

Editor

Carlos Luis González-Valiente

Conflict of interest

The authors declare no conflict of interest.

Received

Jan. 27, 2023

Final version




Aug. 7, 2023

Approved

Aug. 8, 2023

The evolution research on Silver Economy: Current researches, trends, and implications for future directions

A evolução da investigação sobre a Economia da Prata: Investigações atuais, tendências e implicações para direções futuras

Rubén Carlos Álvarez-Diez¹ , Reina Margarita Vega-Esparza¹ , Víctor Hugo Bañuelos-García¹ , José Ricardo López-Robles¹ 

¹ Universidad Autónoma de Zacatecas, Unidad Académica de Contaduría y Administración. Zacatecas, Zacatecas, México. *Correspondência para/Correspondence to:* J. R. LÓPEZ-ROBLES. E-mail: ricardolopezrobles@outlook.com

Como citar este artigo/How to cite this article: Álvarez-Diez, R. C. The evolution research on Silver Economy: Current researches, trends, and implications for future directions. *Transinformação*, v. 35, e237325, 2023. <https://doi.org/10.1590/2318-0889202335e237325>

Abstract

Society is undergoing unprecedented transformations caused by big economic, political, technological, social and mostly demographic changes. In this line, the role and weight of older adults turns more important due to the modifications such transformation will bring about in their characteristics, needs, expectations and goals as regards their personal, economic, political, technological and social aspects. This situation has given rise to the concept of Silver Economy, which broadly speaking represents that part of the economy related to the demographic change caused by aging population, including all those economic activities, products and services intended to meet the needs of older adults. Its being a growing field of knowledge makes it complex to identify the driving forces and agents that boost its development and therefore to promote and consolidate this new concept. In accordance with this opportunity, this piece of research maps the main research themes available in literature, making use of *SciMAT*-based smart bibliometric tools and techniques. In addition to other actions, this research makes it possible to identify the main themes, who the relevant agents are, the pioneering countries in this field, and the more productive organizations and sources. To this end, the Scopus database has been used as main source, bearing in mind that it concentrates 281 publications from 1979 to 2022 related to older adults and their role in economic, political, technological and social development, which has resulted a detailed frame of reference on Silver Economy.

Keywords: Competitive intelligence. Elderly economy. Silver economy. Strategic intelligence. Third generation economy.

Resumo

A sociedade está passando por transformações sem precedentes causadas por grandes mudanças econômicas, políticas, tecnológicas, sociais e principalmente demográficas. Nesta linha, o papel e o peso dos adultos mais velhos torna-se mais importante devido às modificações que tal transformação trará em suas características, necessidades, expectativas e objetivos no que diz respeito a seus aspectos pessoais, econômicos, políticos, tecnológicos e sociais. Esta situação deu origem ao conceito de Economia da Prata, que representa, de modo geral, a parte da economia relacionada à mudança demográfica causada pelo envelhecimento da população, incluindo todas aquelas atividades econômicas, produtos e serviços destinados a atender as necessidades de adultos idosos. Por ser um campo de conhecimento crescente, torna-se complexo identificar as forças motrizes e agentes que impulsionam seu desenvolvimento e, portanto, promover e consolidar este novo conceito. De acordo com esta oportunidade, este trabalho de pesquisa mapeia os principais temas de pesquisa disponíveis na literatura, fazendo uso de ferramentas e técnicas bibliométricas inteligentes baseadas no SciMAT. Esta pesquisa permite também, identificar os principais temas, quem são os agentes relevantes, os países pioneiros neste campo, assim como as organizações e fontes mais produtivas. Para isso, utilizamos o banco de dados Scopus que concentra 281 publicações de 1979 a 2022 relacionadas aos adultos mais velhos e seu papel no desenvolvimento econômico, político, tecnológico e social, o que resultou em um quadro detalhado de referência sobre a Economia da Prata.

Palavras-chave: Inteligência competitiva. Economia de alto nível. Economia de prata. Inteligência estratégica. Economia de terceira geração.

Introduction

Several studies concur in the fact that the population worldwide is aging and therefore the economic, political, social, academic, scientific and technological needs of older adults are changing; inquiring about which the actions to be assessed are when this population group has different scenarios to the others in terms of jobs, health, development, social value, economic weight, among others (Jakovljevic *et al.*, 2021; Reymond, 2021; Wang; Li, 2021; Yang; Zheng; Zhao, 2021).

The *World Health Organization* has determined that, in 2030, one out of six persons worldwide will be 60 years or older (1,000 million currently) and, in 2050, there will be 2,100 million (Kalasic; Vidovic, 2018). The aforesaid organization also states that in developed countries such as Japan 30% of their population or more will be made up of older adults, an aspect that will also occur in countries where the economic income of this group can be considered average or low (Rudnicka *et al.*, 2020).

This complex situation urges all kinds of public and private agents to design policies and strategies by the characteristics and needs of this age bracket, considering the potential risks this may bring about such as the collapse of the healthcare systems and pensions (Feng, 2019; Miyamoto; Yoshino, 2022; Plácido; Herdeiro; Roque, 2022).

However, this situation is not new and an example of this is the fact that, in the 1970s, the concept of Silver Economy came out, which is ruled by the consumption of the older adults, considering products and services that are specific to them (Marcucci *et al.*, 2021; Rogelj; Bogataj, 2019).

According to Okumura *et al.* (2020), Silver Economy is “that part of the global economy related to the demographic change caused by aging population, which focuses on the needs and demands of older adults (McGuirk; Conway Lenihan; Lenihan, 2022).

Silver Economy will bring about big changes in development and there will be new ways to do business focused on education, entertainment, physical care, living together in communities or houses adapted to their conditions, allowing them to have more independence and individuality, psychological and medical care, technological application, as well as jobs and self-employment in agreement with their personal needs (McGuirk; Conway Lenihan; Lenihan, 2022).

The constant, sustained increase in older adults worldwide will define new ways of development in economy, science and technology, which will have to solve problems such as high concentrations of older adults in the big cities, decrease in production in private companies and high tax rates by governments for the private persons in order to settle the high costs in maintenance and related problems, among others. All this will require designing, applying and assessing public policies and private strategies that meet the needs of the near future as well as involving all agents to address this scenario together and with a comprehensive perspective (Lipp; Peine, 2022; Cervantes Martínez *et al.*, 2023).

From the governmental perspective, public policies are considered population-problem-solving actions implemented by a government. In this sense, several authors consider that public policies are an answer by the Government to certain social interests, contexts and issues. Thus, the priority of public institutions will be to protect the interests of the social needs in specific sectors such as the older adults by way of actions aimed at providing wellbeing in a cross-sectional view that considers health, economy, social services, entrepreneurship, occupation, jobs and self-employment, among others (Tummers, 2019).

From a viewpoint focusing on both the public and the economic policies, both areas are expected to grow out of the opportunity brought about by the boost of Silver Economy and also by the opportunity to be able to complement certain professional and personal needs. Concretely, entrepreneurship will be one of the lines driving the opportunity to cover their economic needs because, even having a pension, they will both need new income and diversify it through new formats such as telecommuting, part-time working hours or any one adapted to their context. Besides, from the viewpoint of new products and services for this population group, so Silver Economy is an opportunity for everyone, an aspect that is becoming evident in developed countries mostly coping with the problem that that will gradually be replicated in the rest of the world in their successful cases (Conway Lenihan; McGuirk, 2022).

Economy aging proposes changes as compared to the performance of the current economy worldwide: there will be a need for public policies allowing alternatives for employment, saving and generation of diverse income so that older adults can enjoy their life and foster the profitability of the public financial resources to keep adequate functioning of those services the state must render, including the current financial retirement systems, for instance. Therefore, economic security is the certainty of financial wellbeing for older adults. Also, several authors consider the need to establish ways of economic income allowing enough economic income to guarantee good quality of life based on three big pillars, the family, the market and the State (Zhukovska, 2020).

Silver Economy will design and enforce several educational programs (both public and private) enabling integration into jobs, keeping the physical and mental capacity in the best possible conditions as well as the acquisition of skills and competences according to their conditions and generating constant income that meets their needs under the premise of self-sustainment: not to harm the social, economic and ecological environment, generating wellbeing in all senses (Butt *et al.*, 2021).

In this sense, it is possible to foresee the relevance Silver Economy will have in all areas, it may even stand as a driving force for development, with the capacity to support the strategies derived from the pandemic, where the population group of older adults was one of the most affected. However, said situation poses more doubts than answers, expecting they can be solved through multiple approaches (Erlenheim; Pappel, 2022).

Accordingly, it is necessary to establish a frame of reference that should analyze the current main themes of research, development and innovation in the area of the Silver Economy, under its key agents. To this end, an analysis of performance and bibliometric networks is stated to be an adequate framework to foster a comprehensive, comparative, objective analysis of the main research themes related to Silver Economy and to assess their evolution. Furthermore, it will make it possible to include prospective support to identify opportunities and gaps in research, development and innovation for the future decisions made by agents interested in this issue.

Taking into account the above, the objectives of this piece of research are to visualize and understand Silver Economy and to identify its intellectual structure, using *SciMAT* bibliometric software, by evaluating the main indicators related to bibliometric performance (publications, citations received, authors, geographic distribution, among others) (Silva Júnior; Dutra, 2021; Gamboa-Rosales *et al.*, 2020; Gontijo; Hamanaka; Araujo, 2021; Herrera-Viedma *et al.*, 2020; López-Robles *et al.*, 2019; Sott *et al.*, 2021; Marinho de Sousa, Shintaku, 2022; Andrade Gontijo; Hamanaka; Ferreira de Araújo, 2022).

Methodological Procedures

Taking into account the objectives of this piece of research, bibliometrics is considered an adequate approach to qualitatively and quantitatively analyze the current state of the art of Silver Economy in literature as well as its evolution.

To this end, a three-stage methodology is presented, the first stage being the analysis of performance based on bibliometric indicators measuring the output of different actors and the impact reached by the publications in Scopus database (Gutiérrez-Salcedo *et al.*, 2018; Moed *et al.*, 1985; Moed; De Bruin; Van Leeuwen, 1995; Bolaño García; Duarte Acosta; González Castro, 2023). Secondly, there is an analysis of conceptual scientific mapping based on the network of co-words using *SciMAT*, which draws on an approach focused on three milestones: (1) detection of research themes, (2) visualization of themes (lines of research) and (3) mapping of the evolution of the identified themes (Cobo, 2012).

To this end, the identified research themes have been presented in a strategic diagram. It is a map composed of two dimensions separated into four different areas according to their relevance, where the research themes are shown as a sphere and their volume is equal to the total publications related to it: Motor themes (Q1 – Upper right quadrant) are relevant themes to structure and develop the field of research; Very developed and isolated themes (Q2 – Upper left quadrant) are significant themes lacking enough importance to be considered something more than a peripheral or very specialized activity for the area/areas of knowledge in question; Emerging or declining themes (Q3 – Lower left quadrant) are themes considered weak, but this weakness may be understood as an emerging or declining state; Basic and transversal themes (Q4 – Lower right quadrant) are themes that are not sufficiently developed but may be relevant to the area of knowledge due to their cross-sectionality or integration.

Thirdly, the evolution of the themes identified in each of the periods have been analyzed to understand which are the themes marking continuity and which represent the current interests in research, development and innovation. This methodological procedure is a first approach since, according to the results and a subsequent interaction, an analysis for other periods of time can be made and identifying areas of themes within them (Cobo *et al.*, 2015).

Finally, to carry out the analysis of scientific mapping and performance, the publications related to Silver Economy in the Scopus database were compiled and processed, using the following

advanced search: *TITLE-ABS-KEY*("silver econom*" OR "silver generation*" OR "silver market*" OR "elderly econom*" OR "ederly generation*" OR "ederly market*" OR "ederly econom*" OR "ageing econom*" OR "ageing generatio*" OR "ageing market*" OR "senior econom*" OR "senior generation*" OR "senior market*" OR "third age econom*" OR "third age generation*" OR "third age market*" OR "grey econom*" OR "grey generation*" OR "grey market*") AND (*LIMIT-TO*(*DOCTYPE*,"ar") OR *LIMIT-TO*(*DOCTYPE*,"cp") OR *LIMIT-TO*(*DOCTYPE*,"re") OR *LIMIT-TO*(*DOCTYPE*,"ch")) AND (*LIMIT-TO*(*LANGUAGE*,"English"))).

The publications and their gross data were retrieved from *Scopus* as plain text and processed in *SciMAT* to establish the knowledge foundation serving as the main resource for developing the analysis of performance and the bibliometric maps. Furthermore, so as to improve the quality of data, a process of duplicity elimination was carried out (for instance, "SILVER ECONOMY", "SE-SILVER-ECONOMY" and "SILVER-ECONOMY-(SE)" were merged as "SILVER-ECONOMY" and senseless keywords (for example, "HEALTHCARE", "TRAVEL" or "TOURIST" were stopped).

Results

Silver Economy can be deemed to be an area of knowledge that in recent years has begun to arouse more interest among the social, political, entrepreneurial, academic, scientific and technological agents due to its cross-sectional nature and its potential, as can be seen in Figure 1. (A) that shows the publications and citations recorded year after year from 1979 to 2022, according to *Scopus* database.

In terms of publications, the trend is positive, despite the falls and valleys that can be identified in the analyzed periods. In this line, it is outstanding that, since 2020, despite the pandemic, a new historical maximum has been recorded every year. This aspect is expected to remain in 2022 that, despite showing a lower value than the previous period, is still an active year. The advanced search used in this piece of research retrieved 1,139 documents from 1979 to 2022, which were revised one by one and those bearing clear relation to the described themes were identified, thus leaving a final sample of 281 publications distributed into research articles (175 publications), chapters of books (47 publications), participation in congresses (45 publications) and revisions of the state of the art (14 publications). Besides, said publications were distributed into four periods to facilitate their thematic analysis and thus be able to identify the influence of the several stages on the development of the area of knowledge through the h-index (see Figure 1B).

In contrast with productivity, the last analyzed period does not have any relevant publications according to the h-index, the second period being the most productive in these terms with 15 publications, followed by the third and the first periods with 14 and 5 publications respectively.

In terms of citations, though the h-index identifies 34 publications (12%), citations are equivalent to a total of 60% of accumulated citations (2,433), a relevant aspect if we take into account that most of them have already extended beyond the window period that, in accordance with the area, is estimated to range from 4 to 7 years, which allows inferring that publications are relevant for the development of Silver Economy in terms of knowledge.

In this sense and considering that the evolution in both cases is positive and sustained in time, it is possible to propose that Silver Economy will continue being a subject of interest in the coming years and it is convenient to understand who are the relevant agents for both scenarios as well as the thematic structure composing it, in order to make the most of the efforts to be made in terms of research, development and innovation.

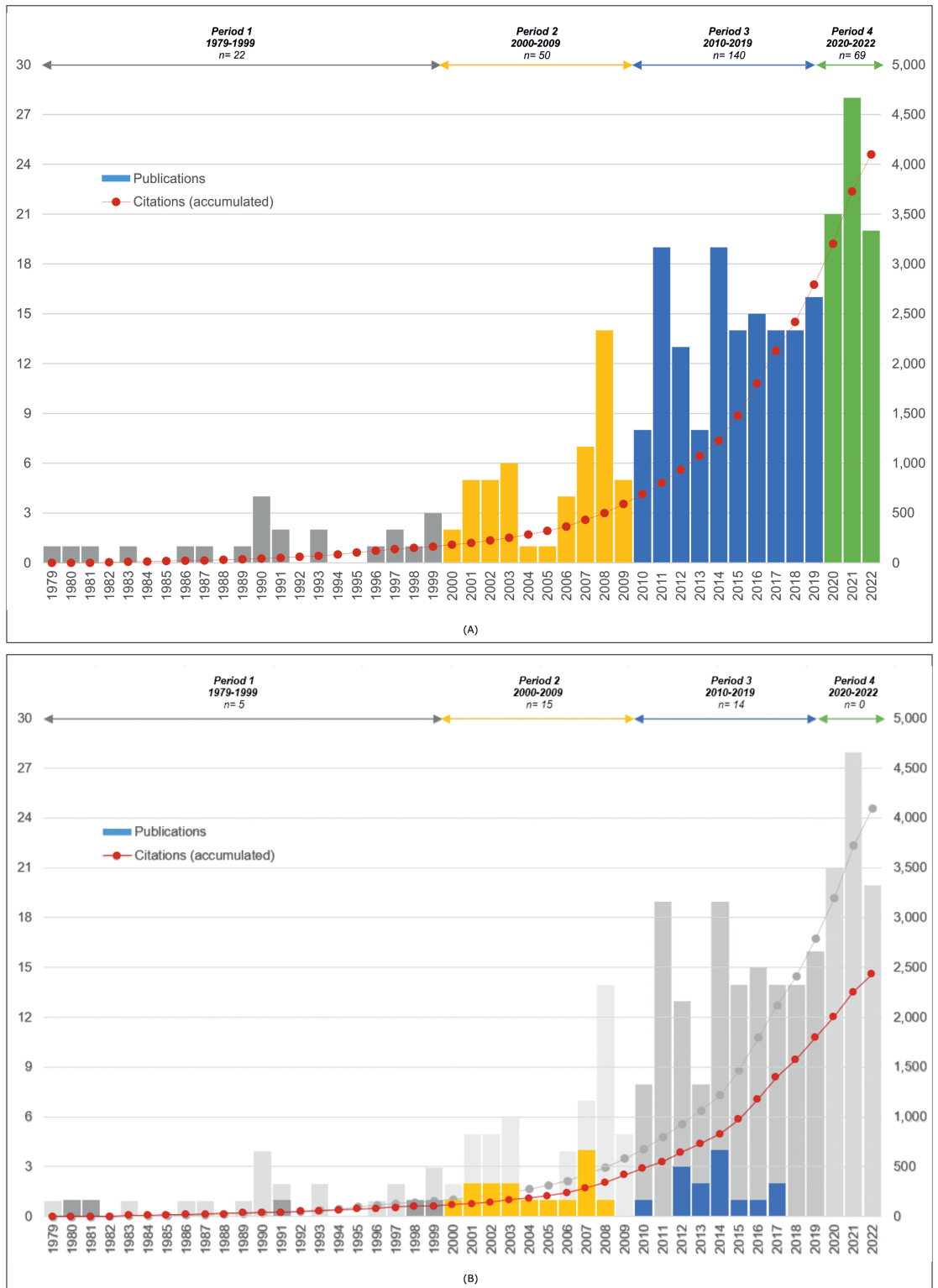


Figure 1 – (A) Distribution of publications and citations related to Silver Economy from 1979 to 2022, as per *Scopus*. (B) Distribution of publications and citations related to Silver Economy from 1979 to 2022 as per the h-index in *Scopus*.

Source: Own elaboration (2023).

To this end, Table 1 shows the performance obtained in the period from 1979 to 2022 and for the publications considered relevant as per the h-index obtained from *Scopus* database.

Considering the previous results and the growing interest in that issue, it is appropriate to identify the main themes of research, development and innovation about Silver Economy. To this

Table 1. Productivity and impact for the concept of Silver Economy from 1979 to 2022 and h-index as per Scopus.

Description Total (1979-2022) (Publications, n=281; Cites, n=4,098)	(Publications or Cites) Description	Description h-index (Publications, n=34; Cites, n=2,433)	(Publications or Cites) Description
Most productive authors	(7) Kohlbacher, F. (5) Butt, S.A.; Pappel, I. (4) Alvelos, H.; Bogataj, D.; Carneiro, M.J.; Eusebio, C.; Herstatt, C.; Kastenholz, E. (>=3) 639 authors	Most productive authors	(3) Jang, S.C. (2) Kohlbacher, F.; O'Leary, J.T.; Shoemaker, S. (>=1) 1,154 authors
Most cited authors	(286) Jang, S.; Wu, C.-M.E. (224) Shoemaker, S. (158) Moschis, G.P. (>=150) 643 authors	Most cited authors	(286) Jang, S.; Wu, C.-M.E. (224) Shoemaker, S. (157) Moschis, G.P. (>=138) 74 authors
Most productive organizations	(7) German Institute for Japanese Studies (6) Tallinna Tehnikaülikool; University of Oxford; Univerza v Ljubljani (5) The University of Queensland (>=4) 518 organizations	Most productive organizations	(2) College of Health and Human Sciences; German Institute for Japanese Studies DJJ; Purdue University; The University of Queensland; University of Nevada, Las Vegas (>=1) 46 organizations
Most productive countries	(50) United States (26) United Kingdom (24) Japan (>=2) 47 countries	Most productive countries	(14) United States (4) United Kingdom (3) Australia (>=2) 14 countries
Most productive sources	(5) IFAC Papersonline; Journal Of Consumer Marketing; Small Enterprise Research (4) Journal of Travel And Tourism Marketing; Lecture Notes in Computer Science Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes In Bioinformatics (3) Journal of Hospitality and Leisure Marketing; Journal of Travel Research; Smart Innovation Systems and Technologies (>=2) 128 sources	Most productive sources	(3) Journal of Consumer Marketing; Journal of Travel Research (2) Journal of Travel and Tourism Marketing; Tourism Management (>=1) 23 sources
Most productive subjects	(7) Business, Management and Accounting (5) Social Sciences (4) Economics, Econometrics and Finance (>=2) 17 subjects	Most productive subjects	(25) Business, Management and Accounting (14) Social Sciences (6) Economics, Econometrics and Finance (>=2) 7 subjects

Source: Own elaboration (2023).

end, the publications gathered with the previously described advanced search in Scopus database and distributed into four periods (Period 1: 1979-1999; Period 2: 2000-2009; Period 3: 2010-2019 and Period 4: 2020-2022) were taken into consideration, so as to be able to establish the evolution and a frame of reference about all the themes related to Silver Economy.

Figure 2 shows the themes developed in the period from 1979 to 1999 related to Silver Economy. As can be seen, three themes have been identified, which have been distributed in quadrants 1, 2 and 4, they are: ECONOMIC-FACTORS, HOSPITAL-MANAGEMENT and GEOGRAPHIC-FACTORS, respectively. The most relevant themes by performance and contributions to the construction of the area of knowledge are those related to the economic and geographic factors, which cover themes related to migration, politics, workforce, distribution of income, social classes, aging population, psychological aspects, family structure, agents and public policies, among others. It is important to highlight that, despite the low productivity, the identified themes show a clear trend towards the economic, labor-related, demographic, geographic and public conditions as main elements of Silver Economy.

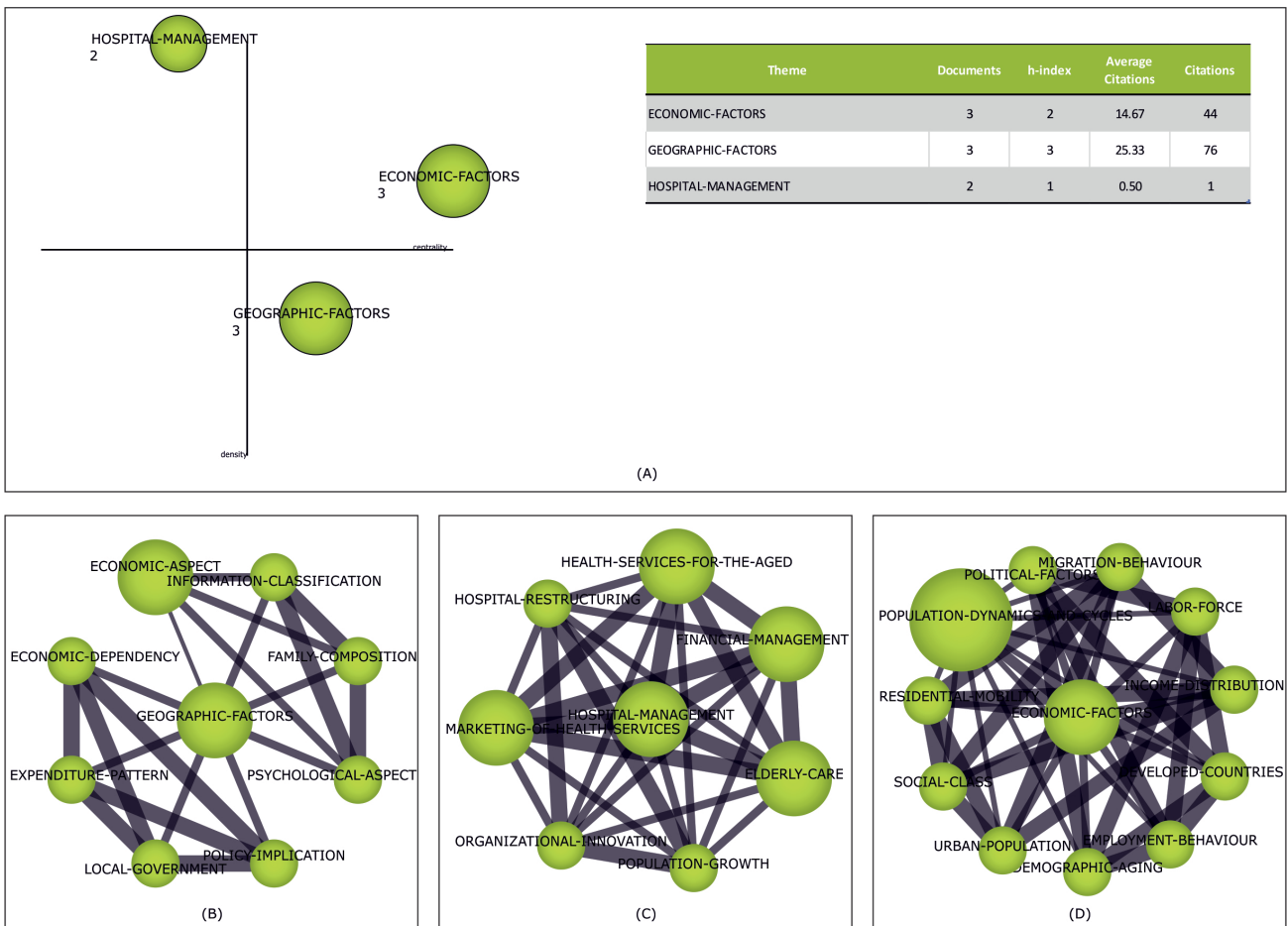


Figure 2 – Strategic map of Silver Economy from 1979 to 1999 and conceptual networks.
 Source: Own elaboration (2023).

Regarding the second period, 2000-2009, the perspective is slightly different, since 10 themes are identified and distributed mainly in quadrants 1 and 3, as seen in Figure 3. Considering that quadrants 1 and 4 promote the development of the area of knowledge, the fact that most of them are concentrated as motor themes stands out, which shows the growing interest in Silver Economy. The following themes are identified in these quadrants: FAMILY-CHARACTERISTICS, GENDER-FACTORS, HEALTH-CARE-SYSTEM, EMPLOYMENT-BEHAVIOUR, POPULATION-DYNAMICS-AND-CYCLES and OLD-ADULT-CONSUMER.

Considering the previous period, it can be observed that the themes identified as relevant remain and appear with new relations, thus extending the scope of research, which reaffirms the growing interest in Silver Economy. In the new areas covered by the themes included in quadrants 1 and 4 are marital status, family structure, socioeconomic factors, mortality factors, healthcare systems, costs and implications of access to healthcare systems, relationship with the patient, gender factors specifically, community participation, incorporation of advanced technologies, regional development, new markets, tourism and new marketing trends.

Unlike the second period, the third period shows a smaller concentration of themes resulting from specialization and deepening in the main themes, passing from maximal indicators comparable to 7 publications by themes in the second period to themes with values higher than 11 publications in the third period. Figure 4 shows the strategic map corresponding to the period

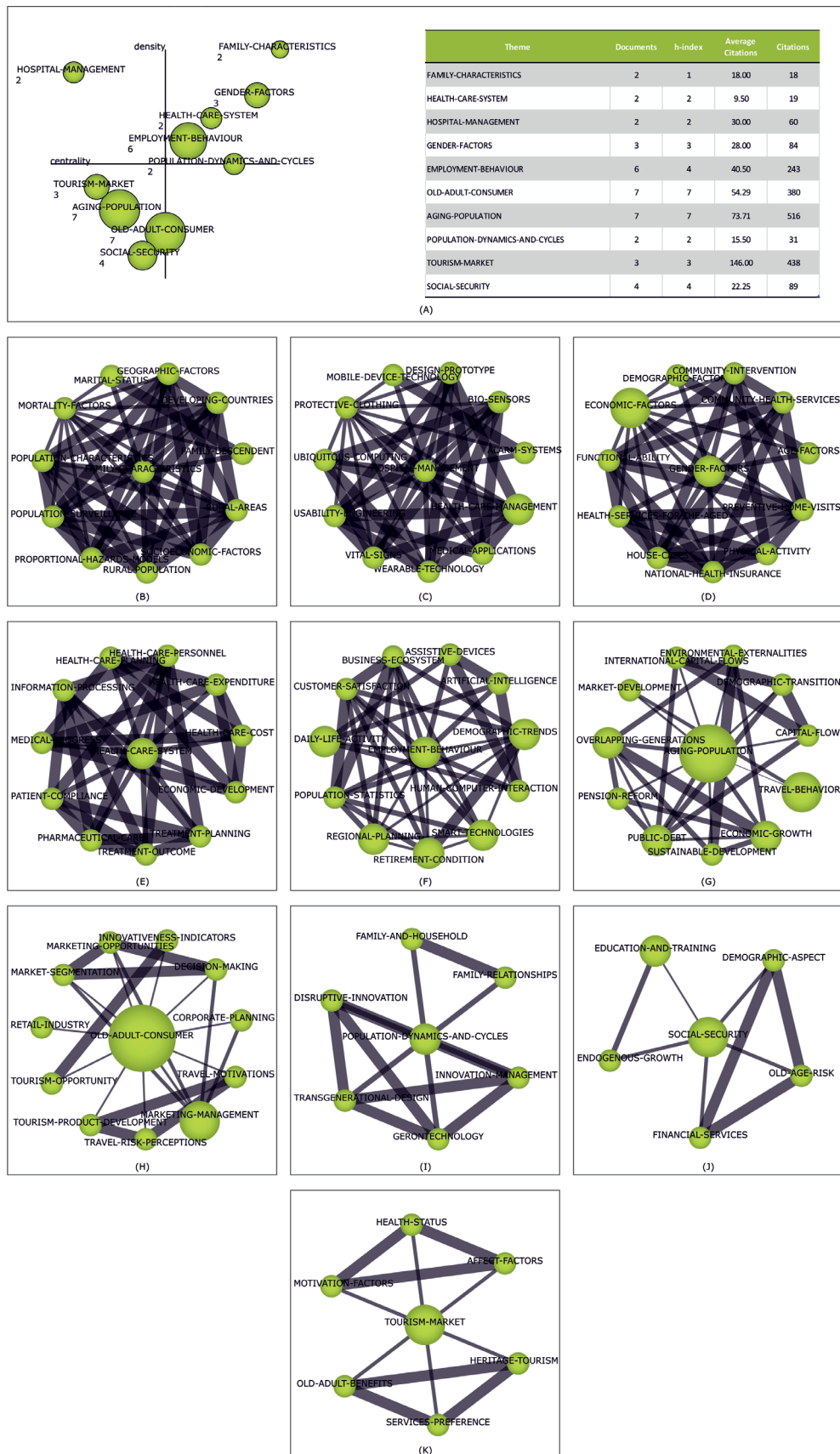


Figure 3 – Strategic map of Silver Economy from 2000 to 2009 and conceptual networks. Source: Own elaboration (2023).

from 2010 to 2019, which concentrates seven themes distributed into the four quadrants, though distributed mainly in quadrants 1 and 4, which shows continuity in the development of knowledge related to Silver Economy.

INVESTMENT-MANAGEMENT, E-COMMERCE, AGING-POPULATION and E-HEALTH-CARE-SERVICES are the most relevant themes in the third period, the basic or transversal themes being the ones showing more productivity in literature with 29 and 21 publications respectively.

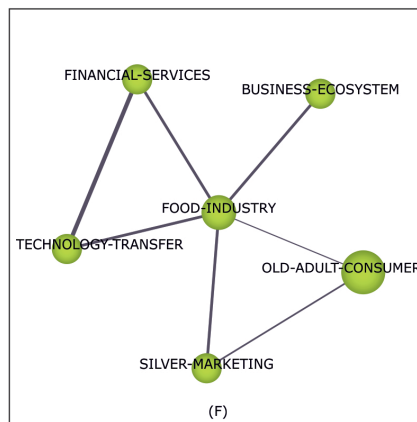
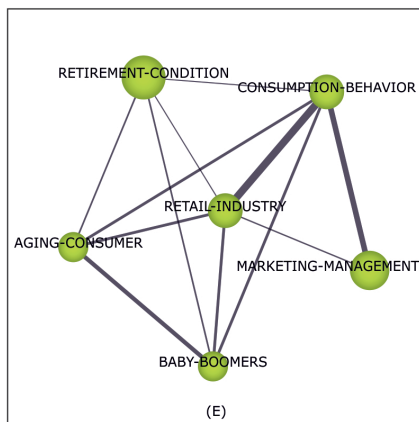
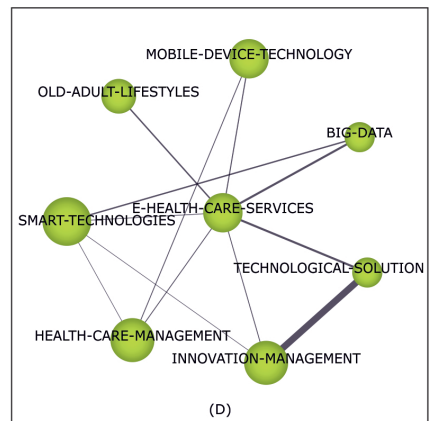
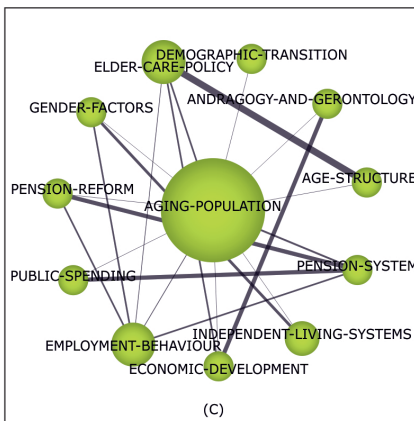
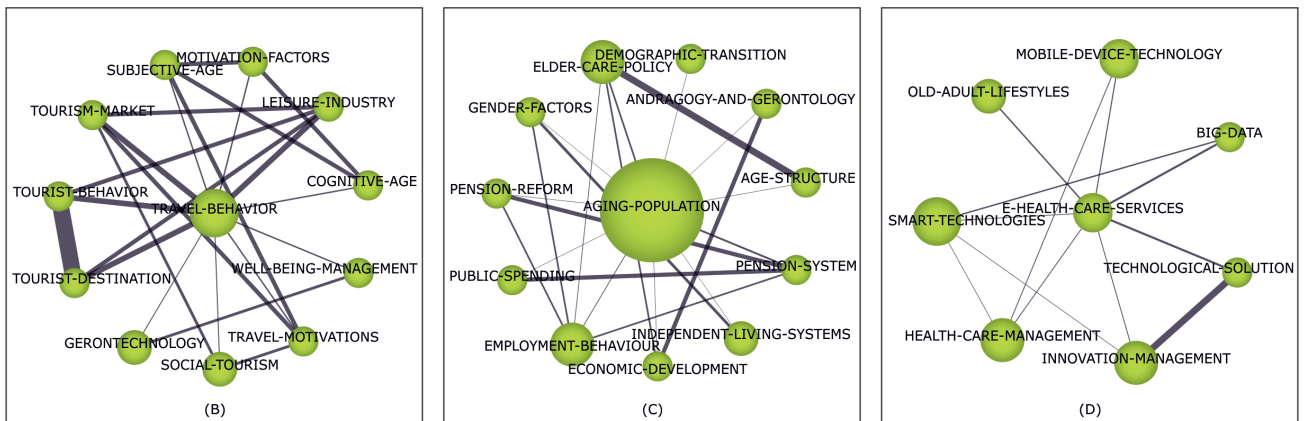
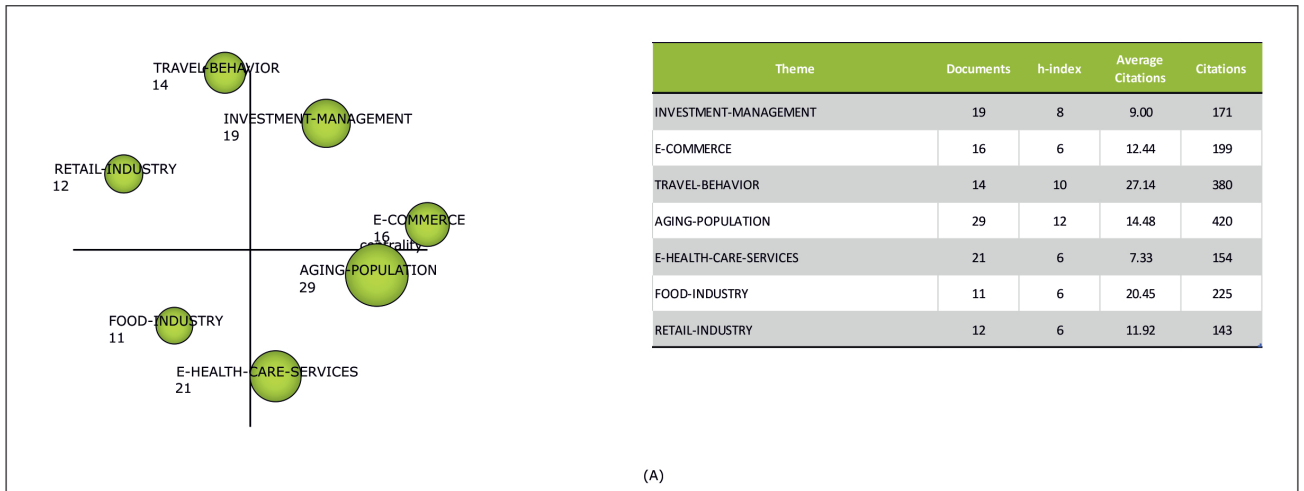


Figure 4 – Strategic map of Silver Economy from 2010 to 2019 and conceptual networks. Source: Own elaboration (2023).

The aforementioned themes bear relation to themes mentioned in previous periods but have specialization in economic and financial factors, assistance to older adults, pension systems, strategies for regional development, specific public policies, public expenditure, activities related to economic growth, products targeted at older adults, new work-related activities, advanced and smart technologies, innovation applied to services, and incorporation of mobile and connected technologies, among others, placing value on a clear orientation to specific public policies as well as the use of smart and connected technologies.

Finally, the fourth period (2020-2022) shows only four themes: TECHNOLOGICAL-SOLUTION, POPULATION-STATISTICS, DIGITAL-TRANSFORMATION and SMART-TECHNOLOGIES, distributed in quadrants 1, 2 and 3, as can be seen in Figure 5. In this case, it is important to highlight that the scarcity of themes results from the fact that only 3 years have been covered compared to the 10 years covered in the second and third periods.

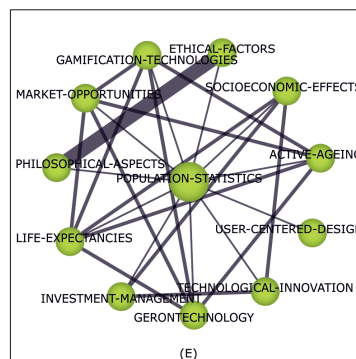
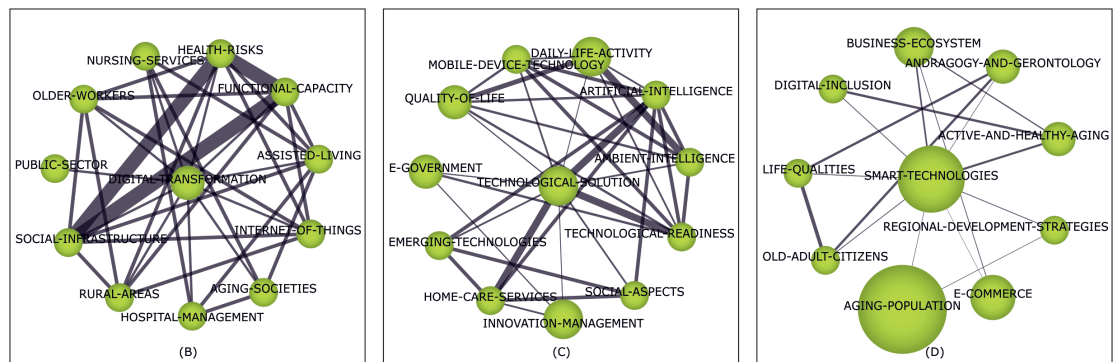
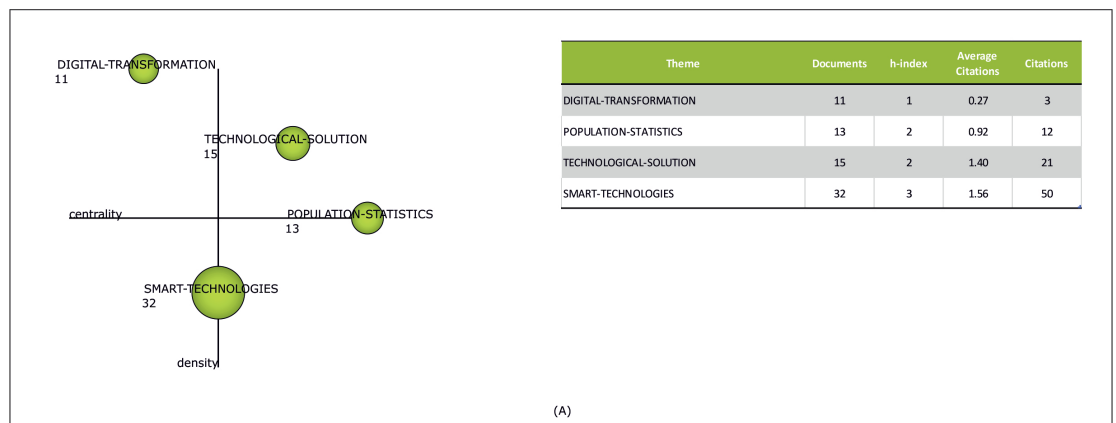


Figure 5 – Strategic map of Silver Economy from 2020 to 2022 and conceptual networks. Source: Own elaboration (2023).

Regarding relevant themes, three are identified in the fourth period, one of them as a motor themes and the others as basic or transversal themes. This condition most probably occurs because of the limitation in available years and the change of paradigm occurring in 2020, the first year of the period in question and in which the COVID-19 pandemic set, to a great extent, the guidelines on which research was conducted.

In this sense, in the thematic networks of the main quadrants can be identified actions seeking the application of the previous themes and complementing the situation caused by the pandemic, and where aspects such as activation of the older adults, technological innovation, market opportunities, expectations and specific products for older adults, improved living conditions, application of new technologies, regional development and promotion of ecosystems based on innovation and cooperation stand out.

Taking into account the results of all periods, Figure 6 shows the evolution of the themes between periods, the vertical line corresponding to each period, the solid lines being the direct union of included themes, while the intermittent line is the one corresponding to shared themes.

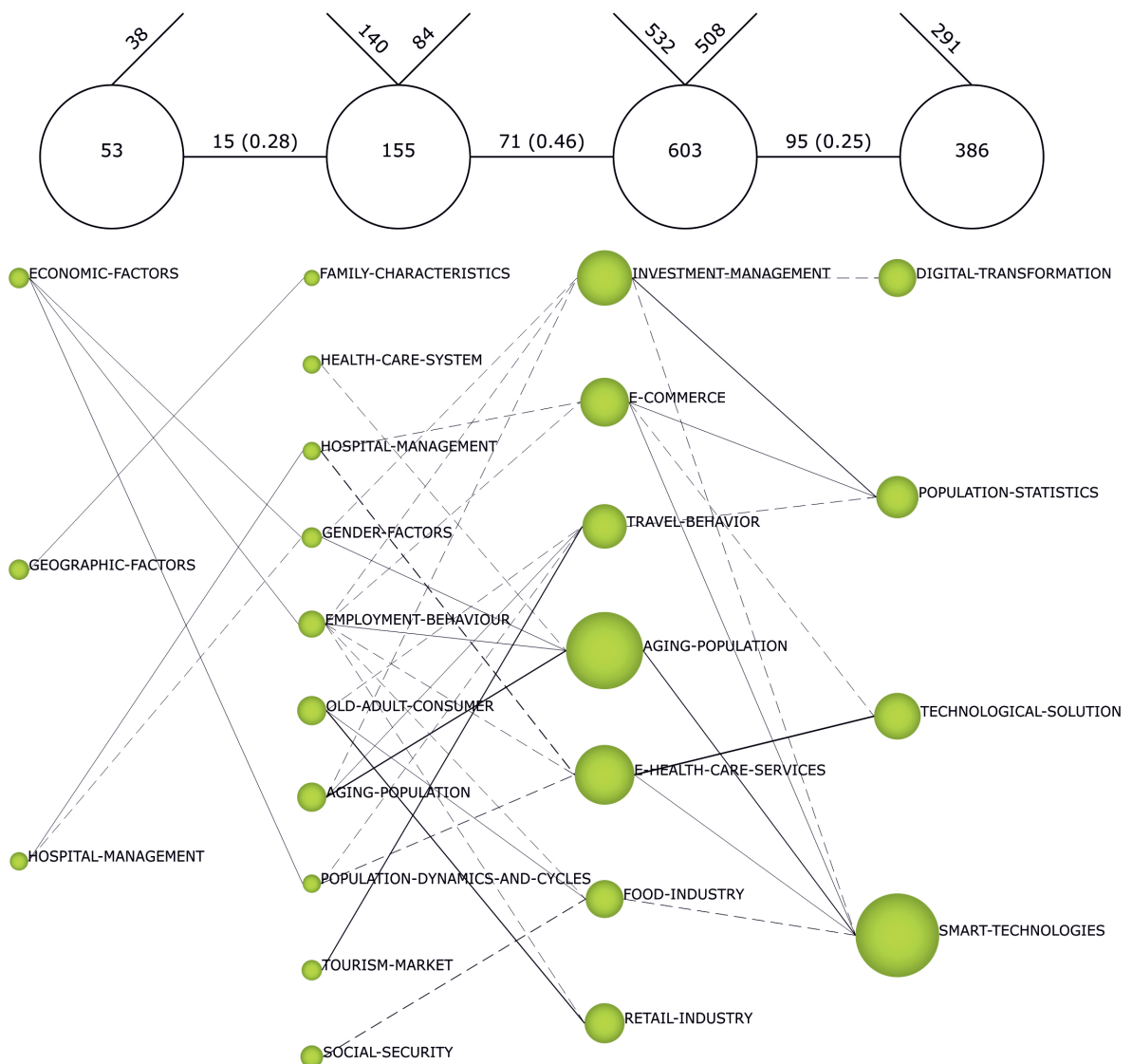


Figure 6 – Map of evolution of Silver Economy from 1979 to 2022.
Source: Own elaboration (2023).

Accordingly, it can be seen that, in the first period, a total of 53 themes were identified, only 15 (28%) out of them showed continuity in the second period. During the second period, 155 themes were identified, 71 (46%) out of them showed continuity in the third period, such situation shows continuity and the growing interest in Silver Economy. During the third period, a total of 603 themes were recorded, only 95 (25%) out of them showed continuity in the fourth period, presumably due to the technological transformation and the effects on the changes of paradigm brought about by the pandemic, which resulted in 291 new themes in the fourth period, out of a total of 386, a representative figure if it is taken into account that said period only covers 3 years as compared to 10 years in the previous period.

Another relevant aspect in the map of evolution is the increase in the number of publications and the specialization in areas such as technology, economy (services) and development of public policies, such aspects reinforce the interest of the agents, regardless of their nature, in knowing the scope of Silver Economy in more detail.

Finally, it can be noted that, the themes developed in the literature and their structures are consistent with the statement that has started to be built about what refers to Silver Economy and the fact that disruptive technologies with clear applications in health, wellbeing, tourism and sustainability back it.

Discussion and conclusion

Pursuant to the goals of this article, more than one thousand research themes have already been identified, their impact, relation and evolution, these results allow us to establish a frame of reference around Silver Economy, from a comprehensive perspective, ie, academic, scientific, technological, entrepreneurial, social and political. From the identified themes, the following stand out for their motor, basic and transversal role: ECONOMIC-FACTORS, GEOGRAPHIC-FACTORS, FAMILY-CHARACTERISTICS, GENDER-FACTORS, HEALTH-CARE-SYSTEM, EMPLOYMENT-BEHAVIOR, POPULATION-DYNAMICS-AND-CYCLES, OLD-ADULT-CONSUMER, INVESTMENT-MANAGEMENT, E-COMMERCE, AGING-POPULATION, E-HEALTH-CARE-SERVICES, TECHNOLOGICAL-SOLUTION, POPULATION-STATISTICS y SMART-TECHNOLOGIES.

The evolution of the concept of Silver Economy pursuant to the themes identified in the literature starts from an approach related to the economic, geographic, family- and gender-related factors up to an approach of population as a whole where the latest technologies are integrated, passing for the evolution of older adults as consumers and clients of services of commerce, tourism and health. This is a remarkable fact because there is a joint approach to the older adult population where technology is proposed as an answer and the acceptance of the aging population.

In qualitative terms, it can be seen a sustained increase in publications and participation in congresses, these aspects show the interest in Silver Economy. Though the growth is not comparable yet to the one occurring in other areas of knowledge in the last years, it is important to remark that the advances of other areas such as public policies, specific healthcare services, strategies targeted at older adults as well as the application of new technologies and teaching methodologies, among others.

The increase in older adult population trends worldwide arouses general interest in understanding the phenomenon of worldwide aging and finding out the ways making it possible to develop strategies for sustainable development for those composing this age bracket by way of applying innovating systems adequate to the context of the challenges the population future

poses for the stakeholders of the world economy, but also for the particularities that may exist in each region. Therefore, it is feasible to expect that most of the short-term advances be focused on specific regions or cases.

In this sense, it could be possible to say that Europe is one of the regions that will allocate more resources for the development and consolidation of the concept of Silver Economy, followed by countries in the same continent and developed countries in the rest of the world. However, developing countries are making use of the condition and willingness of the aforementioned regions, establishing dynamics and strategies allowing them to join or participate, thus furthering their positioning within the global Silver Economy.

It can be concluded that Silver Economy is a growing area of cross-sectional research that is expected to consolidate in the next years, according to the particularities of the more developed regions in the world. In this sense, the opportunities for growth and continuity will be related to the involvement that may exist with other areas of knowledge and the depth of the exercises to be conducted in regions such as Europe, Asia and North America, mainly. A detailed analysis by regions and the evaluation in shorter periods to identify particularities and specializations are potential lines of research (i.e. consumer behavior, silver marketing strategies, public policy implications, among others). Thus, the next steps will be to analyze the publications and approaches by region, considering the potential research lines and its implications.

Finally, the Silver Economy poses significant implications and opportunities for entrepreneurs in the design of new services and products. With the aging population increasing globally, there is a growing demand for innovative solutions that cater to the needs and preferences of older consumers. This presents a vast business market, ranging from healthcare and wellness services to technology and mobility solutions. Entrepreneurs who proactively address the challenges and aspirations of the older demographic stand to benefit from the untapped potential of the Silver Economy. By creating age-friendly, inclusive, and user-centric offerings, they can not only meet the demands of this market segment but also foster a positive impact on society by promoting active and dignified aging. Embracing the Silver Economy as a business opportunity can lead to sustainable growth and societal contributions while catering to the unique requirements of an aging population.

References

- Andrade Gontijo, M. C.; Hamanaka, R. Y.; Ferreira De Araújo, R. Research data management: production and impact from Dimensions database data. *In: Días, T. M. R. Informação, Dados e Tecnologia: Advanced Notes in Information Science*. Tallinn: ColNes Publishing, 2022. v. 2, p. 112-120. Doi: <https://doi.org/10.47909/anis.978-9916-9760-3-6.89>.
- Bolaño García, M.; Duarte Acosta, N.; González Castro, K. Producción científica sobre el uso de las TIC como herramienta de inclusión social para personas sordas: un análisis bibliométrico. *Salud, Ciencia y Tecnología*, v. 3, p. 318, 2023. Doi: <https://doi.org/10.56294/saludcyt2023318>.
- Butt, S. A. et al. Designing A Digital Collaborative Platform for the Silver Economy: Inception and Conceptualization 2021. *In: Eighth International Conference on eDemocracy & eGovernment, 8.*, Quito: IEEE, 2021. Doi: <https://doi.org/10.1109/ICEDEG52154.2021.9530937>
- Cervantes Martínez, L. et al. Generación de conocimiento en la era de telecomunicaciones y su impacto en la educación y desarrollo económico en América Latina. *Salud, Ciencia y Tecnología*, v. 3, p. 363, 2023. Doi: <https://doi.org/10.56294/saludcyt2023363>.
- Cobo, M. J. *SciMat: herramienta software para el análisis de la evolución del conocimiento científico. Propuesta de una metodología de evaluación*. Granada: Universidad de Granada, 2012. Doi: <https://doi.org/http://hdl.handle.net/10481/20201>.

- Cobo, M. J. et al. 25 years at Knowledge-Based Systems: A bibliometric analysis. *Knowledge-Based Systems*, v. 80, n., p. 3-13, 2015. Doi: <https://doi.org/10.1016/j.knosys.2014.12.035>.
- Conway Lenihan, A.; McGuirk, H. Small enterprises and the silver economy. *Small Enterprise Research*, v. 29, n. 1, p. 1-5, 2022. Doi: <https://doi.org/10.1080/13215906.2022.2048205>.
- Silva Júnior, E. M.; Dutra, M. L. A roadmap toward the automatic composition of systematic literature reviews. *Iberoamerican Journal of Science Measurement and Communication*, v. 1, n. 2, p. 1-22, 2021. Doi: <https://doi.org/10.47909/ijismc.52>.
- Erlenheim, R.; Pappel, I. The Role of Service Design in Increasing Regional Innovation in the Silver Economy. In: International Conference on Electronic Governance and Open Society: Challenges in Eurasia. Quito: IEEE, 2022. Doi: https://doi.org/10.1007/978-3-031-04238-6_2.
- Feng, Z. Global convergence: Aging and long-term care policy challenges in the developing world. *Journal of Aging & Social Policy*, v. 31, n. 4, p. 291-297, 2019. Doi: <https://doi.org/10.1080/08959420.2019.1626205>.
- Gamboa-Rosales, N. K. et al. Visualizing the Intellectual Structure and Evolution of Intelligent Transportation Systems: A Systematic Analysis of Research Themes and Trends. *Sustainability*, v. 12, n. 21, p. 8759, 2020. Doi: <https://doi.org/10.3390/su12218759>.
- Gontijo, M. C. A.; Hamanaka, R. Y.; Araujo, R. F. Research data management: a bibliometric and altmetric study based on Dimensions. *Iberoamerican Journal of Science Measurement and Communication*, v. 1, n. 3, p. 1-19, 2021. Doi: <https://doi.org/10.47909/ijismc.120>.
- Gutiérrez-Salcedo, M. et al. Some bibliometric procedures for analyzing and evaluating research fields. *Applied Intelligence*, v. 48, n. 5, p. 1275-1287, 2018. Doi: <https://doi.org/10.1007/s10489-017-1105-y>.
- Herrera-Viedma, E. et al. Global trends in coronavirus research at the time of Covid-19: A general bibliometric approach and content analysis using SciMAT. *El Profesional de la Información*, v. 29, n. 3, 2020. Doi: <https://doi.org/10.3145/epi.2020.may.22>.
- Jakovljevic, M. et al. Aging and global health. In: Kickbusch, I.; Ganten, D.; Moeti, M. (ed.). *Handbook of Global Health*. Cham: Springer, 2021. p. 73-102. Doi: https://doi.org/10.1007/978-3-030-45009-0_4.
- Kalasic, A.; Vidovic, O. K. Aging and health: priorities of the World Health Organization for the decade of healthy aging 2020-2030. *Ageing Human Rights*, v. 67, 2018.
- Lipp, B.; Peine, A. Ageing as a driver of progressive politics? What the European Silver Economy teaches us about the co-constitution of ageing and innovation. *Ageing & Society*, v. n., p. 1-13, 2022. Doi: <https://doi.org/10.1017/S0144686X22000903>.
- López-Robles, J. R. et al. 30 years of intelligence models in management and business: A bibliometric review. *International Journal of Information Management*, v. 48, p. 22-38, 2019. Doi: <https://doi.org/10.1016/j.ijinfomgt.2019.01.013>.
- Marcucci, G. et al. A Bibliometric Analysis of the Emerging Trends in Silver Economy. *IFAC: Papers online*, v. 54, n. 1, p. 936-941, 2021. Doi: <https://doi.org/10.1016/j.ifacol.2021.08.190>.
- Marinho De Sousa, R. P.; Shintaku, M. Data privacy policy: relevant observations for its implementation. In: Dias, T.M.R. *Informação, Dados e Tecnologia*. Tallinn: ColNes Publishing, 2022. (Advanced Notes in Information Science, v. 2, p. 82-91). Doi: <https://doi.org/10.47909/anis.978-9916-9760-3-6.112>.
- McGuirk, H.; Conway Lenihan, A.; Lenihan, N. Awareness and potential of the silver economy for enterprises: a European regional level study. *Small Enterprise Research*, v. 29, n. 1, p. 6-19, 2022 Doi: <https://doi.org/10.1080/13215906.2021.1919915>.
- Miyamoto, H.; Yoshino, N. A note on population aging and effectiveness of fiscal policy. *Macroeconomic Dynamics*, v. 26, n. 6, p. 1679-1689, 2022. Doi: <https://doi.org/10.1017/S1365100520000607>.
- Moed, H. F. et al. A comparative study of bibliometric past performance analysis and peer judgement. *Scientometrics*, v. 8, n. 3-4, p. 149-159, 1985. Doi: <https://doi.org/10.1007/BF02016933>.
- Moed, H. F.; De Bruin, R.; Van Leeuwen, T. H. New bibliometric tools for the assessment of national research performance: Database description, overview of indicators and first applications. *Scientometrics*, v. 33, n. 3, p. 381-422, 1995. Doi: <https://doi.org/10.1007/bf02017338>.

- Okumura, M. et al. *The Silver Economy in Latin America and the Caribbean: Aging as an Opportunity for Innovation, Entrepreneurship, and Inclusion*. [S.l.]: Grupo BID, 2020. Doi: <http://dx.doi.org/10.18235/0002598>.
- Plácido, A. I.; Herdeiro, M. T.; Roque, F. Health and Wellbeing in Aging. *International Journal of Environmental Research and Public Health*, v. 19, n. 14, p. 8835, 2022. Doi: <https://doi.org/10.3390/ijerph19148835>.
- Reymond, D. Patents information for humanities research: Could there be something? *Iberoamerican Journal of Science Measurement and Communication*, v. 1, n. 1, p. 006-006, 2021. Doi: <https://doi.org/10.47909/ijsmc.02>.
- Rogelj, V.; Bogataj, D. Social infrastructure of Silver Economy: Literature review and Research agenda. *IFAC: Papers online*, v. 52, n. 13, p. 2680-2685, 2019. Doi: <https://doi.org/10.1016/j.ifacol.2019.11.612>.
- Rudnicka, E. et al. The World Health Organization (WHO) approach to healthy ageing. *Maturitas*, v. 139, n., p. 6-11, 2020. Doi: <https://doi.org/10.1016%2Fj.maturitas.2020.05.018>.
- Sott, M. K. et al. Process modeling for smart factories: using science mapping to understand the strategic themes, main challenges and future trends. *Business Process Management Journal*, v. 27, n. 5, p. 1391-1417, 2021. Doi: <https://doi.org/10.1108/BPMJ-05-2020-0181>.
- Tummers, L. Public policy and behavior change. *Public Administration Review*, v. 79, n. 6, p. 925-930, 2019. Doi: <https://doi.org/10.1111/puar.13109>.
- Wang, Q.; Li, L. The effects of population aging, life expectancy, unemployment rate, population density, per capita GDP, urbanization on per capita carbon emissions. *Sustainable Production and Consumption*, v. 28, n., p. 760-774, 2021. Doi: <https://doi.org/10.1016/j.spc.2021.06.029>.
- Yang, Y.; Zheng, R.; Zhao, L. Population aging, health investment and economic growth: based on a cross-country panel data analysis. *International Journal of Environmental Research and Public Health*, v. 18, n. 4, p. 1801, 2021. Doi: <https://doi.org/10.3390%2Fijerph18041801>.
- Zhukovska, A. "Silver economy" as a resource of inclusive development of the national economy. *Herald of Economics*, v. 3 n. 97, p. 37-53, 2020. Doi: <http://dx.doi.org/10.35774/visnyk2020.03.037>.

Acknowledgments

The authors acknowledge the support by Universidad Autónoma de Zacatecas (UAZ), Consejo Nacional de Humanidades, Ciencias y Tecnologías (CONAHCYT), Consejo Zacatecano de Ciencia Tecnología e Innovación (COZCYT) and Management, Evaluation and Training Processes of Public Policies of Mexico Academic Group (CA-206) to carry out this piece of research.

Collaborators

R. C. Álvarez-Diez, R. M. Vega-Esparza, V. H. Bañuelos-García and J. R. López-Robles collaborated with the conceptualization, validation, formal analysis, investigation, resources, Writing – original draft preparation and Project administration; R. C. Álvarez-Diez and J. R. López-Robles collaborated with methodology, data curation, writing – review and editing –, visualization and supervision; J. R. López-Robles collaborated with software; All authors have read and agreed to the published version of the manuscript.



Available in:

<https://www.redalyc.org/articulo.oa?id=384378477001>

How to cite

Complete issue

More information about this article

Journal's webpage in redalyc.org

Scientific Information System Redalyc
Diamond Open Access scientific journal network
Non-commercial open infrastructure owned by academia

Rubén Carlos Álvarez-Diez, Reina Margarita Vega-Esparza,
Víctor Hugo Bañuelos-García, José Ricardo López-Robles
**The evolution research on Silver Economy: Current
researches, trends, and implications for future directions
A evolução da investigação sobre a Economia da Prata:
Investigações atuais, tendências e implicações para
direções futuras**

Transinformação

vol. 35, e237325, 2023

Pontifícia Universidade Católica de Campinas,

ISSN: 0103-3786

ISSN-E: 2318-0889

DOI: <https://doi.org/10.1590/2318-0889202335e237325>