# Shared Economy: A Scientometric Analysis and of the Evolution and Thematic Impact of the Research Field

**Erico Souza Costa[1], Melissa Watanabe[2], Jaime Dagostim Picolo[3]**

[1]PhD student of the Postgraduate Program in Socioeconomic Development at the Universidade do Extremo Sul Catarinense - UNESC, Santa Catarina/Brazil, research fellow in the CNPq 01/2019 Public Notice project of the National Council for Scientific and Technological Development (CNPq).Master in Socioeconomic Development - Universidade do Extremo Sul Catarinense - UNESC (2020).
E-mail: ericosouzacosta[at]gmail.com.

[2]Permanent professor of the Post-Graduate Program in Socioeconomic Development (PPGDS) - UNESC, Brazil. Current Coordinator of the Observatory for Socioeconomic Development and Innovation (OBDESI/UNESC)
E-mail: melissawatanabe[at]unesc.net

[3]Permanent professor of the Post-Graduate Program in Socioeconomic Development and the Business Administration Course - Universidade do Extremo Sul Catarinense – UNESC
E-mail: Jaime[at]unesc.net.

**Abstract:** *In view of the growing literature and theme field Shared Economy (SE), this work aims to "understand its evolution as a field of scientific study sheltered under the theoretical optics of shared economy, collaborative consumption and economy on demand, having as panorama publications between the years 1979 to 2019". The investigation occurs from the evolutionary dynamics in the thematic field using the SciMAT® tool. A total of 3, 719 samples were collected at WoS® and Scopus®. The results show solidity in the thematic field approach, indicating the consolidation of terms throughout new research, as well as developments in discussions on new themes. The academic focus on consumer conceptions based on shared access begins from 2010 and intensifies between 2013 and 2019, especially in discussions about rides and issues attributed to sustainable development. From the intensification of the debate, new areas of debate emerge in the thematic field. The ramifications identified in the thematic evolution between 2014 and 2015 can be understood as the conceptual maturation of the SE theme in the academic environment. The ramifications of the links between the themes indicate that researchers from different areas of research in the thematic field constitute academic interest. This research contributes to the context of the thematic field, and can broaden the horizon and planning for future research. Despite the indicators of maturity in the research on SE, the thematic field still offers an opportunity to deepen in new thematic areas, as well as the possibility of rekindling little debated discussions.*

**Keywords:** Shared economy; Scientometry; SciMAT; Development; Sustainability

**Field:** Information Science, Quantitative Methods, Bibliometrics.

**JEL:** C8; Y10.

## 1. Introduction

Shared Economy (SE) comprises the logic of sharing in consumer relations, initiatives, and undertakings aimed at creating value and common use without the need for ownership. Its most current definition summarizes it as an economic system articulated through the Internet through which the sharing of goods and services between individuals develops, either free of charge or through payment (Oxford Dictionary, 2019) . Shared Economy, as a phenomenon, refers to sharing based on temporary access, collaborative consumption, and on-demand. Economies involved in this logic appeals to issues of social and environmental sustainability, since sharing and collaboration slow consumption that can be considered to some extent exacerbated and can thus reallocate idle goods (Belk, 2013; Cohen and Kietzmann, 2014; Cohen and Muñoz, 2016; Hamari, Sjöklint and Ukkonen, 2016; Martin, 2016) . This phenomenon has attracted academic attention as new ventures adhere to the logic of sharing (Cohen and Muñoz, 2016; Hamari, Sjöklint and Ukkonen, 2016; Martin, 2016; Leung, Xue and Wen, 2019) .

Academic interest in the thematic field is multidisciplinary, since the phenomenon has spread to different contexts and economic activities (BOSTMAN, R.; ROGERS, 2011; Belk, 2014; Möhlmann, 2015; Kessler, 2018) . Academic goals focus on understanding the motivations (Hamari, Sjöklint and Ukkonen, 2016) , socioeconomic and socio-environmental impacts (Albinsson and Yasanthi Perera, 2012; Cohen and Kietzmann, 2014) , and types of networks and market logic developed from sharing (Cohen and Muñoz, 2016) . However, even with increasing number of publications, it is also appointed as a thematic area under construction (Hamari, Sjöklint and Ukkonen, 2016; Martin, 2016; Leung, Xue and Wen, 2019) and with not so impressive empirical approaches (Cohen and Muñoz, 2016) , in addition to verifying a low interaction between researchers as well as dispersion of production in the thematic área (Lima and Carlos Filho, 2019) .

This study aims to understand the evolution of the thematicfield of research that encompasses the phenomenon of sharing economies conceptualized as Shared Economy (SE) (BOSTMAN, R.; ROGERS, 2011; Belk, 2014; Kessler, 2018) . Given the growing literature in this thematic field, scientometric and bibliometric instruments were applied to this study. (Vanti, 2002; Santin, 2011; Mugnaini, Fujino and Kobashi, 2017) . Scientific mapping contributes by synthesizing areas of knowledge and research, contemplating elements categorized by categories: authorship and co-authorship, journals and citations, in addition to having a quantitative rigor for subjective evaluation of the literature (Cobo *et al.,* 2011b; Zupic and Čater, 2015) .

Scientometrics and Bibliometrics are instruments resulting from initiatives to measure scientific and technological activity and progress (Silva and Bianchi, 2001; Mugnaini, Fujino and Kobashi, 2017) , due to the exponential increase in the volume of data made available to the academic environment. They aim to contribute by simplifying the collection and analysis of a set of data in a given research, in the evaluation and quantitative analysis of productivity and the inter-comparisons of activity, productivity and scientific progress (Leydesdorff and Milojević, 2015; Wolfram, 2017) .

Some works are references of research based on the mapping of thematic fields. These studies, with a bibliometric methodological approach, seek to overcome the challenge of working with a large volume of data and understanding the broad spectrum of knowledge available to researchers on a given topic. This could not be different on the thematic field of Shared Economy, Collaborative Economy, and Economy on Demand, under the perspectives and trends (Cheng, 2016) ; integrated bicycle sharing systems (SI, et al., 2019); about collaborative economy and its relationship with sustainability (Ertz and Leblanc-Proulx, 2019) ; on business models in sharing-based economies (Ritter and Schanz, 2019) as well as the types of businesses involved in this logic (Netter, Pedersen and Lüdeke-Freund, 2019) , on the impact of different perspectives and the challenges posed to sharing platforms (Clauss, Harengel and Hock, 2019) . However, these are studies focused on specific aspects and characteristics within thematic areas in the SE thematic field. Succinctly, the question arises as to how the field of research on SE has been developing in the scientific community.

This research contributes for its breadth, making a macro analysis of the evolution of the thematic field, shedding light on the developments contemplated in the SE thematic evolution process, seeking to understand how the scientific literature on SE, collaborative consumption and economy on demand occur over time.

## 2. Measurement of Scientific Activity

Technological advances and the expansion of computational capacity enabled the exponential increase in the volume of data and also simplified data collection and analysis (Wolfram, 2017) . The challenge in dealing with the large volume of data imposed on researchers has resulted in initiatives that are committed to measurement, subject to analytical rigor for mapping and visualizing academic activity. (Vanti, 2002; Santin, 2011; Leydesdorff and Milojević, 2015; Mugnaini, Fujino and Kobashi, 2017) .

Initiatives to measure scientific activity have gained strength and legitimacy since the 1970s (Vanti, 2002; Santin, 2011) . According to Leydesdorff and Milojević (2012) the conceptions of metric evaluation of scientific communication and activity begin with the creation of the Science Citation Index (SCI), aiming to improve information retrieval. Since then, new methodologies and the use of different analytical tools have been developed to complement and standardize the statistics of the academic "company". In this sense, Scientometrics and Bibliometrics are tools individually or together applicable to methodological processes in the treatment and analysis of scientific dynamics. (Leydesdorff and Milojević, 2015) .

Both Scientometrics and Bibliometrics emerge from the need to measure and compare scientific progress and activity, endowed with analytical rigor in the evaluation and quantitative analysis in empirical studies of science. (Silva and Bianchi, 2001; Leydesdorff and Milojević, 2015) . In the scientometric study, keyword co-occurrence analysis protocols are applied to characterize themes, given their "density" and "centrality" in a given cluster. In the bibliometric study, the data is submitted to a set of procedures involving techniques for detecting themes and conceptual networks, production, thematic areas, and origins of interrelations in the development of knowledge in a given field. (Leydesdorff and Vaughan, 2006; Leydesdorff, 2008; Eck and Waltman, 2009; Cobo *et al.,* 2011b) .

The application of these two instruments in scientific research allows for the unification of efforts and consolidation of the academic-scientific community by conditioning greater critical rigor and visibility of scientific productivity. According to Mugnaini, Fujino and Kobashi (2017), these conditions allow the scientific community to better allocate resources in addition to subsidizing research policies, science assessment, technologies and innovation in a multidisciplinary perspective.

### 2.1 Scientometry and Bibliometry

Scientometrics is an instrument that uses tools from Bibliometrics, but different in terms of the spectrum of information it analyzes. The scientometric study overlaps with the bibliometric, contributing to macro-analysis in the quantitative aspect of science, in the evaluation as a discipline, activity or economic environment (Tague-Sutcliffe, 1992) . Scientometry is used in the analysis and evaluation of the dynamics of science, as a social environment, in terms of scientific production, circulation and consumption, in the communication of science, mainly in social sciences, humanities and related fields (Kobashi and Santos, 2008; Mingers and Leydesdorff, 2015)

The dynamics of the sciences are presented in three dimensions and Scientometry represents one of them. The dimensions of science are distinguished in: i) Sociology of Sciences; ii) Philosophy of Science and Artificial

Intelligence; iii) Scientometry. For each dimension, two analytical aspects are used as a proxy or indicator with another dimension  (Leydesdorff and Milojević, 2015) . Understand the schematic representation between the dimensions for the disciplinary perspectives through Figure 1.
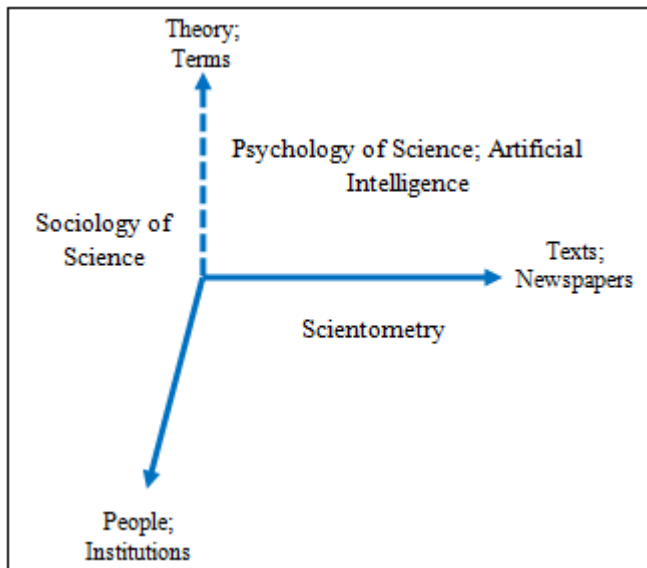


**Figure 1:** Three main dimensions in the dynamic of sciences
Source: Adapted from Leydesdorff and Milojević (2012).

The dimensions of analytical units allow textual rearrangement through the recombination of references and local agencies (names of authors; institutional addresses) and cognitive organizers (keywords, title and names of journals), thus being able to better reflect, networks and social relations, economic and cognitive and authors, inventors, institutions and journals. This rearrangement expands and assigns new ways of using texts, contributing to the better distinction of communities, in the networks of journals and publications.  (Leydesdorff and Milojević, 2015) .

Computational advance contributes to the use of Scientometry and Bibliometry through software that includes in its programming, various protocols for adjustments and calculations of these two instruments. Data processing is performed using algorithms that group information and generate maps for visualizing networks and clusters  (Cobo *et al.,* 2011b) . For each type of information the type of map generated reflects the techniques used to obtain abstractions  (Cobo *et al.,* 2011a) .

Bibliometrics is also a tool for quantitative analysis, bringing together a set of methods for measuring a large volume of data, composed of texts and information to explore the impact of a particular community and or field of research or specific bibliographic materials.  (Cobo *et al.,* 2011b) , focusing on media such as books, magazines, articles and publications in general (Mingers and Leydesdorff, 2015) .

Literature points out that literary behavior is governed by Lotka's Law[1], Zipf's Law[2]andBradford's Law[3]. These laws deal with the dynamics of the authors, the use of keywords and the centrality of the subjects (Vanti, 2002; Guedes and Borschiver, 2005; Mugnaini, Fujino and Kobashi, 2017) . Therefore, Bibliometrics makes it possible to evaluate the productivity of researchers, identify fields of research developed and recognize solid themes and areas of knowledge. Discerning fields of science with greater solidity improves the researcher's ability to identify prolific authors and in specific periods  (Guedes and Borschiver, 2005; Zupic and Čater, 2015; Gutiérrez-Salcedo *et al.,* 2017) . It expands the vision in different perspectives, filters and systematizes information, making the researcher's work more dynamic  (Rialp *et al.,* 2019) . It is also an instrument in constant evolution (Vanti, 2002) .

The results generated by the bibliometric instrument are called bibliometric indicators. These are procedures for data normalization and similarities measurement. The h-index is the indicator that draws more attention, as it provides inference of the scientific impact of researchers  (Cobo *et al.,* 2011b; Bornmann and Leydesdorff, 2014; Gutiérrez-Salcedo *et al.,* 2017) .

## 3.  Materials and Techniques

### 3.1  Data Search, Collection and Pre-Processing

This research is a retrospective and secondary study based on the survey of data on academic production published between 1945 and November 2019, available in the *Web of Science*® (WoS) and Scopus-Elsevier® (Scopus) databases. We opted for the collection in these two platforms due to the recognition given to them by the scientific communities, in addition to the availability of enabling previous analysis through the tools available in their bases (Mingers and Leydesdorff, 2015) .

The thematic field studied covers publications that deal with economic dynamics based on shared, collaborative consumption and on demand.

Search and collection of data consists of the use of keywords with a conceptual basis (*collaborative consumption, collaborative economy and gig economy)* and terms with empirical application focused on developments on the SE phenomenon, focused on urban mobility, accommodation

---

[1] Lotka's inverse-square Law establishes that given number of authors who make n contributions in a given scientific field, it approaches $1/n^2$ in relation to authors who make only a single contribution (Lotka, 1926).
[2] Zipf's Principle of Least Effort argues that terms that require the least effort will be more frequent in the text (ZIPF, 2016).
[3] Bradford's dispersion Law describes that the dispersion of production in a scientific field can be contemplated in three zones, following a geometric progression of distribution. The first, occupying the center of the dispersion, comprises few journals. The second with little more than periodicals and the third with most(Black, 2004).

(tourism) and work organization (*carshar\*, rideshar\*, microtransit, bikeshar\*, ridesourcing, scootershar\*, selfdriv\*, peer-to-peer accommodations, couchSurfing, gig labor, cowork, microwork\**) *[The use of the "asterisk" (\*) serves as a wildcard that serves to replace characters to the right of the word applied in the search.]*.

The authors used the Boolean operator "OR" to achieve the greatest number of results. The materials were limited to the type of articles and reviews and only in the English language

[The filter in the English language is due to the greater number of documents and because those with the greatest impact are in this language.].

The procedures for collecting and processing data follow two major steps. Step I apply to search, systematic review, and meta-analysis, including adjustments and data reduction. Stage II, scientometric and bibliometric analysis protocols and criteria are applied. Figure 2 shows the respective steps.
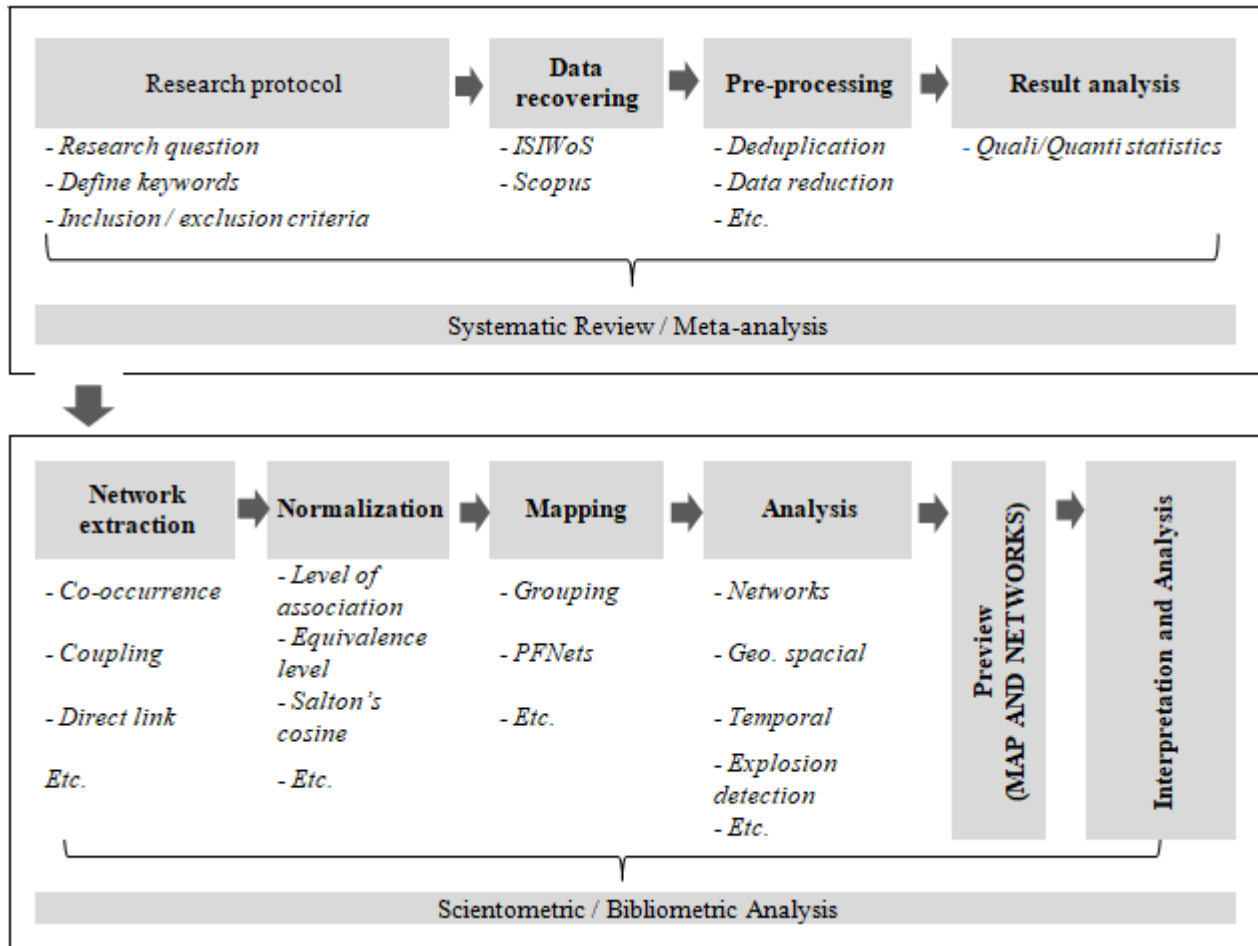


**Figure 2:** Outline-steps in the data collection and analysis procedure
Source: Prepared by the authors, adapted from Sampaio (2007); Cobo et al., (2012)

Data collection took place between October 10 and 15, 2019, and obtained, with both bases, the result of 3, 719 samples (1, 782 articles in WoS® and; 1, 937 in Scopus-Elsevier®).

The authors verified samples' adherence in accordance with the inclusion criteria: (i) identification of at least one keyword used in the search in the title or abstract (abstract); (ii) approach in a theoretical/conceptual and/or empirical way the use of at least one of the terms in the search; (iii) be in the English language. To serve as a base, the criteria were first applied to the WoS® base and later used for the deduplication of samples present in the Scopus® base.

Thus, 1, 458 samples were eliminated, considering non-adherence and/or deduplicated between platforms, 444 samples collected on the WoS® basis for non-adherence and 1, 118 samples for non-adherence and deduplicates collected

on the Scopus® base. At the end, it counted 2, 157 samples, of which 1, 338 correspond to WoS® and 819 to Scopus® base. With the data collected in the databases, they can be submitted to the protocols and criteria of scientometric and bibliometric analysis.

**3.2 Detection of the Main Thematic Areas and Main Themes**

Plotting, visualization and interpretation in the thematic analyzes on the collected data is done using SciMAT® software, a tool used in scientific mapping under a longitudinal structure through modulations dedicated to: i) management of the knowledge base and its entities; ii) conducting scientific mapping analysis and; visualization of the results and maps generated (Cobo, 2016)

The software employs a set of protocols for word co-occurrence analysis, characterizing the themes by parameters preselected by the researcher, which correspond to network, performance, temporality and longitudinal analysis. In this way the maps are generated from bibliographic information (Cobo *et al.,* 2012) .

For the analysis of the evolution of the thematic field, the authors subdivided raw data into five consecutive subperiods, in order to promote a better arrangement of the data and obtain a significant count of documents to produce the analysis (Figure 3). The first (1979-2009) covers the 30-year subperiod, resulting in significant data counting to achieve expressive analysis of the information. The remaining subperiods comprise two-year subperiods. The other subperiods had an established interval of 2 years each.
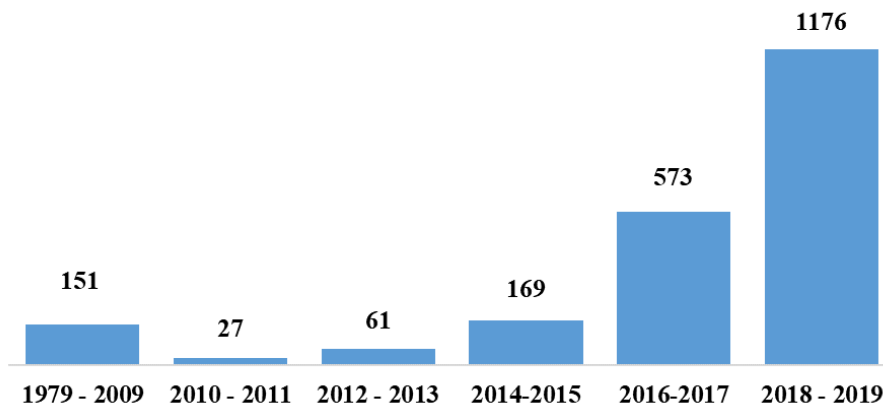


**Figure 3:** Grouping of publications by subperiod.
Source: Prepared by the authors; WoS$^{®}$

Temporal or longitudinal analysis reveals conceptual, social or intellectual evolution of the field. The Thematic evolution map makes it possible to detect areas that show evolution of the thematic network in specific periods (Figure 4). This map presents the main themes detected in the subperiods corresponding to the data. The evolution can be seen once the themes found in "Period a" are also detected in "Period b", thus denominating a "conceptual nexus" between periods.
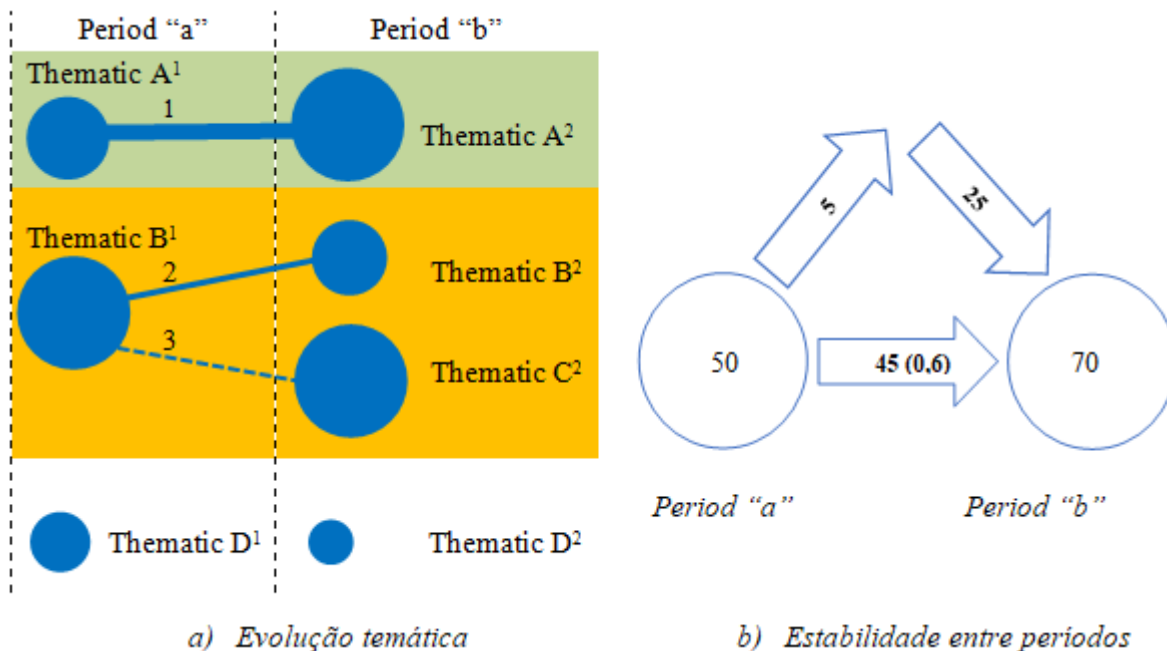


**Figure 4:** Graphical plot for thematic evolution view.
Source: Prepared from Cobo et. al. (2011b).

In Figure 4*a,* the colors correspond to different themes linked by themes. Theme $A^1$ and Theme $A^2$ make up one theme, while Theme $B^1$, $B^2$ and $C^2$ make up another theme. On the other hand, Themes $D^1$ and $D^2$ comprise another theme that in turn has no connection, indicating the emergence of a new theme in the period, implying discontinuation for Theme $D^1$ for the next period in $D^2$ (Cobo *et al.,* 2011b) .

The solid lines connecting the themes (lines 1 and 2) means that both themes are labeled with the same keyword or the label is part of another theme, but has thematic links

presenting thematic link. Themes interconnected by dotted lines (line 3) mean that they share elements that do not share thematic links. This measure, conditioned by the inclusion index, measures the importance of the thematic nexus and considers the elements that the themes have in common.

Cobo et al. (2011b) argues that the inclusion index has advantages and greater utility in measuring similar sets, as it does not present a bias due to the number of items. It has a value of 1, since the keywords are identified in both periods. The analysis of the subperiods based on the overlap presents the best indicator in the weighing of the thematic nexus. In this way, the degree of similarity and link is expressed by the thickness of the bar connecting the themes between sub-periods.

The overlap between sub-periods is graphically presented, demonstrating the general overlap in the number of keywords shared between period "a" to period "b". The overlapping measures are obtained using the stability index. As shown in Figure 4b, the circles represent each subperiod and their respective values, the number of associated keywords. The upper exit arrow indicates the number of keywords present in period "a" that do not intersect with period "b". The upper entry arrow implies new keywords that enter the "b" period. The horizontal arrow represents the number of keywords shared between the periods and the value in parentheses indicates the similarity index between them. (Cobo *et al.,* 2011b) .

## 4. Results

### 4.1 Analysis of Evolution of Topics In Shared Economy

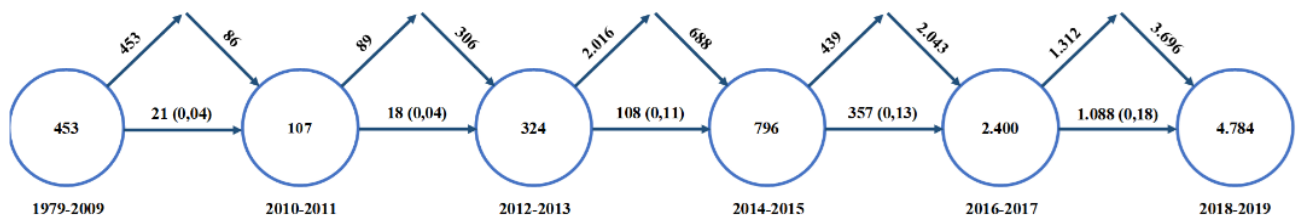The evolution of the themes observed by the overlap in the sub-periods (Figure 5) shows growth throughout the analyzed period. The share rate of keywords (horizontal arrow) between subperiods is higher between 2012-2013 and 2014-2015, indicating a growth of 16.5%. Although there was an increase in the count of new incoming words in the subsequent period (upper down arrow), the sharing rate decreased from 11.5% in the 2016-2017 subperiod to 0.49% in the 2018-2019 subperiod. The similarity index between subperiods in word *sharing* shows increasing values (horizontal arrow, values in parentheses). This may represent the consolidation of the terminologies used in the research area (Cobo *et al.,* 2011b) .

One verifies that the first subperiod (1979-2009) shows a significant word count output for the subsequent period. Cobo et al. (2011b) justify that the departure of a large volume of keywords from one period to a subsequent one, may indicate crosscutting themes. In addition, few themes identified in the 1979-2009 subperiod have evolved in subsequent subperiods. This significant word count coming out of the first sub-period indicates a change in the focus of the research that covers the precepts attributed to the sharing economy. From this subperiod it is based on the construction of networks, P2P [P2P stands for *Peer to Peer* and refers to storage networks, access and shared distribution of digital resources / information on the internet. See also *The eigentrust algorithm for reputation management in p2p networks* (Kamvar, Schlosser and Garcia-Molina, 2003)] communication and conceptions attributed to the idea of sharing as a response to structural infrastructure problems in transport mechanisms.

Change in focus and the new conception of consumption based on sharing, perceived from the beginning of the 2010-2011 subperiod, result in the heating of academic interest and new themes emerging in this area of research.



**Figure5:** Thematic evolution by the fraction of overlap in keywords received and received between successive subperiods. Source: WoS®; Scopus®; SciMAT®.

Results obtained in the analysis of the evolution of the themes (Figure 6) refer to the documents in which there is sharing of keywords between the sub-periods. The evolution of the theme can be represented by the same lexicography or by a term that presents a different lexicography, then it shares with the theme in the previous period: conceptual and thematic similarity or "conceptual nexus" (Cobo *et al.,* 2011b) .

The authors identified, in the thematic evolution map, two major networks of themes, which extend from 1979 to 2019, representing the sharing of the conceptual nexus that the themes have between the periods.

**Figure 6:** Map of thematic evolution of SE research field (1979-2019).
Source: Prepared by the authors; WoS®; Scopus®; SciMAT®.

Table 1 shows the quantitative and impact measures of the main themes on the thematic evolution map. This is a proportion of the importance of each of the identified areas.

**Table 1:** Quantitative measures and global impact of the main thematic areas identified-between 1979 and 2019.

| Themes | Number of documents | Number of quotes | Average of quotes | h-index |
|---|---|---|---|---|
| Sharing-Economy | 469 | 8.533 | 18, 19 | 42 |
| Satisfaction | 132 | 2.096 | 15, 88 | 26 |
| Carshare | 127 | 2.062 | 16, 24 | 24 |
| Collaborative-Consumption | 113 | 2.913 | 25, 78 | 23 |
| Ridesharing | 90 | 1.348 | 14, 98 | 20 |
| Urban-Transport | 58 | 530 | 9, 14 | 10 |
| Bikeshare | 55 | 1.156 | 21, 02 | 18 |
| Work | 49 | 575 | 11, 73 | 15 |
| Vehicle | 37 | 376 | 10, 16 | 9 |
| Behavior | 23 | 1.255 | 54, 57 | 9 |
| Industry | 16 | 175 | 10, 94 | 8 |
| Collaborative-Economy | 13 | 320 | 24, 62 | 4 |
| Housing | 5 | 56 | 11, 2 | 3 |

Source: Prepared by the authors; WoS®; Scopus®; SciMAT®.

The subperiods of 2013-14, 2015-16 and 2018-19 show greater interconnection and greater density between themes. This is the result of the expansion of the debate on the themes resulting in connections between different thematic areas. At least two thematic areas have evolved themes from the first to the last subperiod. The themes *CARLINK, SUSTAINABLE-DEVELOPMENT, CARPOOL AND CARPOOLING*, present thematic evolution, constituting important and solid themes throughout the analyzed period.

Color shading of some interconnections extending over several subperiods aims to indicate the evolution of the themes. The network indicated by the green color reflects research in the field of forecasting, control and proposing systems to improve mobility. Despite identifying only a conceptual proximity link between nodes in sub-periods two and three, these are important contributions focused on aspects of traffic control of individual transport that align with the new articulated approaches in ride-sharing systems and models present from the third subperiod. The blue and yellow shadows focus on themes related to behavior, decision-making and conditions observed in the phenomenon of savings and consumption based on sharing. The yellow shadow also represents links to more conceptual themes on the theme.

One also verified themes that are not part of thematic areas. This is evident in the first two sub-periods, as these are recent themes, the beginning of new themes or basic themes

with difficult categorization, or even the use of keywords that make the detection of other themes difficult. (Cobo *et al.,* 2011b) .

The evolution of the themes is more evident when looking at the network of clusters in Figure 6. Each cluster comprises a maximum of 10 subthemes. The subject in question occupies the center of the image and the subthemes surround it [A more accurate view of the clusters in Figures 6 and 7 can be better seen in the supplementary material].

Three themes are identified in the first subperiod (1979-2009) and have evolved into two thematic networks that come together in the fourth subperiod (2014-2015), indicating continuous and cohesive evolution of the themes. The *SUSTAINABLE-DEVELOPMENT* theme focuses on transport conditions related to planning, demand and

strategies. This theme unfolds in proposals for sharing rides with a view to sustainability. These themes cover this behavior and planning to raise the potential of sharing focused on mobility. Two other themes, *CARPOOL* and *CARPOOLING* refer to areas of research interested in understanding models, behavior and quantifying through empirical research.

*CARSHARE* theme is more frequent in the subperiods. The trajectory of this theme in academic research occurred with its shift from a basic transversal theme to a motor theme until the last period. As observed in the sub-periods 2010-2011 and 2014-2015, their frequency in these periods was high, given the proportion represented in the center (Figure 7).
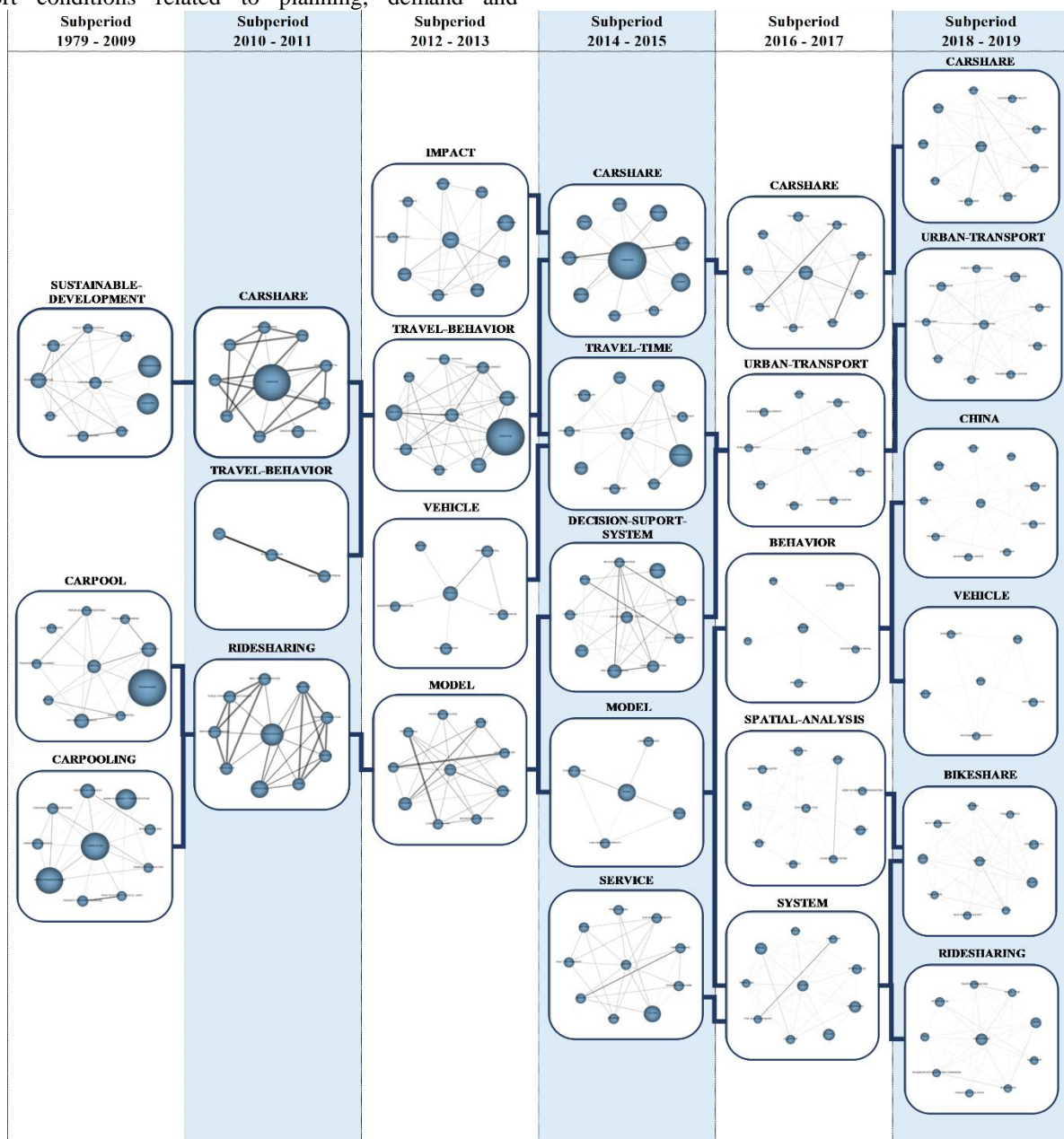


**Figure 7:** Cluster networks formed over the analyzed periods-1979 to 2019.
Source: Prepared by the authors; WoS®; Scopus®; SciMAT®.

From the 2014-2015 subperiod onwards (Figure 8) the *COMMUNITY* theme branches out into four other themes in

the subsequent period, the themes *SHARING-ECONOMY, WORK, HOSPITALITY and NETWORK.* One can

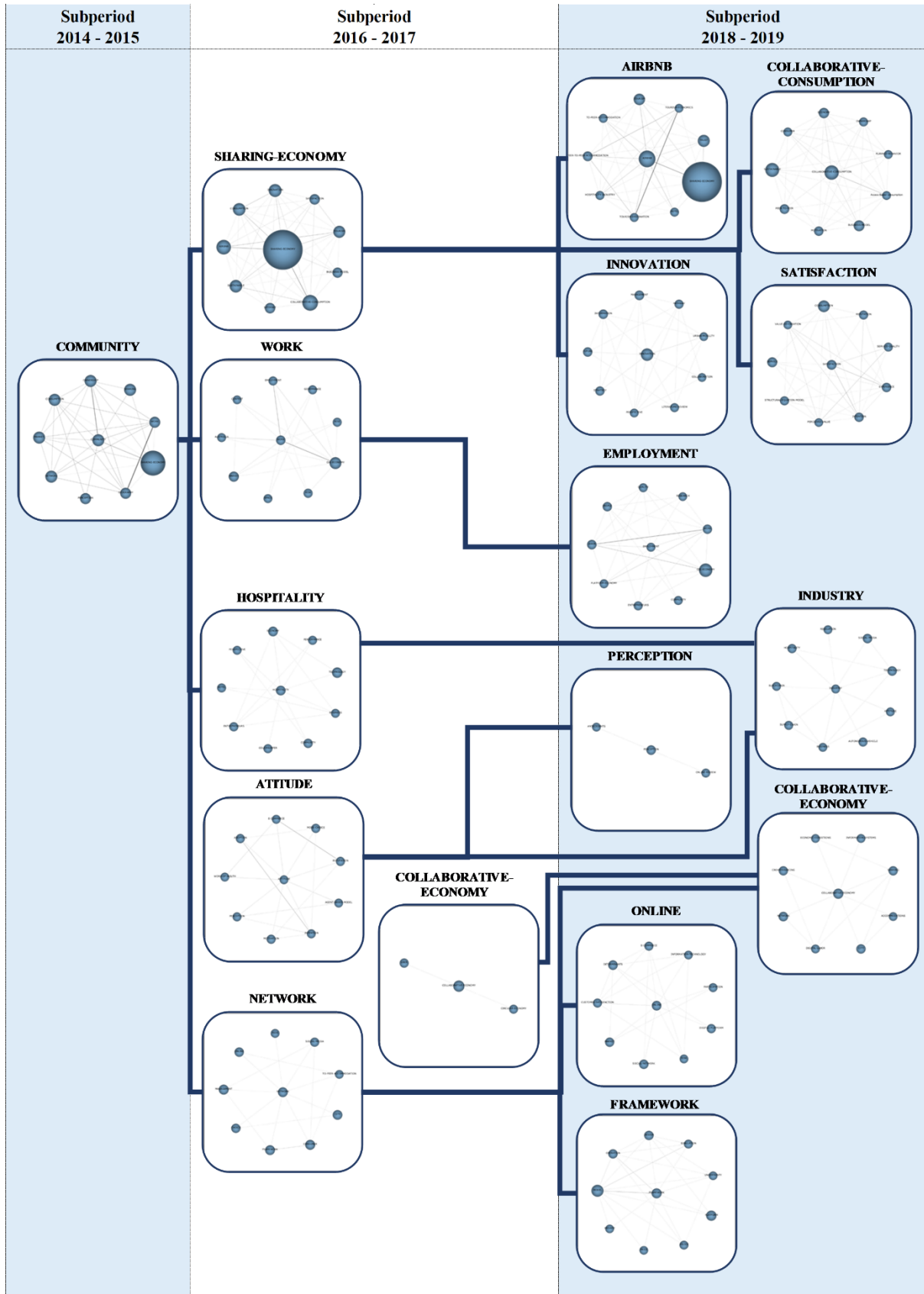understand this branching as the conceptual maturation of SE in the academic environment.



**Figure 8:** Cluster networks formed over the analyzed periods-2014 to 2019.
Source: Prepared by the authors; WoS®; Scopus®; SciMAT®.

The themes *HOSPITALITY* and *NETWORK* dialogue with several thematic areas, presented in an approach that aims to interpret and measure the dynamics observed in the sharing theme. The theme *SHARING-ECONOMY* covers the conceptual character of the research area. One can observe

this by the number of citations (Table 1) and the proportion of publications in the subperiod that the theme received.

One also can identify at least two discontinuous networks and a young network that presents itself as an emerging theme in the development and thematic evolution, as shown in Figure 9.



*(a) Thematic network*



*(b) Thematic network*
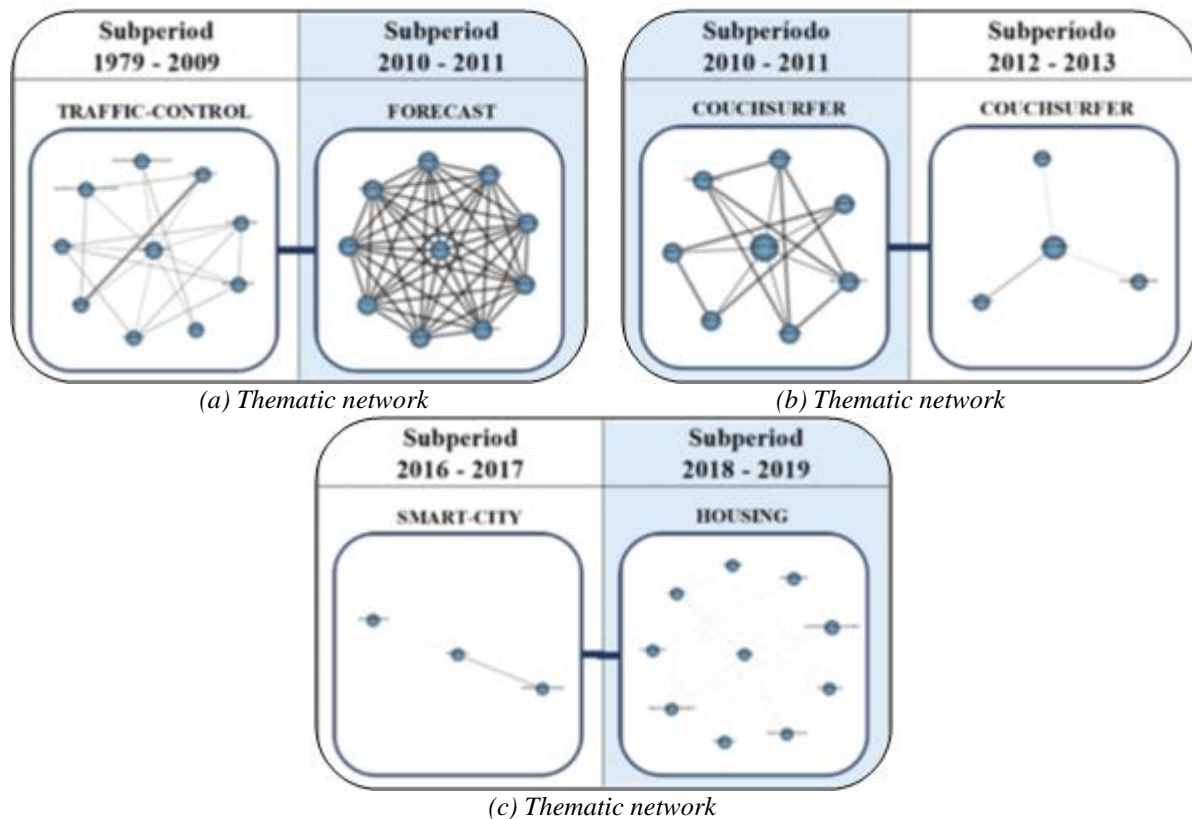


*(c) Thematic network*

**Figure 9:** Discontinued or young thematic networks.
Source: Prepared by the authors; WoS®; Scopus®; SciMAT®.

In Figures 9a and 9b, the networks present an interruption in the evolution of the themes in the second subperiod to their identification. Its contribution to the evolution of the network of themes occurs only through the sharing of elements not related to the theme. In Figure 9a the questions are centered on the logistical aspects of traffic and tools for forecasting, planning, controlling and policies for maintaining urban traffic. In Figure 9b, the discussions focused on the formation of community purchasing and co-creation networks. The evolution of this network at the end of the 2013 period presents only conceptual sharing to subsequent networks. In its turn, there is also another theme network (Figure 9c), which shows emerging themes. The *SMART-CITY* theme evolves to the *HOUSING* theme, which is a cluster for several other sub-themes with characteristics of greater unfolding centered on new research fronts.

In summary, the analysis of the evolution of the themes indicates that themes linked in the first subperiod demonstrate continuous evolution over the subsequent subperiods. The branching of links between themes shows broad interest from different areas of researchers in the thematic field. The themes that evolved over the subperiods did not show exhaustion or disappearance. Only the first and second subperiods do not identified themes that have not evolved, because they do not share conceptual nexus or thematic elements with themes in future subperiods.

Regarding the evolution of the themes, two areas, interconnected in a large thematic field that branch into various thematic areas in the final subperiods, are identified in the first subperiod. The theme CARSHARE evolved for almost all periods (Figure 6) and can be considered a solid theme, since its evolution comprises themes of conceptual structure in the field of research, as well as new themes, emerging within the thematic field.

One understands the evolution of each thematic area in each subperiod by having the first and second subperiods focused on infrastructure and logistics issues, aimed at problems in urban mobility and the appeal to sustainability conditions supported by shared consumption. The third subperiod focuses the themes on models to which the themes of the previous subperiods assume conditions for better sustainable development from the perspective of sharing. In the fourth subperiod, the themes deal with behavior, types of services, dynamics related to types of services and interaction with their supply and demand. This subperiod also presents the emergence of the COMMUNITY theme, which encompasses other themes in order to better conceptualize the dynamics in consumption behavior based on sharing. The fifth subperiod (2016-2017) identifies a diffusion of new themes as evolving or emerging themes, which share thematic elements with previous subperiods. As well as the diffusion of new themes, there is also the diffusion of new approaches, perceived not as a thematic evolution, but an

evolution of approaches, since in many themes one observed is only the thematic link and not the conceptual nexus (Figure 6). As far as it is concerned, those in which the themes in this subperiod have evolved with a conceptual nexus, there is also a diffusion of new themes. The last sub-period identifies themes whose perspective of the economy based on shared consumption develops. *AIRBNB* is identified as a topic that has attracted the attention of the academic community, due to the count of publications.

Considering the growing number of publications observed over the analyzed subperiods, the topics of major academic interest are *SHARING-ECONOMY* in the penultimate subperiod and AIRBNB in the last subperiod. *SHARING-ECONOMY* is the main thematic area of the SE research field, with high impact indicators (h-index = 42). The density of the theme is justified by its thematic scope and its conceptual nexus with other themes. The themes *VEHICLE, BEHAVIOR, INDUSTRY, COLLABORATIVE-ECONOMY* and HOUSING, are themes identified with low impact indicators for the SE research field. However, they are also identified themes with emerging characteristics within the thematic field.

The approach of field evolution analysis of SE research field through the application of bibliometric analysis tools and techniques made possible the global contemplation of the cognitive structure and the knowledge housed in the main themes in the thematic areas, thus offering knowledge of the evolutionary characteristics of each theme, its evolutionary period and impact. The characterization of themes by means of impact indicators allows them to be qualified and to assess the thematic areas.

## 5. Final Considerations

Academic interest on the subject of sharing economies has been discreet until the mid-2010s, despite the growing number of publications. Since then, the densification of the internet network has become more intense. Consequently, business initiatives with a logic of asset redistribution or shared access begin to emerge without the need to transfer ownership. These are highly digitalized businesses, which facilitate communication between the applicant and the provider.

The themes, when analyzed by occurrence in keywords *sharing economy*, *Airbnb*, *collaborative consumption*, appear on the same cluster. Its identification in time also shows itself current for the three terms, indicating the topicality of the theme in the research. When considering the thematic approach over time, it is evident that the academy is still interested in these subjects and a few of them are exhausted.

Thematic evolution is solid in the approach of the thematic field, indicating the consolidation of terms throughout new research. This becomes evident when verifying that, over time, new themes presented structuring characteristics for the research field, becoming developed and conceptual themes.

This research contributes by its macro approach in the analysis of the SE theme, identifying the developments in

the evolution of the themes over time, contributing to the refinement and elaboration of future research and aiming to align the data collection strategy in order to guarantee reaching materials that add greater value to research. Although it is a large-scale research on a thematic field spanning four decades of publications, the results contribute only as a background to the research field. However, profound changes in socioeconomic activities around the world are taking place at the conclusion of this research.

One can mention that in the year 2020 will be remembered in history for the consequences caused by the spread of the SARS-CoV-2 coronavirus that causes COVID-19 disease. The developments that occurred since the identification of the virus and its spread have had major consequences for economic and social routines worldwide, especially with regard to urban mobility, circulation and social agglomerations, as well as preventing the widespread spread of the virus in order to implement, in time, measures to mitigate and combat COVID-19.

One speculated about the restrictive impacts imposed on economic activities in several sectors, however, it is not yet possible to measure the extent of the impact in the face of the conditions imposed. Regarding the restriction of people's mobility, the most direct impact on SE is reflected on the social dynamics of co-working in relation to the direct interaction between agents. The stoppages also significantly affected the tourism and tourism furniture sector. The absence of mass or public transport also affects shared mobility. Even if there is a need to transit, agents may feel insecure or concerned about the transmission of the virus.

Thus, initiatives and enterprises that were gaining space in economic activities, aimed at shared or collaborative consumption are in a moment of responsiveness in the face of the uncertainties imposed by the global pandemic of COVID-19. This scenario also opens up a new prism of perspectives for research in this thematic field. Given the above, one makes notes for a research agenda.

The logic in the SE theme originates from discussions centered on urban mobility issues. Shared mobility has evolved in academic discussions throughout the analyzed period. The analysis of the evolution of the thematic field indicates a directing of efforts towards study areas focused on the tourism and real estate sector. These sectors drew attention by reinventing themselves with the profusion of online sharing platforms.

In view of the reality of restricted urban mobility and possible economic impacts due to COVID-19, new perspectives or rewarming of consolidated perspectives in the research field based on the logic of shared and collaborative consumption may possibly arise. In this horizon line, alignments are proposed for future research.

1) Apply the scientometric approach to the subthemes identified in this research, giving an account of the developments after the conclusion of this research.
2) When considering measures restricting urban mobility due to COVID-19, develop longitudinal research on the theme SE, given its character as an alternative mode of social and urban transport.

3) Longitudinal study covering developments in the post-pandemic SE thematic discussions COVID-19 as well as its impact on the logic of shared and collaborative consumption.

4) Understanding the divergent dynamics-restrictive imposition and impacts and opportunities-imposed by the post-pandemic global society COVID-19 and the logic of sharing in SE.

The panorama of opportunities for new research in the thematic field seems to be branched out, as well as the possibility of rekindling discussions that have been little debated or that appear to be more opportune for the moment.

## 6. Acknowledgements

## 7. Highlights

- Evolutionary analysis of the thematic field covering a period of 4 decades of publications.
- Identification of the main thematic networks and evolutionary ramifications of the thematic terms used in the research.
- Overview of development and main discussions in the thematic field.

## 8. Conflict of Interest

The authors declare no conflict of interest.

## References

[1] Albinsson, P. A. and Yasanthi Perera, B. (2012) 'Alternative marketplaces in the 21st century: Building community through sharing events', *Journal of Consumer Behaviour*, 11 (4), pp.303–315. doi: 10.1002/cb.1389.

[2] Belk, R. (2014) 'Sharing versus pseudo-sharing in web 2.0', *Anthropologist*, 18 (1), pp.7–23. doi: 10.1080/09720073.2014.11891518.

[3] Belk, R. W. (2013) 'Extended self in a digital world', *Journal of Consumer Research*, 40 (3), pp.477–500. doi: 10.1086/671052.

[4] Black, P. E. (2004) 'Dictionary of algorithms and data structures. ' Available at: https://xlinux. nist. gov/dads/HTML/bradfordsLaw. html.

[5] Bornmann, L. and Leydesdorff, L. (2014) 'Scientometrics in a changing research landscape', *EMBO reports*, 15 (12), pp.1228–1232. doi: 10.15252/embr.201439608.

[6] BOSTMAN, R.; ROGERS, R. (2011) *What's mine is yours how collaborative consumption is changing the way we live*. London.

[7] Cheng, M. (2016) 'Sharing economy: A review and agenda for future research', *International Journal of Hospitality Management*, 57, pp.60–70. doi: 10.1016/j.ijhm.2016.06.003.

[8] Clauss, T., Harengel, P. and Hock, M. (2019) 'The perception of value of platform-based business models in the sharing economy: determining the drivers of user loyalty', *Review of Managerial Science*, 13 (3), pp.605–634. doi: 10.1007/s11846-018-0313-0.

[9] Cobo, M. J. *et al.* (2011a) 'An approach for detecting, quantifying, and visualizing the evolution of a research field: A practical application to the Fuzzy Sets Theory field', *Journal of Informetrics*, 5 (1), pp.146–166. doi: 10.1016/j. joi.2010.10.002.

[10] Cobo, M. J. *et al.* (2011b) 'Science mapping software tools: Review, analysis, and cooperative study among tools', *Journal of the American Society for Information Science and Technology*, 62 (7), pp.1382–1402. doi: 10.1002/asi.21525.

[11] Cobo, M. J. *et al.* (2012) 'SciMAT: A new science mapping analysis software tool', *Journal of the American Society for Information Science and Technology*, 63 (8), pp.1609–1630. doi: 10.1002/asi.22688.

[12] Cobo, M. J. (2016) *SciMAT, Science Mapping Analysis Tool*. Available at: https://sci2s. ugr. es/scimat/.

[13] Cohen, B. and Kietzmann, J. (2014) 'Ride On! Mobility Business Models for the Sharing Economy', *Organization & Environment*, 27 (3), pp.279–296. doi: 10.1177/1086026614546199.

[14] Cohen, B. and Muñoz, P. (2016) 'Sharing cities and sustainable consumption and production: towards an integrated framework', *Journal of Cleaner Production*, 134, pp.87–97. doi: 10.1016/j. jclepro.2015.07.133.

[15] Eck, N. J. Van and Waltman, L. (2009) 'How to Normalize Cooccurrence Data ? An Analysis of Some Well-Known Similarity Measures', 60 (8), pp.1635–1651. doi: 10.1002/asi.

[16] Ertz, M. and Leblanc-Proulx, S. (2019) 'Review of a proposed methodology for bibliometric and visualization analyses for organizations: application to the collaboration economy', *Journal of Marketing Analytics*, 7 (2), pp.84–93. doi: 10.1057/s41270-019-00052-9.

[17] Guedes, V. L. S. and Borschiver, S. (2005) 'Bibliometria : Uma Ferramenta Estatística Para a Gestão Da Informação E Do Conhecimento, Em Sistemas De Informação, De Comunicação, De', *CINFORM-Encontro Nacional de Ciência da Informação*, pp.1–18. Available at: http://dici. ibict. br/archive/00000508/01/VaniaLSGuedes. pdf.

[18] Gutiérrez-Salcedo, M. *et al.* (2017) 'Some bibliometric procedures for analyzing and evaluating research fields', *Applied Intelligence*. doi: 10.1007/s10489-017-1105-y.

[19] Hamari, J., Sjöklint, M. and Ukkonen, A. (2016) 'The sharing economy: Why people participate in collaborative consumption', *Journal of the Association for Information Science and Technology*, 67 (9), pp.2047–2059. doi: 10.1002/asi.23552.

[20] Kamvar, S. D., Schlosser, M. T. and Garcia-Molina, H. (2003) 'The Eigentrust algorithm for reputation management in P2P networks', in *Proceedings of the twelfth international conference on World Wide Web-*

*WWW '03*. New York, New York, USA: ACM Press, p.640. doi: 10.1145/775152.775242.

[21] Kessler, S. (2018) *Gigged: The gig economy, the end of the job and the future of work.*

[22] Kobashi, N. Y. and Santos, R. N. M. dos (2008) 'Arqueologia do trabalho imaterial: uma aplicação bibliométrica à análise de dissertações e teses 10.5007/1518-2924.2008v13nesp1p106', *Encontros Bibli: revista eletrônica de biblioteconomia e ciência da informação*, 13 (1). doi: 10.5007/1518-2924.2008v13nesp1p106.

[23] Leung, X. Y., Xue, L. and Wen, H. (2019) 'Framing the sharing economy: Toward a sustainable ecosystem', *Tourism Management*, 71, pp.44–53. doi: 10.1016/j. tourman.2018.09.021.

[24] Leydesdorff, L. (2008) 'On the normalization and visualization of author co-citation data: Salton's Cosineversus the Jaccard index', *Journal of the American Society for Information Science and Technology*, 59 (1), pp.77–85. doi: 10.1002/asi.20732.

[25] Leydesdorff, L. and Milojević, S. (2015) 'Scientometrics', in *International Encyclopedia of the Social & Behavioral Sciences*. Elsevier, pp.322–327. doi: 10.1016/B978-0-08-097086-8.85030-8.

[26] Leydesdorff, L. and Vaughan, L. (2006) 'Co-occurrence matrices and their applications in information science: Extending ACA to the Web environment', *Journal of the American Society for Information Science and Technology*, 57 (12), pp.1616–1628. doi: 10.1002/asi.20335.

[27] Lima, S. and Carlos Filho, F. de A. (2019) 'Bibliometric analysis of scientific production on sharing economy', *Revista de Gestão*, 26 (3), pp.237–255. doi: 10.1108/rege-01-2019-0018.

[28] Lotka, A. J. (1926) 'The frequency distribution of scientific productivity', *Journal of the Washington academy of sciences*, 16, pp.317-323 (7 pages). Available at: https: //www.jstor. org/stable/24529203?seq=1.

[29] Martin, C. J. (2016) 'The sharing economy: A pathway to sustainability or a nightmarish form of neoliberal capitalism?', *Ecological Economics*, 121, pp.149–159. doi: 10.1016/j. ecolecon.2015.11.027.

[30] Mingers, J. and Leydesdorff, L. (2015) 'A review of theory and practice in scientometrics', *European Journal of Operational Research*, 246 (1), pp.1–19. doi: 10.1016/j. ejor.2015.04.002.

[31] Möhlmann, M. (2015) 'Collaborative consumption: determinants of satisfaction and the likelihood of using a sharing economy option again', *Journal of Consumer Behaviour*, 14 (3), pp.193–207. doi: 10.1002/cb.1512.

[32] Mugnaini, R., Fujino, A. and Kobashi, N. Y. (eds) (2017) *Bibliometria e cientometria no Brasil: infraestrutura para avaliação da pesquisa científica na era do Big Data*. Universidade de São Paulo. Escola de Comunicações e Artes. doi: 10.11606/9788572051705.

[33] Netter, S., Pedersen, E. R. G. and Lüdeke-Freund, F. (2019) 'Sharing economy revisited: Towards a new framework for understanding sharing models', *Journal of Cleaner Production*, 221, pp.224–233. doi: 10.1016/j. jclepro.2019.02.225.

[34] Oxford Dictionary (2019) *Definition of sharing economy*. Available at: https: //www.lexico.

com/definition/sharing_economy (Accessed: 18 July 2020).

[35] Rialp, A. *et al.* (2019) 'Twenty-five years (1992–2016) of the International Business Review: A bibliometric overview', *International Business Review*, 28 (6), p.101587. doi: 10.1016/j. ibusrev.2019.101587.

[36] Ritter, M. and Schanz, H. (2019) 'The sharing economy: A comprehensive business model framework', *Journal of Cleaner Production*, 213, pp.320–331. doi: 10.1016/j. jclepro.2018.12.154.

[37] Santin, D. M. (2011) 'Avanços e perspectivas da infometria e dos indicadores multidimensionais na análise de fluxos da informação e estruturas do conhecimento 10.5007/1518-2924.2011v16n32p107', *Encontros Bibli: revista eletrônica de biblioteconomia e ciência da informação*, 16 (32). doi: 10.5007/1518-2924.2011v16n32p107.

[38] Silva, J. A. da and Bianchi, M. de L. P. (2001) 'Cientometria: a métrica da ciência', *Paidéia (Ribeirão Preto)*, 11 (21), pp.5–10. doi: 10.1590/S0103-863X2001000200002.

[39] Tague-Sutcliffe, J. (1992) 'An introduction to informetrics', *Information Processing & Management*, 28 (1), pp.1–3. doi: 10.1016/0306-4573 (92) 90087-G.

[40] Vanti, N. A. P. (2002) 'Da bibliometria à webometria: uma exploração conceitual dos mecanismos utilizados para medir o registro da informação e a difusão do conhecimento', *Ciência da Informação*, 31 (2), pp.369–379. doi: 10.1590/S0100-19652002000200016.

[41] Wolfram, D. (2017) *Bibliometria e cientometria no Brasil: infraestrutura para avaliação da pesquisa científica na era do Big Data*. Edited by R. Mugnaini, A. Fujino, and N. Y. Kobashi. Universidade de São Paulo. Escola de Comunicações e Artes. doi: 10.11606/9788572051705.

[42] ZIPF, G. K. (2016) *Human behavior and the principle of least effort: An introduction to human ecology.*

[43] Zupic, I. and Čater, T. (2015) 'Bibliometric Methods in Management and Organization', *Organizational Research Methods*, 18 (3), pp.429–472. doi: 10.1177/1094428114562629.