# The scientific production of social frailty: A bibliometric analysis

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## 1. Introduction

In the 20th century, Western countries underwent a significant demographic transformation characterized by increased life expectancy and declining fertility rates (Cisotto et al., 2022). This resulted in an aging population, notably prominent in Italy, which became the oldest country in Europe.

The concept of frailty emerged as a major public health concern, referring to a condition of physical vulnerability and the negative health consequences associated with aging. There is an ongoing debate regarding the nature of frailty, with some models emphasizing physical aspects while others highlight its multidimensional nature (De Vries et al., 2011). Integrated models recognize frailty as a dynamic biopsychosocial phenomenon, considering the accumulation of deficits across physical, psychological, and social domains. Social frailty specifically refers to a lack of engagement in social networks and the perceived absence of connections and support (Andrew et al., 2008). While physical and psychological frailty have been extensively explored, social frailty remains relatively understudied (Bunt et al., 2017).

To enhance our understanding of this subject, it is crucial to map the existing scientific knowledge within the field. This involves conducting a comprehensive review of the relevant literature, synthesizing previous research findings, and identifying potential areas for future investigation. Bibliometrics, a statistical measurement-based methodology, serves as a valuable tool to facilitate this review process, providing a systematic, transparent, and replicable approach to assess scientific production, researchers, and scientific activities (Cuccurullo et al., 2016). Bibliometric methods have been widely applied across various research domains to evaluate the impact of the field itself, specific researchers, papers, and journals. They offer insights into knowledge inputs, research gaps, emerging trends, and future opportunities.

In this study, we employ a prominent approach to highlight both structural and cognitive patterns within the research field, namely science mapping (Aria et al., 2020). Science mapping allows us to identify, visualize, and analyse the themes and trends in a research domain, both synchronically and diachronically, without repetition (Cobo et al., 2011). With this approach, we aimed to map the social frailty research field and assess its scientific productivity.

## 2. Methodology

To retrieve the scientific production, we employed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) model, as illustrated in Figure 1 (Liberati et al., 2009). PRISMA offers a comprehensive framework that outlines inclusion and exclusion criteria for article selection in a systematic literature review, ensuring transparency and reproducibility in the selection process. The Web of Science (WoS) indexing database, initially launched by the Institute for Scientific Information (ISI) and currently maintained by Clarivate Analytics, was used to retrieve the articles. Specifically, the Science Citation Index Expanded (SCI expanded) and the Social Science Citation Index (SSCI) within the WoS core collections were employed for this purpose.
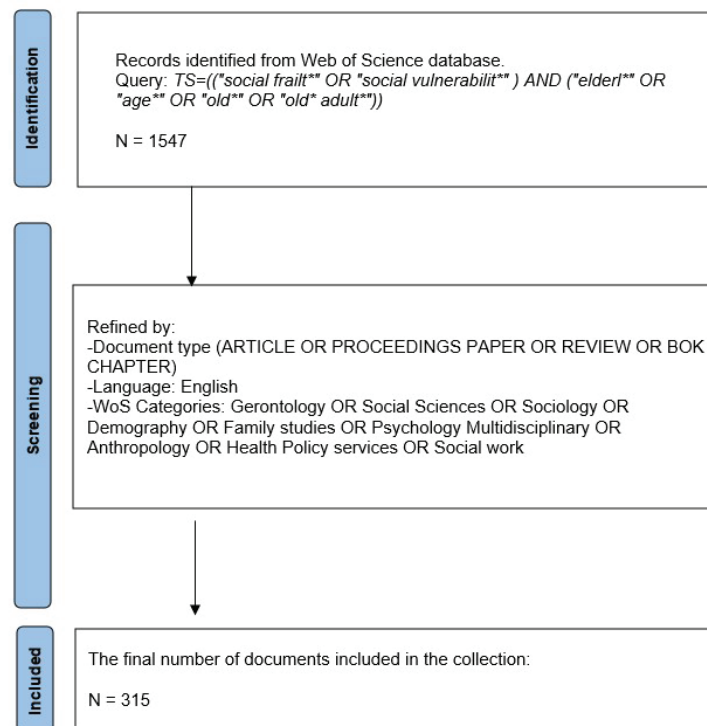
**Figure 1**: PRISMA diagram flow

The query used for documents search is as follow: TS=(("social frailt*" OR "social vulnerabilit*") AND ("elderl*" OR "age*" OR "old*" OR "old* adult*")). The TS tag (Topic) searches for terms from the query in the titles, abstracts, and keywords fields of documents indexed on WoS. Quotation marks and asterisks serve as wildcards commonly used in search queries. Quotation marks retrieve records that contain the exact term sequence in the TS fields, while the asterisk allows for finding various forms of the associated term.

The collection of documents was gathered in early July 2023. To refine the search, only Articles, Proceedings papers, Review articles, and Book chapters in English published from 1998 to 2022 were selected. Bibliographic data, including titles, abstracts, author names, keywords, and cited references, were collected. The documents were exported to PlainText format. Documents without abstracts and those related to the medical and psychiatric fields were excluded as the goal is to focus solely on productions in the social field, resulting in a total of 315 retrieved documents. The bibliometrix R open-source package (Aria and Cuccurullo, 2017) was utilized to perform bibliometric analyses on the entire collection.

Specifically, this study utilized bibliometric analysis to examine the conceptual structure of publications in a specific scientific field. The analysis involved two main techniques: co-occurrence network analysis and thematic mapping. The co-occurrence network analysis involved constructing a co-occurrence matrix to quantify the frequency with which terms appeared together in the documents (Wang et al., 2019). The resulting matrix was represented as a weighted network, where nodes represented terms and edges denoted associations between linked terms. Community detection (Fortunato, 2010) was performed using the Walktrap algorithm (Pons and Latapy, 2006).

Thematic mapping was used to visually represent these identified themes on a bi-dimensional map (Cobo et al., 2011). The x-axis measured Callon centrality, indicating the significance of a theme within the research field, while the y-axis measured Callon density, indicating the level of theme development (Callon et al., 1983). This mapping approach allowed for the categorization of themes into four types based on their location on the map. The first quadrant of the map, located

in the upper right, consists of motor themes that are highly significant and well-developed, as indicated by their high centrality and density. The second quadrant, located in the upper left, represents isolated or niche themes that are highly developed internally but lacked significant external links, resulting in low centrality and limited importance for the broader research field. The third quadrant, located in the lower left, comprises emerging or declining themes with low centrality and density, indicating weak or marginal development. The fourth quadrant, located in the lower right, identifies basic and transversal themes with high centrality and low density, representing principal issues cutting across different research areas.

Each theme is represented as a network cluster, with the bubble name reflecting the word with the highest occurrence value within the cluster and the bubble size indicating the proportion of the cluster's word occurrences. This comprehensive analysis provided insights into the conceptual structure of the field and the relationships between different research themes.

## 3. Main findings

Starting from 1,547 documents, several filters were applied to refine our collection to 315 publications published from 1998 to 2022. As we can see in Table 1, the documents were published by 1355 authors across 172 distinct sources, encompassing both journals and books. The average number of citations per document published within the reference timespan (1998-2022) stands at 22.13. The publication's annual growth rate is calculated at 7.43%. As shown in Figure 2, scientific research pertaining to social fragility has been experiencing a notable upward trend, with notable peaks in 2014 and 2020, marked by a significant increase in literature. However, it is from the year 2021 onward that we observe a remarkable surge in research activity concerning this topic.

**Table 1: Basic information about the collection**

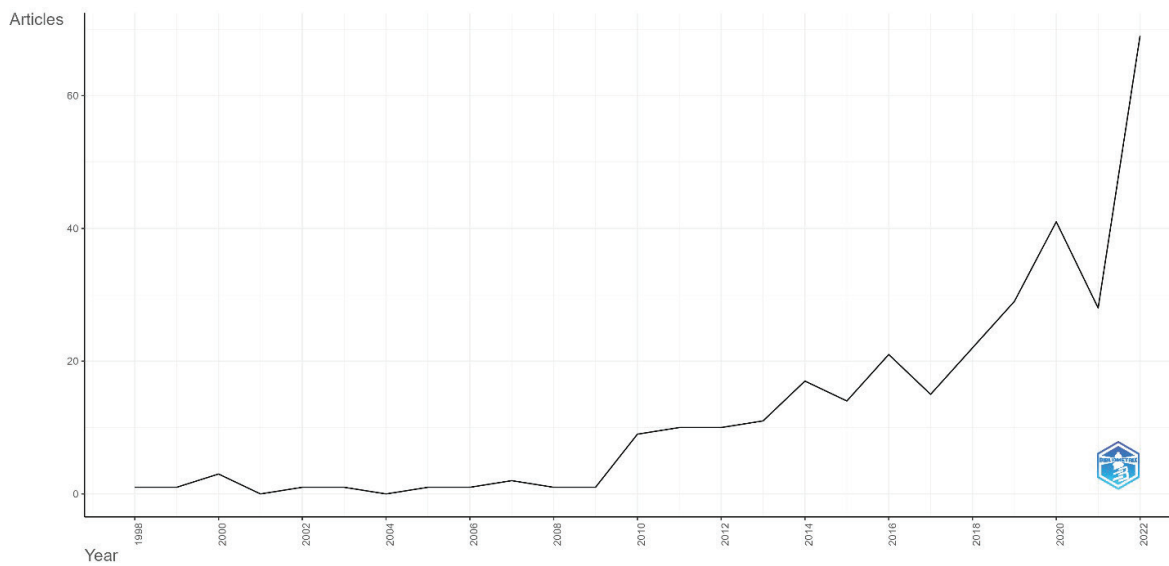| OVERVIEW | |
| --- | --- |
| Timespan | 1998:2022 |
| Sources (journals, books, etc) | 172 |
| Documents | 315 |
| Annual growth rate % | 7.43 |
| Document average age | 5.36 |
| Average citations per doc | 22.13 |
| References | 14967 |
| **DOCUMENT CONTENTS** | |
| Keywords Plus (ID) | 985 |
| Author's keywords (DE) | 921 |
| **AUTHORS** | |
| Authors | 1355 |
| Authors of single-authored docs | 29 |
| **AUTHORS COLLABORATION** | |
| Single-authored docs | 30 |
| Co-authors per Doc | 4.73 |
| International co-authorships % | 24.76% |
| **DOCUMENT TYPES** | |
| Article | 284 |
| Book chapter | 5 |
| Proceedings paper | 16 |
| Review | 10 |

**Figure 2: Annual scientific production from 1998 to 2022**

To extract and analyse the concepts present in the collected scientific documents, we performed a thematic map (Figure 3). Keywords Plus (IDs) were used as the unit of analysis to build the co-occurrence matrix and, consequently, generate the thematic map. IDs represent words or phrases that commonly appear in the titles of article references to identify and categorize articles according to their content within the database.
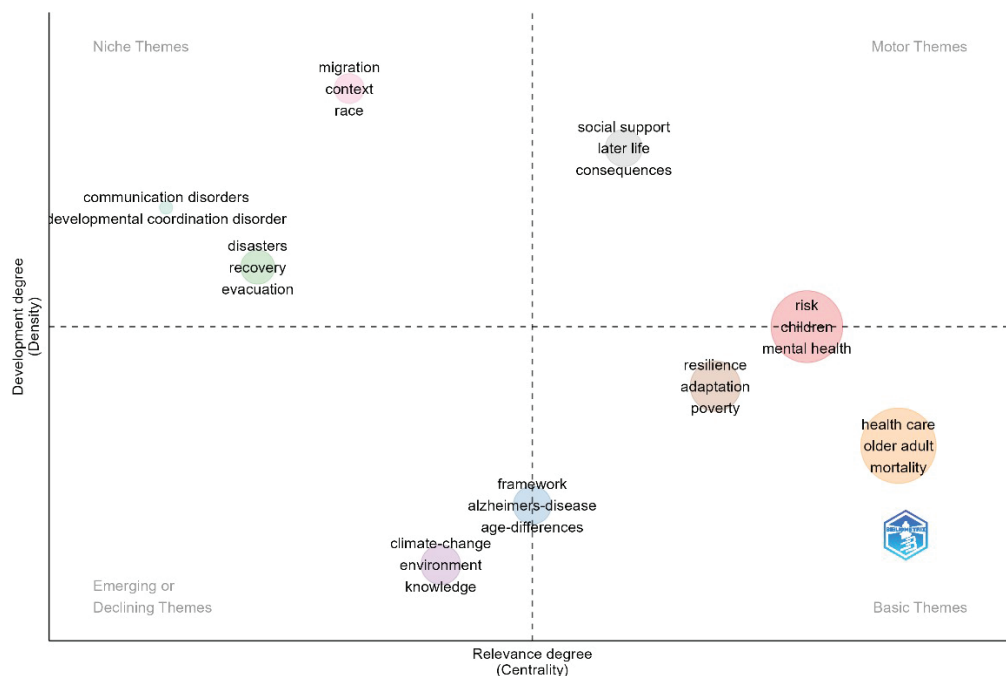


**Figure 3: Thematic map on social frailty**

One noteworthy topic, identified as a core theme, centres on the social implications of social support during adulthood, encompassing a wide range of dimensions. Researchers analyse the impact of social support on aspects such as social integration, community involvement, and social

connectedness. They investigate how social networks and support systems contribute to social capital and social cohesion within communities. Additionally, studies explore the impact of social support on interpersonal relationships, including family dynamics, friendships, and romantic partnerships. The primary themes in scientific production on social support in adulthood revolve around mental health in older people and the issues of poverty and social disparities. A substantial body of research has been conducted to understand the mental health challenges faced by older individuals, such as depression, anxiety, cognitive decline, and dementia. Researchers strive to pinpoint risk factors, assess their influence on well-being, and formulate effective interventions. Additionally, studies focus on socioeconomic factors contributing to poverty among older individuals, investigating the consequences on health, quality of life, and overall social well-being. Strategies and interventions are developed to address poverty and promote social equity among older adults (Hayajneh and Rababa, 2022).

Within the emerging theme, a compelling cluster within the scientific output is dedicated to climate change. This area of research recognizes the pressing necessity to address environmental challenges and their consequences on human health and well-being. Scholars are investigating the impacts of climate change on physical and mental health, identifying populations that are particularly vulnerable, and exploring strategies to mitigate these effects (McDermott-Levy et al., 2019). This line of inquiry contributes to the broader understanding of the interconnectedness between environmental sustainability and public health.

Finally, niche topics represent specialized areas of research within the broader field. Studies focusing on the migration of older people explore patterns, motivations, and challenges associated with older adults relocating from one place to another (Bradley and Van Willigen, 2010). Moreover, research on the social and psychological consequences of communication and coordination disorders during adulthood examines the impact of disorders like aphasia or apraxia on social interactions, daily functioning, and quality of life in older adults (Heine and Browning, 2002).

## 4. Conclusions and future developments

The paper presented a preliminary analysis of recurring themes within scholarly production on the topic of social fragility in the psycho-social field. Overall, the scientific production in the field of social support in adulthood encompasses a wide range of themes. Researchers investigate the physical, psychological, and social dimensions of aging, with particular emphasis on mental health, poverty, Alzheimer's disease, climate change, migration, and communication disorders. The goal was to generate knowledge that informs policies, interventions, and support systems to promote the well-being and overall quality of life for older adults.

Although the topic remains relatively underexplored, forthcoming endeavours will be directed towards conducting a longitudinal bibliometric analysis to investigate the evolution of social fragility topics over time.

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