illustrates the degree in which countries produce scientific articles with one another. Table 1 displays the 20 countries with the highest number of citations. For this particular type of analysis, the total link strength represents how often researchers from a country tends to co-author documents with authors from other countries. The greater the total link strength, the higher the level of cooperative works. Figure 1 displays the bibliographic mapping of the co-authorship per country network. The results of the analysis shows that England and the United States are the countries with the highest total link strength by a significant margin, which suggests they are the countries with the highest degree of joint research. Additionally, both are the countries with the highest number of authored documents and citations. Denmark is the country with the highest citation per document ratio. Of notice, is that most of the countries on the table are in Europe.

As figure 1 shows, the United States, England, and China are the largest items on the map, having the highest total link strengths and greatest number of links (England has 41, America and China both have 42). In addition, the strongest link of the network is the one between China and the United States. As England is the country with the highest total link strength, it is located at the center of the map. It is worth mentioning that these three countries are in separate clusters and are the items with the highest link number and link strength of their respective clusters. In the map we can see that countries tend to be grouped in clusters by region. Clusters 1 (red), 4 (yellow), 5 (purple), 7 (orange), and 8 (brown) are mostly composed of European countries (also explaining the proximity between clusters in the map); while cluster 2 (green) is mostly composed of countries from Asia and Oceania: and cluster 3 (blue) is mostly composed of South American and spanish speaking countries.

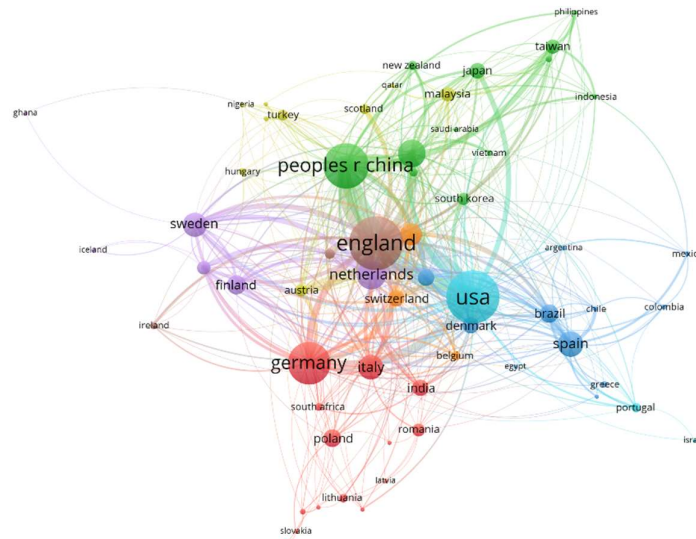
Table 1: Co-authorship per country ordered by number of citations

Rank	Country	Documents	Citations	Total Link Strength	C/D
1	England	287	12559	298	43.75958188
2	Usa	281	9163	251	32.60854093
3	Netherlands	130	7800	134	60
4	Germany	210	5389	134	25.66190476
5	Peoples R China	230	5160	197	22.43478261
6	Denmark	62	4967	63	80.11290323
7	Norway	49	3811	55	77.7755102
8	Australia	122	3548	111	29.08196721
9	Finland	75	3103	53	41.37333333
10	Sweden	102	3028	94	29.68627451
11	Switzerland	63	2115	82	33.57142857
12	Italy	105	1860	65	17.71428571
13	France	91	1848	102	20.30769231
14	Scotland	33	1737	25	52.63636364
15	Spain	108	1707	79	15.80555556
16	India	62	1407	37	22.69354839
17	Canada	63	1365	58	21.66666667
18	Austria	43	1336	56	31.06976744
19	Wales	32	1311	35	40.96875
20	South Korea	43	1294	25	30.09302326

Minimum number of documents authored by a country: 5

Source: own elaboration

Figure 1: Co-authorship per country network



Source: own elaboration

3.2 Co-occurrence of author selected keywords

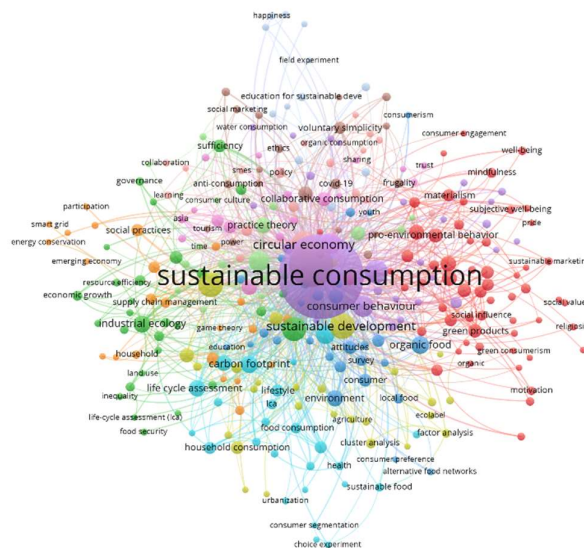
The author selected keywords co-occurrence network shows how often keywords show up with one another. Only keywords that appeared a minimum of 5 times in the sample were included on the analysis. Table 2 shows the 20 most used keywords. As expected, “sustainable consumption” is the most frequent keyword, given that it was the search term used to obtain the sample. Most of the keywords on the table are topics related to “sustainability” or “consumption” such as “sustainable development”, “consumer behavior”, or “food”. “Circular economy” is the most frequent keyword that doesn’t have the words “sustainability” or “consumer”, or any of their variations.

Table 2: Co-occurrence of author selected keywords ordered by number of occurrences

Rank	Keyword	Occurrences	Total Link Strength
1	Sustainable Consumption	807	1295
2	Sustainability	218	391
3	Circular Economy	77	140
4	Sustainable Development	72	118
5	Sustainable Consumption and Production	71	92
6	Consumption	66	167
7	Consumer Behavior	62	142
8	Consumer Behaviour	50	103
9	Sharing Economy	48	100
10	Climate Change	47	104
11	China	39	79
12	Organic Food	36	60
13	Carbon Footprint	34	77
14	Industrial Ecology	32	75
15	Environment	30	66
16	Life Cycle Assessment	30	50
17	Food	29	67
18	Practice Theory	29	57
19	Food Waste	28	56
20	Theory of Planned Behavior	28	67

Minimum number of occurrences of a keyword: 5
 Source: own elaboration

Figure 2: Co-occurrence of author selected keywords network



Source: own elaboration

Figure 2 shows the bibliographic mapping of the analysis. As “sustainable consumption” is the most used keyword (and the search term), it is located at the center of the network, directly surrounded by the other most frequent keywords. Rarer keywords such as “happiness”, “religiosity”, and “choice experiments” are located at the edge of the network due to being the less related to sustainable consumption.

3.3 Citations per scientific article

The scientific article citation analysis shows how much the articles of the sample cite each other. The links in this analysis do not specify the direction of the relationship. A link represents a relationship in which an article cites another, it does not allow the user to verify which article is citing which, although this can be surmised from the article’s year of publication. It should be noted that this analysis does not present the total link strength for the items, only the number of links and citations.

The most cited article of the sample is “The sharing economy: Why people participate in collaborative consumption” by Hamari, J; Sjöklint, M; and Ukkonen, A (2016). The article’s objective was to study people’s motivations for engaging in collaborative consumption. Despite being the article with the highest number of citations, its number of links is relatively low. This suggest that this article is highly cited by articles belonging to a field different, but no unrelated to “sustainable consumption”.

The paper with the highest number of links, and fourth highest number of citations, is “Sustainable Consumption: Green Consumer Behaviour when Purchasing Products” by Young, W; Hwang, K; McDonald, S; and Oates, CJ (2010). The article’s aim was to analyze the purchasing process for green consumers in relation to consumer technology products in the UK. The article’s number of citations and links suggest that the article is frequently cited by other articles of the sample. Figure 3 shows an illustration of the bibliographic network.

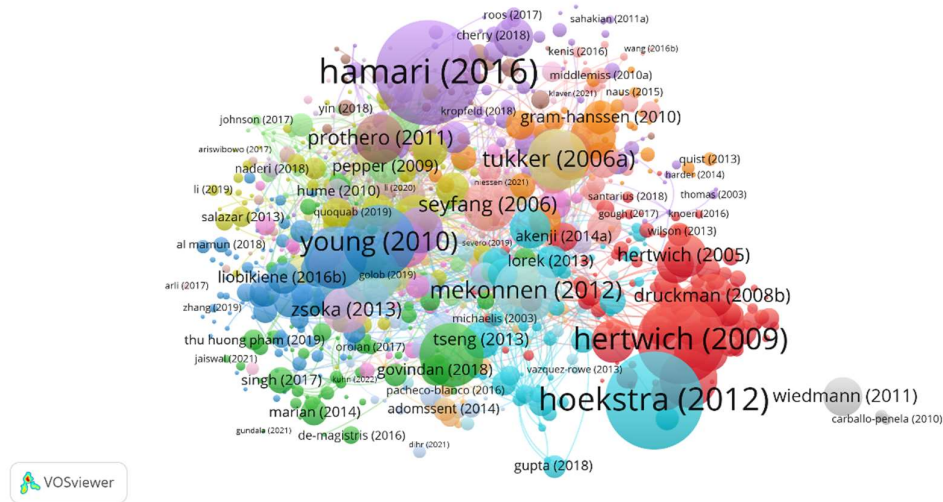
Table 3: Citations per scientific article

Rank	Document	Citations	Links
1	Hamari (2016)	1226	34
2	Hoekstra (2012)	1089	5
3	Hertwich (2009)	913	26
4	Young (2010)	673	132
5	Mekonnen (2012)	539	2
6	Papargyropoulou (2014)	534	10
7	Tanner (2003)	513	127
8	Tukker (2006a)	502	10
9	Vermeir (2008)	467	68
10	Guan (2008)	448	7
11	Seyfang (2006)	385	60
12	Prothero (2011)	356	76
13	Thogersen (2002)	317	40
14	Zsoka (2013)	317	18
15	Ropke (2009)	309	47
16	Peattie (2009)	302	22

17	Gadenne (2011)	296	28
18	Thogersen (2003)	294	29
19	Hertwich (2005)	292	32
20	Druckman (2008b)	284	10

Source: own elaboration

Figure 3: Citations per document network



Source: own elaboration

3.4 Citations per Sources

The citations per sources analysis (table 4) shows the scientific journals found in the sample, how many documents they have published, how many times the journal has been cited, and the ratio of citations per document. Just like the other citation analyses, there is no mention of the direction of the links. The journal “fresenius environmental bullet” was omitted from the mapping due to its low citation count and due to appearing a significant long distance away from the rest of the items, thus hindering visualization of the map.

The source with the highest number of citations by a wide margin, nearly 3 times as much as the second most cited journal, is “Journal of Cleaner Production”. It is also the journal with the highest number of published documents (over 200 documents ahead of the journal with the third highest number of published works). Given that it is the source with the highest number of documents and citations, it is of no surprise that it also has the highest link strength, which in this analysis, represents how much documents from a journal cite, or are cited by, other journals.

Figure 4 shows the bibliographic mapping of the citation per sources analysis. The strongest link of the entire network is the one between “journal of cleaner production” and “sustainability” (the purple circle); the two sources with the highest number of published documents. In addition, “journal of cleaner production” is the item with the highest number of links at 71.

Table 4: Citations per sources ordered by number of citations

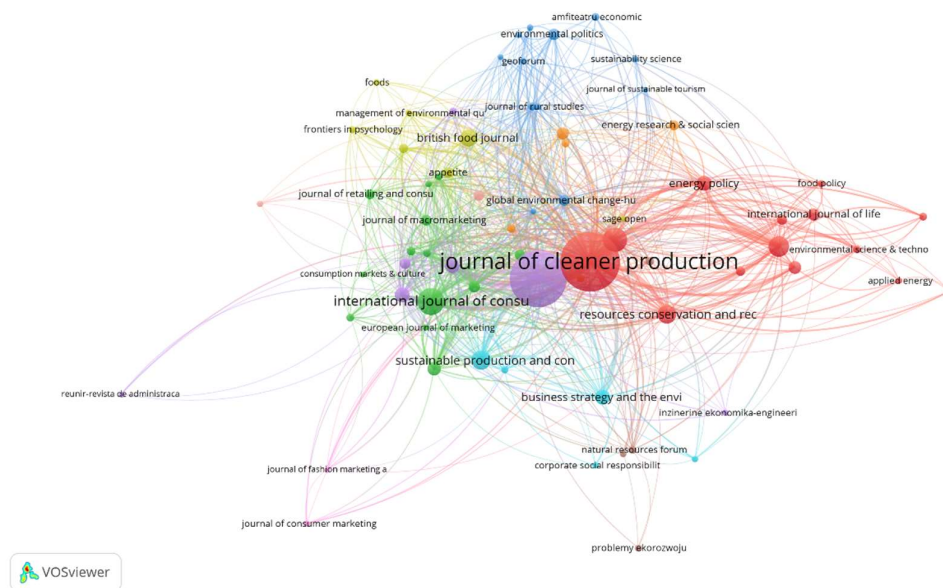
Rank	Source	Documents	Citations	Total Link Strength	C/D
1	Journal Of Cleaner Production	281	11444	1174	40.72598
2	Ecological Economics	58	4199	397	72.39655
3	Journal Of Industrial Ecology	44	3034	265	68.95455
4	International Journal of Consumer Studies	70	2434	352	34.77143

5	Sustainability	258	2308	737	8.945736
6	Energy Policy	26	2207	178	84.88462
7	Journal Of Business Research	25	1427	234	57.08
8	Global Environmental Change-Human and Policy Dimensions	15	1394	117	92.93333
9	Sustainable Development	24	1328	271	55.33333
10	Environmental Science & Technology	9	1240	52	137.7778
11	Resources Conservation and Recycling	37	834	157	22.54054
12	Psychology & Marketing	16	815	212	50.9375
13	Business Strategy and The Environment	25	807	134	32.28
14	Journal Of Business Ethics	22	721	149	32.77273
15	Journal Of Rural Studies	9	718	79	79.77778
16	Journal Of Economic Psychology	5	585	86	117
17	Journal Of Public Policy & Marketing	8	505	110	63.125
18	International Journal of Life Cycle Assessment	18	483	50	26.83333
19	British Food Journal	31	446	91	14.3871
20	Journal Of Environmental Psychology	7	433	52	61.85714

Minimum number of documents of a source: 5

Source: own elaboration

Figure 4: Citations per source network



Source: own elaboration

3.5 Citations per Organization

Table 5 shows the result of the citations per organization analysis. The institution with the highest number of citations and published documents is “univ leeds”, which stands for University of Leeds, a university located in England. Predictably, it is also the university with the highest link strength. Corroborating the results from the country co-authorship analysis, nearly one-third of the institutions in table 5 are from England. Also, 18 out the 20 institutions in table 5 are from Europe.

The mapping of the citations per organization analysis can be found in table 5. The strongest link of the network is the one between “lund univ” (Lund University) and “delft univ technol” (Delf University of Technology), both European universities. University of Leeds is the item with the highest number of links at 120.

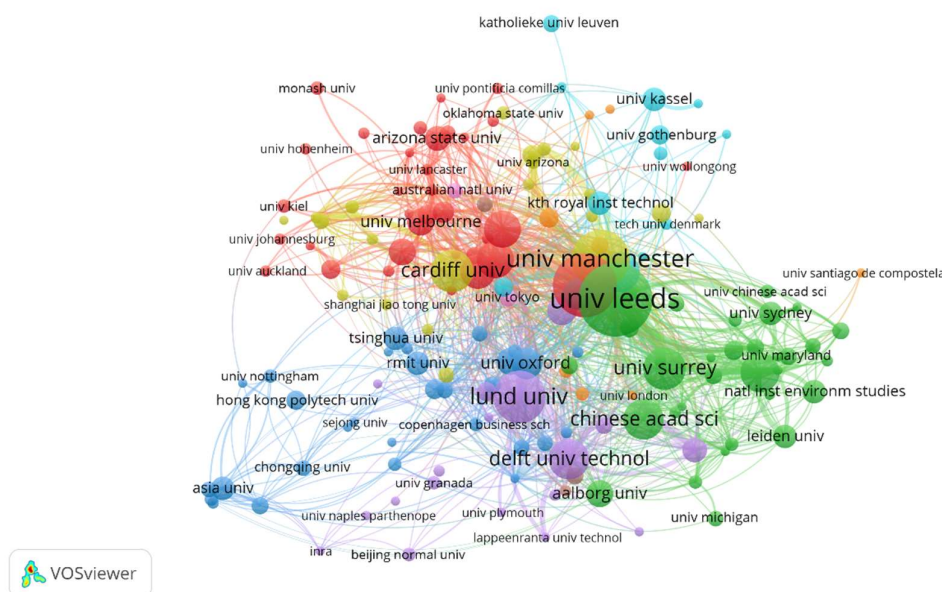
Table 5: Citations per organization ordered by number of citations

Rank	Country	Documents	Citations	Total Link Strength	C/D
1	univ leeds	38	3974	403	104.5789
2	norwegian univ sci & technol	20	2589	212	129.45
3	univ tampere	5	1806	46	361.2
4	univ twente	6	1773	31	295.5
5	univ cambridge	13	1432	106	110.1538
6	aalto univ	14	1414	77	101
7	copenhagen business sch	7	1349	74	192.7143
8	univ sheffield	19	1327	223	69.84211
9	univ utrecht	8	1300	73	162.5
10	univ manchester	30	1217	292	40.56667
11	lund univ	27	1150	232	42.59259
12	univ surrey	22	1084	150	49.27273
13	univ e anglia	10	1052	133	105.2
14	cardiff univ	22	963	170	43.77273
15	robert gordon univ	6	920	138	153.3333
16	aarhus univ	19	906	193	47.68421
17	univ sydney	12	850	77	70.83333
18	tech univ berlin	33	814	191	24.66667
19	delft univ technol	21	803	215	38.2381
20	chinese acad sci	21	788	83	37.52381

Minimum number of documents of an organization: 5

Source: own elaboration

Figure 5: Citations per organization network



Source: own elaboration

3.6 Citations per author

The citations per author analysis, table 6, shows which authors of the sample tend to frequently cite, or be cited by, other authors in the sample. The author with the most citations and the highest total link strength is Hubacek, Klaus. Since the author doesn't have a number of published documents significantly higher than the curve, the result suggests that the author is often cited by other authors in the sample. The author with the highest number of authored documents is Tseng, Ming-Lang.

The mapping of the citations per author analysis' bibliographic network is shown in Figure 6. The strongest link in the network is the one between Hubacek, Klaus and Guan, Dabo. Tukker, Arnold is the author with the highest number of links. Regarding clusters, cluster 6 (cyan) is formed by European and Asian authors; cluster 5 (purple) is formed by Asian authors; cluster 4 (yellow) is formed by a mix of European, American, and Asian authors; cluster 3 (blue) is composed mostly of European authors, particularly German authors; cluster 2 (green) by European authors, particularly authors from Germany and Lithuania. The proximity between cluster 2, 3, 6 and the left half of cluster 4 shows highlights a high degree of citation between European authors. Similarly, cluster 5 and the other half of cluster 4 suggest a high level of citation between Asian authors.

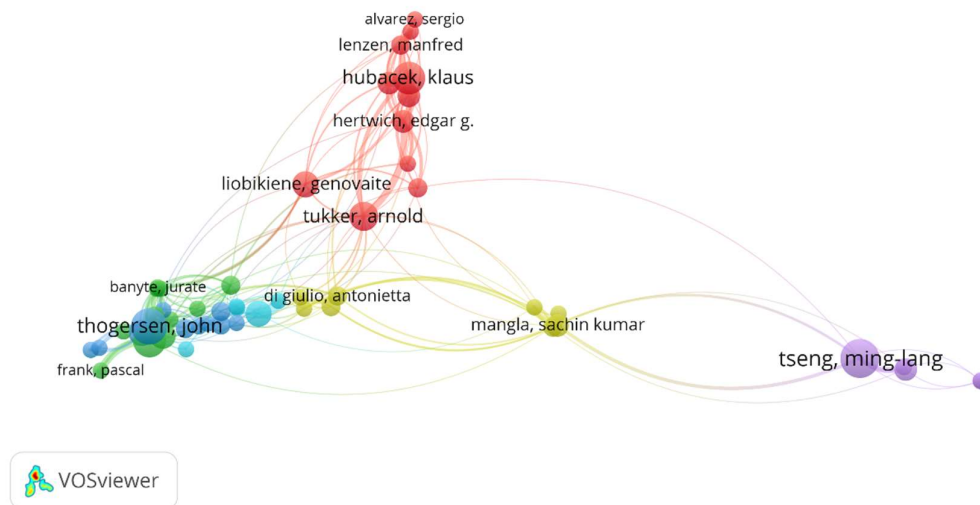
Table 6: Citations per author ordered by number of citations

Rank	Author	Documents	Citations	Total Link Strength	C/D
1	Hubacek, Klaus	10	1560	54	156
2	Guan, Dabo	7	1367	36	195.2857
3	Hertwich, Edgar G.	7	1296	41	185.1429
4	Tukker, Arnold	9	1141	37	126.7778
5	Thogersen, John	11	865	31	78.63636
6	Lenzen, Manfred	6	716	19	119.3333
7	Wiedmann, Thomas	5	682	25	136.4
8	Jackson, Tim	6	666	23	111
9	Feng, Kuishuang	7	639	33	91.28571
10	Ropke, Inge	5	495	20	99
11	Liobikiene, Genovaite	8	433	20	54.125
12	Spaargaren, Gert	8	421	27	52.625
13	Huisingh, Donald	5	402	15	80.4
14	Luthra, Sunil	6	391	27	65.16667
15	Mangla, Sachin Kumar	7	378	31	54
16	Fischer, Daniel	10	373	46	37.3
17	Evans, David	5	337	12	67.4
18	Tseng, Ming- Lang	12	336	21	28
19	Hobson, Kersty	6	323	9	53.83333
20	Middlemiss, Lucie	5	317	3	63.4

Minimum number of documents per author: 5

Source: own elaboration

Figure 6: Citations per author network



Source: own elaboration

3.7 Bibliographic coupling per document

The bibliographic coupling per document analysis is presented in table 7. It shows the degree in which documents share references. As the data remains the same throughout the article, the number of citations per document can be better observed in table 3. The scientific article with the highest total link strength is “New Conceptions of Sufficient Home Size in High-Income Countries: Are We Approaching a Sustainable Consumption Transition?” by Cohen, MJ. This suggests that this article shares the most references with other documents in the sample.

Figure 7 shows the graphical representation of the bibliographic coupling per document analysis. “cohen 2021” is the item with the two strongest links in the entire network: the strongest link is with “ernst (2012)”, and the second strongest link with “song (2015)”. Surprisingly, despite the relatively large sample size, the sample is accommodated in 3 distinct separate clusters, while most other analysis had at least double that number of clusters and said clusters are often mixed with one another.

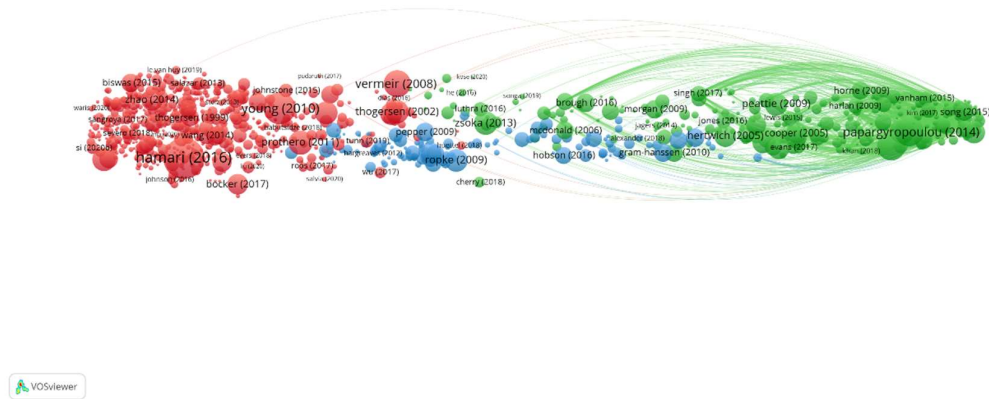
Table 7: Bibliographic coupling per document ordered by total link strength

Rank	Document	Citations	Total Link Strength
1	Cohen (2021)	9	36483
2	Ernst (2012)	24	35260
3	Song (2015)	169	23843
4	Kim (2017)	12	23283
5	Marx-Pienaar (2014)	13	22193
6	McArthur (2021)	1	21465
7	Bringezu (2012)	79	21179
8	Marx (2010)	8	20861
9	Selvefors (2019)	29	20365
10	Bocken (2017)	25	20164
11	Kreuzer (2019)	7	19965
12	Watkins (2016b)	8	19519
13	Barta (2017)	3	18591

14	Liedtke (2015)	96	15205
15	Pacheco-Blanco (2018)	2	14967
16	Morone (2019)	47	14852
17	Whitmarsh (2017)	13	14047
18	Seyfang (2010)	178	12323
19	Watson (2020)	15	11755
20	Rana (2019)	80	11206

Source: Own elaboration

Figure 7: Bibliographic Coupling per document network



Source: own elaboration

3.8 Co-citation per author

Table 8 shows the co-citation per author analysis. This analysis illustrates how frequently researchers are cited together. The results table shows the top 20 authors with the most citations. Note that the items in this analysis refer to the authors cited within the articles of the sample, not the authors of said articles (those can be observed in table 6). Also of note is that VOSviewer warns the user that Web of Science data only includes the first author of a cited article, while the rest of the authors are omitted from the co-citation analysis.

The results show the “ajzen, i” is the author cited the most by the authors of the articles that compose the sample. This abbreviation refers to Ajzen, Icek from the University of Massachusetts Amherst. By skimming through the extracted data from Web of Science we can observe several of Ajzen’s works being cited, such as “The Theory of Planned Behavior”, “Understanding Attitudes and Predicting Social Behavior”, and “Perceived Behavioral Control, Self-Efficacy, Locus of Control, and the Theory of Planned Behavior”. Ajzen is also the author with highest total link strength, meaning it is the author that tends to be cited the most alongside other authors, which is an expected result given that they are the author with the highest number of citations.

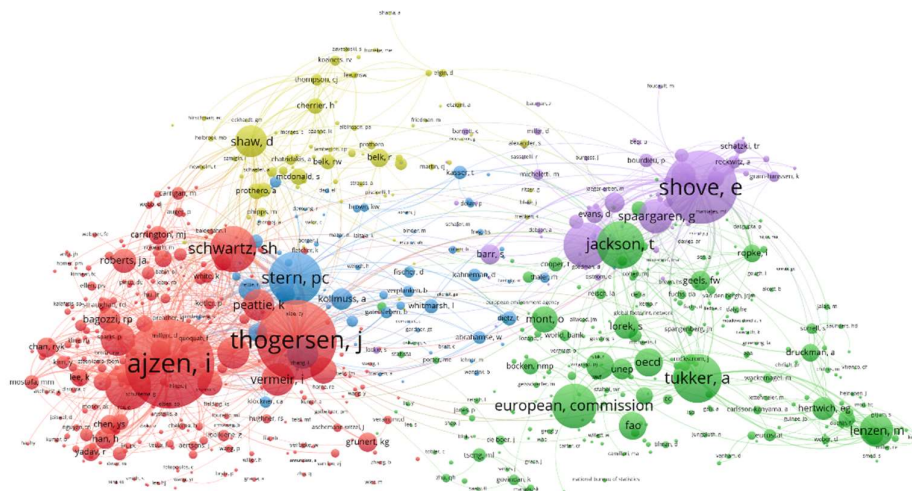
The mapping of the co-citation per author analysis is displayed in Figure 8. The strongest link in the network is the one between “schwartz, sh” and “thogersen, j”, meaning this is the pair of authors who appear the most together. Additionally, “thogersen, j” is the author with the highest number of links at 722. Unlike most other mappings, we can see the formation of 5 clusters mostly separated from each other, suggesting that authors tend to be cited within particular groups.

Table 8: Co-citation per author ordered by citations

Id	Author	Citations	Total Link Strength
1	Ajzen, I	601	19654
2	Thogersen, J	540	16645
3	Shove, E	493	12514
4	Stern, Pc	360	11654
5	Tukker, A	332	7441
6	Jackson, T	322	7480
7	Hair, Jf	313	9620
8	Schwartz, Sh	312	10383
9	Seyfang, G	306	6677
10	European, Commission	301	4429
11	Spaargaren, G	231	5269
12	Fornell, C	229	6983
13	Lenzen, M	225	4628
14	Vermeir, I	223	6556
15	Shaw, D	219	7676
16	Bamberg, S	217	7046
17	Peattie, K	213	6691
18	Steg, L	213	6682
19	Oecd	195	4022
20	United, Nations	190	3598

Minimum number of citations per author: 20
 Source: own elaboration

Figure 8: Co-citation per author network



Source: own elaboration

4. Conclusions

To learn about the current state of sustainable consumption research in Web of Science; we extracted 2168 scientific articles from 1995 to 2021 indexed in SSCI, SCI-EXPANDED, and ESCI from the Web of Science Core Collection to conduct a bibliometric analyses using VOSviewer.

Our findings suggest England is the most productive country regarding sustainable consumption research. It has the highest number of published documents and citations, as well as the highest degree of co-authorship. Regarding keywords, the most frequent keywords in sustainable consumption are those related to the field of “sustainability” such as “sustainable development” and “sustainable production”; and “consumption”, such as “consumer behavior” and “food”. The most cited article of the sample is “The sharing economy: Why people participate in collaborative consumption” by Hamari, J; Sjöklint, M; and Ukkonen, A (2016). The article most cited by other articles in the topic of sustainable consumption is “Sustainable Consumption: Green Consumer Behaviour when Purchasing Products” by Young, W; Hwang, K; McDonald, S; and Oates, CJ (2010).

The source with the highest number of citations and published documents is “Journal of Cleaner Production”. The institution with the highest number of citations and published documents is the University of Leeds. Most of the institutions with the highest level of production regarding “sustainable consumption” were from Europe, particularly from England. The author with the most citations is Hubacek, Klaus, while the author with the highest number of authored documents is Tseng, Ming-Lang.

The scientific article that shares the most references with other articles of the sample is “New Conceptions of Sufficient Home Size in High-Income Countries: Are We Approaching a Sustainable Consumption Transition?” by Cohen, MJ. Interestingly, we can see the formation of three clusters when it comes to scientific articles sharing bibliography. The author most referenced by the authors of the sample is Ajzen, Icek.

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