

Chapter 3

A Bibliometric Analysis of Ageing Literature: Global and Asia-Pacific Trends



Muhammad Nateque Mahmood and Subas P. Dhakal

Abstract The ageing population has been considered the dominant demographic phenomenon of this millennium that equally affects both developed and developing nations alike. Given that the Asia Pacific region has been ageing more rapidly than at any time in history, this chapter examines the body of literature on “ageing” by mapping the prevalent themes of research, research hotspots, and influential stakeholders. The findings have implications for researchers into ageing as well as policymakers across countries included in this volume and beyond.

Keywords Ageing · Asia Pacific · Network analysis · Scientometric review · SDGs · VOSviewer

3.1 Introduction

According to the United Nations Department of Economic and Social Affairs (UNDESA), the global population over 65 year is projected to double from around 700 million in 2019 to 1.5 billion in 2050 (UNDESA 2019: 1). Although this demographic phenomenon clearly represents progress in the medical sciences and socio-economic progress, it also poses challenges in terms of the various Sustainable Development Goals (SDGs) described in Chap. 1 of this volume. The complex nature of ageing population related socio-cultural challenges, for example, optimising the retirement age and providing the elderly with the opportunity to live with purpose and dignity (see Sander et al. 2015), has catapulted ageing as an important research and policy agenda in countries around the world, and particularly in the

M. N. Mahmood (✉)
Deakin University (Waterfront Campus), Geelong, VIC, Australia
e-mail: n.mahmood@deakin.edu.au

S. P. Dhakal
UNE Business School, University of New England (UNE), Armidale,
NSW, Australia

Asia Pacific region. One of the World Bank's (2016) landmark reports *Live Long and Prosper: Aging in East Asia and Pacific* highlights the fact that the region is: "home to over a third of the global population ages 65 and older ... and has been ageing rather rapidly than any time in history" (p. xv). This chapter contends that the systematic scientific examination of the literature has the potential to generate useful insights on ageing and employs a quantitative approach through a bibliometric analysis. It is expected that the outputs presented here will inform researchers and policymakers on the emerging ageing related research topics and policy agenda in the region and beyond.

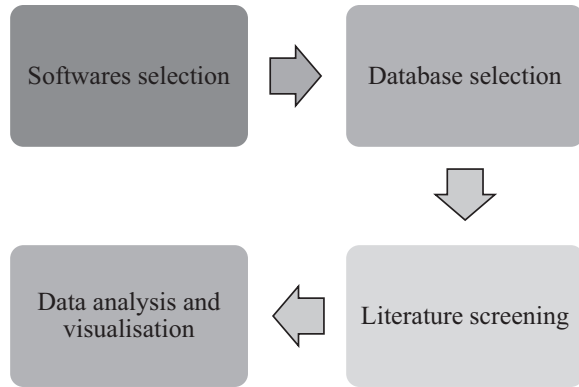
This chapter is structured in four parts, with the next section providing a background and methodological approach to bibliometric analysis. The subsequent section of the chapter describes the findings and discusses their implications, before presenting concluding remarks.

3.2 The Bibliometric Analysis Approach

Bibliometrics and scientometrics are two different methodological approaches in which the scholarly literature itself becomes the subject of analysis (Provalis Research 2021). While scientometrics explores and collectively visualises the impact of scholarly outputs, bibliometrics focuses on assessing the magnitude and scope of the contribution of a particular field or subfield of research. Although bibliometrics is related to the much broader term infometrics as well as the narrower term scientometrics, it has been primarily used for providing quantitative analysis of written publications (Ellegaard and Wallin 2015: 1810). Bibliometric analysis has become a growing area of research interest in recent years. For example, a quick search of "bibliometric analysis" in Google Scholar yielded 164,000 results in April 2021. And when the search was limited to a period between 2011 and present, it yielded 34,200 results, indicating a phenomenal growth in the past decade.

Given the relevance of the ageing phenomenon and the societal challenges associated with it, bibliometric analysis can unravel the factors that drive knowledge advancements such as prominent academic institutions, researchers, and research themes. Several bibliometric analyses have been carried out across a variety of ageing related themes. For instance, (a) Gu et al. (2019) examined the issue of healthy ageing, (b) Müller et al. (2016) investigated the nexus between physical activity and ageing, and (c) Nagarajan et al. (2019) explored organisational contributions to sustaining an ageing workforce. Although these studies did reveal emerging themes in the ageing literature, a focus on the Asia Pacific region has remained under the radar. This chapter responds to this gap and adopts a four-stage bibliometric analysis process: (a) the selection of software, (b) the selection of databases, (c) the screening of literature, and (d) data analysis and visualisation (Fig. 3.1).

Fig. 3.1 Four-staged bibliometric analysis process. (Source: Authors)



First, the selection of software was based on three criteria: cost, researcher capabilities, and user-friendliness. This analysis utilised the *VOSviewer* 1.6.1.13 and *Microsoft Excel* 2016. On the one hand, *VOSviewer* is a freely available tool that provides basic functionalities for visualising the literature by citation, co-citation links, co-authorship and or co-occurrence links (Hilal et al. 2019; van Eck and Waltman 2019). On the other, the flexibility and user-friendliness of Excel often makes it an excellent choice for sorting as well as creating data visualisations for the purpose of bibliometric analysis (Sweileh et al. 2017). Both softwares facilitated the quantitative analysis of the literature in order to produce keyword maps, author collaboration and prominent outlet maps.

Second, the selection of a database for retrieving bibliometric data was based on two criteria: access and coverage. For the purpose of this analysis, the Scopus database was selected in order to identify and collate ageing related literature because of its widespread coverage as well as the recency of publications in the database (Hasan et al. 2021; Sankar 2019).

Third, the literature search was carried out by using keywords “ageing population” + “society” in the title, abstract, and keyword sections of published articles. The search covered the period 2011–2020 and was not limited to a country or a region. Five subject areas categorised by Scopus were selected: Social sciences, Arts and humanities, Business, management and accounting, Economics, econometrics and finance, and Multidisciplinary. Although, the initial search identified 644 publications, after manual screening (for example, excluding medicine related articles, outputs published in conference proceedings, books and book chapters, and trade journals) a total of 563 articles was selected for the bibliometric analysis.

The fourth stage involved the creation of graphs and tables to visualise and present findings such as the annual number of publications, network analysis, prominent countries, researchers and research outlets, and emerging research themes.

3.3 Key Findings

The findings are presented in two different sections. First, global trends on ageing, top journal outlets, and research themes. Second, the findings presented focus on Asia Pacific with particular emphasis on the countries represented in this volume.

3.3.1 Global Focus

3.3.1.1 Trend of Research on Ageing (2011–2020)

Research outputs showed steady growth over the last 10 years. Figure 3.2 shows that the highest number of articles was published in 2019 and 2020. One of the potential reasons behind this growth is the recognition of the ageing agenda within global priorities such as the 17 SDGs of the United Nations (2015).

3.3.1.2 Top Outlets

The initial sample statistics based on the Scopus database showed that 177 journals published a total of 563 articles between 2011 and 2020. Figure 3.3 shows the top journals that have published more than ten articles on ageing. The journal *Ageing and Society* had the highest number of articles (45), followed by *Sustainability Switzerland* with 24 articles. Given the aim and scope of the journal *Ageing and Society* – “an interdisciplinary and international journal devoted to the understanding of human ageing and the circumstances of older people in their social and cultural contexts” (Anonymous n.d.), this finding is rather self-explanatory.

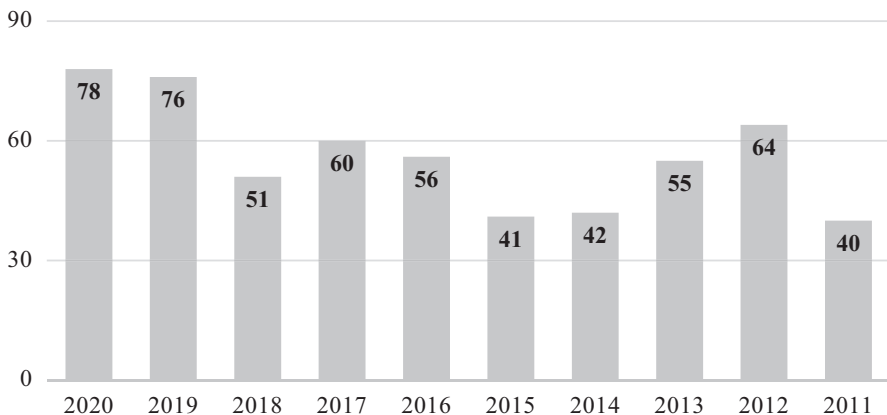


Fig. 3.2 Research outputs between 2011 and 2020

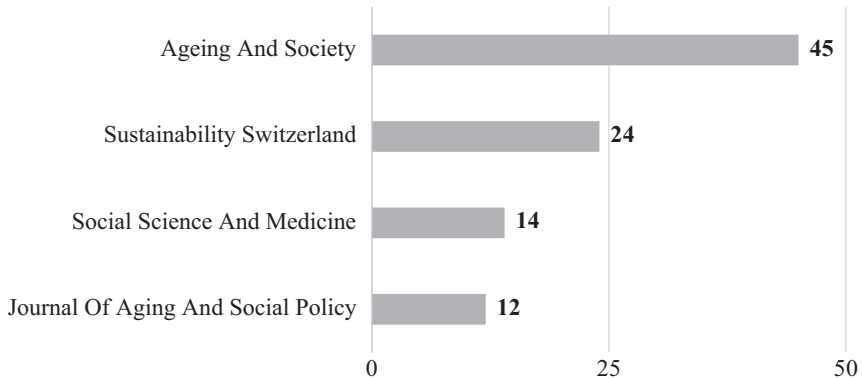


Fig. 3.3 Top contributing journals ($n > 10$) during a period between 2011 and 2020

3.3.1.3 Research Focus (Co-occurrence of Keywords Analysis)

The analysis of the co-occurrence of keywords represented through a network map delivers insightful observations and results in the field of the knowledge domain which are calculated based on the frequency of keyword occurrence. In *VOSviewer*, a fractional counting technique was deployed in order to mine author keywords, and as a result 1629 keywords or themes were extracted. With the minimum number of occurrences set to the default value of three, 110 themes met the threshold value. The network map (Fig. 3.4) was used as a basis to identify research themes and rate their prominence. The relative importance based on the degree centrality values were used to rank the prominence of research themes. The higher the degree centrality value, the more influential the research theme (Opsahl et al. 2010).

Table 3.1 reveals ten of the most important and least important research themes captured in the literature. The analysis revealed that themes such as ageing, older people, and health were key influential themes, whereas less attention had been paid to themes such as sustainable development, attitude, and mortality in the ageing literature.

3.3.1.4 Influential Countries and Collaboration Linkages

A collaboration network was created in *VOSviewer* with the type of analysis as “co-authorship”, the unit of analysis being “countries” and the counting method set to “fractional counting”. The co-authorship analysis also led to the identification of collaboration between nations based on the research output on ageing. Out of 67 countries within the dataset, 30 met these criteria of the minimum number of five documents and five citations to be included in the network map.

The Fig. 3.5 shows that the United States of America (USA) stands out as the most influential country with strong links with the United Kingdom in relation to ageing related research. Another cluster with strong research collaboration linkages

Table 3.1 The top and bottom ten research themes

Themes	Relative importance
Most important	
Ageing	1
Older people	2
Health	3
Population ageing	4
Ageing society	5
Demography	6
Gender	7
Elderly	8
Older adults	9
Active ageing	10
Least important	
Social media	101
Loneliness	102
Sustainability	103
Pension reform	104
Alzheimer’s disease	105
Caregiving	106
Health policy	107
Sustainable development	108
Attitude	109
Mortality	110

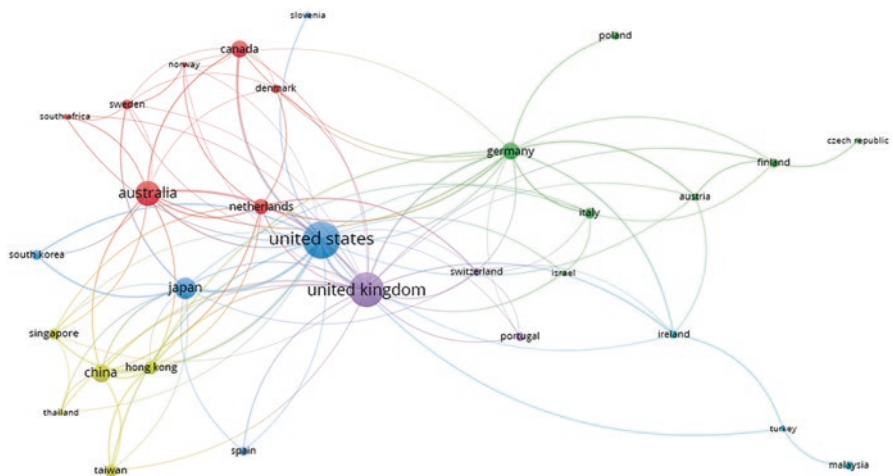


Fig. 3.5 Prominent countries

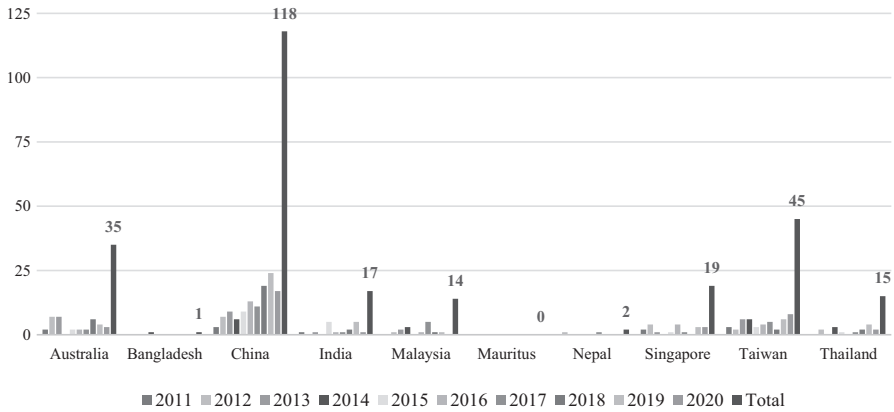


Fig. 3.6 Breakdown of number of articles by country and year

in the database. As Fig. 3.6 depicts, a total of 118 articles were China related, followed by Taiwan (45) and Australia (35). At the bottom of the list were Nepal (2) and Bangladesh (1). The fact that China has the largest number of publications aligns with a broader narrative that because of growing global tensions, limits on international cooperation, and an emphasis on applied research, have shaped the country's vision for quality research and associated outputs (Mallapaty 2021).

3.3.2.2 Prominent Institutions in the Region

Table 3.2 summarises the information related to countries and leading institutions in the Asia Pacific Region that are active in the ageing related research space. Of the seven countries identified, Japan had the highest count ($n = 12$) of institutions, followed by Australia ($n = 5$), and New Zealand ($n = 3$). Given that Japan has the oldest population in the world – with more than a quarter (28%) of its population over 65 (Edmond 2019) – the burgeoning interest in ageing related research across multiple institutions is understandable.

3.3.2.3 Prominent Researchers and Research Themes of the Region

Table 3.3 summarises the analysis of ageing literature on countries represented in this volume. Of the nine countries, China had the highest ($n = 118$) number of articles in the database, followed by Australia ($n = 35$). The *Plos One* ($n = 17$) and *Ageing and Society* ($n = 11$) were the top two journal outlets. Two of the prominent researchers in terms of publishing ageing related research in the region were Warburton, J. ($n = 5$) from Australia and Bai, X. ($n = 4$) from China. Liu and Sun's (2016) paper entitled 'Pension reform in China' was the most cited ($n = 129$) article

Table 3.2 Country and institutions engaged in ageing related research in Asia Pacific

Country	Institutions
Australia (n = 5)	Bendigo Loddon Primary Care Partnership
	Flinders University
	Latrobe University
	Monash University
	University of Melbourne
China (n = 2)	Peking Union Medical College Hospital
	Renmin University
Hong Kong (n = 1)	University of Hong Kong
Japan (n = 12)	Aichi Sukutoku University
	Chiba University
	Kobe University
	Kyoto University
	National Rehabilitation Center for Persons with Disabilities
	Keio University
	Og Sports Company
	Sendai Tomizawa Hospital
	Tokyo Medical and Dental University
	Tokyo Metropolitan Geriatric Hospital
National Center for Geriatrics and Gerontology	
New Zealand (n = 3)	University of Tokyo
	University of Auckland
	Lincoln University
Singapore (n = 1)	University of Otago
	National University of Singapore

in Google Scholar, followed by Huang et al.'s (2012) article entitled, 'Caring for the elderly: the embodied labour of migrant care workers in Singapore' (n = 126).

Table 3.3 also captures research themes across the nine countries based on the frequency of keywords. Although themes such as aged, elderly and human were common, themes such as elderly abuse (Bangladesh), urban population (Nepal), and mental health (Singapore) represent the diverse nature of ageing literature in the region.

3.4 Discussions and Conclusion

This chapter presents a bibliometric analysis of the ageing literature using the Scopus database for the period between 2011 and 2020. Since bibliometric approaches are primarily concerned with the analysis of citations in the academic literature, such analysis is suited for gauging the magnitude and scope of research

Table 3.3 Prominent authors, outlets, and keywords of articles related to countries included in this volume

Country (articles count)	Prominent authors (articles count ≥ 2)	Prominent outlet (s) (Top 5 and/or $n \geq 2$)	Prominent key words (frequency count)	Top cited article (Google scholar count $n \geq 10$)
Australia (35)	Warburton, J. (5); Atkins, M.T. (2); Callander, E. J. (2); Faulkner, D. (2); Lui, C.W. (2); Schofield, D. J. (2)	Ageing and Society (n = 4); Plos One (3); Journal of Rural Studies (2); Longitudinal and Life Course Studies (2)	Australia (26); Ageing Population (10); Elderly Population (10); Ageing (9); Aged (8)	Bartlett, H., Warburton, J., Lui, C. W., Peach, L., & Carroll, M. (2013). Preventing social isolation in later life: Findings and insights from a pilot Queensland intervention study. <i>Ageing and Society</i> , 33(7), 1167. [49]
Bangladesh (1)	N/A	N/A	Bangladesh (1); Active aging index (1); Elder abuse (1)	Tareque, M. I., Ahmed, M. M., Tiedt, A. D., & Hoque, N. (2014). Can an active aging index (AAI) provide insight into reducing elder abuse? A case study in Rajshahi District, Bangladesh. <i>Archives of gerontology and geriatrics</i> , 58(3), 399–407. [12]
China (118)	Bai, X. (4); Lam, W.W.Y. (3); Liu, T. (3); Loo, B.P.Y. (3); Basten, S. (2); Chen, F. (2); Cheng, L. (2); Chou, K.L. (2); De Vos, J. (2); Du, P. (2); Gu, D. (2); Hu, A. (2); Hu, Y. (2); Jiang, W. (2); Lai, D.W.L. (2); Mahendran, R. (2); Nie, J.B. (2); Pang, Z. (2); Singh, A. (2); Sun, L. (2); Tan, Q. (2); Wang, S. (2); Wang, Y. (2); Wu, Y. (2); Xizhe, P. (2); Yang, M. (2); Yip, P. (2); Zeng, Y. (2); Zhan, H. (2); Zhang, D. (2); Zhou, C. (2)	Plos One (8); Sustainability Switzerland (8); Ageing and Society (7); Journal of Ageing and Social Policy (4); Social Indicators Research (4)	China (96); Human (38); Ageing Population (36); Ageing (32); Female (31)	Liu, T., & Sun, L. (2016). Pension reform in China. <i>Journal of Ageing & Social Policy</i> , 28(1), 15–28. [129]

India (17)	Singh, A. (2)	Plos One (3); International Journal Of Social Economics (2); Social Science and Medicine (2)	India (14); Human (9); Adult (8); Aging (7); Female (6)	Kumar, K., Singh, A., Kumar, S., Ram, F., Singh, A., Ram, U. ... & Kowal, P. R. (2015). Socio-economic differentials in impoverishment effects of out-of-pocket health expenditure in China and India: Evidence from WHO SAGE. <i>PLoS one</i> , 10(8), e0135051. [85]
Malaysia (14)	Wan-Ibrahim, W.A. (3); Zainab, I. (3)	Malaysian Journal of Economic Studies (2); World Applied Sciences Journal (2)	Malaysia (5); Aging Population (3); Population Aging (3); Economic Growth (2); Employees Provident Fund (2)	Abd Samad, S., & Mansor, N. (2017). Population ageing and social protection in Malaysia. <i>Malaysian Journal of Economic Studies</i> , 50(2), 139–156. [88]
Mauritius (0)	N/A	N/A	N/A	N/A
Nepal (2)	N/A	N/A	Nepal (3); Aged (2); Female (2); Humans (2); Urban Population (2)	Speck, S. (2017). "They moved to city areas, abroad": Views of the elderly on the implications of outmigration for the Middle Hills of Western Nepal. <i>Mountain Research and Development</i> , 37(4), 425–435. [16]
Singapore (19)	Huang, S. (2); Lam, W.W.Y. (2); Loo, B.P.Y. (2); Mahendran, R. (2); Thang, L.L. (2); Yeoh, B.S.A. (2); Yuen, B. (2)	Social Science and Medicine (2)	Singapore (14); Aging (5); Elderly Population (5); Health Status (4); Mental Health (4)	Huang, S., Yeoh, B. S., & Toyota, M. (2012). Caring for the elderly: The embodied labour of migrant care workers in Singapore. <i>Global Networks</i> , 12(2), 195–215. [126]

(continued)

Table 3.3 (continued)

Country (articles count)	Prominent authors (articles count ≥ 2)	Prominent outlet (s) (Top 5 and/or $n \geq 2$)	Prominent key words (frequency count)	Top cited article (Google scholar count $n \geq 10$)
Taiwan (45)	Wu, C. H. (2)	Educational Gerontology (5); Geriatrics and Gerontology International (4); Sustainability Switzerland (4); Plos One (3); Social Science and Medicine (2)	Taiwan (25); Human (15); Aged (14); Middle aged (10); 80 and over (9)	Lin, J. P., & Yi, C. C. (2013). A comparative analysis of intergenerational relations in East Asia. <i>International Sociology</i> , 28(3), 297–315. [93]
Thailand (14)	Prachuabmoh, V. (2)	N/A	Thailand (10); Aged (5); Human (4); 80 and over (4); Elderly (4)	Basten, S., Muttarak, R., & Pothisiri, W. (2014). “The persistence of parent repayment” and the anticipation of filial obligations of care in two Thai provinces. <i>Asian Social Work and Policy Review</i> , 8(2), 109–122. [11]

trends. The analysis presented in this chapter indicates that the past decade has witnessed a sharp growth in the literature on ageing related research. In the global context of rapidly growing ageing demographic, ageing related research, this is likely to continue in the future. Based on the findings presented in the chapter, the following three issues are discussed below.

3.4.1 Emerging Topics

On the one hand, the analysis clearly indicated that themes such as the ageing population, gender and ageing, active ageing, quality of life, and economic aspects of ageing have dominated the literature. This is in line with the six priorities identified under the Research Agenda on Ageing for the Twenty-First Century (RAA-21 -United Nations 2007). On the other hand, themes such as caregiving, human capital, sustainable development, and mortality have received comparatively less attention. Future studies should take these findings into account and build on the analysis presented in the chapter to shape ageing related research in the broader context of SDGs in the Asia Pacific and beyond.

3.4.2 Collaboration Between Developed and Developing Countries

The analysis showed that developed countries, in particular the US, stand out as the most influential in terms of ageing related research outputs, with strong links with Europe. While China is the leader in terms of research outputs amongst countries in the Asia Pacific, several countries represented in this volume including Australia, Malaysia, Singapore, Taiwan, and Thailand have a significant number of research outputs. More importantly, Australia's equidistant position in terms of harnessing research collaboration between North American and European and Asia Pacific countries – including countries represented in this volume – is a noteworthy finding.

3.4.3 Forgotten Regions

The findings also highlight what is lacking is the ageing literature in terms of collaboration between developed and developing economies (Syed et al. 2012). In addition, the ageing literature is mostly absent from countries in the Africa and the South American continents. In the broader context of SDG # 17 – to revitalise the global partnership for sustainable development (United Nations 2020) – researchers

and research institutions should take these findings into account and potentially plan and shape ageing related research going forward.

As with any empirical studies, there are limitations to the analysis presented in this chapter. First, the analysis presented here was solely based on the Scopus database and is not representative of the wider literature. The findings therefore could have been affected by intrinsic limitations of the database (Darko et al. 2020). Second, the literature was searched using selected keywords, and the database might not have fully retrieved all the available literature (Meyer 2020). Future studies should take these limitations into account and build on the analysis presented in the chapter. The chapter will particularly be of interest to academics, researchers, research students and policy makers interested in understanding how various elements of ageing agenda are evolving and which need attention. By presenting a comprehensive bibliometric analysis, this chapter has contributed to capturing the existing knowledge on ageing related research, with a specific focus on the Asia Pacific region. The chapter also provides practical valuable insights for researchers and policymakers in order to identify their research needs and shape their future research directions.

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