

One Population, Many Labels: Thematic Clusters in Ageing Research Across Business and Management

Alperen Şahin

İstanbul Esenyurt Üniversitesi

Taşkın Dirsehan

dirsehan@essb.eur.nl

Al-Farabi Kazakh National University

Małgorzata Baran

Collegium Civitas

Marlena Kondrat

University of Warsaw

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Abstract

Ageing research in business and management is constrained by terminological fragmentation, with scholars using labels such as “elderly,” “older adults,” and “senior workers” interchangeably for the same population. This inconsistency undermines the reliability of systematic literature retrieval. Addressing this issue, the present study maps the field’s thematic structure and develops a standardized search string to ensure consistent evidence identification across varying terminology. A bibliometric keyword co-occurrence analysis was conducted on 3,673 peer-reviewed articles from Scopus and Web of Science. The analysis reveals four core clusters: (1) consumer well-being and service quality, (2) labour markets and retirement transitions, (3) care services and healthcare delivery, and (4) AI, robotics, and smart technologies. These clusters are theoretically interpreted through Institutional Theory, the Resource-Based View, Diversity and Inclusion, and Socioemotional Selectivity Theory, spanning macro, meso, and micro levels. Findings indicate that care services represent the most established research stream, while AI and smart technologies constitute the fastest-growing frontier. Consumer well-being demonstrates the highest citation impact. To address terminological inconsistency, an 18-term standardized search string is proposed, integrating spelling variants, domain-specific terms, and wildcard truncations. This study provides a theoretically grounded, multi-level conceptual map, uncovering four distinct scholarly communities previously obscured by fragmented terminology.

1. Introduction

Population aging represents one of the most profound demographic transformations of the twenty-first century, reshaping business, management, and organizational studies in fundamental ways (Chand & Tung, 2014; Kulik et al., 2014). Growing proportions of older individuals require businesses to reconsider market definitions, product designs, workforce strategies, and managerial practices (Galeotti et al., 2024; Pit et al., 2021). This shift has positioned aging as a critical topic across various subfields of business research, from marketing and human resources to innovation and consumer behavior (Moschis & Mathur, 2024; Olumekor & Polbitsyn, 2022).

Despite growing scholarly attention, a significant methodological challenge persists terminological fragmentation. Researchers employ inconsistent terminology to refer to older populations, including elderly, older adults, senior workforce, aging population, third-age consumers, geriatric segment, silver economy, and mature workers, often without conceptual harmonization. This fragmentation is not merely a semantic inconvenience; it carries substantive consequences for knowledge accumulation. When researchers cannot reliably locate studies that use different labels for the same population, systematic reviews become incomplete, theoretical syntheses remain partial, and evidence-based decision-making in organizations and policy contexts is compromised. Unlike adjacent fields such as gender studies or disability research, where terminological conventions have gradually stabilized around agreed-upon constructs, aging research in business and management continues to operate across multiple disconnected vocabularies with no widely adopted search standard to bridge them.

The present study adopts a quantitative, data-driven approach to systematically map the conceptual landscape of aging research within business and management literature. Recognizing the exploratory nature of this endeavor, bibliometric keyword co-occurrence analysis was employed (Sedighi, 2016; Tijssen & Van Raan, 1994) to uncover the latent thematic structure organizing this fragmented research domain. Unlike narrative reviews, which are inherently selective and subject to individual interpretation, bibliometric mapping allows themes to emerge organically from the data itself, based on the actual terminological choices and conceptual associations made by thousands of researchers over decades of scholarship. Using VOSviewer network visualization, four thematic clusters were identified from keyword co-occurrence patterns across 3,673 peer-reviewed publications. These clusters were interpreted through four established theoretical frameworks, namely Institutional Theory, Resource-Based View and Human Capital Theory, Diversity and Inclusion Frameworks, and Socioemotional Selectivity Theory, situating empirically derived clusters within existing scholarly discourse while maintaining exploratory rigor.

This study is guided by three research questions:

RQ1. What are the major thematic clusters that structure aging-related research in business and management literature?

RQ2. How do these thematic clusters align with established theoretical frameworks (Institutional Theory, Resource-Based View, Diversity & Inclusion, Socioemotional Selectivity Theory) across macro, meso, and micro levels of analysis?

RQ3. What is the optimal search string that consolidates diverse aging terminologies and ensures maximum coverage of aging-related literature in business and management databases?

This study makes two distinct contributions to the literature. A theoretically grounded conceptual map of aging research in business and management is provided, revealing how four coherent research communities have emerged around consumer well-being, labor markets and retirement, healthcare delivery, and technology for aging populations. An empirically derived, comprehensive search string is also delivered, enabling researchers to systematically retrieve aging-related literature regardless of the terminology employed. Taken together, these contributions advance coherent understanding of aging in organizational contexts and provide researchers with the foundations for more rigorous, reproducible, and complete literature searches in this rapidly growing field.

2. Theoretical Background

The increasing significance of population aging in business and management sciences necessitates robust theoretical foundations to organize previously scattered findings. This section reviews and synthesizes four theoretical frameworks that offer complementary perspectives on aging in business and organizational contexts. These frameworks were not selected prior to analysis; rather, they were

identified following initial inspection of the emergent cluster structures, guided by their established relevance to aging in organizational settings.

Multiple theoretical candidates were considered during this stage, including life-course theory, human development frameworks, and age stratification theory. However, Institutional Theory, the Resource-Based View, Diversity and Inclusion frameworks, and Socioemotional Selectivity Theory were retained because they most directly address the organizational, strategic, and psychological dimensions visible across the four clusters, and because each operates at a distinct level of analysis (macro, meso, and micro respectively), enabling an integrative multi-level explanation rather than partial, single-level accounts. This iterative movement between empirical patterns and theoretical interpretation reflects an abductive approach, consistent with established practice in bibliometric research (Zupic & Čater, 2015).

Specifically, each retained framework maps onto a distinct level of analysis evident in the keyword clusters: Institutional Theory aligns with macro-level governance keywords (retirement regulation, age discrimination law); RBV/HCT with meso-level organizational terms (human capital, workforce training); D&I with inclusion-focused vocabulary (ageism, diversity management); and SST with micro-level psychological terms (well-being, motivation, adaptation)

2.1. Institutional theory: Aging as an institutionalized discourse

Institutional theory in the context of aging refers to how social institutions, norms, and values shape the perception and experience of aging. According to this theory, aging is not merely a biological process but also a social construct defined by societal expectations (DiMaggio & Powell, 1983). Institutional theory helps understand that experiences related to aging are largely shaped by surrounding social and cultural structures. This approach is useful because it allows for the analysis of how changes in policy, culture, and social practices can affect the lives of older individuals. For example, legal regulations like age discrimination bans are formal institutions enforcing changes in HR policies. Simultaneously, informal normative pressures, such as the growing ethos of diversity management or corporate social responsibility towards an aging society, encourage companies to adopt "age management" practices even without direct legal compulsion (Boehm et al., 2014).

The process of institutional isomorphism leads to the convergence of strategies among different organizations in response to the same environmental pressures (Meyer & Rowan, 1977). In the market context, the institutionalization of concepts such as the "silver economy" creates new operational fields, encouraging enterprises to innovate products and business models targeting this age group (Walker, 2006). Research based on institutional theory thus helps explain why organizations take actions regarding an aging workforce or consumers, often driven not just by direct economic rationality, but also by the need for legitimacy and adaptation to the environment.

2.2. Resource-Based View and Human Capital Theory: Aging as a strategic resource

While institutional theory explains external pressures, the Resource-Based View (RBV) and human capital theory focus on the internal, strategic aspects of age. RBV emphasizes that a sustainable competitive advantage is built on possessing valuable, rare, and hard-to-imitate resources (Barney, 1991). Here, an older employee is seen as a holder of a unique bundle of capitals: human (experience, expertise, practical wisdom), social (network, loyalty), and finally psychological capital (emotional stability, conscientiousness) (Wright et al., 1994).

Human capital theory, serving as the micro-foundation for RBV, analyzes investment in knowledge and skills over the life cycle (Becker, 1989). From this perspective, older employees represent the accumulated value of long-term investments in their development. Losing these employees due to early retirements or ageism in the workplace means losing significant investments for the company. At the same time, this theory highlights the challenge of motivating older employees to continue investing in their human capital (e.g., by upgrading digital skills), which requires appropriate organizational incentives (Kooij et al., 2008).

Both RBV and human capital theory (Becker, 1989) emphasize the importance of older employees as valuable organizational resources. The joint application of these theories suggests that organizations should not only value the existing capital in the form of knowledge and experience of older employees but also actively invest in it to maximize its value. Integrating these approaches can lead to more sustainable age management strategies in organizations that are better prepared for the challenges of an aging society.

2.3. Diversity and Inclusion Frameworks in Age Management: Aging as an inclusion challenge

Diversity and Inclusion (D&I) frameworks shift the analysis from the level of resources to the level of group processes and organizational climate. From this perspective, age is one of the key differentiating characteristics, similar to gender or ethnicity. However, age diversity alone is not enough; it is crucial to create an inclusive environment where older employees feel respected, heard, and fully engaged (Shore et al., 2009).

Research in this area focuses on exclusion mechanisms, such as ageism (age discrimination), stereotypes (e.g., regarding unwillingness to learn or low flexibility), and unconscious biases in recruitment, evaluation, and promotion processes (Posthuma & Campion, 2009). "Age management" practices are understood here as actions aimed not only at retaining older employees but also actively involving them in organizational life, utilizing their potential in multigenerational teams, and providing them with equal development opportunities (Truxillo et al., 2015). An inclusive work environment for all

age groups thus becomes a factor influencing innovation, talent retention, and employer brand attractiveness, which directly translates into the company's economic results.

2.4. Socioemotional Selectivity Theory: Aging as an individual adaptation process

To fully understand the behaviors of older employees and consumers, it is necessary to delve into the micro-level, namely psychological processes. Socioemotional Selectivity Theory (SST) explains how the perception of remaining time affects an individual's goals and motivation (Carstensen et al., 1999). When people perceive time as almost unlimited (typical for youth), they prioritize goals related to acquiring knowledge and broadening horizons. However, when time is perceived as limited (often occurring with age), priorities shift to emotionally satisfying goals, associated with a sense of meaning, maintaining positive emotions, and nurturing close relationships (Carstensen et al., 1999).

SST has profound implications for management. It explains why older employees may be more motivated by a sense of meaning and contribution to the company community than by promotion or acquiring new, general qualifications. It also suggests they may exhibit greater loyalty to an organization that provides them with a positive social environment (Kooij et al., 2008). In marketing, SST helps to understand the preferences of older consumers, who may value products and services that enhance social relationships, security, and emotional well-being more. This theory thus highlights that age-related behavioral changes are not merely the result of declining abilities but also an adaptive reorientation of life goals. The application of SST in management sciences offers valuable insights into age management and employee motivation, which are crucial in the context of an aging workforce.

2.5. Integrative conceptual framework: Linking Macro-Meso-Micro perspectives

The presented theories do not exclude each other but form a complementary explanatory system that reflects the multifaceted reality of aging in a business context. To fully capture its complexity, it is necessary to combine these perspectives into a coherent, multi-level framework that considers the interactions between the social environment, organizations, and individuals. Below is a detailed development of each level and the dynamics of their integration.

At the macro level, the aging process is shaped by broader institutional, legal, and cultural forces. Institutional theory provides tools to understand how formal regulations (e.g., anti-discrimination laws, retirement age) and informal cultural norms (e.g., stereotypes about the productivity of older individuals) create the "rules of the game" and legitimize specific practices. The institutional environment exerts pressure on organizations through mechanisms of isomorphism, leading to the convergence of their strategies and structures (DiMaggio & Powell, 1983; Walker, 2006)

The meso level serves as a bridge between the broader environment and the individual. At this level, organizations, subjected to institutional pressures, make strategic decisions about age management.

These decisions are shaped by the logic of the Resource-Based View (RBV) and Diversity & Inclusion (D&I) frameworks. Organizations view older employees through the lens of their unique resources human capital (experience, knowledge), social capital (networks), and psychological capital (stability). Simultaneously, to utilize these resources, they implement practices aimed at minimizing ageism, which can manifest as direct or indirect discrimination, harassment, or victimization (Barney, 1991; Shore et al., 2009).

At the micro level are the internal, psychological processes of the individual that directly affect their behavior, motivation, and well-being in the workplace. Socioemotional Selectivity Theory (SST) explains that with perceived time constraints, an individual's priorities shift from cognitive goals (knowledge acquisition) to emotional goals (seeking meaning, maintaining positive emotions, nurturing close relationships) (Carstensen et al., 1999; Kooij et al., 2008). The true value of the proposed framework lies in understanding the dynamic interactions between levels.

3. Methods

This study employs a bibliometric keyword co-occurrence analysis to systematically map the conceptual landscape of aging research within business and management literature. Bibliometric methods have become increasingly recognized as valuable tools for synthesizing large bodies of scholarly work, identifying thematic structures, and revealing intellectual connections that may not be apparent through traditional narrative reviews (Donthu et al., 2021; Zupic & Čater, 2015). Keyword co-occurrence analysis, in particular, offers a data-driven approach to uncovering the semantic relationships and conceptual clusters that structure a research domain by examining which terms frequently appear together in scholarly publications (Van Eck & Waltman, 2010).

Unlike subjective or theory-driven categorization schemes, this exploratory approach allows themes to emerge organically from the data itself, based on the actual terminological choices and conceptual associations made by researchers in the field. This bottom-up methodology is particularly appropriate for addressing the terminological fragmentation observed in aging research, as it does not impose predetermined categories but rather reveals how the research community itself has collectively structured knowledge around aging in organizational contexts. The following subsections detail the procedures for data collection, integration, cleaning, and analysis.

3.1. Data Sources and Collection

Bibliographic data were retrieved from two major scientific databases (Scopus and Web of Science) on July 12, 2025, to ensure both comprehensive coverage and scholarly credibility. These databases were selected because they offer extensive indexing of peer-reviewed publications across business, management, and related disciplines, thereby providing a robust foundation for the study's analytical procedures. (Falagas et al., 2008; Harzing & Alakangas, 2016; Pranckutė, 2021; Salisbury, 2009). To

maintain relevance to the business domain, the dataset was restricted to specific subject categories: Business, Management and Accounting.

The search strategy across Scopus and Web of Science was anchored by the root keyword *elder**, which facilitated the retrieval of diverse aging-related terms including *elderly*, *elders*, *eldercare*, and *elder workforce*. This preliminary scoping query was maintained with intentional conservation. The primary objective of the RQ1/RQ2 bibliometric analysis was to delineate a coherent core of aging research within the fields of business and management, and the widely utilized *elder** root offered sufficient breadth to achieve this goal.

This intentional two-stage design reflects a calculated methodological decision. It involves an initial focused query for structural mapping followed by a comprehensive cross-disciplinary string for broader coverage. Applying the full multi-term query at the beginning would have produced a heterogeneous corpus that was poorly suited for mapping the specific nuances of business and management literature. To operationalize this specific approach, searches were conducted within the Title, Abstract, and Keywords fields using the following query structures:

- **Scopus:** TITLE-ABS-KEY("elder*") AND LIMIT-TO(DOCTYPE, "ar") AND LIMIT-TO(LANGUAGE, "English") AND PUBYEAR > 1928 AND PUBYEAR < 2026
- **Web of Science:** TS=("elder*") AND DT=(Article) AND LA=(English) AND PY=(1929–2025)

These criteria were designed to account for terminological variability in aging-related research while capturing conceptually diverse studies situated within business and management contexts. To ensure dataset quality and comparability across databases, the analysis included only peer-reviewed journal articles published in English between 1929 and 2025, thereby excluding non-scholarly materials and ensuring a consistent corpus aligned with established bibliometric standards.

3.2. Data Integration and Cleaning

To combine and standardize the datasets obtained from Scopus and Web of Science, we utilized BibexPy (Kara et al., 2025), a Python-based bibliometric integration tool. BibexPy enables the harmonization of metadata from multiple bibliographic sources and facilitates key preprocessing steps, including field alignment (e.g., author names, titles, and keywords), DOI- and title-based deduplication, and format transformation compatible with co-occurrence analysis tools.

Crucially, BibexPy allows researchers to merge bibliographic exports from different databases into a single, unified file format suitable for input into visualization software such as VOSviewer (Van Eck & Waltman, 2010). This functionality significantly streamlines the preparation of datasets for multi-database bibliometric analyses, eliminating the need for time-consuming and error-prone manual processing. Following the cleaning and deduplication procedures, the final dataset consisted of 3673 unique publications, ready for subsequent co-occurrence and cluster analysis.

3.3. Keyword Co-occurrence Analysis

The unified dataset was imported into VOSviewer (version 1.6.20) to conduct a keyword co-occurrence analysis. The analysis was performed exclusively on author-supplied keywords, as these terms most accurately capture the conceptual focus and intentional thematic framing of each publication. To enhance analytical precision and reduce noise in the network structure, a minimum occurrence threshold of 5 keywords was applied, thereby excluding low-frequency terms that do not contribute meaningfully to the co-occurrence network.

Following data cleaning and thresholding, VOSviewer's association strength normalization and modularity-based clustering algorithm (van Eck, 2011; Van Eck & Waltman, 2014) were employed to identify latent thematic structures. The resulting co-occurrence networks were visualized using the standard network and density mapping layouts, which facilitated the detection of tightly connected keyword communities.

In this study, a total of 8,570 unique author keywords were extracted from the collected literature dataset focusing on aging and related business studies. To ensure robust thematic mapping, a minimum occurrence threshold of 5 was applied, resulting in 339 significant keywords being retained for network visualization.

The co-occurrence network was visualized and analyzed using VOSviewer software, employing a resolution (Van Eck & Waltman, 2016, 2017) parameter of 0.5 to balance granularity and interpretability. As illustrated in Fig. 1, the resulting network map shows the spatial relationships and strength of connections among keywords, providing a clear overview of the major research themes and their interconnections. Each node represents a keyword, with node size indicating occurrence frequency and link strength representing co-occurrence relationships. Colors distinguish the four identified thematic clusters.

This framework emerged from bibliometric keyword co-occurrence analysis of 3,673 publications in business and management literature on aging. Each cluster is characterized by a coherent set of keywords that frequently co-occur in the literature, indicating shared conceptual foundations and research foci. The following subsections present detailed analyses of each thematic cluster. For each cluster, we provide: (1) a descriptive overview of its conceptual focus, (2) theoretical interpretation across macro, meso, and micro levels of analysis, and (3) identification of key terms used to denote older individuals within that cluster. This multi-level analysis enables both conceptual understanding and practical application in literature search design.

4. Cluster Structure and Thematic Findings (RQ1 and RQ2)

The four theoretical frameworks introduced in Section 2 serve as interpretive lenses for the empirically derived clusters. Rather than imposing these frameworks deductively, we apply them inductively to the keyword groupings identified through co-occurrence analysis, examining how each cluster's conceptual vocabulary aligns with institutional, strategic, inclusion-based, and psychological perspectives on aging.

This approach preserves the exploratory integrity of the bibliometric method while situating findings within established scholarly discourse.

The four clusters identified through VOSviewer's modularity-based algorithm vary in size, reflecting differential research activity across thematic areas. Cluster 1 (Consumer Well-being and Service Quality) comprises 130 keywords, Cluster 2 (Labor Markets and Retirement Transitions) includes 97 keywords, Cluster 3 (Care Services and Healthcare Delivery) contains 84 keywords, and Cluster 4 (AI, Robotics, and Smart Technologies) encompasses 28 keywords. It is important to note that these figures represent the number of qualifying keywords within each cluster, not the number of publications assigned to each theme. The 339 keywords mapped across the network represent the core conceptual vocabulary of the field that met the minimum frequency threshold ($n = 5$), forming the structural basis of the visualized map.

4.1. Consumer Well-being and Service Quality (Cluster 1, $n = 130$)

This cluster captures the lived experiences of older individuals by integrating daily practices, well-being, consumption behaviors, leisure, tourism, social relationships, health perceptions, and community participation. Aging is conceptualized not merely as a chronological status but as a multidimensional process shaped by quality of life, emotional priorities, market positioning, and institutional context.

From an Institutional Theory perspective, the cluster demonstrates how institutional, legal, and cultural frameworks structure the context of aging. Keywords such as *customer satisfaction*, *service quality*, *accessibility*, and *age-friendly cities* reflect coercive, normative, and mimetic pressures that compel organizations to adopt age-responsive standards. Concepts like *accessible tourism* and *senior tourism*, aligned with silver economy discourse, position older adults as an attractive and legitimate market segment, encouraging the development of specialized services and innovative business models. Terms including *social exclusion*, *disability*, and *accessibility* indicate the influence of anti-discrimination and equality regulations that define legitimate practices and ensure participation in social and economic life. Across tourism, retail, healthcare, and urban planning, these pressures generate isomorphic convergence toward age-friendly strategies.

Through the Resource-Based View (RBV) and Diversity & Inclusion (D&I) frameworks, the cluster highlights how organizations strategically recognize older adults as valuable stakeholders. Keywords such as *older consumers*, *elderly consumers*, *consumer behavior*, *customer satisfaction*, and *service quality* underscore the identification of this group as a distinct market segment with specific preferences and purchasing power. Concepts like *volunteering*, *social innovation*, and *intergenerational engagement* demonstrate how organizations mobilize older adults' human capital (experience and expertise), social capital (networks), and psychological capital (stability and resilience). Simultaneously, terms such as *tourism*, *leisure*, *lifestyle*, and *well-being* reflect age-friendly service design, accessible infrastructure, and inclusive marketing strategies aimed at minimizing age discrimination and maximizing engagement. The

presence of *social support*, *social interaction*, and *intergenerational solidarity* further signals organizational climates that foster inclusion, respect, and empathy, enabling active participation in economic and community life.

From the perspective of Socioemotional Selectivity Theory (SST), the cluster captures the internal motivations and behavioral patterns of older individuals. Keywords such as *well-being*, *life satisfaction*, *quality of life*, and *subjective well-being* reflect a shift toward emotionally meaningful goals, prioritizing positive affect, close relationships, and purpose over purely achievement-oriented objectives. Terms including *leisure*, *tourism*, *physical activity*, *mental health*, and *health perception* indicate deliberate experience curation aimed at maximizing emotional fulfillment. The presence of *behavioral intention* and *lifestyle* highlights older adults as active decision-makers shaping consumption and engagement patterns according to personal values. Concepts such as *frailty*, *disability*, and *rural* reveal individual-level vulnerabilities and adaptive strategies, while *social support*, *social interaction*, and *loneliness* underscore the centrality of meaningful relationships. Finally, references to *customer satisfaction* and *service quality* reflect evaluative responses to institutional offerings, and terms like *active aging*, and *social innovation* demonstrate a continued pursuit of contribution and purposeful engagement consistent with SST predictions. Notably, the simultaneous presence of frailty and active aging within this cluster suggests that consumer well-being research addresses aging not as a uniform trajectory but as a spectrum — from capability-oriented active aging frameworks to vulnerability-focused care needs — providing a richer and more realistic portrait of older consumers than either pole alone.

4.2. Labor Markets and Retirement Transitions (Cluster 2, n = 97)

This cluster captures the structural and demographic dimensions of aging, conceptualizing it as a societal transformation that reshapes workforce composition, pension regimes, economic sustainability, and intergenerational equity. Dominant keywords related to employment, retirement, labor force participation, and demographic indicators position aging primarily as a macroeconomic and policy issue with organizational and individual-level implications.

From an Institutional Theory perspective, the cluster reflects the regulatory and normative frameworks governing societal responses to demographic aging. Terms such as aging population, demographic change, and demography signal the demographic transition generating systemic pressures on governments, pension systems, healthcare infrastructures, and labor markets. Keywords including retirement, pensions, social security, and reverse mortgage represent formal institutional arrangements retirement age rules, pension legislation, and social insurance systems that structure life-course transitions and organizational employment practices.

The identification of elder abuse within this labor market cluster likely signifies its co-occurrence with retirement transitions and pension vulnerability. This suggests that the financial exploitation of older adults, which is a recognized sub-field of elder abuse scholarship, is conceptually tied to economic insecurity in later life instead of being limited to healthcare or caregiving contexts. Furthermore, various

geographic markers, such as Europe, Thailand, Finland, and Israel, highlight the cross-national variations existing within welfare regimes and their respective policy responses.

Concepts such as sustainability, the silver economy, and efficiency serve to frame aging as both a fiscal risk and an economic opportunity. These frameworks generate isomorphic pressures that necessitate adaptation within organizations and the broader labor market. Additionally, keywords such as employment, labor supply, and age discrimination highlight the role of labor regulations and anti-discrimination laws. These legal frameworks are fundamental in shaping contemporary practices regarding recruitment, retention, and retirement.

Through the Resource-Based View (RBV) and Diversity & Inclusion (D&I) frameworks, the cluster reveals how organizations strategically manage age diversity and demographic change. Keywords such as *older workers*, *labor force participation*, *employment*, *job satisfaction*, *organizational commitment*, and *human capital* indicate recognition of older employees as valuable resources embodying accumulated expertise, institutional memory, and stable work orientations.

Terms including training, knowledge, careers, and management reflect investments in retention and capability development. The coexistence of retirement with work-life balance and work-family conflict suggests age-sensitive HR practices such as flexible scheduling, phased retirement, and adaptive job design. Keywords like motivation, satisfaction, and psychological well-being highlight the importance of supportive organizational climates, while age discrimination signals inclusion efforts. Market-oriented terms such as market segmentation and consumer behavior position older adults as a distinct consumer group requiring tailored offerings. Additionally, caregiving and work-family indicate organizational responses to dual worker–caregiver roles, while geographic diversity implies context-specific age management strategies in multinational settings.

From a Socioemotional Selectivity Theory (SST) perspective, the cluster captures psychological processes and life-course transitions associated with work and retirement. Keywords such as *retirement*, *life course*, *life expectancy*, and *adaptation* reflect goal recalibration in response to perceived time horizons. Consistent with SST, older individuals shift from career advancement and knowledge acquisition toward emotionally meaningful goals, as evidenced by *motivation*, *satisfaction*, and *psychological well-being*.

Terms such as *work-life balance* and *work-family conflict* indicate efforts to reallocate time toward family and personally meaningful activities. *Job satisfaction*, *organizational commitment*, and *resilience* reflect evaluative and adaptive responses to work environments based on autonomy, meaning, and relational quality. Keywords including *health status*, *stress*, *vulnerability*, and *cognitive age* highlight heterogeneity in aging experiences and subjective age perceptions influencing retirement decisions. Economic insecurity is captured through *poverty*, *pensions*, and *social security*, which may constrain emotional goal prioritization. Negative experiences are reflected in *elder abuse* and *social vulnerability*, whereas *caregiving* and *family* represent emotionally significant but potentially demanding roles. Finally, *travel*

motivations suggests that post-retirement engagement in leisure and exploration aligns with SST's emphasis on the prioritization of positive and emotionally rewarding experiences.

4.3. Care Services and Healthcare Delivery (Cluster 3, n = 84)

This cluster conceptualizes aging through the provision, management, and quality of healthcare and elder care services. It frames aging primarily as a health and social care challenge requiring institutional regulation, organizational capability, workforce management, and service innovation. Dominant keywords related to healthcare delivery, nursing homes, elder care, care work, and quality standards signal a systemic focus on how care infrastructures respond to growing and complex needs of older populations.

From an Institutional Theory perspective, the cluster reflects the formal regulatory and governance structures shaping healthcare and elder care systems. Terms such as *health care*, *health services*, *public health*, *public sector*, and *health insurance* represent the institutional architecture that defines access, financing, and standards of care. Keywords including *nursing homes*, *hospitals*, *home care*, *long-term care*, and *long-term care insurance* indicate structured arrangements for organizing and funding services across institutional and community-based settings.

Geographic references (e.g., *United States of America*, *Sweden*, *Australia*, *Canada*, *Malaysia*, *France*, *South Africa*) highlight cross-national variation in welfare regimes, healthcare financing models, and cultural norms concerning family versus state responsibility. Regulatory concepts such as *patient safety*, *quality of care*, *quality improvement*, and *rehabilitation* reflect accreditation systems and standardized protocols that generate isomorphic pressures toward compliance and best practices. Terms like *elder abuse* and *patient care* further signal legal rights frameworks designed to protect vulnerable older adults within institutional settings.

Through the Resource-Based View (RBV) and Diversity & Inclusion (D&I) lenses, the cluster emphasizes organizational capabilities in delivering elder care. Keywords such as *nursing homes*, *hospitals*, *home care*, *primary care*, *elder care*, and *elderly care* represent differentiated service models tailored to varying care intensities. Terms including *care work*, *caregivers*, *nursing*, *managers*, and *leadership* reflect the human capital base clinical expertise, caregiving competencies, and managerial capacity underpinning service quality.

The presence of *human resource management*, *workplace learning*, and *management development* indicates strategic investment in workforce training and capability building. Concepts such as *quality of care*, *quality improvement*, *service delivery*, *performance*, and *productivity* demonstrate organizational focus on effectiveness, efficiency, and patient outcomes. Keywords including *innovation*, *organizational change*, and *change management* signal adaptive responses to demographic pressures and evolving care demands. References to *case study*, *qualitative research*, and *case management* suggest reliance on evidence-based and context-sensitive approaches to improving care practices.

From a Socioemotional Selectivity Theory (SST) perspective, the cluster captures older individuals' experiences, expectations, and agency within healthcare systems. Keywords such as *elderly patients*, *older people*, and *older age* identify the central actors whose needs shape service design. Consistent with SST, older adults increasingly prioritize emotional well-being, dignity, and meaningful interaction, as reflected in terms like *quality of life*, *empowerment*, *autonomy*, and *self-efficacy*. Care is evaluated not only by clinical effectiveness but by respect, responsiveness, and relational quality.

The keyword *perception* underscores the importance of subjective evaluations of care experiences. Concepts such as *co-creation* and *value co-creation* indicate growing expectations for participatory decision-making and shared responsibility in service design. Meanwhile, terms including *caregivers*, *care work*, and *informal care* reveal that older individuals may also occupy caregiving roles themselves, creating emotionally meaningful yet potentially burdensome dynamics that affect their well-being and healthcare utilization.

4.4. AI, Robotics, and Smart Technologies (Cluster 4, n = 28)

This cluster situates aging at the intersection of technological innovation, artificial intelligence, and digital transformation. It conceptualizes aging as both a technological challenge and an opportunity, emphasizing assistive technologies, smart environments, and age-tech solutions designed to enhance independence, safety, and quality of life. The prominence of *artificial intelligence*, *machine learning*, *robotics*, *smart homes*, and *Internet of Things (IoT)* indicates a systemic shift toward digitally mediated models of care and support, while also raising concerns regarding digital inclusion and ethical governance.

From an Institutional Theory perspective, the cluster reflects emerging regulatory frameworks, policy initiatives, and normative discourses shaping age-tech development. Keywords such as *aging population* and *elderly customers* signal demographic pressures driving governments, healthcare systems, and technology industries to innovate. The co-occurrence of *technology*, *artificial intelligence*, *machine learning*, and *robotics* suggests evolving governance regimes addressing data privacy, algorithmic accountability, safety standards, and ethical guidelines for AI-enabled care and human–robot interaction.

Terms including *healthcare*, *dementia*, and *fall detection* point to health technology assessment systems and reimbursement policies that influence market viability and adoption. Concepts such as *ambient assisted living* and *smart home* align with “aging in place” policy discourses that prioritize community-based living over institutionalization, thereby incentivizing technology-enabled independence. Institutional environments are further reflected in interoperability standards, digital accessibility guidelines, and safety certifications that create isomorphic pressures for convergence toward common technical and ethical norms. Cross-national differences in digital infrastructure, regulation, and cultural acceptance of robotics or monitoring systems imply significant contextual variation in adoption trajectories.

Through the Resource-Based View (RBV) and Diversity & Inclusion (D&I) lenses, the cluster highlights organizational capabilities in developing and commercializing age-tech innovations. Keywords such as *artificial intelligence*, *machine learning*, *deep learning*, and *robotics* represent core technological competencies underpinning competitive advantage. Terms including *business model*, *e-health*, and *technology acceptance model* indicate strategic efforts to ensure economic sustainability and user alignment.

Application-specific keywords *activity recognition*, *fall detection*, *health monitoring*, and *dementia* reflect specialized innovation domains targeting age-related vulnerabilities. Concepts such as *ambient assisted living*, *smart homes*, and *Internet of Things* demonstrate investments in integrated ecosystems combining sensors, analytics, and automated responses. The term *elderly customers* signals market segmentation strategies, while *gerontechnology* and *assistive technology* denote specialized design capabilities accommodating sensory, cognitive, and mobility changes associated with aging.

From a Socioemotional Selectivity Theory (SST) perspective, the cluster captures older adults' evaluative processes regarding technology adoption. Technologies are assessed primarily in terms of their capacity to support emotionally meaningful goals maintaining autonomy, preserving relationships, and sustaining quality of life rather than novelty or technical sophistication. Keywords such as *quality of life*, *ambient assisted living*, and *activity recognition* reflect solutions aimed at enabling aging in place and reinforcing self-efficacy.

The presence of *technology acceptance model* and *adoption* underscores the importance of perceived usefulness, ease of use, trust, and value congruence in shaping acceptance. Terms such as *dementia*, *fall detection*, and *health monitoring* address health vulnerabilities; however, adoption hinges on whether these systems are experienced as empowering (enhancing safety and independence) or intrusive (threatening privacy and autonomy). Thus, technological engagement among older adults is mediated by emotional regulation, perceived control, and alignment with personally meaningful life goals.

4.5. Thematic Evolution and Academic Impact

Beyond the thematic content, analyzing the publication years and citation metrics of the keywords provides critical insights into the evolution of aging research in business and management. Figure 2 demonstrates the structural domains of aging research exhibit distinct temporal maturities.

As the violin plot illustrates the maturity of each theoretical cluster. Cluster 4 (AI & Smart Tech) represents the most recent, emerging frontier of aging research, while Cluster 3 (Care Services) constitutes the oldest and most established foundation. Care Services (Cluster 3) and Labor Markets (Cluster 2) represent the earliest, foundational pillars of the literature. In contrast, AI and Smart Technologies (Cluster 4) is a rapidly emerging frontier, accelerating notably post-2019. Figure 3 contextualizes this temporal evolution against academic impact.

The scatter plot maps the average publication year (x-axis) against average citations (y-axis), with bubble size representing keyword frequency. It highlights that while AI/Technology is the most recent

theme, Consumer Well-being currently commands the highest academic impact in the field. Although AI/Technology is the most recent theoretical domain, Consumer Well-being (Cluster 1) currently generates the highest average citations, positioning it as the most academically impactful arena in current business aging research. This matrix highlights the shifting frontiers of the field, suggesting that future high-impact research is likely to occur at the intersection of these mature (consumer well-being) and emerging (smart technologies) domains.

4.6. Developing a Universal Search Query for Aging Research (RQ3)

Beyond the bibliometric analysis, this study aimed to provide a methodological contribution to aging research. All keywords within the four thematic clusters were examined in detail, and terms directly defining older individuals were systematically identified. The aging descriptors obtained from each cluster are as follows: from Cluster 1, "elderly," "older adults," "seniors," "the elderly," "older consumers," and "elderly consumers"; from Cluster 2, "aging," "aging population," "ageing," "elder abuse," "elderly population," "older women," "population aging," and "senior citizen"; from Cluster 3, "elder," "elder care," "elderly care," "elderly entrepreneur," "elderly patients," and "geriatrics"; and from Cluster 4, "elderly person," "aging society," and "aging population."

Following term identification, the search string underwent systematic optimization to maximize precision and coverage. Semantic specificity was carefully evaluated. Certain standalone terms were excluded because they generated noise outside the aging context. For example, "older" retrieves results such as older buildings or older technology; therefore, it was retained only within controlled combinations including *older adult*, *older people*, *older person*, *older consumer*, *older worker*, *older women*, and *older men*. Broad and ambiguous terms such as *age* and *aged* were avoided due to their expansive semantic scope beyond aging research.

Wildcard efficiency was also assessed to prevent redundancy. The truncation symbol (*) was used to capture lexical variations within a single expression. For instance, *elder* retrieves *elder*, *elders*, *elderly*, *elderly population*, *elderly person*, *elderly care*, *elderly patients*, and *elderly consumers*. Listing each variation separately would unnecessarily lengthen the string without increasing coverage. The same principle was applied to terms such as *older adult*, *older person*, *senior citizen*, and *geriatric*, ensuring comprehensiveness through structured truncation rather than repetition.

Cross-disciplinary inclusiveness guided terminological selection. Aging research spans social sciences, management, marketing, health sciences, and public policy, each employing distinct vocabularies. Academic literature commonly uses older adults and aging, marketing scholarship favors senior citizens and older consumers, and health sciences frequently employ geriatric terminology. The search string incorporated each of these traditions to ensure balanced disciplinary representation.

Geographical and linguistic variation was incorporated to enhance international coverage. British and American spelling differences, particularly *aging* and *ageing*, were included simultaneously. Parallel

constructions such as aging population / aging population and aging society / aging society were also integrated to prevent regional publication bias and ensure retrieval from diverse English-language contexts.

As a result of this systematic optimization process, a comprehensive search string was developed that all researchers working on aging can use, providing maximum literature coverage regardless of field or discipline:

("aging" OR "aging" OR "aging population" OR "aging population" OR "aging society" OR "aging society" OR "population aging" OR "population aging" OR "elder*" OR "older adult*" OR "older people" OR "older person*" OR "older consumer*" OR "older worker*" OR "older women" OR "older men" OR "senior citizen*" OR "geriatric*")

These search strings include no additional restrictions. Users may refine their searches by adding filters such as *language*, *document type* (e.g., article), *year range*, or *subject area*.

5. Limitations and Future Research Directions

The study carries several limitations. It relies exclusively on Scopus and Web of Science, which do not capture regional journals, book chapters, conference proceedings, or grey literature. This restriction may introduce bias toward English-language and Western-centric publications, underrepresenting scholarship from emerging economies. Future studies should consider supplementing these databases with PubMed, PsycINFO, or regional repositories.

Anchoring the initial query on the root term "elder*" raises a potential selection bias concern. This concern is substantially mitigated by post-hoc analysis: of 3,964 total keyword occurrences, only 13.7% derive from elder-family terms, while the remaining 86.3% entered the corpus organically through co-occurrence. Alternative descriptors such as older adults (110 occurrences), older people (78), and seniors (28) emerged naturally, confirming that the network represents the full terminological vocabulary of the field rather than the anchor term alone.

The four thematic clusters are statistically derived configurations based on co-occurrence frequency rather than theoretically predefined categories. Alternative analytical parameters such as different resolution settings or occurrence thresholds would likely yield different outcomes. Keyword co-occurrence also reflects associative proximity rather than causal relationships, meaning theoretical tensions and intellectual debates within clusters remain invisible through this method alone.

The study deliberately confines its scope to business and management literature, excluding sociology, gerontology, public health, and social policy. This boundary maintains analytical coherence but omits theoretical insights from neighbouring disciplines that directly shape organisational responses to ageing. Cross-disciplinary bibliometric analyses in future research would likely reveal underexplored theoretical bridges between business studies and gerontological traditions.

Bibliometric mapping offers unmatched breadth but sacrifices interpretive depth. Highly cited works that shaped the field through theoretical reframing or paradigmatic shifts remain hidden behind keyword patterns. Future research should complement this macro-level mapping with qualitative citation analysis or systematic content reviews of influential works to surface the debates and contested findings that quantitative methods alone cannot reveal.

6. Conclusion

Researchers attempting systematic literature searches on ageing in business and management encounter a familiar puzzle: why does this field feel so scattered? Scholars in marketing write about senior consumers, human resource specialists discuss older workers, healthcare researchers focus on elderly patients, and technology developers target ageing populations. Everyone studies the same demographic phenomenon but speaks different disciplinary languages, making it extraordinarily difficult to synthesise what is collectively known.

Mapping 3,673 peer-reviewed publications through bibliometric keyword co-occurrence analysis revealed the underlying structure beneath this apparent fragmentation. Four coherent research communities have emerged, each addressing distinct but complementary dimensions of how societies, organisations, and individuals adapt to demographic change. One community centres on consumer well-being and service quality, examining how older adults navigate markets, leisure, and community participation as active economic agents. Another addresses labour markets and retirement transitions, framing ageing primarily as a macroeconomic and policy challenge with profound organisational implications. A third focuses on care services and healthcare delivery, conceptualising ageing through the lens of institutional provision, workforce capability, and service innovation. The fourth, smallest but fastest-growing cluster, situates ageing at the intersection of artificial intelligence, robotics, and smart technologies.

What appeared terminologically fragmented actually follows coherent theoretical patterns. Interpreting these clusters through Institutional Theory, the Resource-Based View, Diversity and Inclusion frameworks, and Socioemotional Selectivity Theory reveals that ageing in business and management is simultaneously a macro-level institutional challenge, a meso-level strategic imperative, and a micro-level psychological adaptation process. No single theory captures the full complexity; rather, integrating these complementary perspectives across levels of analysis enables a genuinely comprehensive understanding.

The study also delivers a practical methodological tool with immediate applicability. Systematic examination of ageing descriptors across all four clusters revealed the full breadth of vocabulary employed across disciplines and geographies. The resulting search string consolidates British and American spelling variants, discipline-specific terminology, and wildcard truncations into a single retrievable protocol. Researchers designing systematic reviews, meta-analyses, or scoping studies can deploy this instrument immediately, without reconstructing the terminological landscape from scratch.

For practitioners and policymakers, the thematic map offers equally valuable orientation. Organisations navigating workforce ageing, consumer market shifts, care service demands, or technology adoption can use the cluster structure to identify which bodies of research are most relevant to their specific challenges and which theoretical lenses are most likely to yield actionable insights.

Global ageing is accelerating, and the organisational, market, and policy challenges it generates will only intensify in coming decades. Better tools for synthesising knowledge across disciplinary and terminological boundaries are not merely desirable; they are essential. This study's dual contribution, a theoretically grounded map of the research landscape and an empirically derived instrument for navigating its terminological complexity, moves the field closer to the coherent, evidence-based understanding that ageing societies urgently need.

Declarations

Ethical Statement

This study did not involve human participants, animals, or the collection of identifiable personal data requiring ethical approval. The research was conducted using secondary data obtained from publicly available sources and was carried out in accordance with applicable ethical standards and institutional research guidelines.

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Author Contribution

A.S. contributed to the conceptualization, literature review, methodology, investigation, formal analysis, and preparation of the original manuscript. T.D. contributed to the conceptualization, methodology, supervision, validation, project administration, and review and editing of the manuscript. M.B. contributed to the investigation, interpretation of the findings, validation, and review and editing of the manuscript. M.K. contributed to the investigation, data curation, interpretation of the findings, and review and editing of the manuscript. All authors reviewed and approved the final version of the manuscript.

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Figures

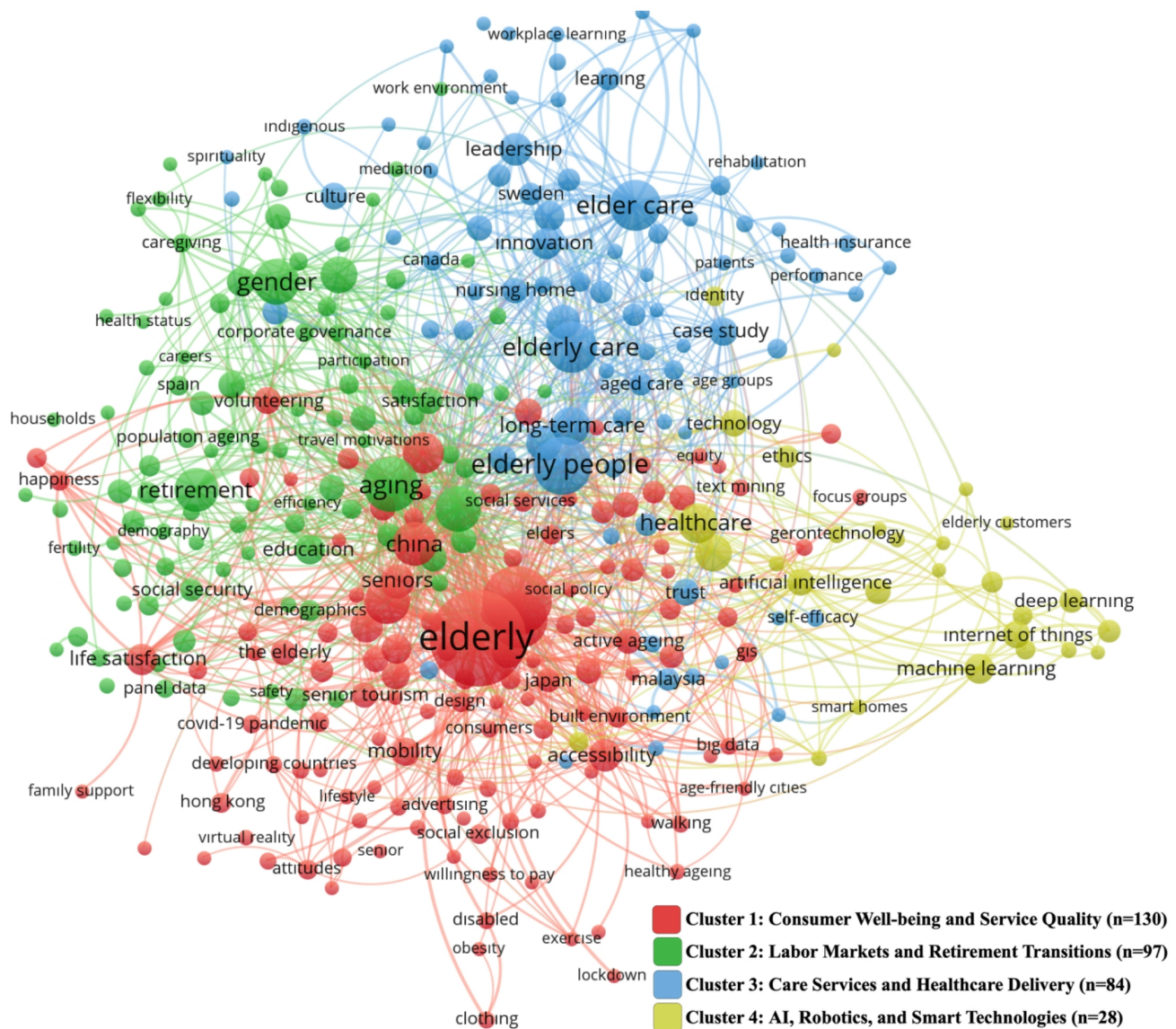


Figure 1

Keyword co-occurrence network map generated using VOSviewer.

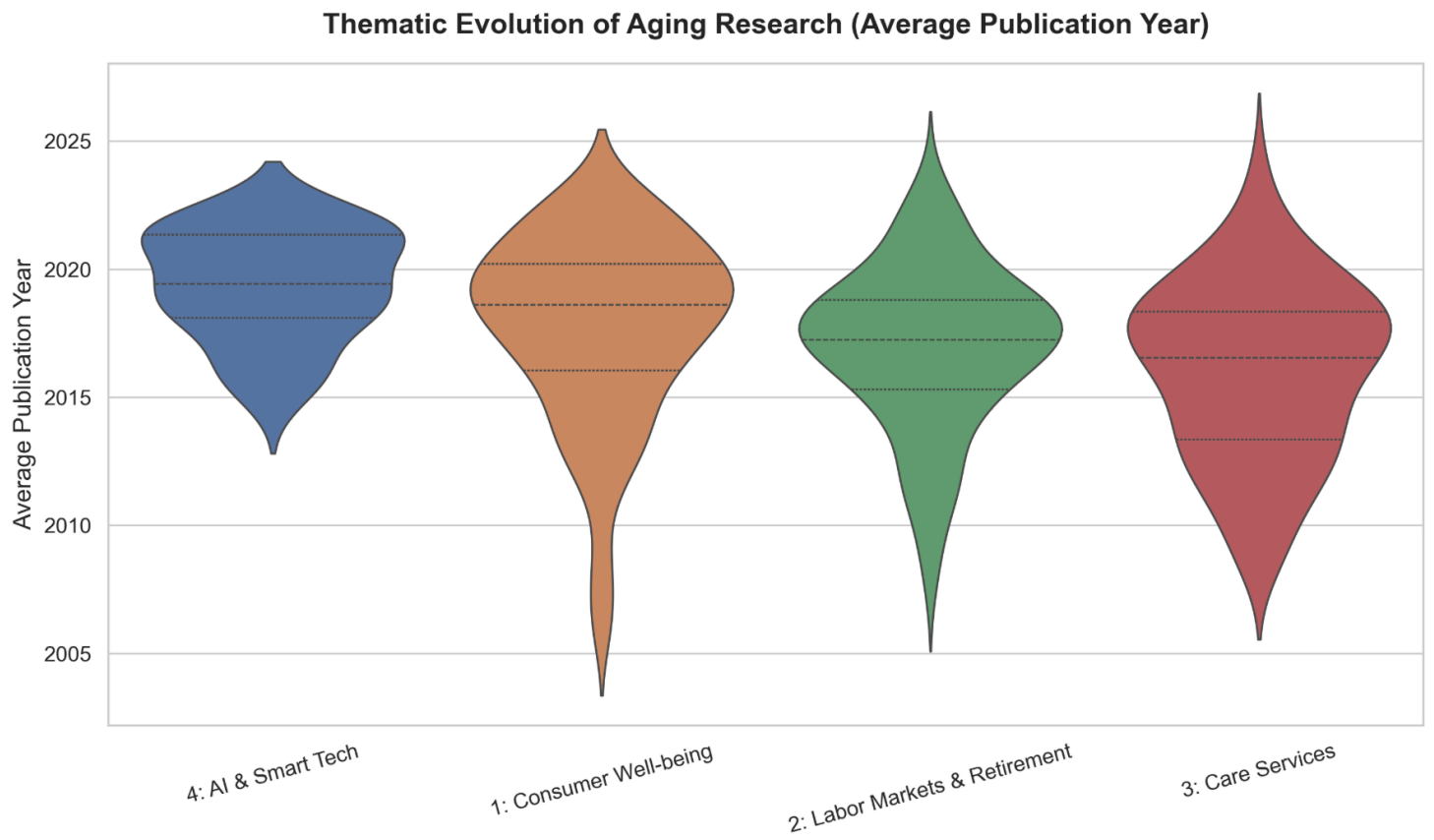


Figure 2

Thematic Evolution of Aging Research (Average Publication Year)

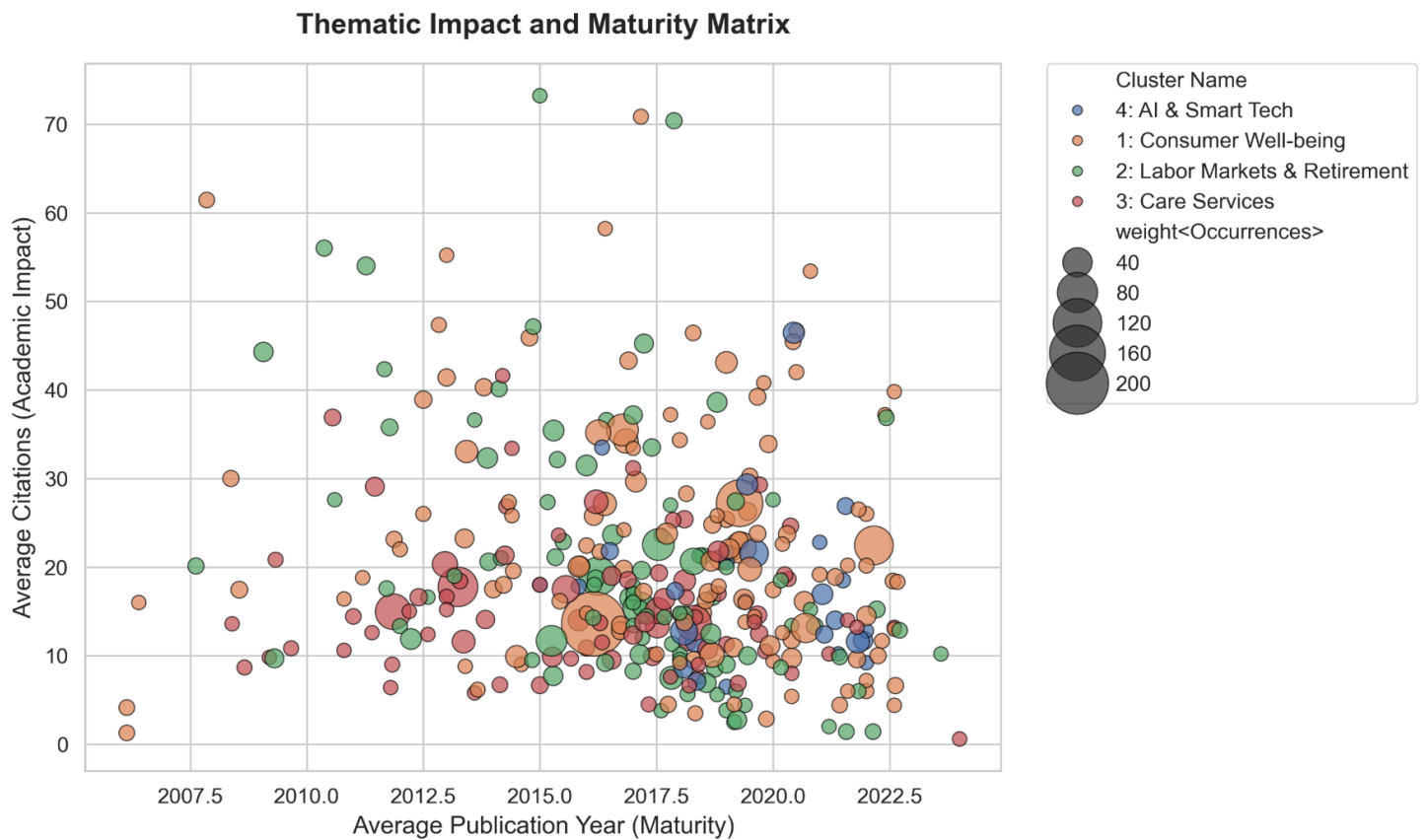


Figure 3

Thematic Impact and Maturity Matrix

Supplementary Files

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