ASECU South-Eastern Europe Journal of Economics 2 (2023) 105-124 SEEJE

SMARTLY CONNECTED BRANDS. A SUSTAINABLE PERSPECTIVE (ANALYSIS AS A BIBLIOMETRIC STUDY)

ALEXANDRA RALUCA JELEA*
"Alexandru Ioan Cuza" University of Iași, Romania

Abstract
The understanding of the term "smart consumer" has changed over time. A few years ago, it used to mean that someone is getting the best deal while shopping. Nowadays, technology plays an important part. This article uses a quantitative method that utilizes bibliometric analysis as a technique to analyse existing literature. A total of 5 terms was considered: smart objects, smart brands, smart consumers, sustainable consumers and smart sustainable consumers. The timeline of articles was computed over a specific time period while the keywords trend and the articles most cited were found using VOSviewer. For the 'smart sustainable consumers' term a table was created containing additional information regarding the number of authors, study attributes, study type, analysis unit, sample size, and data collection method. The results of this study show that there is an opportunity to further develop and investigate this matter using a qualitative approach.

Keywords: smart brands, smart consumer, smart objects, sustainable consumer, VOSviewer, bibliometric analysis.

JEL Classification: M30, M31, N30.

The paper has been nominated for the ***Tsekouras Prize for Young Economists,*** awarded by the Association of Economic Universities of South and Eastern Europe and the Blach Sea Region (ASECU), at the 11th ASECU Youth International Conference and Summer School, 4-10 September 2022, Nitra, Slovakia

* ***Corresponding authror:*** Alexandra Raluca Jelea, "Alexandru Ioan Cuza" University of Iași, B-dul Carol I, Nr. 20A, RO-700505 – Iaşi Romania. Email: alexandra.jelea@uaic.ro

1. Introduction

In our time, the term "smart" is used quite frequently. We have come to live in a smart home and to use smart objects. We purchase smart brands, and ~~we~~ call ourselves smart consumers. However, the understanding of the term "smart consumer" has changed over time. A few years ago, it used to mean ~~that~~ someone who was getting the best deal while shopping. Nowadays, technology plays an important part. Therefore, the meaning of "smart consumer" has become broader in meaning. It implies more than someone who finds the best deal, and describes someone who knows exactly how much they are willing to spend (*Being a Smart Consumer | New Brunswick Financial and Consumer Services Commission (FCNB)*, n.d.); someone who compares prices and tech specs, reads reviews, and decides how to buy the product (online or at a physical store) (Reformat, 2013). Still, the research proposed here will not analyse what a smart consumer is but will, instead, explore the existing literature using bibliometric analysis.

Bibliometric indicators are particularly significant for researchers, since they are often used when studying funding decisions, appointments, and promotions of researchers (*Bibliometric Indicators: Quality Measurements of Scientific Publication | Radiology*, n.d.). As more scientific discoveries occur and research results published are read and then quoted by other researchers, bibliometric indicators are becoming increasingly essential (*For What Purpose are the Bibliometric Indicators and How Should They Work – RICYT*, 2019) . In this research, the main bibliometric indicators used are quality indicators and structural indicators. As a basic bibliometric indicator, this paper used citations and mapping.

This paper was inspired by the bibliometric analysis made by Çelik, Z on Flow Theory (Çelik & Uslu, 2022). The aim for this study is to follow the logic in the study previously presented, i.e. to create a bibliometric table containing useful information on smart sustainable consumers.

2. Data and Methods

This research paper aims at conducting a bibliometric analysis based on the following terms: *smart consumer* and *smart sustainable consumer*. For these two terms, the number of articles published was computed along with the keywords most frequently used in the articles collected, as well as the main authors with publications on this topic. The database was created using the Lens online database and searching for the two terms, separately. From the results, the first 1000 most cited articles were downloaded as an RIX file and uploaded onto VOSviewer. Besides the previous two terms, the following ones were also used: *smart brands*, *smart objects* and *sustainable consumers*. What was taken into consideration regarding the first two terms were the keywords trends, the number of articles written over a specific period of time, and the most frequently cited authors in that period of time (these periods of time differ

because the trends emerged during a number of years). The sample size of articles containing the keywords varies because not all terms appear in the same number of articles since keywords are automatically calculated by VOSviewer based on the databases uploaded. For the second batch of terms, the same steps were followed in order to compile the database, which was also uploaded in VOSviewer. For the term *sustainable smart consumer* a bibliometric table was created using only 26 articles, which were chosen as the most relevant ones.

All five terms have been chosen based on conducting interviews with 5 specialists.

The main objectives for this research paper are going to help find any gaps that may exist in relevant literature and the topics that deserve to be further explored/ investigated.

O1. To identify the timeline for published articles that contain the following terms: *smart brands, smart consumer, smart object, sustainable consumers* and *smart sustainable consumer*.

O2. To identify the most frequently cited author with publications referring to the following terms: *smart brands, smart consumer, smart object, sustainable consumers and smart sustainable consumer.*

O3. To identify the most frequently used keywords in published articles on the following topics: *smart brands, smart consumer, smart object, sustainable consumers* and *smart sustainable consumer*.

O4. To identify the number of authors, study attribute, study type, the unit of analysis, the sample size and data collection method for the articles published and referring to the term *smart sustainable consumer*.

The main issue this research paper is addressing is to find any gaps that might exist regarding the emerging term *smart sustainable consumer*.

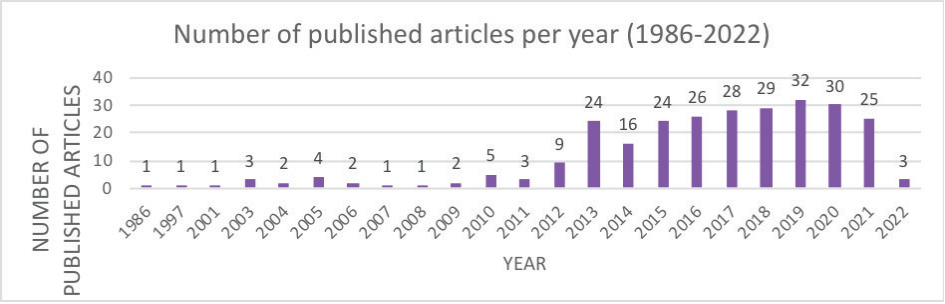
3. Results and Discussion

3.1. O1. To identify the timeline for the following terms: smart brands, smart consumer, smart object, sustainable consumers and smart sustainable consumer.

Smart brands

In order to identify the timeline of ~~the~~ articles written concerning the *smart brands* term, it is important to find out which years provided the highest number of published articles referring to this term. However, VOSviewer does not provide such an analysis, so we computed the number of articles in Excel. The initial sample size was 274, because that was the total number of published articles found on the Lens database. Since some of the articles were not dated, the final sample included 272 articles published from 1986 to 2022.

Figure 1. Number of articles related to "smart brands" published over the years 1986 - 2022



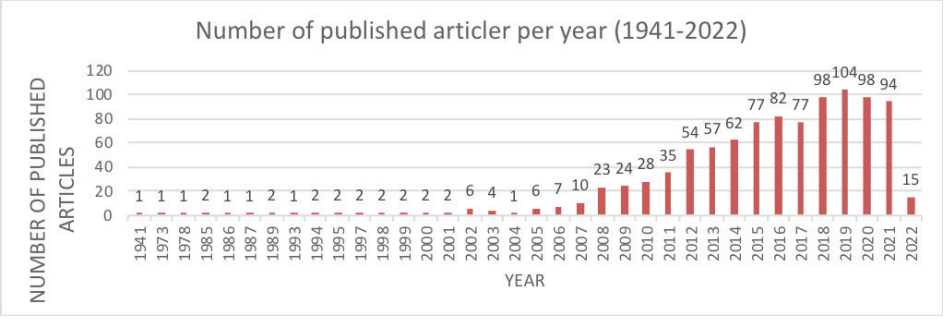
Source: author's own processing in Excel

As seen in the figure above, there is a rising trend from 2015 to 2019 and a descending trend from 2020 to 2022. In the early 2000s, only a few articles were published, but from 2014 to 2020, interest in this topic grew significantly.

Smart consumer

In order to identify the timeline of articles referring to the *smart consumer* term, it is important to note which years provided the highest number of relevant articles on this topic. However, VOSviewer does not provide such an analysis, so we computed the number of articles in Excel. The initial sample size was 1000, but some of the articles were not dated and, therefore, the final sample contained 986 articles published from 1941 to 2022.

Figure 2. Number of articles related to "smart consumers" published over the years 1941 - 2022



Source: author's own processing in Excel

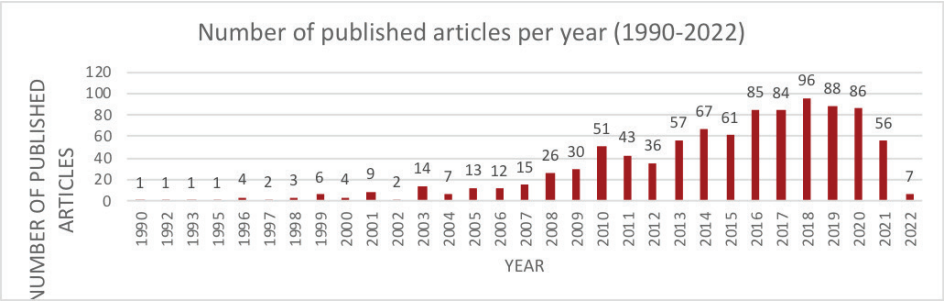
As seen in Figure 2, the number of articles referring to the *'smart consumer'* term rose significantly as of 2009. In the early 2000s only a few articles were published,

but from 2009 to 2021 interest in this topic grew significantly. A decrease is noted in 2017, but the trend kept rising in the following year.

Smart objects

In order to identify the timeline of articles referring to the *"smart objects"* term, it is important to find out which years provided the highest number of published articles referring to this term. However, VOSviewer does not provide such an analysis, so computations concerning the number of articles was performed in Excel. The initial sample size was 1000 articles, but some of the articles were not dated and, therefore, they were excluded; the final sample contained 968 articles published from 1990 to 2022. This period of time was chosen because the earliest publication found on the Lens database was in the year 1990.

Figure 3. Number of articles related to "smart objects" published over the years 1990 - 2022



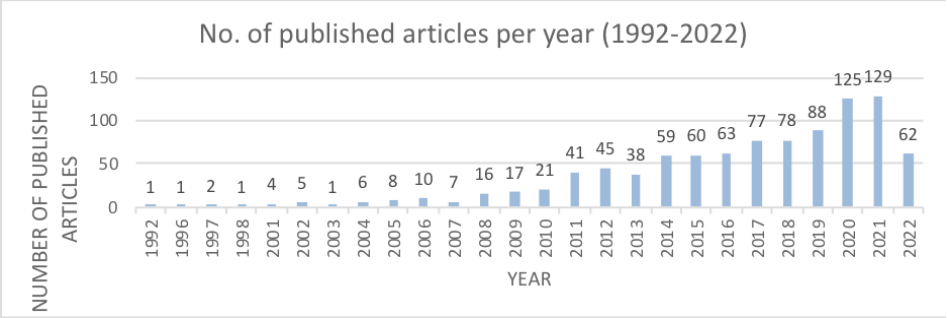
Source: author's own processing in Excel

The number of articles referring to the "*smart objects*" term rose significantly as of 2016. In the early 2000s only a few articles were published, but from 2010 to 2020 ~~the~~ interest related to this term grew significantly. Overall, the trend rose and decreased: for example, it rose two years in a row (2013 and 2014) and there was a drop in 2015.

Sustainable consumer

In order to identify the timeline of articles referring to the *sustainable consumer* term, it is important to find out which years provided the highest number of articles *related to this term*. However, VOSviewer does not provide such an analysis, so we computed the number of articles in Excel. The initial sample size was 1000, but some of the articles were not dated, so the final sample contained 965 articles from 1992 to 2022.

Figure 4. Number of articles related to the "sustainable consumer" published over the years 1992 - 2022



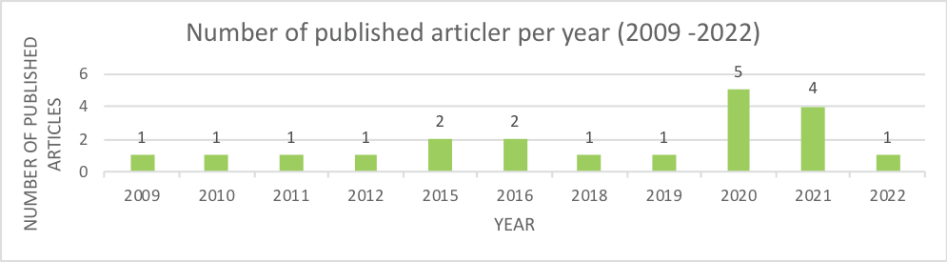
Source: author's own processing in Excel

As seen in Figure 4, the number of articles referring to the "*sustainable consumer*" term has been significantly rising as of 2012. In the early 2000s only a few articles were published, but from 2014 to 2021 interest in this term grew significantly. Some decrease was noted in 2013. Data for 2022, have not completed yet, since this research paper is being compiled in mid-July. By the time 2022 ends, more relevant articles will have been published.

Smart Sustainable consumer

In order to identify the timeline of articles referring to the term "sustainable smart consumer", it is important to find out the years providing the highest number of articles published regarding this term. However, VOSviewer does not provide such an analysis, so we computed the number of articles using Excel. The initial sample size was 20 from 2009 to 2022 with some gaps in 2013, 2014 and 2017 and peaking in 2020.

Figure 5. Number of articles related to "sustainable smart consumers" published over the years 2009 - 2022



Source: author's own processing in Excel

All terms investigated above indicate that some terms have been investigated much deeper and this can be proved by the fact that relevant papers emerged in the 1900s and continued into the 2000s. Another point worth highlighting is the numbers of published articles, which are quite high concerning the well-known terms, i.e. *smart consumer, sustainable consumer, ~~and~~ smart objects;* in fact, those selected for this study numbers exceed the 1000 threshold. In the meantime, for the less frequently used terms, i.e. smart brands, and smart sustainable consumers, published articles are relatively fewer, their total amount not exceeding 300 in total.

3.2 O2. To identify the most frequently cited author with publications regarding the following terms: smart brands, smart consumer, smart object, sustainable consumers and smart sustainable consumer.

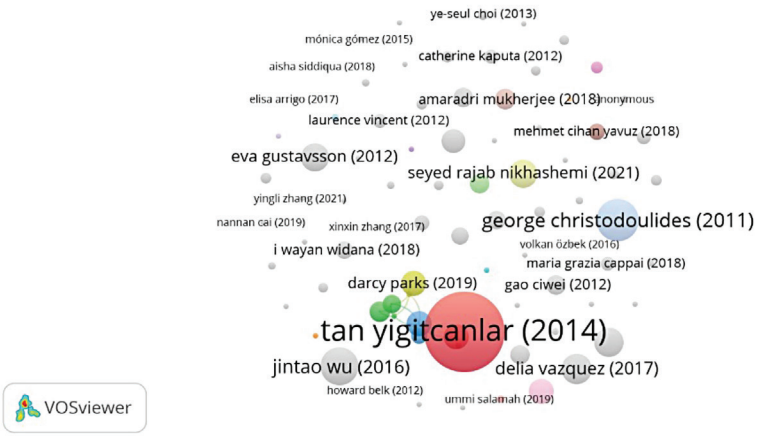
The purpose of this objective is to highlight who are the most frequently mentioned authors and which are in the top respective terms.

Smart brands

The database for the *smart brands* term contains only 274 relevant records.

According to the citations collected, out of the 274 documents only 84 contain at least one; of these 84 only 10 come with acknowledged authors. As shown in Figure 6, Tan Yigitcanlar has the highest number of citations, namely 193, followed in second place by George Christodoulides with 54 citations and by Jintao Wu in third place with 45 citations.

Figure 6. Smart brands article citations with outliers



Source: author's own processing in VOSviewer

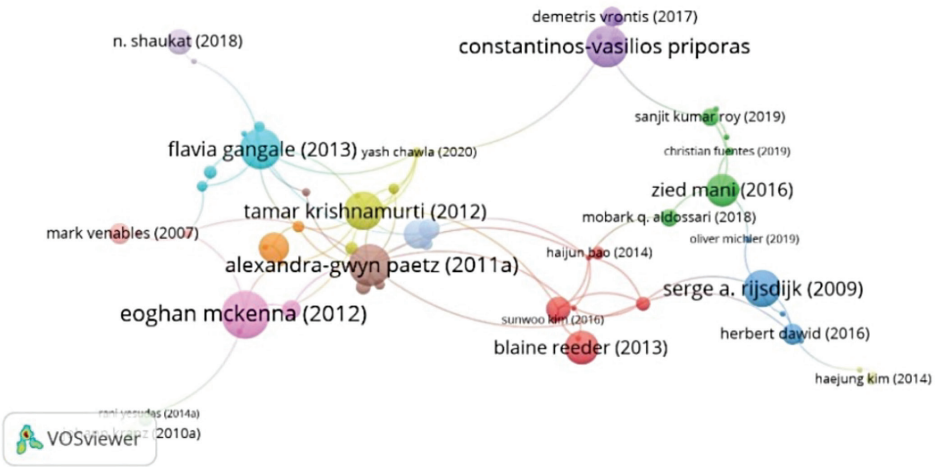
Only computation of author citations results is presented in the data outline because the relevant authors are too few to report.

Smart consumer

The database for the *smart consumers* term contains 1000 relevant records.

According to the citations collected, out of the 1000 documents only 528 contained at least one citation; out of these 528 only 66 come with acknowledged authors. As shown in Figure 7, Eoghan McKenn has the highest number of citations, namely 267, followed in second place by Constantinos-Vasilios Priporas with 210 citations, and Alexandra-Gwyn Paetz in third place with 199 citations.

Figure 7. Smart consumer article citations without outliers

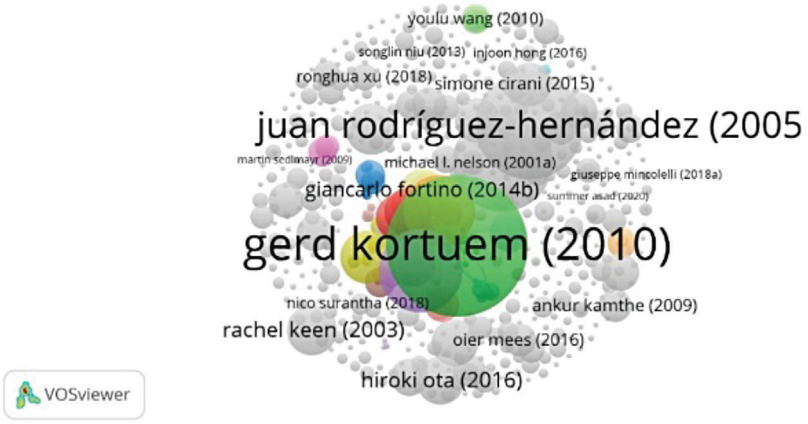


Source: author's own processing in VOSviewer

Smart objects

Regarding the most frequently cited authors, out of 1000 records only 627 are co-citated. From those, as shown in Figure 6, Gerd Kortuem ranks first with 1201 citations.

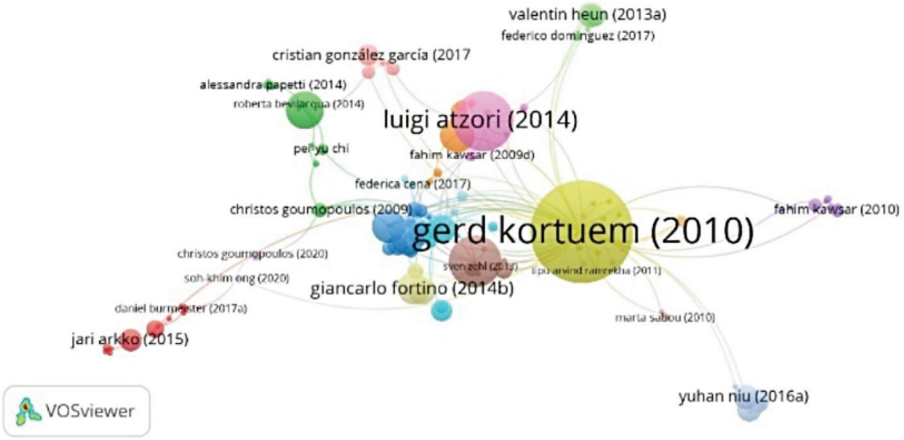
Figure 10. Smart objects article citations with outliers



Source: author's own processing in VOSviewer

Juan Rodríguez-Hernández ranks second with 703 citations followed by Dariu M. Gavrila with 604 citations in third place, and Luigi Atzori with 422 citations in fourth place.

Figure 11. Smart objects article citations without outliers



Source: author's own processing in VOSviewer

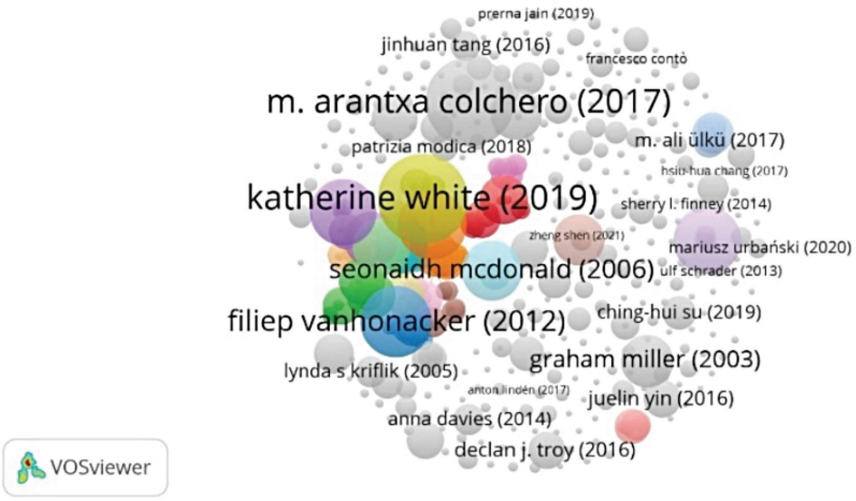
As shown in Figure 11, co-cited articles with acknowledged authors are not that many. Out of 627 documents only 119 items contain co-citations of acknowledged authors.

Sustainable consumers

The database for the *sustainable consumers* term contains 1000 records.

According to the citations collected, out of the 1000 documents only 429 contained at least one citation, and out of these 429 only 104 contain an acknowledged author.

Figure 12. Sustainable consumers article citations with outliers



Source: author's own processing in VOSviewer

As shown in Figure 12, Katherine White has the highest number of citations with 407, followed in second place by M. Arantxa Colchero with 396 citations, and Filiep Vanhonacker in third place with 259 citations.

Smart sustainable consumer

The database for *smart consumers* contains 20 records, which indicates that not many articles referring to this term have been authored.

According to the citations collected, out of 20 documents only 9 contain at least one citation and none of them are correlated.

Figure 13. Sustainable smart consumers article citations

Source: author's own processing in VOSviewer

As shown in Figure 13, Alexandra-Gwyn Paetz has the highest number of citations with 209, followed in second place by Christos Vlachokostas with 12 citations, and by Haiyun Chen in third place with 10 citations.

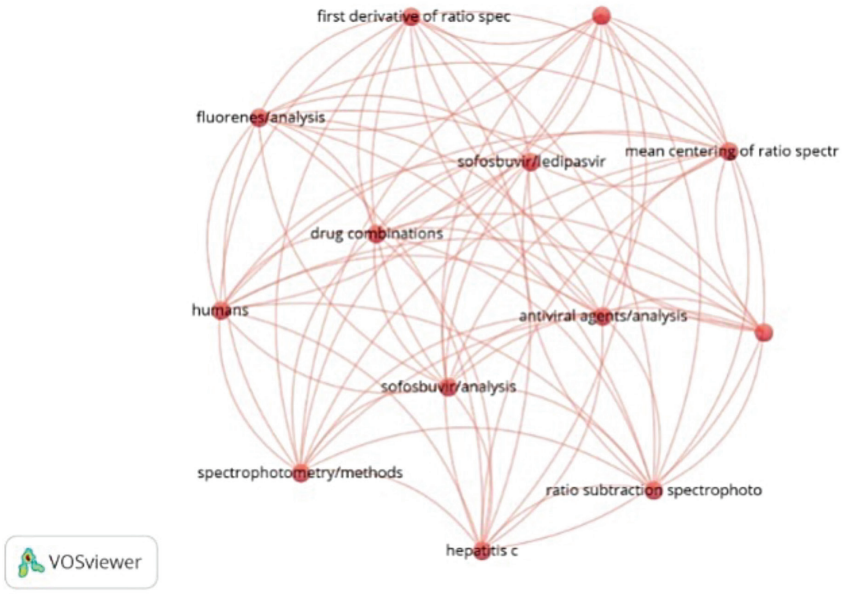
3.3 O3. To identify the most frequently used keywords in published articles on the following terms: smart brands, smart consumer, smart object, sustainable consumers and smart sustainable consumer.

Smart brands

Our next objective concerning *smart brands* was to identify the main keywords that showed up most frequently in the articles selected.

Only 13 keywords were found, most of which are pertinent to the medical field (Figure 14).

Figure 14. Smart objects article clusters concerning keywords



Source: author's own processing in VOSviewer

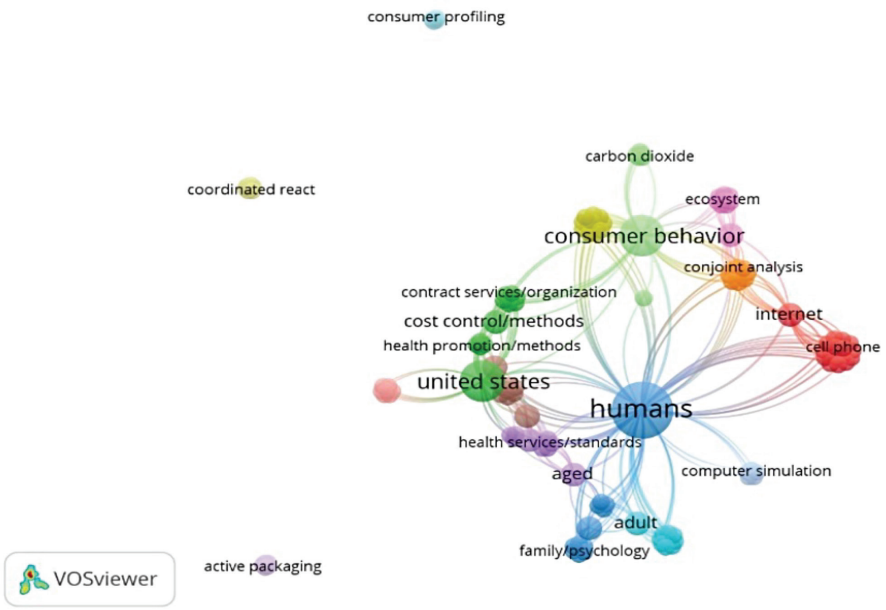
This may be a great opportunity to introduce something new to a field that has never been investigated before. The term *smart brands* is just emerging and seems to be the main focal point in the field of medicine, affording a great opportunity for a higher number of articles to be published in the economy or marketing field, as well.

Smart consumer

Our next objective for the *smart consumer* term was to identify which are the main keywords showing up.

Out of 1000 records only 137 keywords were found; out of these 137 only 122 are correlated. As shown in Figure 15 there are several outliers, namely consumer profiling, coordinated reactions and active packaging.

Figure 15. Smart consumer article clusters concerning keywords



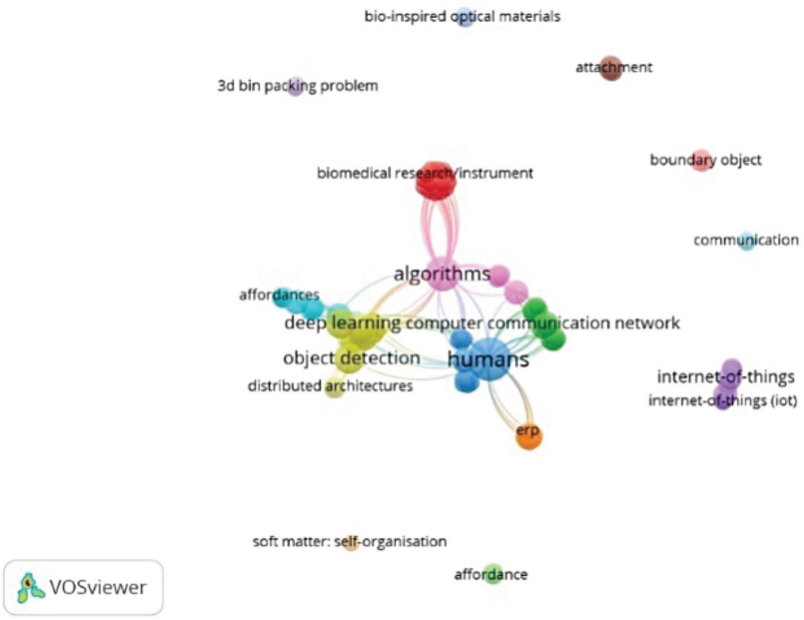
Source: author's own processing in VOSviewer

The main cluster contains keywords such as humans, consumer behaviour, internet, ecosystem, cost/control methods, computer stimulation, family/psychology, health services/standards.

Smart objects

The third type of analysis performed concerned keywords; out of 1000 records only 134 keywords were found. Out of these 134 only 90 are correlated. As shown in Figure 16 there are several outliers, such as attachment, boundary object, communication, 3d bin packing problem, affordance, soft matter, self-organisation, and, most importantly, the internet of things.

Figure 16. Smart consumers article clusters concerning keywords



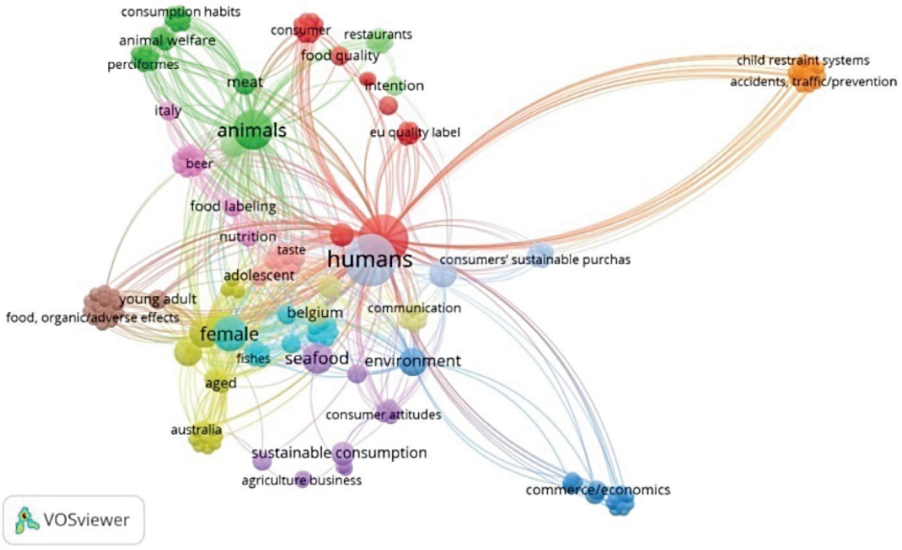
Source: author's own processing in VOSviewer

The main cluster contains keywords such as humans, algorithms, erp, deep learning. This is because smart objects mainly refer to appliances that can be connected using Bluetooth technology.

Sustainable consumers

The third type of analysis performed concerned keywords; out of 1000 records only 208 keywords were identified; of these 208 only 188 are correlated. There are several outliers such as consumer's perception, family and friend support, consumer behaviour change, and food waste. The main cluster contains keywords such as humans, animals, sustainable consumption, books, animal welfare, food labelling, accidents, traffic/prevention, etc. A clearer image for the cluster can be seen in Figure 17.

Figure 17. Sustainable consumer article clusters concerning keywords without outliers



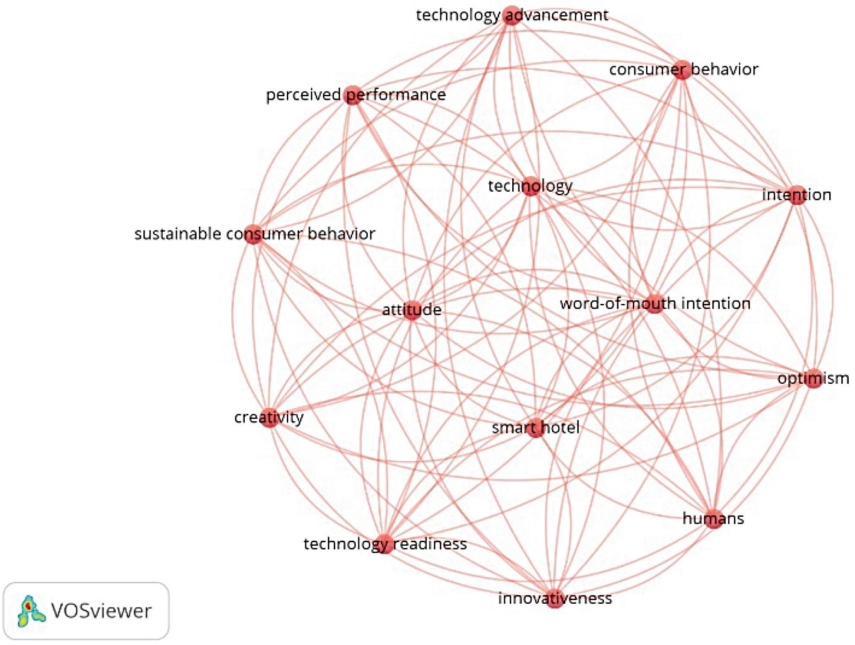
Source: author's own processing in VOSviewer

It is apparent that ~~the~~ keywords for the *sustainable consumers* term are associated more with the idea of food and how to be more sustainable as opposed to how technology may be used in a more sustainable way.

Smart sustainable consumer

The third type of analysis performed concerned keywords; out of the 20 records only 14 keywords were identified, none of which are correlated. As shown in Figure 16 it is apparent that the cluster contains keywords such as technology, smart hotel, humans, technology readiness, attitude, perceived performance, etc.

Figure 18. Smart sustainable consumers article clusters concerning keywords



Source: author's own processing in VOSviewer

It becomes apparent that the focus is on technology, on how advanced it is and on the extent to which people are ready to adapt to it.

3.4. O4 To identify the number of authors, study attribute, study type, the unit of analysis, the sample size and data collection method for the articles published and referring to the term smart sustainable consumer.

As shown in Table 1, a chronological analysis of findings is presented, covering the period from 2009 to date. Among the 26 studies selected, there are more studies authored by three or more individuals (73.07%), the majority being journal articles (100%), and mostly using the quantitative method (54.54%).

Table 1: Bibliometric analysis concerning smart sustainable consumers

Bibliography of Selected Studies		Time Period									
		2009 - 2014		2015- 2018		2019 - 2022		2020 - Present		2009 - Present	
		N1 = 10		N2 = 5		N3 = 11		N5 = 8		N6 = 26	
		f	%	f	%	f	%	f	%	f	%
Number of authors	One author	1	10%	1	20%	1	10.10%	1	12.5%	3	11.53%
	Two authors			4	80%					4	15.38%
	Three or more authors	9	90%			10	90.90%	7	87.5%	19	73.07%
Study Attribute	Journal Article	4	100%	3	100%	4	100%	3	100%	11	100%
Study type	Quantitative	2	50%	1	33.33%	3	75%	2	66.66%	6	54.54%
	Qualitative	2	50%	2	66.66%	1	25%	1	33.33%	5	45.45%
Unit of Analysis	Student and other					1	25%			1	9.09%
	Other	3	75%	2	66.66%	2	50%	2	66.66%	7	63.63%
	Source	1	25%	1	33.33%	1	25%	1	33.33%	3	27.27%
Sample size	A thousand and below	1	25%	1	33.33%	3	75%	2	66.66%	5	45.45%
	Over a thousand	1	25%							1	9,09%
	Not quantitative	2	50%	2	66.66%	1	25%	1	33.33%	5	45.45%
Data collection method	Survey	1	25%			3	75%	2	66.66%	4	36.36%
	Focus group	1	25%							1	9.09%
	Literature review	1	25%	2	66.66%	1	25%	1	33.33%	4	36.36%
	Mixed (experiment, questionnaire)	1	25%	1	33.33%					2	18.18%

Through the 26 studies it is apparent that the most frequently used unit of analysis is “other” (63.63%), with a sample size of “up to one thousand” and “not quantitative” at the same percentage (45.45%). The main data collection method used was literature review and survey (36.36%) followed by mixed methods (18.18%), mostly involving questionnaires.

4. Conclusion

In conclusion, all computations performed, and data gathered lead to an essential observation, namely that certain concepts have been scrutinized more extensively concerning all the terms investigated. This is apparent from the fact that the majority of these investigations commenced in the late 1900s rather than in the 2000s. Additionally, notable terms, such as "smart consumer," "sustainable consumer," and "smart objects", boast a substantial number of published articles, exceeding even the threshold of 1000 articles that was chosen for this study. Conversely, lesser-known terms such as "smart brands" and "smart sustainable consumer" are referred to in significantly fewer published articles, totalling under 300 as a whole. As for the last two terms, articles referring to these terms emerged in the early 2000s, while the first three terms were referred to in articles written towards the end of the 1900s, a fact reflecting the significance of the time factor and explaining why the number of articles varies.

Beside the number of published articles, the trend in the most *frequently* used keywords for all the terms selected were *humans, technology, consumer, environment, internet, algorithm*.

The most frequently cited authors were Alexandra-Gwyn Paetz, Katherine White, Eoghan McKenn, Tan Yigitcanlar and Gerd Kortuem.

Discussion

Since there are not so many articles referring to the term *smart sustainable consumers*, this could lead to the inference that the public is not yet acquainted with a possible explanation for this term. This consumer could be someone who is paying attention to how scarce resources are used, be they food, technology or fashion.

On the other hand, this study can guide other researchers to analyze the trends of future articles and investigate a field not yet adequately explored.

The Bibliometric Table indicates that more quantitative studies were authored related to these terms in recent years. This confirms that there is an opportunity for further investigation using a qualitative approach.

Acknowledgements

This paper was created with the help of my supervising tutoring professor to whom I am most grateful.

References

Being a Smart Consumer | New Brunswick Financial and Consumer Services Commission (FCNB). (n.d.). Retrieved February 24, 2024, from https://www.fcnb.ca/en/guides/being-a-smart-consumer

Bibliometric Indicators: Quality Measurements of Scientific Publication | Radiology. (n.d.). Retrieved February 24, 2024, from https://pubs.rsna.org/doi/10.1148/radiol.09090626

Çeli˙k, Z., & Uslu, A. (2022). BIBLIOMETRIC ANALYSIS OF FLOW THEORY FROM PAST TO PRESENT WITH VISUAL MAPPING TECHNIQUE: A MARKETING-SIDED APPROACH. Öneri Dergisi, 17(57), Article 57. https://doi.org/10.14783/maruoneri.990480

For What Purpose are the Bibliometric Indicators and How Should They Work – RICYT. (2019, September 12). https://www.ricyt.org/2019/09/for-what-purpose-are-the-bibliometric-indicators-and-how-should-they-work/

Reformat, B. (2013). The Idea of Smart Shopping—The Generation of Smart Consumers. Studia Ekonomiczne / Uniwersytet Ekonomiczny w Katowicach, nr 149 La société de l'information : perspective européenne et globale : l'espace européen de l'information, 166–175.

Appendix

Table 1: Articles chosen for the bibliometric analyses concerning sustainable smart consumers

Year	Selected studies	Study attribute	N (No of authors)
2009	Wilma Mert; Melanie Watts; Wibke Tritthart - Smart domestic appliances in sustainable energy systems - consumer acceptance and restrictions	journal article	3
2010	Jacquelyn Ottman - A Smart New Way to Segment Green Consumers | Sustainability Marketing, The New Rules of Green Marketing Book | J. Ottman Consulting	book	1
2011	Alexandra-Gwyn Paetz; Elisabeth Dütschke; Wolf Fichtner - Smart Homes as a Means to Sustainable Energy Consumption: A Study of Consumer Perceptions	journal article	3
2012	E.M.F. van den Broek; M.A. Dolman; C.P.A. van Wagenberg - Smart consumer awareness of sustainability of food products	journal article	3
2015	François Coallier - The role of the "interconnected" consumer in smart and sustainable cities: the interconnectedness between new and emerging technologies, the Internet of Things (IoT)	journal article	1
2016	Valerie Graf-Drasch; Henner Gimpel - The Impact of Sustainability on Consumers' Technology Approval : Taking Smart Energy-Saving Systems as an Example of Application	journal article	2
2018	Nieke Lemmen; Ayça Berfu Ünal - Symposium. Designing smart energy technology: How to engage and motivate consumers' sustainable energy use	journal article	2
2019	C. A. Malarvizhi; Sreenivasan Jayashree; Shamima Raihan Manzoor - Examining a Model to Measure Green Packaging Practices Among Consumers in Malaysia: A Sustainable Contributor to Achieving Smart Environmental Goals	journal article	3
2020	Haiyun Chen; Ting Zhu; Jiazhen Huo; Habisch Andre - Sustainable co-governance of smart bike-sharing schemes based on consumers' perspective	journal article	4
2021	Saraju P. Mohanty - Low-Cost Consumer Technology Can Help to Build Sustainable Smart Villages	journal article	1
2022	M.M. Fouad; Stratis Kanarachos; Mahmoud Allam - Perceptions of consumers towards smart and sustainable energy market services: The role of early adopters	journal article	3