
Edited by Judith Phillips
and Elaine Douglas
Healthy Ageing
Social, Behavioural
and Design Innovations
in Research
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HEALTHY AGEING

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Edited by
Judith Phillips and Elaine Douglas

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Preface

Leading and delivering the social, behavioural and design research programme as part of the Healthy Ageing Challenge was an exciting opportunity for us to explore new cutting-edge themes and approaches in ageing and gerontology with interdisciplinary teams of researchers from across the UK working to a shared 'mission' to shape the direction of ageing research in the UK. One of the most rewarding aspects was to observe the enthusiasm everyone in the research programme and the Challenge had to make a positive impact on the lives of older people through innovations in their everyday environment (home, neighbourhood and workplace); their connectivity (digital and social) and their cognitive health to name a few areas. We wanted to capture this enthusiasm for research and innovation in this edited book.

Bringing an edited book of this nature together with a wide range of topics was one of the challenges. We sought to do this by outlining the distinctive elements running the programme – co-production, design gerontology and academic-business connections at the start of the book, and concluding with the conceptual innovation around 'environments' as a unifying thread through the projects.

Periodically taking stock and mapping the direction of travel for a discipline is important for assessing its vitality and sustainability. It was important to us to follow the previous Programme Director, Alan Walker, who published from the Economic and Social Research Council's 'Growing Older' and 'New Dynamics of Ageing' research programmes, to have an edited collection of the projects and to comment on how the programme developed, including its contribution to social gerontology both empirically and conceptually.

As with a book of this nature there are many people we would like to thank: older people, businesses and researchers who were integral to the Social, Behavioural and Design Research Programme (SBDRP), and those who participated in the initial review panels and workshops. We would like to also thank the UKRI HAC teams who worked with us and the project teams to make the SBDRP a success – both at the ESRC (Huw Vasey, Natasha Richardson and Lucy Gresley) and Innovate UK (Sophie Hardwick, Alexandra Knox, Jane Guest, Chris Ward, Julia Glenn, Natalie Gray and Charlotte Duggan); KTN (Karen Wilkinson and David Calder), our Expert Review Group (Roger O'Sullivan, Public Health Ireland; Cat Drew, Design Council; James Lowman, Association of Convenience Stores; Madeleine Starr, Carers UK; Lynsey Brydson, BE-ST; Jeremy Porteus and Sally Taylor-Ridgeway, Housing LIN; Karen Mechan, Scottish Government and Tom Scharf, Newcastle University), and members of the Programme Board of the HAC expertly chaired by Alison Park. Special thanks to George MacGinnis, Cynthia Bullock and Melanie Knetsch for their encouragement,

enthusiasm and commitment to the SBDRP. Thanks also go to Kimberley Coutts-Murray and Carol Anne Greenan who worked tirelessly to support us throughout the programme.

The book provides an evidence base for academics, policy makers and practitioners as well as helping business understand the opportunities emerging from healthy ageing that will support people to live well for longer. It is our hope that readers will be inspired to take this work further and will be interested in learning from the scale and scope of the Healthy Ageing Challenge and how research is integrated into a large complex programme.

Judith Phillips and Elaine Douglas
University of Stirling

Foreword

Cynthia Bullock
Director – Healthy Lives, Innovate UK, UKRI
(Deputy Director Healthy Ageing Challenge)

'Population ageing is poised to become one of the most significant social transformations of the 21st century' (United Nations, nd). This book addresses such a timely and important societal issue.

Set within the context of the Healthy Ageing Challenge, a £98m government investment brought together academics, investors, entrepreneurs and older people from across sectors who partnered to deliver solutions that could change people's lives. The production of evidence was at its heart, with research focusing on cutting-edge issues in interdisciplinary mission-oriented research and providing critical insights for business, research funders, designers, policy makers and practitioners. The importance of the research programme within the Healthy Ageing Challenge is illustrated throughout this book.

The varied chapters in the book explore less well identified themes in gerontology such as relationships between business, researchers and older people; the concept of an ageing economy; approaches to design-led research and co-production; and challenge-led interdisciplinary approaches. Chapters address topics that have had little visibility in ageing research, such as climate change, the visitor economy, hospitality and retail sectors.

The book is essential reading for academics in ageing and gerontological research and teaching; businesses which want to engage with an ageing market; designers and older people themselves involved in producing research; policy makers and practitioners involved in various aspects of work with older people, and not just traditional areas of health and social care but in the way we design our built and natural environments, support our ageing workforce, and stimulate the private sector to respond to the opportunities and challenges of an ageing population.

As Deputy Director of the Healthy Ageing Challenge, I was delighted to work with Judith Phillips and Elaine Douglas who are well qualified to edit this book, bringing together key researchers and policy makers from the field of ageing and beyond. As gerontologists covering environmental and social gerontology and public health and health behaviours, they bring the book together, distilling refreshing insights on why the programme was successful, how to manage a programme of research, and present future research opportunities.

Reference

United Nations (nd) *Ageing*. Available at: https://www.unpopulation.org/en/sections/issues-depth/ageing/index.html

1

Introduction to challenges and opportunities for an ageing society

Judith Phillips, George MacGinnis and Elaine Douglas

Introduction to the book

This book originates from the Healthy Ageing Challenge (HAC), a four-year UK Research and Innovation (UKRI) initiative in which academic research played a crucial role in understanding the key issues facing, and opportunities offered by, an ageing population, and the ways in which innovative ideas, products, services and systems could support healthy ageing. The Social, Behavioural and Design Research Programme (SBDRP) run through the Economic Social Research Council (ESRC) and Innovate UK (research councils under UKRI) brought together researchers from social science, arts and humanities, natural sciences, and health together with other disciplines and sectors interested in ageing.

Building on previous ageing research programmes (Growing Older, New Dynamics of Ageing, and Lifelong Health and Wellbeing) the HAC/SBDRP, funded by UKRI, was the first programme to explicitly work with business and industry as well as older people to co-produce innovative products and services.

This book aims to:

- highlight key aspects and processes of the SBDRP programme of research;
- translate new thinking on ageing and demonstrate the leading contribution of social sciences and arts to grand challenges and the relevance, applicability and utility of ageing research to wider societal issues;
- introduce the role of business in ageing research and the reader to the opportunities, contexts and potential for academics and business to work together with older people;
- provide examples of how ageing research can impact different business sectors;
- illustrate large research challenge projects with older people at the heart;
- provide an overview of the state of gerontological research;
- point researchers in new directions for research ideas and agendas;
- address a gap in developing an ageing market.

This chapter addresses the definition of 'healthy ageing' as seen through different lenses, maps the policy context and process of the HAC, and in particular SBDRP, before highlighting the programme's distinctive contribution to social and environmental gerontology. The key features of this were: a mission focused approach; co-design and co-production with older people and business; and capacity building. It provides the setting for the subsequent chapters in the book drawing on the themes of the SBDRP.

Defining 'healthy ageing'

Ageing is seen as one of the grand challenges across the world. Traditionally the focus has been on longevity (living longer) and less on healthy ageing (living well through the lifecourse).

Increases in life expectancy in the UK have slowed over the last decade (ONS, 2024). The most recent figures (2018–20), which include some of the deaths attributed to the COVID-19 pandemic, indicate that life expectancy in men in the UK is now 79 years (its lowest level since 2012–14), and for women has stalled at 83 years.

Across the UK, there are differences in life expectancy (how long people live) and healthy life expectancy (how long people remain healthy) depending on whether we are male or female, the constituent country in which we live and by the level of deprivation of the area in which we live. In general, men and women have similar healthy life expectancy (time spent in good health in England in 2021–23: men 61.5 years and women 61.9 years), however women tend to live longer than men (Government Actuary's Department, 2024). In England, people live longer and have fewer years of poor health than in either Wales, Scotland or Northern Ireland. Scotland has the lowest life expectancy and healthy life expectancy. Differences between life expectancy and healthy life expectancy can broadly indicate quality of life in relation to longevity (ONS, 2022). A social gradient in healthy life expectancy is evident across all UK nations, such that, those living in the most deprived areas have fewer years in good health and spend a higher proportion of their lives in poor health. In Scotland, the healthy life expectancy of men and women living in the most deprived areas is 24 years sooner than those living in the least deprived areas. Given people living in deprived areas also tend to die at a younger age, they also spend a higher proportion of their lives in poorer health. In effect, health inequalities lead to both shorter lives and longer periods of being unwell.

The focus on 'healthy ageing' has been as a response, particularly by policy makers, to such spatial disparities, and was the driver of the Healthy Ageing Challenge, the theme of this book.

However, there are academic debates and controversies over the term 'healthy ageing' depending on whose lens and perspective is reflected. Often

associated with 'successful ageing' or 'productive ageing' it is viewed by many gerontologists as stigmatising and exclusionary (Katz and Calasanti, 2015; Waddell et al, 2025), particularly ignoring the voices of older people (Badache et al, 2023), lacking subjective views of 'successful ageing' and devoid of diverse cultural contexts. 'Living well' has often been adopted as an alternative by policy makers (Public Health England, 2019) and developed as a concept aligned to a lifecourse approach, a dynamic approach to understanding ageing by examining how lives are socially organised and evolve over time (Phillips et al, 2010). The UN Decade of Healthy Ageing shifted its focus in line with taking a lifecourse approach through an ambitious ten-year plan of action (2020–30) regarding healthy ageing (WHO, 2020).

Policy context

With the focus on 'healthy ageing' as living well and taking a lifecourse approach, the Ageing Society Grand Challenge, launched as part of the UK government's Industrial Strategy in 2018, set out to tackle both the longevity dividend (gains realised by increases in healthy life expectancy; Scott, 2021) and inequalities outlined earlier through a 'mission-oriented' approach (Mazzucato, 2022). Influenced by Mazzucato's work on mission economy, particularly her work in Europe where 'mission-oriented' research had been a cornerstone of European Union programmes of research for several years, the UK government adopted this approach for the Grand Challenges. 'The Ageing Society Grand Challenge' aimed to increase healthy life expectancy by five years by 2035, while at the same time narrowing the gap in the experiences of the richest and the poorest.

We will return to this approach in the concluding chapter given the Labour Government's (2024) five missions and the implications for the direction of ageing research and policy (The Labour Party, 2023). This context, along with an opportunity for economic and social growth and transformation through a healthy ageing population, underpinned the UK government's commitment to its Industrial Strategy (2017–19). In 2017, then Prime Minister Theresa May announced the UK government's *Industrial Strategy: Building a Britain fit for the future* which set out four Grand Challenges, along with an Industrial Strategy Challenge Fund (ISCF) to enable the delivery of activity addressing the identified challenges (UK Government, 2017).

This concerted policy ambition for growth was translated into the Healthy Ageing Challenge (HAC) mission and funded up to £98 million through UKRI with a programme of initiatives over a four-year period to stimulate an ageing market to contribute towards the Ageing Society Grand Challenge mission. Despite the Healthy Ageing sector not being readily identifiable in standard industry classifications or published datasets

with its constituent products and services corresponding to different market segments across the economy (Technopolis, 2024), the mission remained important. The role of public and private sectors, including for profit businesses and social enterprises, played a key part in developing and delivering services, products and innovative business models that would enable people to remain active, productive, independent and socially connected across generations for as long as possible. Building a Healthy Ageing (HA) Research and Innovation ecosystem through interdisciplinary and cross sector collaboration, supported by a Community of Practice, was critical in helping business understand the opportunities of an ageing population (Innovate UK, 2025).

Whereas most policy discourses have centred around an ageing population as a challenge, the HAC mission opened a new lens on an ageing population as an opportunity for economic growth and social transformation. The intention of reframing was to stimulate and attract business to a nascent ageing market and enable UK-based businesses to exploit global markets for healthy ageing products and services. Research, innovation and design were also seen as key to achieving this alongside attracting inward investment into the UK to develop new HA solutions (products, services and business models).

A portfolio of activities was delivered under the HAC (see Chapter 4), including initiatives to help entrepreneurial researchers develop spin outs (Catalysts), helping entrepreneurs and social ventures on their journeys as well as larger collaborations with businesses aiming for 'impact at scale' (Trailblazers). The Community of Practice provided a learning community for all the projects under the HAC and external initiatives were also brought into the Challenge to develop entrepreneurship (for example, Zinc, a venture builder, which developed a programme of enterprise support to scale impact).

All initiatives were couched around a framework developed by the Centre for Ageing Better for their potential to develop a segment of an ageing market.

The themes of the HAC Framework (see Figure 1.1) were:

- **creating healthy active places**: to develop places that encourage people in later life to sustain physical activity;
- **design for age-friendly homes**: to enable people to live independently and safely at home for longer with innovative products and services;
- **maintaining health at work**: to promote and maintain older workers' health and wellbeing;
- **supporting social connections**: to enable people to sustain and broaden their social connections and relationships into later life;
- **living well with cognitive impairment**: to improve the quality of life for older people living with cognitive impairment;

- **sustaining physical activity**: to help people in mid- and later life to increase and sustain their levels of physical activity;
- **managing common complaints of ageing**: to improve the quality of life of people in later life with a range of common health conditions.

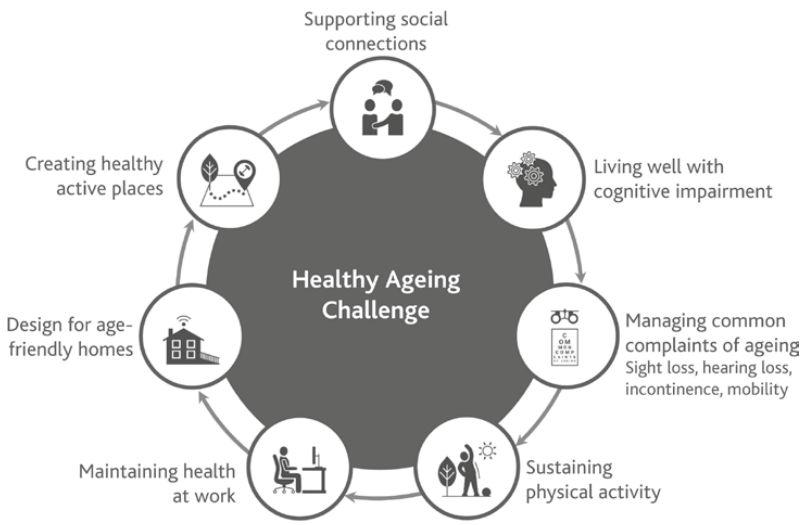
The Social, Behavioural and Design Research Programme (SBDRP) – a programme within a programme

The SBDRP (https://www.ageing-sbdrp.co.uk/) commissioned through ESRC was provided with £12.3 million to fund interdisciplinary academic-led teams to carry out research into social, behavioural and design aspects of healthy ageing, drawing on one or more themes in the Framework.

The Programme was spearheaded by a Research Director (RD) and team who were responsible for overseeing the research and making connections across the full range of Healthy Ageing Challenge activities. The SBDRP funded 12 projects in total covering all four nations of the United Kingdom with successful applicants starting their research projects on 1st March 2021. In addition to commissioning seven major projects, the RD was given a flexible fund for responsive-mode research and a further six projects were commissioned using this fund.

The initial investments were in three-year multi-disciplinary research projects, each receiving awards of up to £2 million for academics based at UK Research Organisations. Proposals were expected to critically engage with

Figure 1.1: Healthy Ageing Challenge Framework



Source: UKRI Healthy Ageing Challenge

businesses, including social enterprises, to enhance their understanding of the needs and opportunities of an ageing population, help inform innovators and open creative spaces for businesses and consumers in an 'ageing market.' Meaningful engagement with public sector and charities was encouraged where appropriate.

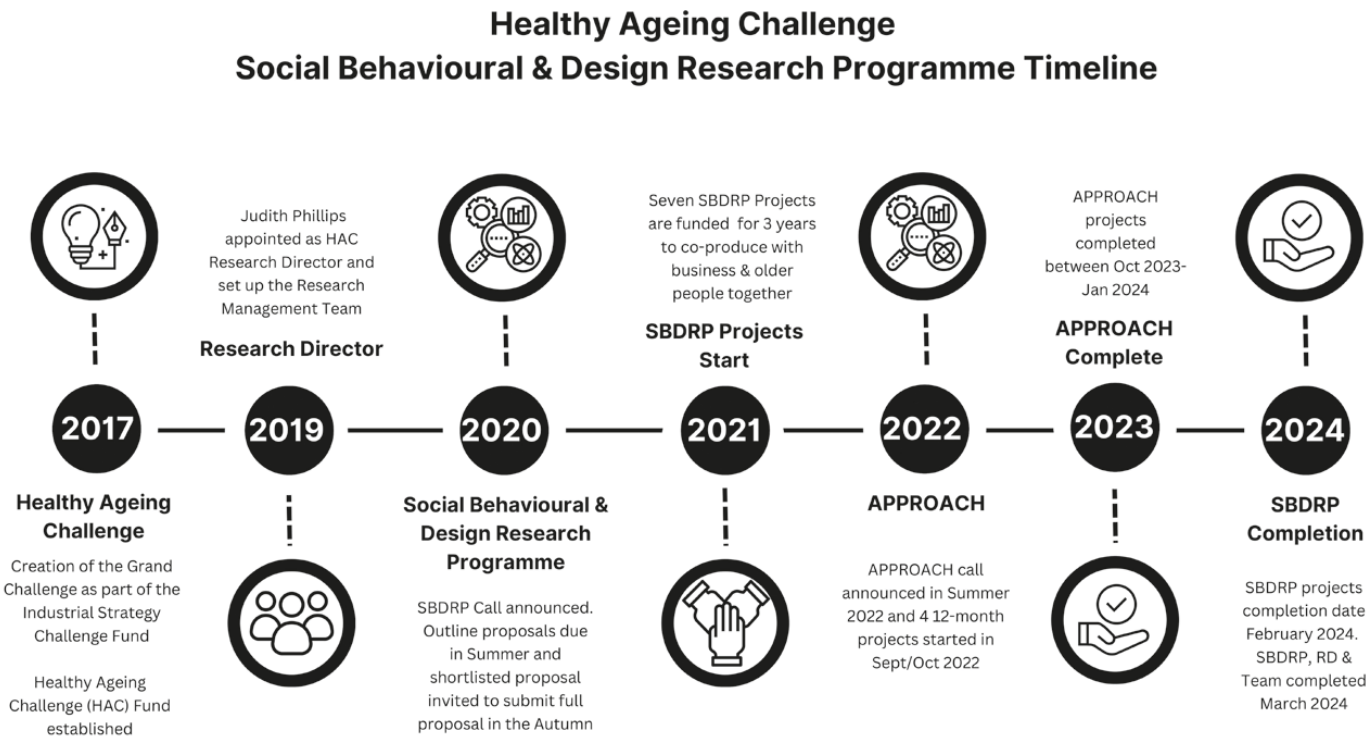
Successful projects were expected to:

- meaningfully engage with older people throughout the life of the project, including the co-design of research, collaborations and general engagement, as well as governance;
- critically and constructively work with business to address their project aims and co-produce research and innovation;
- address diversity and environments of ageing, which could include, but was not limited to, diversity in terms of age, class, disability, ethnicity and gender; where appropriate, applicants were encouraged to consider place-based approaches, including comparative research, to explore environments of ageing, including specific communities and workplaces;
- address ageing across the lifecourse;
- accommodate the impacts of COVID-19;
- work across disciplines to meet the aims of the project including working with those who do not normally carry out research in gerontology or related fields (for example, the inclusion of design researchers, computer scientists or engineers, working in other specialisms);
- include a compelling and well-designed impact, knowledge exchange and communication strategy to ensure their project findings are widely disseminated and understood by the business and innovation communities, as well as service providers, the wider public, including older people, and those making and influencing public policy;
- clearly demonstrate how the project will contribute to the aims of the HAC;
- support a strong commitment to capacity building, supporting the development of researchers at all stages of their career.

The UKRI/ESRC research call for the SBDRP was launched in Summer 2020 (see Figures 1.2 and 1.3). This followed a short delay due to the onset of the COVID-19 pandemic and the instigation of widespread social distancing restrictions in Spring 2020. This enabled applicants to take greater stock of the potential impact that COVID-19 may have on their staff, as well as their engagement with older people and partners. Consideration of the impact of COVID-19 and an appropriate risk assessment was an essential criterion for all applications.

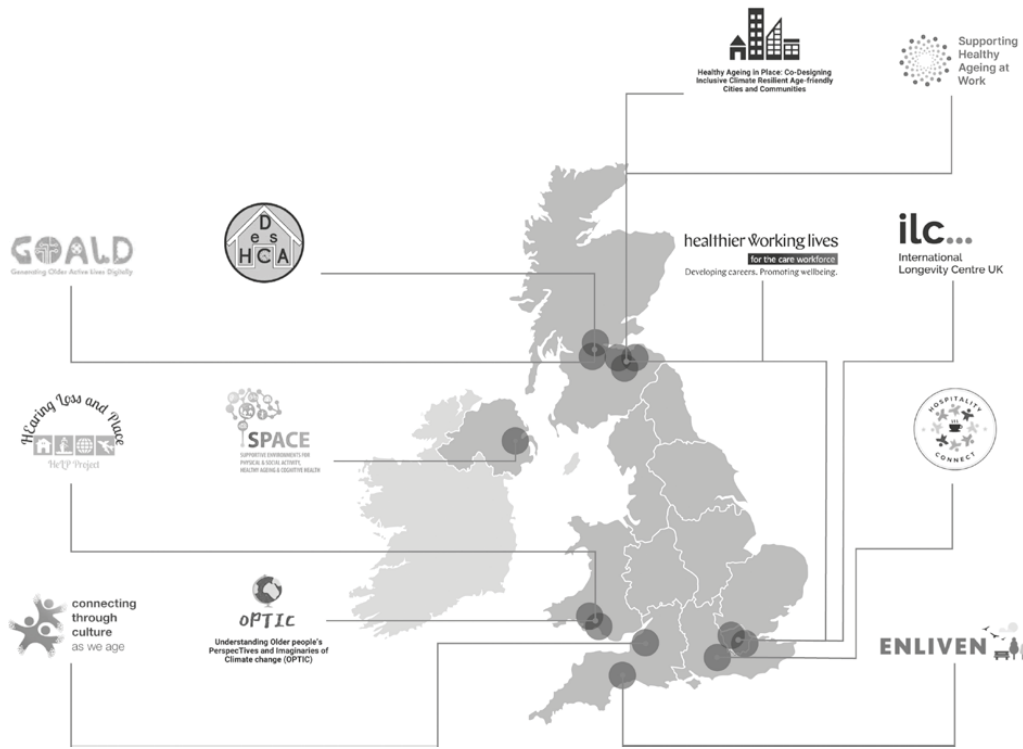
The seven initial three-year funded projects included:

Figure 1.2: SBDRP timeline



Source: Elaine Douglas

Figure 1.3: SBDRP and APPROACH projects



Source: SBDRP Impact Report, University of Stirling https://www.ageing-sbdrp.co.uk/wp-content/uploads/2024/10/Uni-of-Stirling-Impact-Report-2024_HighRes_UKRI_Approved_Updated_.pdf

- Supportive Environments for Physical and Social Activity, Healthy Ageing and Cognitive Health (SPACE) Queens University Belfast (Chapter 5, https://www.ageing-sbdrp.co.uk/research-projects/space/)
- Designing Homes for Healthy Cognitive Ageing (DesHCA) University of Stirling (Chapter 9, https://www.ageing-sbdrp.co.uk/research-projects/deshca/)
- Supporting Healthy Ageing at Work (SHAW) University of Edinburgh (Chapter 10, https://www.ageing-sbdrp.co.uk/research-projects/shaw/)
- Healthier Working Lives for the care workforce (HWL) Kings College London/University of Edinburgh (Chapter 11, https://www.ageing-sbdrp.co.uk/research-projects/healthier-working-lives-and-ageing/)
- Connecting Through Culture As We Age (CTC) University of Bristol (Chapter 12, https://www.ageing-sbdrp.co.uk/research-projects/connecting-through-culture/)
- ExteNding active LIfe for older people with cognitive impairment through innoVation in the visitor economy of the natural ENvironment (ENLIVEN) University of Exeter (Chapter 13, https://www.ageing-sbdrp.co.uk/research-projects/enliven/)
- Generating Older Active Lives Digitally (GOALD) University of Stirling (Chapter 14, https://www.ageing-sbdrp.co.uk/research-projects/connectivity-and-digital-design/)

In 2021, steps were taken to address potential gaps in the research portfolio by launching The **Ageing and Place: Pandemic Recovery and Action on Climate Change** (APPROACH) research call. This was funded by the University of Stirling as part of the Research Directors Flexible Fund and was managed by the SBDRP Research team. Four projects were funded for 12 months and were included in the wider SBDRP. The four one-year APPROACH projects were:

- Understanding Older People's Perspectives and Imaginaries of Climate Change (OPTIC) Swansea University (Chapter 6, https://www.ageing-sbdrp.co.uk/research-projects/optic/)
- Healthy Ageing in Place: Co-Designing Inclusive Climate Resilient Age-friendly Cities and Communities (HACC) Heriot-Watt University (Chapter 6, https://www.ageing-sbdrp.co.uk/research-projects/healthy-ageing-in-place/)
- Hospitality Connect: Retail and hospitality environments for ageing well University of Surrey (Chapter 7, https://www.ageing-sbdrp.co.uk/research-projects/hospitality-connect/)
- Hearing Loss and Place (HELP) Swansea University (Chapter 8, https://www.ageing-sbdrp.co.uk/research-projects/hearing-loss-and-place/)

Two further projects were developed under the SBDRP Flexible Fund, as follows:

- In conjunction with the International Longevity Centre UK (ILC-UK) a two-year Retail Impact project was funded to support retailers in better understanding the evidence about what healthy ageing means and to inspire them into action in relation to their healthy ageing role (Chapter 7, https://www.ageing-sbdrp.co.uk/research-projects/retail-impact-project/).
- The Innovation Caucus was engaged to assess the potential for the development of place-based clusters of ageing research and innovation (Nelles et al, 2024) should a second wave of funding of the Healthy Ageing Challenge become available (Chapter 15).

Working in conjunction with the British Society of Gerontology, a Special Interest Group on Ageing, Business and Society was launched aiming to make a meaningful contribution by generating a constructive, outcomes focused dialogue among social gerontologists and businesses to support progressive policy goals to improve the lives of older people (British Society of Gerontology, nd).

Distinctiveness of the programme

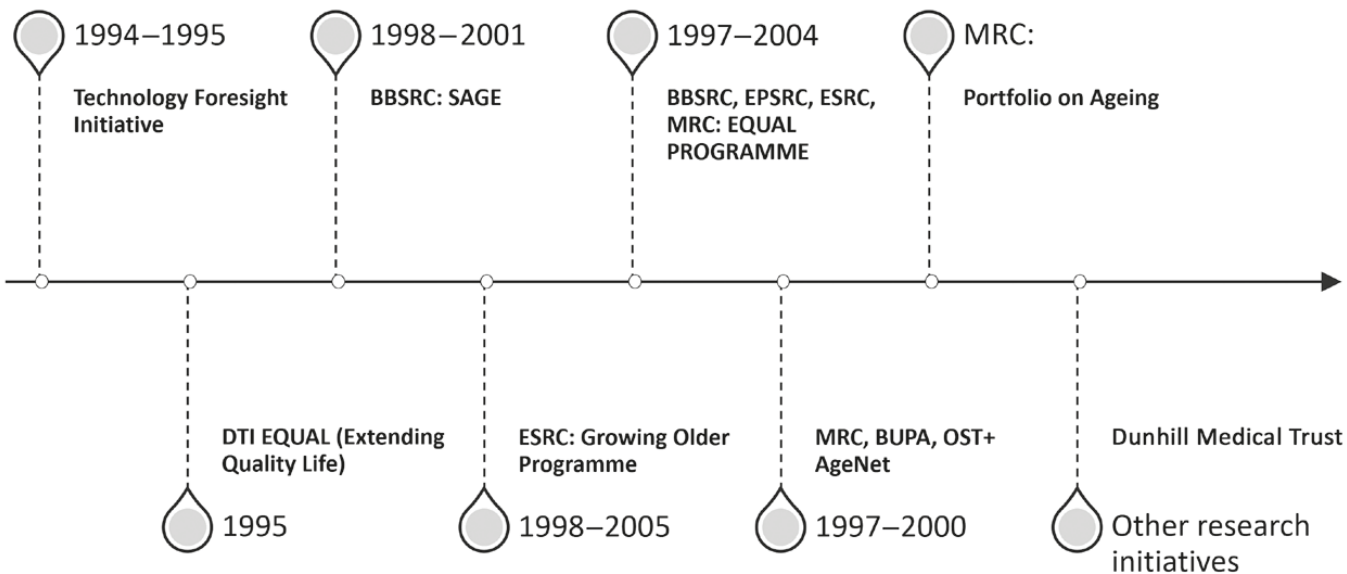
The SBDRP built on a track record of over four decades of research council funding addressing ageing issues (see Figures 1.4 and 1.5). SBDRP follows from previous UKRI programmes including Growing Older (https://growingolder.sirtes.sheffield.ac.uk) and Lifelong Health and Wellbeing and the New Dynamics of Ageing (https://newdynamics.sites.sheffield.ac.uk). Here we concentrate on one previous programme – the New Dynamics of Ageing.

New Dynamics of Ageing (NDA)

The NDA programme of research, which comprised of 35 projects and over 200 researchers, ran between 2005–13. Walker (2014) documents the history and themes of the NDA in his book '*The New Science of Ageing*'. He identifies the key elements in this new science of ageing being multi-disciplinarity, user engagement and knowledge exchange, which were novel at the time of the NDA (Walker, 2014). The lifecourse perspective and recognition of the diversity and inequalities of ageing were also recognised in some of the projects.

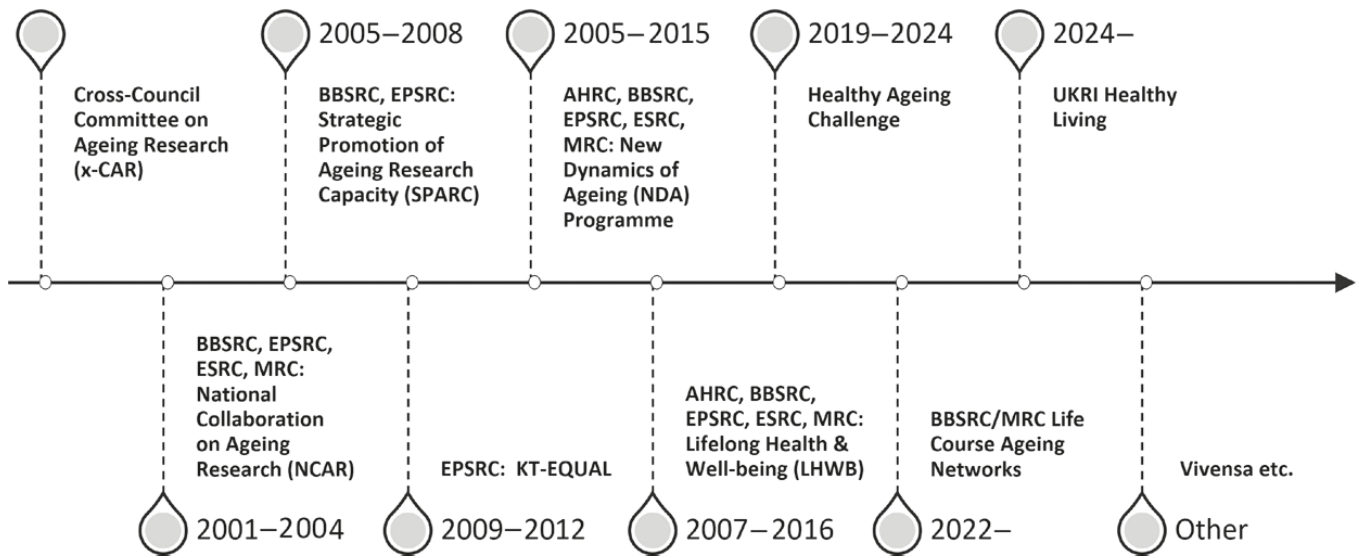
The HAC addressed and built on these elements. The originality of the SBDRP stemmed from a distinctive programme of research addressing new cutting-edge themes and approaches in ageing and gerontology. The

Figure 1.4: UK ageing research, 1990s



Source: Adapted from Walker (2023)

Figure 1.5: UK ageing research, 2000s



Source: Adapted from Walker (2023)

programme's distinctive characteristics that distinguish it from previous programmes are its:

1. **Challenge-led mission oriented research focused on innovation and impact:** A wider definition of the 'healthy ageing' mission involving stakeholders from business and industry as well as social enterprise, and its focus on economic and social growth has not only led to new innovations and impact, but new interdisciplinary and cross sectoral activity highlighting the role of social science and arts and humanities in stimulating economic growth. The *s*ocial model of ageing with social sciences driving the projects was central to the HAC. By focusing on challenge led or **mission focused interdisciplinarity,** innovations were designed to have an impact, thereby potentially enhanced the equality of opportunity across society.
2. Tripartite **co-production with business and older people**. In the NDA programme user engagement was central, particularly with older people (through the Older Peoples' Reference Group) being part of the commissioning group and aligned to all 35 projects in the programme.

   The HAC programme sought to go further with **co-design and co-production** at its heart and not just in relation to older people, but with an expectation that projects would also meaningfully engage with businesses as partners in such co-production (see Chapters 2 and 4). Design was a central feature with user centred design mechanisms and inclusive design being at the forefront of the projects.

   Such tri-partite co-production became a defining feature of the HAC and the SBDRP with older people sitting on interview panels and project teams centrally engaging older people in their projects. Unlike the NDA we decided not to have an overarching older person reference group (OPRG) but supported projects to work 'locally' with their own older people reference groups and partners. We also drew on the expertise within VOICE (nd) which supports public and patient involvement and engagement in research. This was the first research programme to have innovatively brought multi-disciplinary researchers together with business to meaningfully co-produce products and services with older people that tackle everyday challenges and improve quality of life. We enabled this through several specific workshops held online and face to face to discuss business–academic relationships attended by all our projects and some voices from business.
3. The SBDRP strengthened **new conceptual thinking**, turning a challenge into an opportunity adding to the more positive elements in '*The New Science of Ageing*' (Walker, 2014). Businesses have traditionally not developed products and services that reflect ageing as a positive experience but have focused on ageing as inevitable decline and synonymous with

care. The HAC sought to reverse this, looking at the opportunities for business to develop an ageing market.

4. **Building capacity** was a key focus for such programmes with NDA supporting firstly multi-disciplinary skills and knowledge development through presentations and sharing of experiences, and secondly by building capacity among early career researchers (ECRs). Reflecting on the NDA experience we know that researchers on short term contract are in precarious positions and securing a career in gerontological research is not guaranteed. It is something which programmes of research can do little about structurally but important nevertheless to equip ECRs and post docs engaged in these projects with the necessary transferable skills wherever they may be employed and to enthuse them with innovative directions in which multi-disciplinary studies of ageing can go.

Overview of the chapters

Chapters 1 to 4 highlight the distinctive and new strands of the SBDRP, such as co-production with older people, co-design with business and the business–academic relationship.

In Chapter 2 Elaine Douglas and Cate Pemble outline key definitions and demonstrate how the HAC and the SBDRP expanded traditional applications of co-production to create meaningful collaboration between academics, older adults and business partners.

The chapter highlights the challenges faced in developing a co-production approach including the challenges, and mitigations put in place, during the COVID-19 pandemic, and how the project engaged with people from disadvantaged, disabled and diverse backgrounds, and those who were digitally excluded.

Helen Manchester and Sarah Kettley in Chapter 3 illustrate how design approaches can be used in ageing research across a variety of contexts or activities, for instance, in the home, workplace or communities. They look at the tensions that arose in the SBDRP and raise key questions that emerged when adopting design in ageing research.

In Chapter 4 Lucy Gresley and colleagues bring the funder's perspective, highlighting the importance of building in business–research engagement and knowledge exchange from the start of a programme to help businesses design and deliver innovations that people would consider both attractive and affordable and to open business – academic relationships in the social sciences as well as arts and humanities.

Chapters 5 to 14 are organised around the HAC framework: Creating Healthy and Active Places; Design for Age-Friendly Homes; Maintaining Health at Work; Supporting Social Connections; Living Well with Cognitive Impairment; Sustaining Physical Activity (see Figure 1.1). An additional

common thread running through these chapters is the focus on 'environment' (at global, community and individual levels) and 'cognitive health'. We return to these themes in developing new conceptual thinking around 'healthy ageing' and review the theoretical contribution of the HAC/SBDRP to social gerontology in Chapter 17.

Creating healthy and active places

Chapter 5 investigates the impacts, and possible mechanistic pathways, of urban environments on healthy ageing and cognitive health, through the novel integration of multi-omics, lifestyle behaviour and environmental exposures from urban environments. Methods include a systematic review: linking environmental and lifestyle behavioural data and exploratory multi-nomic approaches, to investigate the biological responses to urban environments and related environmental exposures that influence measures of cognitive health. The chapter highlights how Ruth Hunter and the SPACE team supplied evidence for policies and practices that provided supportive urban environments to promote healthy ageing, including promoting brain health.

Global environmental issues continue in Chapter 6 with Merryn Thomas, Ryan Woolrych and teams exploring how climate change brings challenges and opportunities for ageing well, in changing living, working and leisure environments. This chapter reflects on the ways in which two independent one-year projects explored older people's perspectives of climate change to enable the co-design of more inclusive, resilient and sustainable places. Focusing on older people's perspectives and individual and community actions to address climate change, as well as policy level changes, the chapter reflects on how such research can contribute to creating and managing environments in ways that offer greater health and wellbeing benefits while contributing to more sustainable futures.

Moving from global to community level, Xuan (Lorna) Wang, her team and Ailsa Forbes provide new evidence of the opportunities and challenges of engaging the Hospitality and Retail sectors, two of the largest employers in the UK, in supporting ageing well in the community. They reflect on the key findings and outputs from two innovative projects that explored the importance of hospitality and retail for older adults: Hospitality Connect and the Healthy Retail project. The chapter discusses the practical and implementable solutions for hospitality venues such as cafes and pubs and retail shops that emerged from these projects. Based on this work, recommendations are made on how to mobilise the hospitality and the retail sectors in addressing the healthy ageing challenge for all to age better in their own communities.

In Chapter 8 the HELP team addresses the difficulties people with hearing loss experience in a variety of noisy and distracting places such as retail, transport and hospitality sectors, why such noisy environments occur, how

such noise affects not only hearing, but also attention, cognition, wellbeing and social interaction. This evidence formed the basis of addressing the problem and raised awareness of the issue among the public, retail and travel sectors and in making hearing loss-related changes to environments based on a set of co-produced guidelines.

Design for age-friendly homes

Alison Bowes and the DesHCA team in Chapter 9 look at sustainability in cognitively supportive home design providing insights from research on designing homes for healthy cognitive ageing. DesHCA's research aimed to produce scalable, research-informed designs for both new-build and retro-fitted homes that can support cognitive ageing in place. It foregrounded the perspectives of older people, examining their own views about the housing they have and the housing they want, and worked with partners including older people, housing designers, providers and builders to test proposed designs across a wide stakeholder group. Business involvement was vital for the project, given the aim to produce practical solutions for implementation.

The purpose of this chapter is to address the problem of delivering supportive design for cognitive ageing that is sustainable socially, environmentally and economically and that supports people living with cognitive change to age in the place that is right for them and therefore live the lives they wish. The researchers provide empirical evidence that informs designs that can be used in a complex system of housing provision and that accommodates the diversity of requirements and aspirations of older people.

Maintaining health at work

The focus in Chapter 10 by Wendy Loretto and the SHAW team is on supporting and managing less visible aspects of healthy ageing at work. Almost half of 50–64 year-olds have at least one long term health condition. One in five older workers who stop working before State Pension Age cite health problems as the main reason for leaving work. However, with the right workplace supports in place, health problems need not necessarily be a barrier to older people remaining in work.

The Supporting Healthy Ageing at Work (SHAW) study co-designed and tested a range of innovative workplace health interventions to support the health and wellbeing of workers over 50 with three case study partner organisations in finance, manufacturing and social care, as well as a group of self-employed individuals. They focus particularly on 'hidden health' issues that are often overlooked in workplace health interventions, including: menopause; cognitive ageing; mental health and wellbeing;

financial wellbeing; and the needs of informal carers. The workplace health interventions that were co-designed with older workers along with co-designed outputs providing businesses and social enterprises with scalable products, services and business models to support healthy ageing at work are also outlined. The chapter finally sets the findings in the context of the UK policy goal of extending working life.

Continuing with the theme of maintaining health at work in Chapter 11, Linda McKie and the Healthier Working Lives team engaged people over the age of 50 working in the residential care sector in Scotland, co-generating ideas and activities with care workers to improve the working lives of those in the care sector in mid-to-later life.

Frontline care workers experienced their own ageing while addressing the stresses of caring in work and caring for their families and older people; a critical situation made worse at the UK level by the pandemic, changes in immigration policies as well as a dynamic economic context. This has led to a wider challenge of recruitment and retention in the care work force.

The primary goal of the project was the conception, co-design and adoption of innovative products and services that addressed challenges in the recruitment, retention and organisational change as well as enhancement of the health and wellbeing of older workers.

The aim of HWL was to develop a community of innovators and intrapreneurs in the care sector by nurturing creativity, empathy, lifelong learning and peer support among care workers and care providers. The team shared ideas for innovations with entrepreneurs through cross sectoral networks generated through design, health technology, work and wellbeing communities. The chapter outlines how the goal and aims of the project were achieved through co-production.

Supporting social connections

Connecting through Culture as we Age, led by Helen Manchester and her team, explores in Chapter 12 how participation in all forms of arts and culture, particularly those accessed digitally, can influence our wellbeing and feelings of social connection as we get older. The project team worked alongside a group of 20 disabled, socioeconomically and racially minoritised older adults who have played an active role in the project as 'co-researchers'.

In this chapter the team adopted a lifecourse approach to understanding co-researchers' daily lives, social connections and their experiences of digital and cultural participation. The team reflects on how digital cultural engagements create opportunities to forge meaningful social connections, explore identities and sexualities, and resist and re-work societal assumptions of older people. They highlight how experiences of marginalisation across the lifecourse continue to shape co-researchers' lives as they age, touching

on some of the inequalities they face in accessing and participating in arts and culture.

The chapter also reflects on the process, practices and principles of co-design and cross sectoral collaborations with older adults at the centre of this project. It explores how creative industries and policy makers might include and better understand the lived experiences of socially marginalised older adults in design processes.

Living well with cognitive impairment

ExteNding active LIfe for older people with cognitive impairment through innoVation in the visitor economy of the natural ENvironment (ENLIVEN) aimed to enable older people with cognitive impairment to be active, independent and socially connected, and to experience good quality of life, through increasing or initiating engagement with nature-based outdoor activity. Getting out into nature is valuable for wellbeing and health, enabling people to feel more engaged, more enthusiastic, more hopeful, more resilient and better able to deal with challenges. However, many barriers currently limit access to nature-based outdoor activity for older people with cognitive impairment and their families. The businesses and other organisations that manage the places where people typically go to enjoy nature are often keen to make it easier for older people to visit these places and to feel welcome, but do not necessarily know what would make a difference. Chapter 13 describes how Linda Clare and the ENLIVEN project team worked with older people and with businesses in the outdoor visitor economy to develop, implement and evaluate innovative models of practice that can promote access to nature-based outdoor activity.

Case studies illustrate some of the ways in which businesses can make visiting outdoor places easier and more enjoyable for older people living with dementia and other forms of cognitive impairment, and their family members of all ages, to visit. The chapter concludes by presenting the resources developed as a result of the research and discussing implications for policy and practice.

Sustaining physical activity

The aim of the Generating Older Active Lives Digitally (GOALD) project led by Catherine Hennessy and discussed in Chapter 14 was to identify, develop and refine co-produced activities and tools for health promotion in later life. The project examined how to design and deliver digital resources to provide and engage older people in activities and initiatives that support health and wellbeing. Intergenerational co-production groups (ICGs) composed of older and younger participants developed, trialled and refined ideas for digital

applications focusing on the areas of intergenerational physical activity and sports-based intergenerational reminiscence. Over the course of the project, the ICGs' experiences of digital resources and assistive technologies were captured, and these findings shared with business partners to develop new technologies and product ideas and test design concepts.

The chapter chronicles this journey from design to delivery and demonstrates how these innovative digital tools can work and enhance accessibility of these resources to older people across varying socioeconomic, geographic, health status and ethnic groups. It also examines the impact of the co-production experience on older and younger participants. The chapter highlights the potential of bringing a lifecourse perspective on healthy ageing and an awareness of the benefits of an intergenerational co-production approach to the development of products by businesses designing for an ageing population.

Chapters 15 to 17 shift the focus to reflect on advances and challenges for innovation and research within the ecosystem of population ageing. How business connects with social sciences, arts and humanities as part of a healthy ageing ecosystem has been a feature of this book. Chapter 15 by Jen Nelles, Lauren Tuckerman and Nadeen Purna considers the possibility of developing a cluster place-based approach for research and innovation in healthy ageing. The chapter focuses explicitly on the interplay between actors in the healthy ageing domain in the UK and the opportunities for innovation and growth through a lens of place-based development.

Inspired by similar work on clustering in the Creative Industries Challenge (Creative Industries Cluster Programme, 2021), the Healthy Ageing Challenge commissioned the Innovation Caucus to explore the feasibility of adopting a similar approach (Nelles et al, 2024). That research concluded that the hybridity of the healthy ageing domain meant that typical cluster strategies were not suitable – very few localities explored had a sufficient critical mass of economic (and other types of) activity to serve as foundations for clustering. However, the exercise of conceptualising healthy ageing through the lens of innovation clusters still served as a policy inspiration encouraging decision makers to explore and understand different types of localised assets and actors in the healthy ageing domain, the relationships between them and how they might be better connected to fuel innovation. Following this thread, the Innovation Caucus team set out to research how different actors and activities intersect (or don't) to innovate in a large urban area (Greater Manchester in the UK) and to learn what impacts these networks have on the ageing population.

These chapters also review the SBDRP programme of research itself, focusing on both conceptual and methodological issues, the tripartite co-production between older people, business and research, including capacity building and critically reflecting on the success of the programme to deliver

on its aims. The final chapter considers the conceptual advancement made by the programme with a view to signposting future directions and opportunities.

Judith Phillips and Elaine Douglas (Chapter 16) reflect on the SBDRP as part of a complex ecosystem and multi-initiative programme (HAC) encompassing a diverse set of actors, innovators, technologies and businesses. Setting out as a mission-oriented programme encompassing interdisciplinarity, co-production and co-design throughout the research process, and with an aim of building capacity in ageing research, the chapter looks at how this was achieved and the challenges faced in times of uncertainty such as the pandemic, alongside the challenges in leading a diverse programme of research. It provides learning points for future research leaders in managing projects and programmes in ageing and beyond.

In the final chapter of the book, Judith Phillips draws together the key strands of the book and explores the innovations in social, behavioural and design research that could be further developed in a future programme of research and innovation. She explores the trend for wider research approaches through a mission-oriented approach, the necessity to create a sustainable ecosystem of research across sectors as well as disciplines and the need to build capacity in skills and knowledge in ageing research.

This chapter also considers the theoretical contribution of the SBDRP programme to social and environmental gerontology, arguing that a greater focus needs to be placed on the interconnectedness of layers of environment in a definition of 'healthy ageing' to support and develop age-friendly communities.

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2

Co-producing research with people with lived experience

Elaine Douglas and Cate Pemble

This chapter provides a pragmatic insight into the practicalities of co-production, including the challenges and mitigations put in place during the COVID-19 pandemic, and how projects engaged with people from disadvantaged, disabled, and diverse backgrounds, and those who were digitally excluded. This chapter outlines key definitions and demonstrates how the Healthy Ageing Challenge and the Social Behavioural and Design Research Programme (SBDRP) expanded traditional applications of co-production to create meaningful collaboration between academics, older adults, and business partners capable of shaping the design and development of innovative business products and services for older people. We describe how planting the seeds of co-production at the genesis of the SBDRP allowed it to flourish and thrive across projects throughout the life of the programme, while highlighting how applying the principles of co-production in different ways allowed projects to make the most of opportunities presented by co-productive working to achieve their goals.

Co-production has gained significant traction in research over the past two decades (Masterson et al, 2022). However, definitions of co-production vary across and within disciplines, creating confusion about where seeking insight or advice becomes co-production, where co-production becomes co-design, and where co-creation fits into it all. For the purposes of clarity and brevity, we approach distinctions around co-production in the following way, while noting the ongoing work being undertaken elsewhere to define and distinguish between these concepts (Vargo and Lusch, 2004; Needham, 2008; Loeffler et al, 2013; Voorberg et al, 2014).

SBDRP projects' approach to co-production inherently welcomed flexible approaches with the proviso that there was meaningful engagement with older people. As a result, the SBDRP encompassed a diverse set of research projects, with varied aims, methodologies, and stakeholders, who were committed to the principles and values which underpin meaningful co-production (see Masterson et al, 2022 for a discussion).

Yet this endeavour comes with its own challenges, as it introduces a need to explore how a set of values might be enacted in practice. Co-production,

for example, is often described as an equal and reciprocal partnership between professionals and citizens aimed at creating value for a service (Masterson et al, 2022). This model is frequently associated with public services in social care, health, or community sectors. But how does this translate to research? The National Institute for Health and Care Research (NIHR, 2021) has published guidance for co-producing research projects, outlining key principles that support effective co-production. These include: building and maintaining relationships; sharing power and integrating diverse perspectives and skills; valuing and respecting the knowledge of all participants; and ensuring reciprocity.

Co-production with older people is important for several key reasons. Involving older people in the design and decision-making processes ensures they have a voice in shaping the services, products, and experiences that directly impact their lives. This empowers them to take an active role in their communities and helps challenge stereotypes of older adults as passive recipients of care. Older adults have unique lived experiences and perspectives, which can lead to more effective and relevant solutions. By co-producing with them, we can ensure that initiatives truly meet their needs, preferences, and desires, making them more impactful and meaningful. Co-production fosters greater inclusivity by involving older adults in designing solutions for themselves, particularly those who may be marginalised due to disability, ethnicity, or socioeconomic status. It helps create a more diverse and equitable society by acknowledging and addressing the diverse needs of older populations. Active participation in co-production can have positive effects on older adults' wellbeing. It provides a sense of purpose, improves social connections, and enhances mental and emotional health by giving older people opportunities to contribute their skills, knowledge, and creativity.

Co-producing with older people leads to the development of services and programmes that are better aligned with their needs. It ensures that interventions are user-centred, rather than imposed from outside, which can lead to higher engagement and satisfaction with services with greater relevance to their needs. Co-production fosters collaboration and interaction between generations and across different groups. It creates spaces for shared learning, support, and relationship-building, which can help reduce isolation and enhance community bonds. Older people bring diverse perspectives and experiences that can stimulate innovation. By working together, they can contribute to creative and novel solutions that might not arise from a more top-down approach. Their involvement helps drive fresh thinking and new ideas in areas like technology, healthcare, and arts and culture. Overall, co-production with older people ensures that policies, services, and innovations are grounded in their real-world experiences, leading to more sustainable, effective, and acceptable outcomes.

UK Research and Innovation (UKRI) seeks to enhance public involvement in research (UKRI, 2022). Within the UKRI Healthy Ageing Challenge, co-production was extended beyond service design and delivery to support businesses in designing and developing products, systems, and business models that cater to the needs of an ageing population. In this way, the Healthy Ageing Challenge structured co-production to include business development, aligning it with the programme's goals of meeting older people's needs.

Further, the Healthy Ageing Challenge aimed to foster co-productive partnerships between academics, older people, and business leaders. This tripartite collaboration enabled projects within the SBDRP to leverage the combined expertise of researchers, the lived experiences of older people, and the sector specific knowledge of business partners who could translate research into impactful, real-world products and services. Co-productive partners, in turn, benefited not only from the tangible outcomes of these projects but also from the new insights and knowledge gained through the collaborative process.

Co-production provides academics with an opportunity to develop research that is more relevant and impactful by integrating the lived experiences and perspectives of older adults. This engagement enriches academic understanding, enabling researchers to produce insights that are deeply grounded in real-world experiences. Collaborating with older adults can also inspire innovative methodologies that can be applied to future research projects, shifting traditional research approaches towards more inclusive and participatory models. The active involvement of older adults in co-productive research fosters a more holistic understanding of the factors affecting their lives and encourages academics to consider these insights in designing and conducting research.

The principles of co-production such as relationship-building, power-sharing, valuing diverse knowledge, and reciprocity are essential throughout all stages of a project. By prioritising these principles, academic researchers can ensure that their work is not only academically rigorous but also socially relevant and impactful. For instance, projects within the SBDRP that involved older participants were able to create outputs that reflected the real needs and preferences of the target population, resulting in more effective research and solutions. This practice of integrating older adults as co-researchers or advisors allows academics to better understand the complexities influencing their research outputs and encourages collaborative problem-solving that aligns with the goals of meaningful co-production.

Co-production also holds significant benefits for businesses and organisations, particularly in enhancing the design and development of products and services targeted at older populations. By engaging older adults as active contributors, businesses gain valuable insights into consumer needs and preferences, leading to the creation of more relevant, user-centred products. This approach helps businesses move beyond ageist stereotypes

and assumptions that can result in poorly tailored products that alienate older users and fail to achieve market success. Co-production encourages a deeper understanding of the end-user experience, empowering businesses to refine their offerings and increase their appeal to ageing demographics.

The integration of older adults into the co-production process also lends credibility to products and services designed for this market. When products are developed with direct input from older individuals, they are more likely to be accepted and trusted by the target population. This inclusive approach helps businesses avoid potential biases and barriers that can arise when younger designers create products for older users without meaningful input from them. For example, projects within the Healthy Ageing Challenge demonstrated how co-production with older adults led to products and services that met their actual needs, rather than assumptions about their desires and capabilities. This process not only results in products that are more successful and market-ready but also fosters a competitive edge for businesses operating in ageing markets.

Through co-production, businesses and organisations can create mutual benefits, building stronger connections with communities and stakeholders. This approach supports product and service innovation by aligning business strategies with real-world needs and insights, ultimately leading to greater user satisfaction and increased adoption rates.

Embedding co-production in the Social, Behavioural and Design Research Programme

Co-production was integral to the SBDRP from its inception and throughout its duration. This section outlines the ways in which co-production was embedded in the call specification, funding applications, reporting processes, regular meetings, and how it influenced the outcomes and outputs of the research projects. We argue that the sustained emphasis on co-production cultivated an environment where it was highly valued, providing projects with the opportunity to consistently reflect on their plans, progress, and the challenges and benefits they encountered.

All SBDRP projects were required to engage older people meaningfully throughout the life of the project. Applicants had to demonstrate their strategies for involving older people in co-design, collaborative processes, and governance. Special encouragement was given to using creative and innovative engagement methods.

This approach ensured that projects were led by academics with the relevant expertise in co-production and that their plans reflected practical strategies for its integration. Projects were also tasked with addressing how to maintain meaningful co-production with older people during the COVID-19 pandemic. This was especially critical given the social distancing restrictions

in place at the time and the potential apprehension of older or vulnerable individuals as restrictions began to lift (Douglas and Coutts-Murray, 2022), particularly for businesses that directly engaged with older people such as care home staff and those working in the visitor economy.

Once funded, all projects were required to submit quarterly progress reports and hold regular meetings with the Programme Manager, Research Director, and ESRC Investment Lead. These meetings served as a platform for discussing progress, challenges, and future plans in a supportive setting, fostering a culture where research teams could build constructive relationships with the funders and the SBDRP team. This facilitated forward-thinking discussions that encouraged the collective problem-solving of any challenges. SBDRP projects have since reflected that this emphasis highlighted the value placed on co-production and helped to create the space in which its associated activities were encouraged.

Biannual SBDRP events addressed common challenges, including co-production during the pandemic. These events featured in-depth sessions on engaging older people and integrating social sciences with co-design, with particular focus on co-design practices involving businesses and ensuring older people were both included and valued. Some projects shared the tangible impact of co-production with older people and their business partners, such as a clearer understanding of older people's needs and the insights obtained early in product design and development. At the end of the programme, projects were asked to reflect on the impact and the role of co-production with older people. For example, the involvement of older people as co-researchers in the DesHCA project led to the development of a guide specifically designed to help older people to consider how small adaptations could make their home more sustainable in the longer term.

This section has outlined how co-production was established as a core activity from the start and maintained as a priority throughout the programme. The emphasis placed on co-production at the programme level was instrumental in fostering an environment where it was valued and integrated into the research process. This approach supported projects in sharing experiences of co-production, acknowledging both benefits and challenges, and understanding that meaningful co-production requires both time and recognition.

Embedding co-production in SBDRP research projects

As stated earlier, the principles of co-production are essential throughout all phases of a project, though their emphasis can shift. Early in project development, the focus was on creating a collaborative space that incorporated diverse stakeholders, addressed power dynamics, and fostered meaningful engagement. As projects progressed, these principles continued to inform iterative processes and collaborative efforts that shape research outputs and impacts.

Creating and facilitating a co-productive space

The relational nature of co-production is essential, as its success depends on uniting stakeholders with differing interests, perspectives, and goals to achieve a shared objective (Bovaird, 2007; Doberstein, 2015). This process introduces several challenges, including:

- identifying and involving key stakeholders, particularly older people
- addressing varied engagement needs among stakeholders as groups and individuals
- managing power imbalances between stakeholders and the research team
- valuing different types of knowledge
- defining roles, goals, and managing expectations.

A critical aspect of co-production involves assembling an engaged group of stakeholders and creating an environment that facilitates their active participation. One of the key challenges at the outset is determining who should be involved. Identifying the right stakeholders is essential but is often complex, especially in the early stages. Tools such as stakeholder mapping and reflective exercises can be valuable for helping projects identify individuals, groups, and organisations that may be affected by or have the potential to contribute to the project and shape its future impact (Farr, 2017).

Identifying stakeholders

While the SBDRP required projects to engage older people as primary stakeholders, many projects expanded their co-production networks to include partners with unique insights, expertise, and access to resources, ensuring a broad range of perspectives. Projects collaborated with various partners, such as carers (Healthier Working Lives, ENLIVEN); art centres and cultural institutions (Connecting Through Culture); hospitality and retail sectors, including restaurants, cafes, shops, and shopping centres (Hospitality Connect, Hearing Loss and Place, Retail Project); climate change experts (OPTIC, Healthy Ageing In Place); builders and architects (DesHCA); local government and town planners (SPACE); financial sector and office-based workplaces (SHAW, Healthier Working Lives); and sports clubs and community organisations (GOALD).

Engaging in meaningful co-production

With stakeholders identified, the next question is: what defines 'meaningful' co-production? It is not simply adding new stakeholders to existing processes or tokenistically seeking approval for decisions already made (Boswell et al,

2015; Dean, 2017; Crompton, 2019). Meaningful co-production involves mechanisms that integrate stakeholders into the design and delivery phases of the project, allowing them to influence decisions and contribute to project evolution. These mechanisms need not be uniform for all partners, but they should reflect the goal of genuine inclusion and influence.

SBDRP projects employed a range of approaches to foster meaningful co-production, from involving older people and industry partners during bid development to forming reference groups and hosting knowledge exchange events. Examples include recruiting older people with diverse lived experiences as co-researchers and developing multi-stage processes to bring together older people and industry professionals. One example of this is the Connecting Through Culture project, which worked with disadvantaged older groups, particularly those marginalised by disability and/or ethnicity, to understand how and why people engage with arts as they age. With a particular focus on digital offerings, the project co-designed new products and services with older people and the creative industries – offering new opportunities in new settings for many. The outputs of the project included the development of Table Top Travels, an idea initiated by an older participant and later supported by Catalyst funding https://healthylongevitychallenge.org/winners/tabletop-travel/. Offering multiple avenues for involvement demonstrated commitment and supported engagement with diverse communities, thereby promoting inclusivity and equity (Emerson et al, 2011) and fostering more effective research outcomes (Farr, 2017; Fischer et al, 2020; Fischer et al, 2021).

This democratisation of research is not without challenges, especially when balancing power dynamics among diverse stakeholders. Power imbalances can manifest between different stakeholder groups or between the research team and other participants (Farr, 2017; Fischer et al, 2020; Fischer et al, 2021; Worsley et al, 2022). Academic researchers often hold authority, while business and community experts bring practical insights, sometimes overshadowing the voices of community members. Addressing and managing these imbalances is crucial to maintaining a balanced co-productive environment (Compagna and Kohlbacher, 2015; Östlund et al, 2015; Worsley et al, 2022). Projects engaged in reflective practices and emphasised marginalised voices to counterbalance these dynamics.

Once a co-productive space is established and power dynamics managed, the next step is fostering knowledge sharing and critique. Effective co-production relies on recognising and valuing the different types of knowledge each stakeholder brings (Worsley et al, 2022). Academic partners contribute theoretical frameworks and research expertise, while industry partners provide practical market insights. Those with lived experiences offer perspectives of the *end-user*, enriching the research and facilitating mutual understanding. SBDRP projects included workshops, consultations,

and knowledge exchange events designed to encourage interaction and knowledge sharing.

Enacting co-production, creating outputs, and producing impact

After establishing a collaborative space, the focus shifts to the practical aspects of co-production. The nature of co-production makes it difficult to outline a rigid roadmap, as it requires moving away from traditional linear project management to a more adaptive, iterative approach. This iterative process supports the evolving relationship between partners, creating tension as it challenges established practices, such as requiring academics to share control and rethink project question formats and data sharing methods (Fischer et al, 2020). However, this iterative feedback process is often a hallmark of meaningful co-production (Compagna and Kohlbacher, 2015; Kohlbacher et al, 2015; Östlund et al, 2015; Worsley et al, 2022).

Flexible, adaptive co-production leads to outputs that better meet stakeholders' needs. For instance, Connecting Through Culture empowered older people to propose new products for addressing social isolation, while DesHCA collaborated with the Dementia Services Development Centre to create an easy-to-read 'Tips and Tricks' booklet. This booklet, which has reached an estimated 30,000 stakeholders, was designed to provide a greater understanding of the principles of age-inclusive and dementia-friendly design, offering practical guidance on how individuals could incorporate these principles into their own homes in ways that aligned with their specific needs and aesthetic preferences. These examples illustrate that genuine co-production not only benefits academic partners but also provides evidence-based, targeted outputs for the wider target population, in this instance, older people.

Overall, the SBDRP projects demonstrated that co-productive working, when supported by dedicated time and resources, enriches research by integrating diverse perspectives and fostering critical insights. While methods and stakeholder involvement varied between projects, they all prioritised genuine participation, knowledge appreciation, and power balance, resulting in iterative processes that enhanced research and created reciprocal benefits.

Conclusion

Co-production is an increasingly valuable approach for academics seeking deeper insight and for businesses and organisations pursuing innovative products and services. By involving older adults throughout the development process rather than only at the end, SBDRP projects were better able to adapt to the needs, desires, and external pressures affecting the adoption, use, and

acceptance of products, services, and innovations (Knight-Davidson et al, 2020; Shinohara and Wobbrock, 2011). Businesses employing co-production strategies gained a competitive advantage, particularly in ageing markets. Integrating older adults into product development allowed businesses to harness innovative ideas tailored to contemporary challenges and ageing populations (van der Hel, 2016; van der Graaf et al, 2023) while minimising the risk of developing products based on ageist stereotypes that are more likely to fail. Academics, meanwhile, benefited from understanding the lived experiences of older adults and the complex factors influencing how and when businesses engage with their research outputs (van der Graaf et al, 2023).

Meaningful co-production brings numerous benefits, but it also involves challenges and requires time. It takes time to plan stakeholder involvement, establish relationships, create a suitable space for contributions, introduce co-production partners, manage tensions, and redesign outputs to achieve impact. Most SBDRP projects had three years to reach these ambitious goals, while the APPROACH projects had a shorter 12-month timeframe.

In Chapters 5 to 14 of the book, the projects will discuss their work within the context of the HAC Framework, illustrating how co-production influenced their projects and contributed to impactful research outcomes.

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3

Towards 'design gerontology': learning from the SBDRP

Helen Manchester and Sarah Kettley

Introduction

As a discipline and a method design has been taken on and led to amalgamations such as Design Sociology (Lupton, 2018), Design Anthropology (Miller, 2017; Gunn et al, 2013), Policy Design (Kimbell et al, 2023) and Design for Health (Chamberlain and Craig, 2017). This chapter explores a rationale for Design Gerontology. It aims to illustrate how design approaches can be used in ageing research across a variety of contexts or activities, for instance, in the home, workplace or in communities.

Design was integral to the Social, Behavioural and Design Research Programme (SBDRP) call. The programme therefore provides us with an opportunity to illuminate the methods and practices that proved generative, the tensions that arose and to raise some of the key questions that emerged when adopting design in ageing research.

The data we use in exploring the programme was collected by the two authors in semi-structured online interviews with project Principal Investigators (PIs), or another person from the project team suggested by the PI, between March and April 2024. We were able to interview 13 people representing nine of the projects. Six of the projects interviewed were funded to run three year projects and received substantial funding, three projects ran for one year and received much less funding. Many of the projects used the term 'co design' to discuss their engagement with design, referencing the importance of the participation of older adults, partnership working and business involvement. In recognition of the different knowledge and expertise needed to understand and intervene in ageing societies, this chapter explores what gerontology as a field might gain from engaging with design and *co-design* approaches, methods and practices.

Introducing design and co-design

While design approaches can vary widely in their values, methods and potential outcomes, all are in some form interventive, often involve creating

'things' (spaces, products, services, experiences, policies) and have a focus on preferable futures. Design and 'design thinking' have been adopted in many business, cultural and digital innovation sectors and spaces (Stewart, 2011). Design thinking is a broad field largely seen as a designer-led approach characterised by a human 'user'-centred, iterative process (Kimbell, 2011). Practices associated with design thinking are diverse but can include divergent and lateral thinking, and asking ambiguous, 'what if' questions focused on the future (Dunne and Raby, 2013). Critiques of design and design thinking suggest that they have become fully integrated into the neoliberal model of capitalism, often maintaining a technocentric and market driven approach to innovation (Escobar, 2018). Several academic disciplines have influenced design to varying degrees. These histories and ongoing evolutions give rise to contested terminology even within design, let alone when it comes into contact with other sectors and disciplines.

Up to now in gerontological research, scholars have drawn on design in the study of environments of ageing, technologies for ageing and design for healthy ageing. In environments of ageing research, studies have explored, for instance, designing age friendly communities (Handler, 2018), housing and design (McCall et al, 2024) and designs for residential care (Bowes et al, 2018). In technologies for ageing research, studies have looked at designing devices for active assisted living (Gaspar et al, 2024), social robotics design (Kamino et al, 2023), Virtual (VR) Reality designs (Baker et al, 2019) and technology designs to combat loneliness and build community (Bennett et al, 2015). In 'healthy ageing research', examples include designing for people living with dementia (Rodgers, 2017) and designs for physical and mental 'fitness' (Harrington et al, 2018). These studies have drawn on a variety of design approaches including user-centred design, inclusive and universal design, human-centred design and participatory design.

Design approaches in ageing research have leaned towards more participatory modes, often focusing on 'humans in relation', placing value on the lived experience of the older people and others benefitting from the services, products and innovation. There is an attention to power relations between people in both research and practice, asking questions such as: "Who is designing?" "Who is not involved?" "Who gets to make sense?" and "Who gets to own the story/output?". These kinds of studies have developed design practices, values and principles that rethink design by centring the knowledge and expertise of those normally marginalised in design processes (Costanza-Chock, 2020; Manchester and Willatt, 2024), asking critical questions about how design currently works through examination of values, practices, sites and methods for more equitable design and innovation. Many of the studies argue that we need to rethink design, away from an expert driven process focused on the design of objects and services and towards design framings that take seriously questions of 'place,

environment, experience and politics' in transforming contexts of design and innovation (Escobar, 2018: 27; Willatt et al, 2024).

Theoretical and methodological differences therefore exist around how and when relationalities and power are understood and negotiated in the praxis of design and co-design, and small variations in methodological approaches and values can carry great ideological weight (Udoewa, 2022). The term 'faux-design' illustrates a level of mistrust in design and co-design approaches (Blomkamp, 2024), while 'authenticity' is contested (Kettley, 2016). As suggested by a PI leading one SBDRP project, there is a great deal of rhetoric around design approaches that include older adults and often closer examination illuminates that 'co-design' projects are often small scale and short term and that, "when you drilled down, it was often quite limited and it was also quite top down".

Design and co-design mindsets and methods

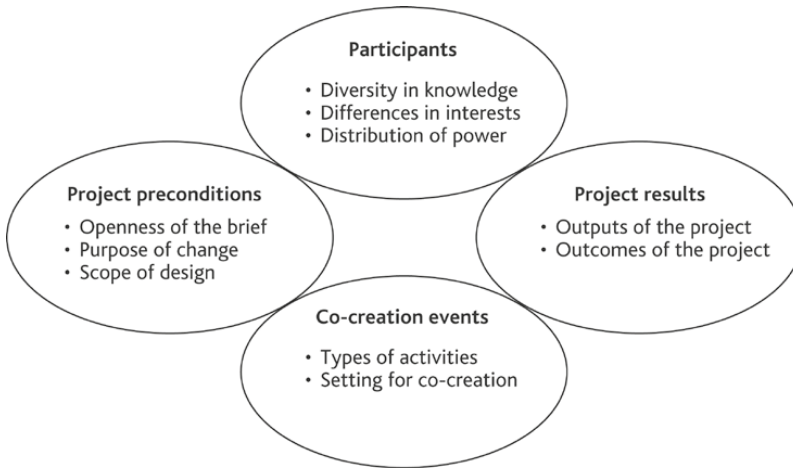
Sanders and Stappers (2008; 2012) undertook research on design practices, using the term co-creation, and developed a landscape of perspectives, or mindsets. Their mapping was based on the understanding that co-creative forms of design can be undertaken in different ways – as a collection of tools and techniques, as a method or as a mindset (2012: 31). Sanders and Stappers' map (2012: 19) is organised around two dimensions: an expert-participatory mindset axis and a research-design methods axis:

- Expert culture: design/research is undertaken *for* people, referred to as users and consumers. The designer is an expert.
- Participatory mindset culture: design/research is undertaken *with* people, whose expertise through lived experience is implicated in the design process. Expertise is diversified and distributed in this mindset.
- Research-led approach: informed by design's histories with other disciplines (engineering, applied psychology, anthropology and sociology).
- Design-led approach: characterised by 'designerly' methods such as critical design, design probes and enactments, sometimes collectively referred to as research-through-design (Gaver, 2012).

Usually, co-creative forms of design involve a series of methods planned to build on each other or involve different groups of people. Methods are often resource intensive, requiring a lot of pre- and post-production and a great many methodological decisions. Lee et al (2018) offer a framework of design choices in co-creation projects, based on an analysis of 13 projects conducted over a ten-year period.

They point out that in many cases, methods can be applied in different ways, for different purposes or according to different mindsets. Their framework

Figure 3.1: Ten Dimensions of co-creative design



Source: Lee et al (2018: 26). Available under Creative Commons Attribution 4.0 International License: https://www.ijdesign.org/index.php/IJDesign/article/view/2782

aims to help understand dimensions of a project, and the alternative attributes that could be considered between planning and conducting a project (Lee et al, 2018: 26). They organise ten dimensions of co-creative design into four categories (Figure 3.1).

They also propose a series of influential relations between these design choices, which shape the project as it proceeds: 1) between participants' knowledge, openness of the brief and purpose of change, 2) the scope of design and participants influencing co-creation events and 3) participants' interests and power influencing outcomes of the project (see Figure 3.1). Methodological decisions include choices related to project outputs and claimed outcomes, and these are inevitably affected by mindset (Lee et al, 2018: 25–26).

This chapter attempts to answer calls for more articulation of the underpinning values and principles in design and co-design research (Masterson et al, 2022). Using the previous frameworks, and data from our interviews, we reflect on these diverse conceptualisations, methodologies, mindsets and values at play across the SBDRP projects, and offer insights from this towards the articulation of a field of Design Gerontology.

Findings from across the SBDRP projects

In understanding our data, we have been drawn to descriptions of design as a relational process (Pihkala and Karasti, 2022; Gottlieb, 2024). In this section we pull out broad themes from our interviews to demonstrate our

understanding of Design Gerontology, based on relational ontologies. These themes are: 1) humans in relation in design; 2) situated design; 3) materialities, aesthetics and atmospheres in design research; 4) ethics, politics and power in design research.

Humans in relation in design

Across the projects we noticed the care that teams adopted in avoiding extractive relationships and building meaningful ones, including within the research team, with advisory group members, with older adults and with industry sectors.

Departing from Lee et al's (2018) focus only on 'design choices related to participants' we noticed the focus on relational expertise, that is, recognising the importance of professional and personal relations in design processes (Dindler and Iversen, 2014). Across the teams there was a sense of the importance of diverse expertise including lived experience, professional and research expertise. Several interviewees mentioned the fluidity of these categories. For instance, older adults might have professional expertise they bring to the project and professionals' lived experience as older adults. Some PIs questioned the Sanders and Stappers' definition of an 'expert mindset' suggesting a diverse expertise informed approach, with expertise coming from those with lived experience as well as professionals.

Authenticity has been theorised as a relational and experiential process of situated meaning-making comprised of before, during and after phases (Kettley et al, 2016). Many of the projects drew on existing long-term relationships with industry, policy and community organisations and they spoke about the need to build relationships beforehand, and for this work to be funded. As suggested by Lee et al (2018), setting the pre-conditions for the work was seen as vital. This included: setting clear expectations at the beginning of the process; thinking carefully about what the invitation is for organisations and older adults; and openly discussing underpinning values. We heard frustrations from designers who sometimes felt the work was being shoehorned into a different mold, or when differences in values were not openly discussed. Interviewees also spoke about the need to "stand back" from the intensity of design in order to reflect during the process of design and afterwards. Reflection was seen as important for a responsive and flexible design process, and for a relational rather than extractive mindset to flow effectively through the methodology: "we were very reflexive and responsive as we went through."

Design and co-design researchers have suggested the importance of conviviality ('living with' and 'making merry') in design projects (Light and Akama, 2014). Across the interviews we noted the focus that teams put on ways of working informally, of "creating an environment in which people

listen to each other and come up with solutions, in the moment." Others described fun and playful methods and activities and the importance of enjoyable, creative and relaxed environments in order to build interpersonal connections and trust. Another mentioned the importance of informal, personal approaches, of being able to "go for a coffee" in order to build less transactional relationships. Design as a process was described as being "messy" and dynamic and interviewees discussed the need for flexibility and adaptability, "being responsive to what is happening on the ground." As seen in the design and person-centred literature (Tudor and Merry, 2006; Potvin et al, 2024), disposition was prioritised over prescriptive methods in order to practice responsiveness and attentiveness. Teams described needing to adopt a variety of roles including facilitating, caring, teaching, learning, advocacy roles and friendship. These roles were often reciprocated by older adults, artists and other professionals involved.

Situated design

Recent years have seen some development of design approaches that centre the voices and situated everyday lives of older adults (Vines et al, 2015; Manchester and Jarke, 2022; Light and Akama, 2014). These scholars start the design process from what matters to those involved and place the everyday lived experiences of older adults at the centre of the design process. This kind of situated approach is often mirrored in the social and cultural gerontological literature where attention to situated experiences across the lifecourse are utilised (for example, Skinner et al, 2015). Ageing is here understood as a dynamic process that is socially and culturally constituted (Willatt et al, 2024). One interviewee told us how it was vital to start with the everyday lives of older people in order to ensure that the outcomes were "doable, practical and affordable." Drawing on lifecourse approaches breaks with static accounts of 'the life cycle as a fixed and repetitive sequence of ages and stages within human life and experience' (Hockey and James 2003: 6). As one PI explained, "it's not just about, suddenly you get to whatever age and fall off a cliff edge and you are an older person." In another project, starting with the everyday lives of older adults and adopting a lifecourse approach was seen as important to recognise and make visible the neglected lives of minoritised older adults, bridging between the micro- and macro- levels of socio-structural analysis (Willatt et al, 2024).

Situatedness is also vital in recognising the need for adaptation in working within institutions and alongside gatekeepers. For instance, in working with business, one interviewee explained the need for flexibility to respond to the "conditions of the sector itself". Alongside this, working with groups of older adults required theories of change that recognised the importance of local and micro-level changes such as building capacities of older adults and

professionals. One interviewee mentioned the joy of watching this happen over time: "their confidence just shoots up, their capacity to voice ideas and concerns is increased and their relational capacity increases…" Another discussed the big difference that even seemingly small, mundane designs can make if they are "outputs that older people themselves can use." Change can also relate to building capacities and facilitating people within sectors as 'changemakers' in order to support internal relations that might sustain the practices, ideas and outcomes.

As suggested earlier, all the projects we spoke to worked closely with a particular business sector to deliver their projects. In this sense, projects often took an ethical stance, understanding the 'accountability of design to the world it creates and the lives of those who inhabit them' (Simonsen and Robertson, 2013: 5). Many of them spoke about a desire to be "solution focused" and to "deliver at scale" which had been a key focus of the funding call. In practice, we found quite different opinions about what 'scaling up' might mean. For some this was about noticing that "a little thing can make a big difference". For instance, producing "outputs that older people themselves can use to do some of the little things. So, we have a brochure that has been informed by what the older people we consulted with actually wanted." This project also explained that it was possible to 'scale up' this impact by working on "a very robust way of representing/doing design for age and cognitive inclusivity" that "reflects what people want, its practical. Having that means we're able to go to lots of different places and present it as something really different from what they've had before". Guidelines for sector use were common outcomes of the projects. Another project "created an approach to the production process of digital technology that highlights and identifies the specific older people's perception of their needs, preferences and interests." The PI involved commented that this was aimed at "business who may want to rethink their market segmentation approach" offering "a more in depth look on what they [older adults] think and feel about these products."

For other projects, scalability meant designing products that could be applicable to a wide range of people, across multiple contexts. This was described as a challenging process that involved discovering commonalities across people's experiences and then connecting this across contexts, taking into account questions of sustainability within very different practices, infrastructures and ways of working.

Materialities, relational aesthetics and atmospheres in co-design research

Following the cultural and material turn in gerontological research, scholars have begun to experiment with more-than-human approaches that adopt a relational ontology which aims to evoke embodied, material and multisensual

worlds through noticing the liveliness of matter (Andrews and Grenier, 2019; Barron, 2019). In design they have been applied to recognise the importance of non-human actors in design processes, and how practice and outcomes are configured through sociomaterial 'assemblages' or ecologies of material and immaterial, humans and non-humans coming together, in relation (Light and Akama, 2014).

Non-human relationality emerged in a number of ways in our interviews. Firstly, we noticed that people described how the materials used during the design process helped to make ideas tangible and visible to others. These materials ranged from VR headsets for housing design to the production of a comic to express intergenerational stories of climate change. Projects discussed how these visual, tangible materials offered a more immediate and enjoyable way to understand complex information and that this stimulated new learning and conversations (Khan et al, 2020). One PI described the use of a VR headset to "walk through" a design for a house. The builders, housing associations and home designers involved noticed how the embodied experience of walking through the VR visualisations led to better feedback than they usually get through visuals alone.

Secondly, people described the importance of the aesthetic quality of designs developed during the process and as outcomes of design work. On one project a comic was co-created, working with an artist and the stories collected from intergenerational workshops where collaging had been a key activity. Facilitators of these sessions described the collages as a kind of 'boundary object', the materialities of the collages stimulating new conversations about climate change across generations: "You end up, at the end of the session with an object which everyone can come together and talk about … people could see what it was and they could take an image of it and remember it".

Across the projects there was a sense that the creative design methods and approaches and materials used had an aesthetic quality that one interviewee told us added a certain "texture" or palette to the project. This was different in each setting and was responsive to the people participating and the needs of the sectors involved. For instance, one interviewee told us that, "really early on we learnt drawing wasn't going to be good. Nobody liked drawing, so we just nixed that straight away".

The concept of 'crafting' came up several times in the interviews. In one instance, 'craftiness' was described as "having to go with what you have in front of you but also crafting something together perhaps". 'Crafting' also related to working alongside artists and designers whose expertise brought an aesthetic quality to the work that made participants feel more valued, and that challenged deficit assumptions around older adults perpetuated through 'designs for ageing'. One PI described how "people are proud of their homes, and they want something that is attractive, enjoyable and

aesthetically pleasing". Another said that when designing technologies with older adults it became clear that "people cared what things looked like as well as what they do".

Throughout this focus on the more than human we saw reference to both the outcomes of the design as well as the process of design. Key to the process is a consideration of the sociomaterial atmospheres we create in spaces for co-designing (Khan et al, 2020). Many of the projects discussed the importance of the 'little arrangements', for instance, the kind of food available, the way that people get to the space and the sound, feel and histories of the buildings. This work supports the growth of autonomy throughout the process and in 'solutions', and the hidden work of design and co-design (López Gómez, 2014). As one PI expressed,

> it really matters … the way that the space is set up … from the taxis to the food to the sound and the aesthetics of a space, and whether it feels comfortable for people. There's a lot of feelings involved in this process: feelings of belonging, of ownership, feelings of possibilities, feelings of being adequate, that it is a space where you feel you can function and be confident.

Ethics, politics and power in design

The previous quote also starts to draw attention to some of the politics of design in ageing research. Design and co-design approaches foreground particular ways of working, making certain kinds of knowledge more legitimate than others (López Gómez and Sánchez Criado, 2021). Choices made throughout the process can make a real difference to the participation of older adults and others, as well as to the designs created and their impact on the lives of those involved (Light and Akama, 2014). As suggested earlier in the chapter there are always important questions to be asked during design processes such as: "Who is doing the configuring of the design?" "For whom is it designed?" "Who is not involved?" "What assumptions are being made about older adults?" In relation to ageing, many projects focused on anti-ageist approaches that challenged expectations of being an older person. Many mentioned accessibility as a concern, others discussed questions related to intersectionalities between age, disability, race and gender identities.

One PI told us that one of the spaces they used during the project was unfamiliar to some of the older adults participating as it was not a place they had visited. This was a city centre cultural space which housed digital design and innovation projects and adopted methods and practices familiar in these sectors. Here the cultural geographies of the city meant that the older adults involved struggled to 'fit' into this space – the food was inappropriate, the space too loud and the practices and histories of the building created a

sense of discomfort or not being 'for them' as it seemed to be set up with younger, more mobile, cosmopolitan bodies in mind.

Another interviewee told us that many of the older adults they wanted to work with were working from home and were recruited from across the UK. In order to facilitate their participation it therefore made more sense to meet online and to complete activities asynchronously through the use of cultural probes (Townsend and Patsarika, 2022). They described holding one workshop in person which became politically difficult because the meeting rooms were adjacent to the Human Resources offices and the conversation was about work and wellbeing. The interviewee said that "I was thinking this might not be the place to raise any criticality about anything" and a decision was taken that online meetings probably worked best.

Principled is a term we are borrowing from the person-centred literature on the politics and operations of non-directivity (Murphy et al, 2013). To be non-directive as a designer is challenging, as design is a necessarily interventive practice. However, to work with people and communities on change as defined by them means to hand over power over the direction of that change. We have found examples of such principled versions of design in some of the SBDRP projects, when the form and sometimes content of the design process itself have been co-produced. One project was explicit about this, reacting to the need for pragmatic flexibility in the face of ongoing restrictions to care homes by designing a "philosophically driven" framework for the strategic co-production of co-design activities. Other respondents spoke about the quality of listening: "how we work on how we listen to others that then helps shape our work", and the 'letting go' of power as participants found value in each other to continue together outside the frame of the project.

Conclusion

Our findings suggest that design in ageing research is an ongoing relational process that needs to be carefully negotiated in the situated contexts in which it takes place. Often gerontological research places the older person at the centre and this was also the case with the SBDRP funded research projects. However, the inclusion of design practices also added an attention to relational, more-than-human, encounters in the unfolding of research. For businesses and others involved, these approaches supported the development of products, services and approaches that engaged deeply with what older adults actually want. This often led to designs that challenged current assumptions made about older adults in market segmentation approaches, enabling businesses to position themselves and their products and services as innovative and cutting edge.

From our interviews we found that design practices are configured according to complex intersecting systems of values, as expressed by the frameworks discussed earlier. None is 'correct' in and of themselves, rather they are negotiated depending on the situated relationalities in the project. We propose value-led frameworks like these be made available for teams preparing to work with each other and with participants and publics, and used to guide ongoing reflection throughout similar challenge programmes in the future.

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4

Academic–business collaboration: multiple viewpoints in a complex landscape

Lucy Gresley, George MacGinnis and Huw Vasey

Introduction

Bringing the funder's perspective, this chapter looks at collaboration between researchers and businesses as part of the UK Research and Innovation (UKRI) Healthy Ageing Challenge. The importance of building engagement and knowledge exchange into funding opportunities is considered, both for achieving social science impact and in helping businesses design and deliver innovations that people would consider attractive and affordable.

The UKRI Healthy Ageing Challenge focused on improving health earlier in the life course, addressing areas with potential for a greater role for businesses, including social enterprises. These could therefore develop and deliver services and products to address the needs of people as they age, and innovative business models to enable those innovations to be adopted at scale.

Social science research engagement with business

While academic social science has long conducted research *on* business, it has not yet developed the kinds of highly engaged co-production approaches we see in other areas of social science, such as patient public engagement (PPI) or policy co-production (see, for example, Sacristan et al, 2016; Bandola-Gill et al, 2023). Indeed, levels of business engagement among social scientists sit well below other academic areas (Abdul Rahman and Vorley, 2022). Partially, this may be due to a hard-earned scepticism of the way in which some businesses 'use' academic research for their own benefit, cherry-picking what suits and disregarding the more critical aspects of the literature (see, for example, Block and Burns, 1986; Fellows and Liu, 2013; Rubenstein, 2018), along with a base distrust of the ethics of using their work to underpin a system some academic social scientists see themselves as opposed to (Abdul Rahman et al, 2020).

Many businesses do utilise social science expertise (Lenihen et al, 2020) and are keen to do more in areas where social science has great strengths, such as systems thinking, or tackling shared global challenges (Wilsdon et al, 2024). While the visibility of social science in business may be low (British Academy, 2023), an analysis of the most recent arts, humanities and social science impact case studies submitted to the 2021 Research Excellence Framework (REF) found that 'economic impact was pervasive in almost every study' (Wagner et al, 2024, p 92). There is also evidence that when there is genuine meaningful collaboration there are benefits for academia, business and society (see, for example, Hughes et al, 2021; Wyatt et al, 2021).

Effective collaborations between academics and businesses were seen to be key in meeting the aims of the Healthy Ageing Challenge, both in ensuring that the best evidence was available to address business needs and to diversify and enhance impact from the programme of social science research. Businesses are understood here as organisations of any size, scale or structure that engage in commercial or professional activities and supply a product or service. They include social enterprises as well as for-profit businesses. From a social science funding perspective, business engagement is understood as a strategic approach to building, developing and maintaining mutually beneficial relationships between businesses and researchers, with the aim of addressing real world challenges.

In making collaborations work, both academic and business agendas need to be addressed: what motivates academics versus what businesses want; emphasis on academic publications versus knowledge synthesis, translation and impact.

A literature review of business engagement with academia published by the Innovation Caucus (Abdul Rahman and Vorley, 2022) found that publications mostly focused on life sciences, computer science, engineering and/or medical disciplines and that literature that focuses on business engagement with social sciences is limited. While it noted that there is evidence that many social science academics are engaging with businesses in their research, the review cited several reasons why it may be under-recognised.

That there has been growing interest in fostering Business Engagement with Social Science is highlighted in a report published by the National Centre for Universities and Business on Business-University Interactions in the UK 2005 to 2021 (Hughes et al, 2021). It found that companies that interact with universities rely on a diverse range of academic disciplines, including the natural sciences and engineering, but also the social sciences, the arts and humanities, and business and management.

The growing interest in recent years can be seen through:

- The launch of the Aspect Network in 2018 with funding from Research England's Connecting Capability Fund. Aspect fosters innovative ventures

capable of delivering sustainable impact by harnessing creativity from Arts, Humanities and Social Sciences disciplines.

- Growing involvement of social sciences in Knowledge Transfer Partnerships, a programme that funds the placement of highly qualified graduates within the businesses for a period of 12–36 months, with ongoing support from their host research organisation. Originally with a focus mainly on STEM disciplines, there is a small and growing presence of social sciences, estimated at around 5 percent of the current 800 placements in 2024 (Innovate UK figures provided to the author in November 2024).

Research and innovation: collaboration within UKRI

The UKRI Healthy Ageing Challenge, established in 2018 as part of the UK Government's Industrial Strategy, was conceived as an integrated programme of research and business-led innovation that would draw on capabilities across UKRI. By investing in an integrated programme of UK-wide innovation and research, the Challenge aimed to support economic growth and improve health as we age by helping businesses, including social ventures, to develop new products and services that could be adopted at scale.

Moving away from the idea of ageing as a 'problem' to be solved, the Challenge focused on investing in the healthy ageing sector to create the conditions for economic, commercial and social transformation. The genesis of the research programme supporting the Healthy Ageing Challenge can be traced to advice given to the Prime Minister by the Council for Science and Technology which noted that 'There is no real shortage of new assistive technologies, nor of innovative approaches to using technology to deliver better care. However, these often fail to scale up' (Council for Science and Technology, 2014, p 1). This provided a clear indication that research to support the Healthy Ageing Challenge needed to address the factors seen as influencing adoption of innovations at scale, in essence, supporting an emphasis on research based on the Arts, Humanities and Social Sciences (AHSS) rather than from the Science, Technology, Engingeering and Mathematics (STEM) disciplines with more established links to business innovation. While there was growing evidence of business academic collaborations at an early stage and individual enterprise level, the ambition to embed this within a major research and innovation investment was novel. In recognition of the significant social and behavioural science aspects of the challenge, the Healthy Ageing Challenge was established as a joint team combining capabilities from Innovate UK and the Economic and Social Research Council (ESRC). In practice, this meant unified governance while working through the two councils' funding mechanisms.

The Challenge invested in innovative projects across multiple industries and sectors, focusing on sustainable business models with significant potential to scale and spread. The Healthy Ageing Challenge's innovation portfolio spanned a broad range of business interests across the innovation lifecycle as follows:

- The Trailblazer and the Designed for Ageing investments supported innovation that was near to or in-market, with a focus on potential to scale. These were the main projects where a social impact would be achieved during the project. Research would support demonstration of economic and social impacts (Tribe, EoN's Homes for Living) and design (Blackwood Homes, Music in Mind Remote). The investments in social ventures were specifically focused on scaling existing ventures, where the development of business models to support growth was a significant component of the scope (Active Families NE, Local Treasures). Innovators accessed research insights.
- Investment partnerships supported earlier stage businesses where the innovations ranged from developing new technology-enabled solutions (XR Therapeutics) through to developing scalable business models (Bellevie Care). See Adding Life to Years (UKRI, 2024a) for illustration of the cited examples.

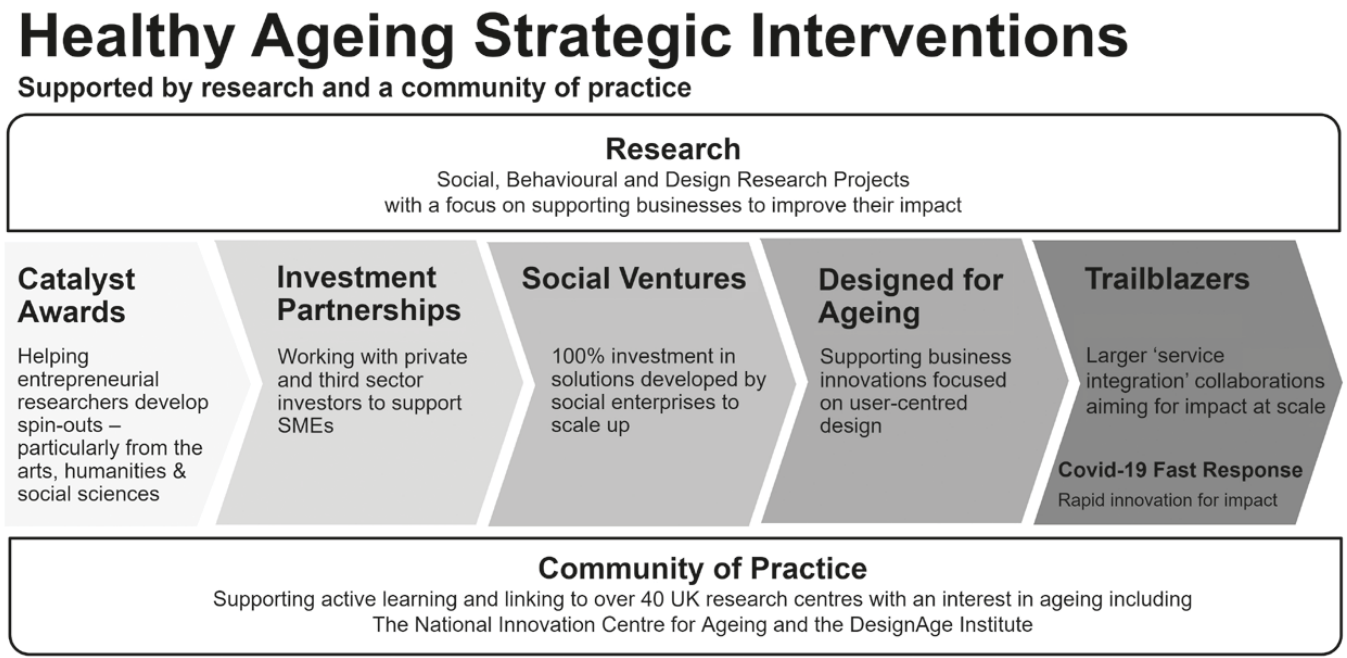
In most cases these innovation project investments involved the application of technology at relatively high readiness, with the focus on developing viable solutions and business models. While Innovate UK (the UK's innovation agency, part of UKRI) had established policies to encourage business–academic collaboration, these have generally focused on bringing in cutting edge science and technology expertise from academia. The Healthy Ageing Challenge opened new avenues to encourage collaboration with academics from the arts, humanities and social sciences. This was aimed at supporting innovators with a strong focus on the application of behavioural insights and inclusive design approaches, most evident in the development and success of the 'Design for Ageing' investments. While this capability ought to sit with the marketing function in a business, in practice it was found that marketing capability or involvement in proposals had been limited.

Led by ESRC, the research investments within the Healthy Ageing Challenge included:

- the innovative Healthy Ageing Research Director role
- the Social, Behavioural and Design Research Programme (SBDRP)
- the Healthy Ageing Catalyst Awards (for research commercialisation).

Traditionally, the role of the research funder may have been understood in terms of grant giving, that is, inviting applications, assessing them and awarding funding. Funders can however, take a broader view, with continued

Figure 4.1: Healthy Ageing Challenge strategic interventions



Source: UKRI Healthy Ageing Challenge

involvement after funding decisions have been made, both to build research and innovation capacity and to support sustainable impact. This was strongly reflected in the Heathy Ageing Challenge research programme, which connected researchers to the newly established Healthy Ageing Community of Practice, with leadership from the Research Director. Researchers were invited to take part in programme events and to focus on sustaining impact, including through relationships with businesses, on an ongoing basis.

Business engagement within the Healthy Ageing Challenge – a new approach

> The Healthy Ageing Challenge has helped galvanise the nascent Healthy Ageing (HA) sector by making considerable inroads into developing a HA Research and Innovation ecosystem in the UK. … The focus on inclusive and user-centred design of HA solutions has leveraged UK expertise in research, innovation, and design, further stimulating investment in the HA sector.
>
> (Technopolis, 2024, p 54)

Inevitably, the landscape of business engagement is diverse and complex, encompassing a range of different perspectives and approaches. For researchers, business engagement can give access to real world data, raise the profile of their research and create pathways to sustainable impact. From a business point of view, collaboration may involve identifying actionable insights from research, helping to develop innovative business models, accelerate ideas and solve specific industry challenges. On the path to research commercialisation, entrepreneurially minded academics both engage with and develop businesses, to grow and sustain impacts from their work.

This landscape is further complicated by the diversity of activities that healthy ageing encompasses. A study commissioned within the Challenge demonstrated that healthy ageing can be considered a hybrid domain, characterised by economic actors involved in a wide diversity of industries (from manufacturing to healthcare to housing to industrial design), but also a wide variety of types of actors involved in innovation (such as social enterprises, governments, researchers and firms) (Nelles et al, 2022). While this diversity certainly brings challenges, the opportunities for social and economic impact are considerable.

Enabling effective business engagement in ageing research

The clear focus of the Healthy Ageing Challenge mission on enabling business development meant that business engagement was embedded into the research programmes from the outset and throughout. This is a good example of a business centred funding approach, since evidence of business

engagement was mandatory in research applications. In the following sections, examples of the strategies used to deliver an integrated programme of research and innovation will be outlined.

Building business engagement in from the start

As described, the Healthy Ageing Challenge research included the Social, Behavioural and Design Research Programme (SBDRP) and the Healthy Ageing Catalyst Awards (for research commercialisation). Business engagement was built into these funding opportunities as follows.

At the planning stages

The Challenge was established following advice from the Prime Minister's Council for Science and Technology (Council for Science and Technology, 2017, p 3), who recommended funding through the Industrial Strategy for 'place based applications of technology to support independence or delivering care, with a focus on ensuring scalability'. The Council also noted that 'application of social and behavioural sciences to understanding people's interaction with technology will be an important element' (of the wide investment in technology to meet increasing care needs). This was developed into a proposal for three place-based demonstrators, essentially living labs, that would 'combine scientific depth of experience and facilities with input from localities to draw on insight from users and customers' and to be supported by a programme of behavioural research.

Significant industry engagement was conducted as detailed plans were being developed in the first year. This surfaced interest in addressing issues related to healthy ageing but there was no appetite for businesses to take on the risk associated with delivering complex population health outcomes. As a result, further research and market engagement was undertaken to inform the design of a revised delivery plan, which envisaged projects more directly focused on addressing business opportunities with an aligned programme of social, behavioural and design research. Importantly, the revised plan retained a focus on supporting positive social impacts aligned to seven challenge themes but dropped the requirement to demonstrate impact in a place-based approach which made involvement by businesses and investors more attractive. At this stage, the need for a Research Director was also identified and provision set aside for responsive-mode research to support the wider innovation programme.

In deciding what kind of research programme to fund

The funding of a dedicated Research Director was an innovative strategy within this challenge. In a role designed to provide authoritative leadership

of social science and arts and humanities research for the challenge, the Research Director was responsible for the coherence of research across the programme and linking with other funded Healthy Ageing activities. As a champion and thought leader, the Research Director engaged with a range of stakeholders, within academic, business and user communities and beyond.

The core research programme design was underway before the appointment of a Research Director, and the first main task for that role was to engage the academic community to refine the specification for the call.

While the programme approach was being redesigned, an opportunity arose to join the Global Longevity Grant Challenge programme, led by the US National Academy of Medicine (NAM), initially in partnership with six countries around the world. This was for 'high risk high reward' innovations, funding a first stage involving US$50,000 awards.

UKRI signed a collaboration agreement to fund up to 60 awards over three years and decided that the investment should align with the wider research interests of the Healthy Ageing Challenge. It was to be shaped to encourage and include innovations from the arts, humanities and social sciences. The aim was to encourage academics to develop their ideas into a business, social enterprise or social movement that would contribute towards healthy ageing. Recognising that this was a particularly novel departure for academics, particularly those in social sciences and humanities, the programme was also to include dedicated support for entrepreneurial academics. As the NAM programme progressed, other collaborating countries started to include innovations related to societal aspects of ageing well, rather than a sole focus on the development of biomedical innovations.

The following aspects helped to shape the design and implementation of a successful academic–business collaborations.

Within funding call specifications

The SBDRP provides a good example of how business engagement was designed into the Healthy Ageing Challenge research programme. The funding call text for the SBDRP outlined an expectation for proposals to 'critically engage with businesses, including social enterprises, to enhance their understanding of the needs and opportunities of an ageing population, help inform innovators and to open creative spaces for businesses and consumers in an "ageing market"' (UKRI, 2020, p 2). This meant that it was mandatory for research proposals to identify potential business partners beforehand and to evidence how researchers would work with those businesses to address their project aims. This strategy ensured that successful proposals would have the engaged business focus needed to meet the aims of this challenge.

By including reviewers with business specific knowledge

Applications for UKRI research funding are governed by the principle that decisions on individual research proposals are best taken by researchers themselves through peer review. To ensure that business engagement was properly integrated into project proposals for the SBDRP, this assessment process also included business reviewers. One of the assessment criteria for proposals was that they should include 'a realistic and meaningful plan to engage with business and the innovation sector, including social enterprises, throughout the life of the project' (UKRI, 2020, p 7).

The guidance also stated that projects 'must engage with businesses, including social enterprises, to share knowledge about the social, behavioural and design aspects of healthy ageing' (UKRI, 2020, p 4). This mandatory engagement could include collaborations, partnerships, events and reference groups. It was intended to stimulate and support innovation in products, services and business models and support the development of a market where there was market failure.

Developing shortlisted proposals through innovative Applicant Dialogue Workshops

Before submitting their full proposal, shortlisted applicants for the SBDRP were given the opportunity to develop their strategies for business engagement, as well as user involvement and knowledge exchange and impact, at an Applicant Dialogue Workshop. Chaired by the Healthy Ageing Challenge directors, these workshops gave applicants a chance to strengthen their proposals through supportive and constructive guidance from a group of expert mentors. All applicants attended and were invited to highlight areas for discussion and received feedback.

Understanding the personal journey was as important as the project proposal

The initial Catalyst Awards focused on supporting 'high risk high reward' ideas within the scope of the Challenge's seven themes that would not otherwise be fundable through existing funding streams. The first call resulted in 11 awards, mostly to senior academics through a standard research council, peer reviewed process. The smaller than planned number of awards reflect a general tendency for peer reviewers to be risk averse, even for small, early-stage projects. Over time, it also became clear that expecting senior academics to develop an entrepreneurial career was a big 'ask', and that most had no interest in taking on a leadership role in a venture. This led to the proposal to develop the application process into a learning journey, and to invest

in outreach and support for applicants to understand the personal journey alongside development of the innovation. Subsequent cohorts included a significant early-stage researcher cohort, also drawn from a wider range of institutions. Many of those who have successfully spun-out their projects were at that earlier stage in their career where they were more open to a wider range of career options.

Sustaining business engagement through relationship building and flexibility

The additional time and skills needed to nurture academic–business relationships were recognised within the Challenge. Ongoing support for both researchers and businesses in building and sustaining networks was offered in the following ways.

By creating and supporting an active Community of Practice

In moving away from a programme design involving place-based living labs, it was recognised that there was still an opportunity to bring together the now more disparate elements of the investments to identify common challenges, share learning and increase impact. Provision for a Community of Practice was included in the plan, and a community was established early on, aiming to connect researchers and innovators. As the Challenge progressed, the community grew in both size and scope, supporting an annual conference event and expanding to be open to anyone with an interest in the area. It provided a mechanism for businesses to connect with researchers, and for research insights to be shared with the wider community.

Through ongoing leadership

In practical terms, funded research projects received continued support from the Research Director and research programme manager, as well as the Healthy Ageing Challenge team, regarding business engagement. This included regular feedback meetings, with ongoing discussions of business collaborations and events. A research community impact workshop was also delivered in the third year of the research programme, with a specific focus on further developing business engagement. Businesses involved with specific projects attended and participated in a panel discussion on business perspectives of research impact. In some cases, ideas developed through the core research programme led to awards to participate in the Catalyst spin-out programme and other Healthy Ageing funding streams.

Through flexible funding

The Research Director role incorporated flexible funding to meet the needs of investments in the wider Challenge portfolio and provide a mechanism for facilitating and utilising opportunities. In collaboration with the Healthy Ageing Challenge team, the Research Director planned and delivered a range of activities to promote impact.

These included a retail impact fellow post to take a lead in raising awareness, driving change and delivering impact in sectors engaged in the town centre, its ecosystem and healthy ageing. Described elsewhere in this book (Chapter 7), this role would link social science research evidence with key sectors, such as national and regional retail associations and organisations, to help promote understanding and develop innovations in the ageing market.

The Healthy Ageing Challenge 'APPROACH' funding call was also delivered through this flexible funding strategy. This responsive-mode call focused on early carer researchers and included a specific emphasis on pandemic recovery and facilitated the commissioning of additional research and impact projects on ageing issues which were encouraged to include business.

Evidencing progress and understanding success

The Healthy Ageing Challenge faced uniquely difficult challenges in understanding and measuring its impacts (UKRI, 2024a). As mentioned, Healthy Ageing is a diverse domain, spanning a wide range of sectors and separate areas such as housing, assistive technology and the arts. This makes it difficult to understand the economic impact the Challenge may have had at an industry level. It also means that a lot of the benefits are realised as 'social impact', which are complex to monitor and measure and may be expected to be realised five–ten years post-Challenge.

Notwithstanding this, multiple approaches were used to understand the success of business–academic engagement as follows

Healthy Ageing Challenge impact reports

Qualitative case story evidence was compiled and published at both the mid-point (UKRI, 2022) and end (UKRI, 2024a) of the Challenge along with supporting videos to highlight research activities. These reports showed how the research was integrated into the Challenge themes, rather than being a stand-alone activity. This also reflects the diversity of the research projects and the wide range of businesses they were focused on: Arts and culture businesses (CTC); Housing (DesHCA); Outdoor visitor attractions (ENLIVEN); Providers of digital assistive technologies (GOALD); Care homes (Healthier

Working Lives); Impact on the workforce (SHAW); Planning and urban design (SPACE); retail and hospitality sectors (Research Director's Flexible Fund).

An independent external evaluation was conducted with a final report produced by Technopolis (2024, p 5) in partnership with IPSOS. The report conclusions note: '[Healthy Ageing Challenge] has helped galvanise the nascent healthy ageing sector by making considerable inroads into developing a healthy ageing research and innovation ecosystem in the UK'.

Healthy Ageing Catalyst programme updates and case studies

As a novel undertaking, the Healthy Ageing Catalyst programme was closely monitored with the aim of learning from experience and evolving the programme. The core support was based on the work that the delivery partner, ZINC (a venture builder), had already demonstrated successfully in the context of a dedicated mission-focused cohort of up to 60 innovators working together through a full year-long programme. A key question was whether this approach would also work with a cohort distributed geographically across the UK in different universities.

The original expectation was to 'catalyse the brightest and best early-stage innovations with potential for global impact' (UKRI, 2024b). The award was to be an initial investment that would put awardees in a strong position to secure further support to take their idea forward, whether that be a business case to secure funding to commercialise their idea or a case to fund further research.

Over time, it became clear that the focus ought to be on commercialisation rather than further research, and that the most successful Catalyst Awardees would require additional time and investment to commercialise their ideas. While some of this may be due to the impact of the pandemic, other factors played into this, including the receptiveness of university Technology Transfer Offices' capability to work with academics from outside their usual audience.

The result was the introduction of the Healthy Ageing Catalysts Accelerator, a follow-on fund for successful Catalyst-stage projects with the greatest potential to found a business and secure further investment. The ongoing assumption was that this would mean success would be measured in terms of the number of new ventures formed; in practice success was reflected in some very different commercialisation journeys developed in partnership with ZINC, including spin out, collaboration agreement, licensing model and social enterprise.

Regular monitoring meetings

In addition to standard project reporting arrangements for ESRC and Innovate UK, a range of governance measures strengthened the linkages between the academic and business innovation components. These comprised:

- the inclusion of the Research Director in the quarterly Advisory Group and monthly Programme Board meetings
- a bi-weekly meeting between the UKRI and Research Director's teams
- monthly reviews of progress with ZINC for the Catalysts.

Top tips for future funding

Benefits of funding a Research Director

The appointment of a Research Director was a novel approach for an Industrial Strategy Challenge Fund (ISCF), and the benefits have been wide reaching. The Research Director led the SBDRP with invaluable expertise and enabled academia and business to share learning and knowledge. In addition to the funding for the seven SBDRP projects, the Challenge provided an additional 'flexible fund' which provided a mechanism for the Research Director to fill identified gaps in the research portfolio. This led to the funding of four APPROACH projects, and a Retail Impact Fellow, based at the International Longevity Centre-UK (ILC-UK), a project which gained significant traction in the retail sector.

A lesson from the Healthy Ageing Challenge is that there was further potential to be realised by bringing in a Research Director as early as possible in the design stage of a future mission. While some collaboration was achieved between the research programme and the 'flagship' Trailblazer workstream, there would have been greater collaboration had the needs for that collaboration been designed in from the start as part of a joint investment. This was most evident in the way evaluation of social impacts was conducted in the various Trailblazer projects. It was recognised early on that the social impacts were likely to be project specific, and very diverse. To address this, each project was mandated to develop its own social impact evaluation plan. At the time, this was without the benefit of central guidance on methods and metrics that might have enabled more robust assessments of comparative impacts from projects addressing common themes.

Benefits of additional expertise

There are benefits for funders in working with delivery partners to offer additional expertise. A review of the first round of Catalyst Awards highlighted the need to offer specialised support for academics, both in developing their own entrepreneurial skills and in partnerships working with the Technology Transfer Offices at their research institutions (typically universities). Through open tendering, UKRI worked with a venture building company (ZINC) to develop a new application process which was both supportive and inclusive, designed to benefit all applicants, including those who were not successful.

Funding for academic–business collaboration needs to be as flexible and agile as possible

While the landscape of academic–business collaboration is already complex, the global COVID-19 pandemic created additional challenges for projects, particularly in terms of access and timescales. The pandemic also created opportunities as some businesses faced an urgent need to adapt to changes in customer behaviours. Projects were required to pivot activities and approaches to progress, incurring unavoidable delays in progress. The Research Director and Healthy Ageing Challenge team worked in collaboration with projects to find ways to address these difficulties. For example, the ENLIVEN project introduced a successful small grants scheme, enabling them to collaborate more widely with multiple businesses to promote the impact of their work.

Funding interdisciplinary teams brings valuable additional skillsets to research

The Healthy Ageing Challenge encouraged applications from early career researchers and interdisciplinary teams to bring a broad range of skills and expertise to research projects. It was noted throughout the programme that this strategy attracted project team members with invaluable industry experience and entrepreneurial skills – for example, researchers who were confident in speaking the language of business, understanding how businesses function and particularly what they need from collaboration with researchers. Listening to businesses and being truly collaborative were the foundations for successful work.

The Healthy Ageing Catalyst Awards were designed to attract motivated researchers who were interested in commercialising their research. Successful award holders often came with an entrepreneurial mindset in addition to their academic skills, showing passion, commitment and pragmatism.

Understanding the value of the cohort

The Challenge-based approach included funding for a Community of Practice and encouraged cohort development across investments. The Healthy Ageing Research Director and Programme Manager provided clear cohort leadership and support and hosted events for the research teams within the SBDRP, including APPROACH researchers. This enabled direct collaboration between projects, including shared events and conference submissions. Most researchers funded through the UKRI Healthy Ageing Challenge reported that being part of a cohort with clear aims and themes in common was one of the most positive aspects of the funding.

With the Healthy Ageing Catalyst programme, the tailored support programme delivered by ZINC, including regular cohort events and training,

was particularly valued. There was wide variation between research organisations and cross disciplines in the level of Technology Transfer support available for researchers, and the supportive cohort model provided a useful counter to this.

Success is about the end user/customer

As part of the UK's industrial strategy, the UKRI Healthy Ageing Challenge had a clear mission in stimulating business to engage in developing and scaling an ageing market. However, at its heart, the Healthy Ageing Challenge was a socially driven mission, aiming to create real change for people as they age, both by including them and really understanding their needs. As one researcher described, the real key to effective business engagement is in understanding the target audience. Projects were successful when potential beneficiaries were engaged in defining needs and in the design process (Chapters 2 and 3). The importance of engaging with the audience and communicating the benefits of research and innovation were also emphasised.

Conclusion

It is clear from the Healthy Ageing Challenge that, where social science and business are involved in genuine collaborations to address whole-system challenges, not only are social science academics keen to work with businesses of all shapes and sizes, but that such deep and meaningful collaborations can bear significant benefits for academia, business and society.

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5

Supportive Environments for Physical and Social Activity, Healthy Ageing and Cognitive Health (SPACE)

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Environmental exposure and cognitive health

The world's population is ageing and the number of people living with dementia and Mild Cognitive Impairment (MCI) is increasing, having doubled from 1990 to 2016 (GBD. Dementia Collaborators, 2016). Effective prevention strategies are overdue. Cognitive health promotion aims to maintain cognitive function in healthy individuals and minimise cognitive decline by targeting modifiable risk factors, reducing neurodegeneration risk and increasing cognitive resilience (Stern, 2009; Montine et al, 2019). Encouraging behaviour changes, such as regular physical activity, and the provision of supportive urban environments (encompassing built, natural and social environmental factors) can prevent or delay the progress of cognitive decline and dementia (Institute of Medicine (IOM), 2015).

There is evidence for the existence of several pathways between the urban environment and cognitive health. Increased urbanisation generally comes with poor air quality, noise pollution and environmental degradation, which have adverse effects on human health (Moore et al, 2003; McIlwaine et al, 2017). Evidence-informed, health-oriented urban design is increasingly recognised as a key strategy to improve health. However, the role of urban environments in relation to brain and cognitive health has received comparatively little attention. Age-friendly urban design principles can promote safety, accessibility and mobility, increasing social connection (O'Brien, 2014) thus positively impacting cognitive trajectories. Environmental factors, such as air pollution, can also affect the underlying

biology. Epigenetics is the study of how our behaviours, such as physical activity, and the environment impact how genes function.

The work undertaken by the SPACE (Supportive Environments for Physical and Social Activity, Healthy Ageing and Cognitive Health) team led by Queen's University Belfast aligned with the Creating Healthy and Active Places in the Healthy Ageing Challenge. The research investigated and informed how we can create healthy active places that are supportive, attractive and accessible to people as they age. The overarching aim of SPACE was to investigate the impacts, and mechanistic pathways, of urban environments on healthy ageing and the cognitive health through the integration of biological data, health behaviours, environmental exposures and urban environment.

Research questions included:

- What is the effect of urban environment and related exposures on cognitive health?
- What are the mechanisms between environmental exposures, health behaviours, biological factors and cognitive health?
- What are the biological responses to the urban environment and related exposures influencing cognitive health?
- What prevention policies and interventions might help prevent cognitive decline, promote cognitive health and reduce cognitive health inequalities?

Co-production, and the active involvement of older people and stakeholders, including business, are key themes threaded throughout SPACE. For example, we partnered with Ordnance Survey Northern Ireland (OSNI) to develop a geoportal (https://space-geoportal-queensub.hub.arcgis.com/ an online repository to access and visualise geospatial data across Northern Ireland; McNickle et al, 2025). The partnership involved an embedded researcher based at Queen's University Belfast from OSNI who led the development of the geoportal. We involved businesses, such as Translink (private public transport provider) and The Paul Hogarth Company (a private urban design company) in co-developing a series of videos and factsheets on urban environment factors, their health impacts and possible solutions. Businesses were instrumental in articulating the possible solutions to create healthy and active environments. Businesses also played a key role in the policy workshop series and informing future recommendations.

Conceptual framework

We adapted a socio-ecological based framework (Cerin et al, 2020) using systems-thinking to explore the interactions between environmental factors and cognitive health. We hypothesised that urban environments affect brain and cognitive health

through factors such as social engagement, physical activity and exposure to harmful urban environmental by-products (for example, noise and air pollution).

To co-develop the Causal Loop Diagram (CLD), we held a 2-day workshop with the SPACE research team (12 experts representing 10 disciplines) based on Group Model Building (GMB) methods. The workshop aimed to create a CLD that identified established and potential urban environment, health behaviours, health and physiological determinants of cognitive decline in older adults, and the interrelations between these factors. The CLD presented 45 factors and 110 connections. All factors were classified in 10 main domains: urban design (such as walkability), social environment (such as social relationships), travel behaviours (such as active travel), by-products (such as air pollution), health behaviours (such as recreational physical activity), mental health (such as stress), disease or physiology (such as molecular risk), exogenous factors (such as industrial pollution sources) and cognitive decline outcomes (such as dementia). The main output was a CLD of the complex system of how the urban environment can influence cognitive decline in older adults (Avila-Palencia et al, 2025).

The CLD was further discussed and validated with stakeholders from community (including older people), policy and practice working in the environment and cognitive health (O'Kane et al, 2024). The co-production process involved stakeholders:

- sharing diverse perspectives
- sharing knowledge and experiences
- focusing on what a shared policy agenda that addresses the systemic relationships between environment and health might look like.

Over 60 participants were shown the CLD, a systems map that describes the relationships between environmental factors and health factors. Participants reflected on the map and were asked for examples of trends happening in the real world that demonstrated movement in the domain of environment and health (O'Kane et al, 2024). The major trends that emerged included:

- designing communities by prioritising the car
- reduction in application of sustainability principles in decisions
- underfunding of urban design
- poor at designing for people who live in the communities
- warming climate.

Further discussions at the workshops identified the following priorities:

- knowledge sharing
- collaboration

- sustainability
- reducing car dependency
- community level action incorporating urban design
- leadership for change.

The co-production threaded throughout the workshop series was essential to ensure that diverse perspectives were discussed, that lived experience of older people were considered and that the recommendations were plausible and possible to be carried out by stakeholders.

Further, the CLD guided the boundary and search strategy for an evidence gap map (EGM) (Trott et al, 2024) and umbrella systematic review and meta-analysis (Glover et al, under review) investigating the evidence on environmental exposures and cognitive health.

A total of 57 reviews (with 257 outcomes) were included in the EGM (Trott et al, 2024). The evidence base was concentrated on 'environmental by-products' and 'social environment' and their impact on outcomes of dementia, Alzheimer's disease and cognitive impairment. Areas also saturated were air pollution within 'environmental by-products' and educational attainment within the 'social environment'. Areas with limited evidence included exposure to 'traffic-related behaviours' and all cognitive outcomes, and all four exposures ('environmental by-products', 'social environment', 'urban design' and 'traffic related behaviours') and child cognitive measures. The EGM provides a live, interactive, visual representation of the evidence. We identified key evidence gaps to be addressed including environmental exposures and child cognitive outcomes, traffic-related behaviours and urban by-products such as noise pollution and light pollution.

We complemented the EGM with an umbrella systematic review and meta-analysis on environmental exposures and cognitive health (Glover et al, under review). Fifty-eight reviews, 11 of which were meta-analyses (53 unique outcomes), were included in the statistical umbrella review. The research highlighted exposure to air pollution (PM2.5, NO2, NOx) and social relationships as having convincing/highly probable levels of evidence for the outcome of dementia. This umbrella review highlights the need for policy and practice to focus on reducing levels of air pollution (PM2.5, NO2, NOx) and environments are designed to enhance social contact.

This mixed methods approach incorporated the perspective and knowledge of local stakeholders using participatory GMB. Broadly, there was a high level of census across the process. The combined approach, including embedded in-depth involvement of stakeholders and older people throughout the process, allowed a better understanding of the underlying mechanisms, including direct and indirect effects. The team co-developed and ensured a fully engaged partnership, where stakeholders considered different perspectives and built a shared understanding of the system.

Our 'active and dynamic' system map involved stakeholders (from local government, urban planners, landscape architects, regional government, voluntary and community sectors) to evolve our collective ideas as new scientific and practice-informed evidence emerged. In this way, multisector stakeholders, including older people, co-developed informed, scalable, sustainable and transferable initiatives aimed at reducing inequalities and ultimately improving cognitive health. The framework also provided a clear, comprehensive, multi-perspective basis to inform data analyses in the next project steps, as well as the interpretation and integration of their results.

Informing the creation of healthy, active places

A primary aim of SPACE was to investigate the impacts, and possible mechanisms, of urban environments on healthy ageing and the cognitive health through the integration of data, including behaviours, environmental exposures and urban environment, to create healthy active places. This work builds on the Northern Ireland Cohort for the Longitudinal Study of Ageing (NICOLA) (Cruise and Kee, 2017; Neville et al, 2021), part of the US Health and Retirement international family of studies (Lee et al, 2021). NICOLA is a prospective representative cohort of 8500 non-institutionalised individuals in Northern Ireland (NI) aged ≥50 years. Data include measures of physical and cognitive health, mental wellbeing, health behaviours, medication, physical activity, social environment and transport (Cruise and Kee, 2017).

We retrofitted NICOLA cohort data with spatial environment data (including Geographic Information System (GIS) data, remote sensing and soil tracer data, modelled air and noise pollution data) to quantify characteristics of the urban environments plausibly associated with cognitive health to examine:

- associations of urban environment characteristics with levels of cognitive health
- the extent to which these associations are explained by health behaviours (physical activity, social engagement) and physiological markers (Geospatial Commission, nd).

The NICOLA cohort was sourced from a randomised sample of NI addresses ensuring a nationally representative sample of 8500 men and women aged ≥50 years (45 percent female; mean age 64.9 (SD 10.3) years; 38 percent in highest deprivation quintiles; 13 percent with MCI; 0.2 percent dementia diagnosis).

We identified and modelled attributes of the urban environment that have an influence on cognitive health and physical activity of older adults, such as air, noise, light pollution, access to green/blue space, proximity to road networks and public transport. Identification and selection of variables was informed by the CLD and reviews (Trott et al, 2024; Glover, under review). We established

GIS based urban environment metrics around participants' residential address (Ellis et al, 2015; Ellis et al, 2018; Cleland et al, 2019). In addition to area-level modelled air pollution (PM2.5 and NO2), we used urban soils data which can act as urbanisation tracers of atmospheric and traffic pollution (for example, arsenic (As), lead (Pb); Carrero et al, 2013; McKinley et al, 2020). Studies have shown that ultrafine particles of these environmental toxins may become blood-borne and translocate to other tissues such as the brain (Oberdorster et al, 2005). Synthesis and analysis of the datasets identified facilitating/impeding urban environment features for cognitive health and physical activity of older adults.

The dataset can test hypotheses derived from the conceptual framework described earlier. Structural equation modelling (SEM) was conducted. In addition, using a compositional data analysis (CoDA) approach investigated links between urban environmental factors and cognitive health, drawing on previous work on chronic kidney disease (McKinley et al, 2020; McKinley et al, 2021).

In total, we collated and linked over 280 environmental exposure variables to the NICOLA cohort. We co-designed and developed a regional geoportal to support research, policy, education and practice on environment and health (https://space-geoportal-queensub.hub.arcgis.com/) (McNickle et al, 2025). Two co-design workshops with 40 multisectoral stakeholders from business (for example, Aecom, Anaeko), local government (for example, Belfast City Council), regional government (for example, Department for Infrastructure, Department for Communities, Housing Executive) and older people from our Healthy Ageing Advisory Group helped inform the design, content, functionality and format of the geoportal. The co-design process involved three workshops and short online surveys that helped inform the content, design and functionality of the geoportal, and data availability. In the second workshop, participants were given the opportunity to test the geoportal, providing important feedback on its useability.

The open access geoportal resource houses over 80 datasets across Northern Ireland. The geoportal offers an effective way for stakeholders to access data relating to a wide range of environmental variables, such as land cover, climate, infrastructure, air pollution, noise pollution, light pollution and access to green space, that affect health. Feedback suggested that users found this digital geoportal useful in many areas including research, informing policy and practice decisions and recommendations, and education by providing the raw data and means to visualise these (McNickle et al, 2025).

The geoportal supported a number of analyses. Examples of these are briefly outlined next:

- *Life-course socioeconomic disparities in access to public green and blue spaces for older adults* (Wang et al, under review a):
  It is still unclear how socioeconomic disparities in different life stages may contribute to access to green and blue spaces in later life. This analysis

assessed the associations between life-course socioeconomic status (SES) and access to public green and blue spaces in older adults in Northern Ireland. The study analysed data from NICOLA (n=7403 participants aged ≥50 years). Results showed that participants with higher SES in childhood, adulthood and elderhood lived closer to different public green and blue spaces. Also, there were urban–rural differences. The effects of childhood and adulthood SES were more pronounced in urban regions, while the effect of elderhood SES was stronger in intermediate regions. These findings provide evidence of life-course socioeconomic disparities in older adults' access to public green and blue spaces, which vary across urban, intermediate and rural regions.

- *Green space, life-course socioeconomic disparities and cognitive function in later life* (Wang et al, under review b):
  There is evidence that green space may be able to narrow socioeconomic disparities in health outcomes ('equigenesis'). However, it is still unclear whether such a finding is also valid for cognitive function in older adults. Using NICOLA data, this study examined whether local green spaces may narrow socioeconomic disparities in cognitive function in later life (such as equigenesis). Results showed that participants with higher SES in adulthood or elderhood had higher MMSE (Mini Mental State Examination) scores, while NDVI (Normalised Difference Vegetation Index) was positively associated with MMSE scores. Also, the association between NDVI and MMSE scores was stronger with lower SES in childhood, adulthood or elderhood. Our findings provide evidence that green space may be able to narrow the life-course socioeconomic inequalities in cognitive function in later life.
- *Exploring the mechanistic pathways between blue space and cognitive function in later life: A retrospective cohort study (*Wang et al, under review c):
  Existing literature demonstrates that residential natural environments (for example, green and blue spaces) are important for cognitive function in later life, but how blue space exposure influences cognitive function and through which pathways remains unclear. We used data from NICOLA to explore the pathways through which blue space influences cognitive function in later life. Mediators included physical activity, walking, Brief Resilience Scale scores, social contact, social support and air quality ($PM_{2.5}$). Our longitudinal evidence suggests that the pathways through which blue space exposure influences cognitive function in later life may vary across different exposure metrics (blueness, accessibility of blue space and availability of blue space).
- *Investigating syndemic effects of air pollution and physical activity on cognitive decline in older adults* (Küçükali et al, 2025):
  Previous research has independently linked air pollution and lack of physical activity with increased mortality and morbidity (Martin et al,

2025). There is an ongoing debate about whether those factors interact to cause an even higher burden, suggesting potential syndemics. This study estimated the interaction between air pollution and physical activity specifically on cognitive decline in older adults in Northern Ireland. The study used the data from NICOLA. This study presents a novel quantitative investigation of a potential syndemic focusing on a less-explored outcome of cognitive health. Although no significant interactions were found, the relatively lower pollution levels in Northern Ireland may limit the generalisability of the findings.

Understanding biological pathways

A further risk factor for neurodegenerative disease that SPACE investigated was epigenetic modification. The epigenome is the term used to describe chemical modifications to the genome which do not change the underlying gene sequence (Morgensztern et al, 2018). These modifications can alter the expression of genes, resulting in a biological cascade which could either contribute to disease risk, or protect from disease (Ho et al, 2012). The epigenome is modifiable by environmental exposures, with urban environment factors such as air pollution being associated with epigenetic modifications (Glover et al, 2024a). This modification may contribute to the biological risk of neurodegenerative disease and is thereby a potential mechanism by which environmental exposures influence disease risk. This makes multi-omic exposomic research on urban environment and neurodegenerative disease of interest, including investigation into the consequences of exposures at both the genetic and epigenetic level.

The exposome (endogenous and exogenous factors to which the body is exposed in the lifetime) is being explored to identify its role in age-associated conditions such as neurodegenerative disease. It has been hypothesised that epigenetic modifications could be used as a proxy to explore the exposome, as it is possible to analyse and visualise epigenetic modifications which are the result of environmental exposures. By investigating epigenetic modifications in urban environmental-neurodegenerative research, it is possible to explore biological pathways by which urban environment factors influence neurodegenerative disease induction and progression (Glover et al, 2024a).

SPACE completed two evidence reviews which informed future related analyses:

- *Exploring the epigenome to identify biological links between the urban environment and neurodegenerative disease* (Glover et al, 2024a):
  The aim of this review was to explain how exploring the epigenome (that is, chemical modifications to the genome which do not change the underlying gene sequence) can further our understanding

of these biological pathways. The epigenome is influenced by environmental factors and has implications for cognitive impairment and neurodegenerative disease. Utilising complex epigenetic analytical techniques including epigenetic clocks, Mendelian randomisation and multi-omic approaches, it is possible to identify environmental consequences on underlying biology. Through better understanding of how epigenetic modifications, which can be inherited or change dynamically in response to environmental exposures, impact cognitive outcomes, we can work to encourage the development of public health policies, as well as urban planning and design policies to reduce the burden of neurodegenerative disease and encourage healthier ageing in the older adult population.

- *DNA methylation sites which provide a biological link between the urban environment and cognition* (Glover et al, 2024b):
  We examined studies which have associated an urban environmental exposure to a type of epigenetic modification, DNA methylation, and a cognitive outcome. We included 14 studies in our review which focused on four categories of environmental exposure: air pollution (n=3), proximity to road (n=1), heavy metals (n=6) and pesticides (n=4). Overall, n=10/16 studies included in our review provided evidence that DNA methylation is significant in the association between the environment and cognition. We identified that n=5/16 studies performed a type of biological pathway analysis.
- *Motor vehicle pollutants emissions on soil pollution and epigenetic age acceleration* (Gupta et al, under review):
  This study presents the impact of the motor vehicle-emitted potentially toxic elements (PTEs) on epigenetic aging clocks. We found positive associations for Molybdenum (Mo) and Zinc (Zn) with epigenetic age acceleration for participants who live closest to the road networks and negative associations for participants who live furthest away from the road networks. Mercury (Hg) was associated with epigenetic age acceleration across all road buffer zones. Increased concentrations of Hg, Mo and Zn in soils near major roads and their increased epigenetic age acceleration provide evidence of significant threats to both the environment and human health. Efforts should be made to reduce the use of Mo and Hg in motor vehicle manufacturing and Zn addition to fuels as additives.

Knowledge synthesis and exchange, impact and science communication

A distinctive aspect of SPACE was our mission for an 'epidemiology of consequence' (Keyes and Galea, 2015: 305) that emphasises a focus on

what will matter most for changing population health. To fully exploit the complex systems approach, involvement of older people and multisectoral stakeholders, we held a series of workshops to elicit lessons-learned and bring together collective deliberations for action. This is appropriate as empirical risk estimation from observational data (even sophisticated causal analyses) needs to be complemented by stakeholders' lived experience and implementation science perspectives when it is possible that intervention 'sweetspots' may differ from those identified in epidemiological analysis (Kelly and Russo, 2018).

Videos, factsheets, webinars

As part of SPACE, we placed huge importance on effective and engaging knowledge exchange and communication with a variety of stakeholders. We produced a series of videos with Thought TV which included our SPACE researchers, our Healthy Ageing Advisory Group and various external partners, exploring the themes of the SPACE project (see SPACE, nd). We produced a series of factsheets alongside the videos, which explore the various topics covered by the SPACE project, including green and blue space, climate change and specific environmental factors including air and noise pollution (see SPACE, nd). We also worked closely with our partners at Belfast Healthy Cities (part of the WHO European Healthy Cities Network) to develop a series of webinars, which were publicly available online (https://www.qub.ac.uk/sites/space/webinars/). These webinars explored the topics of health and the environment, the history of Belfast and how it impacts our ability to live and age well, and novel environmental exposures. The webinars included researchers and academics from SPACE, but also amplified expert voices on these themes.

Podcast

We launched a podcast on the future of ageing research as part of the SPACE research (Hunter and Graham, 2024). This included three episodes focused on the environment, epigenetics and future research challenges and opportunities.

Science communication

Through the ESRC Impact Acceleration Account, we developed creative resources to help educate the general public, and in particular young people, about the themes within SPACE. We developed two books: one children's book, called 'No Planet B?', and a graphic novel/comic for older children and teenagers, called 'Planet B?'. We developed these resources with

colleagues in the Nerve Centre, Revolve Comics and Armagh Observatory and Planetarium (https://www.qub.ac.uk/sites/space/edres/). We also worked with our collaborator in Thought TV again to produce two videos exploring the topics of the search for the Planet B, and what we can learn about ageing from space travel (see SPACE, nd).

Conclusion

SPACE aimed to explore how where we live affects how we live and age. The work aligned with the Creating Healthy and Active Places and investigated and informed how we can create healthy active places that are supportive, attractive and accessible to people as they age. We were an interdisciplinary team led by researchers in the areas of health and the environment, including public health, gerontology, molecular epidemiology, planning and natural and built environment. We embedded the community voice from the beginning, working with our Healthy Ageing Advisory Group, and representatives and advocates from the community sector in Northern Ireland. Our research involved: exploring existing research to understand the relationships between our biology, our health behaviours and our environment; analysing data from over 8000 older people with NICOLA to explore how different environmental factors relate to cognitive health; exploring how the environment influences cognitive health; exploring how biology plays a role in how the urban environment affects cognitive health; and exploring how to collate and promote our findings for impact across research and policy.

SPACE innovative approach presents several strengths. First, the building of a CLD involving project experts and exchanging views with stakeholders considering different perspectives brought a comprehensive view and a shared understanding of the system that configurates the research topic. Also, the diagram provided a multi-perspective basis to inform data analyses, and the interpretation and integration of results. Second, the integration of diverse spatial environment data with health and socioeconomic data from the large sample of NICOLA cohort helped to quantify the effect of the different characteristics of the urban environments on cognitive health. Third, the integration of biomarkers and the use of methods to infer causality of epigenetic signals, by evaluating relationships between exposures, DNA methylation and cognitive health outcomes incorporated the molecular level of analysis. Last, the integration of a Healthy Ageing Advisory Group and the active involvement of the stakeholders, including business, was an important component of the co-design approach of the project and will help to glue all the interdisciplinary pieces of SPACE aligning what the evidence said with the experience of the people who live and transform the urban environment.

Note

[1] https://www.qub.ac.uk/sites/space/

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6

Global environments of ageing: towards co-designing climate resilient environments and communities for ageing well

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Introduction: ageing well in a changing climate

By 2030, an estimated 13 million people in the UK will be aged 65 or older, comprising 22 percent of the population (Office for National Statistics (ONS), 2023). This demographic shift coincides with the escalating impacts of the climate crisis, which presents heightened health risks for older populations (Haq, 2019). Vulnerability stems from both individual factors, such as chronic health conditions, and collective factors including social deprivation and lack of climate resilient infrastructure (Astill and Miller, 2018; McDermott-Levy et al, 2019). For instance, rising temperatures and more frequent heatwaves have been linked to increased mortality among older adults, particularly those with pre-existing medical conditions (Kaltsatou et al, 2018). Despite growing recognition of these risks, older people are rarely included in climate adaptation planning. Public engagement with this demographic remains limited, and there is a notable gap in understanding their perspectives, behaviours and climate imaginaries in relation to the places that shape their everyday lives (Latter, 2022; Pinna et al, 2024). Furthermore, little is known about how older people's everyday knowledge and practices can inform more inclusive and sustainable adaptation strategies.

This chapter reflects on the ways in which two independent one-year projects (2022–23) explored older people's perspectives of climate change to enable the co-design of more inclusive, resilient and sustainable places. *Understanding Older and younger people's PercepTions and Imaginaries of Climate Change* (OPTIC) co-created a comic book of climate change stories with older and younger people in five varied environments of ageing in South Wales. *Healthy Ageing in a Changing Climate: Creating Inclusive, Age-Friendly, and Climate Resilient Cities and Communities in the UK* (HACC) utilised

deliberative dialogue events with older people and co-designed workshops across four cities in the UK to identify ways to build resilient environments for ageing in response to extreme weather events. Drawing on our experiences of the two projects, we discuss how creative and participatory methods can be used to gather and share insights for co-designing climate resilient environments for ageing well. In reflecting on these methods, we highlight opportunities and challenges for future work in this area.

Exploring ageing and climate change through creative, place-based methods

Both projects explored climate change as a 'wicked' problem – a complex, uncertain issue involving multiple stakeholders and no risk-free solutions (Incropera, 2016). Healthy ageing has similarly been described as a wicked problem, shaped by sociocultural and political dynamics and marked by shifting, often contradictory, demands (Riva et al, 2014). It extends beyond biological or medical definitions to encompass autonomy, participation and wellbeing (Sixsmith et al, 2014). To engage with these multifaceted and affect-laden challenges, HACC and OPTIC employed participatory and creative methods to surface perspectives and stimulate reflection (Thomas et al, 2024).

OPTIC

The OPTIC project was carried out by an interdisciplinary team at Swansea and Aberystwyth Universities, Wales. The project used qualitative, creative workshops to understand intergenerational place-based climate change perspectives, transferred knowledge and perspectives between communities and stakeholders via a comic book and programme of events, and connected older people and stakeholders at a learning event.

To start, we set up an advisory group and carried out an online questionnaire to explore preferred comic designs. Next, 65 older (over 65s) and younger people (mainly under 25s) took part in creative workshops in the Swansea area. Recruitment was purposive, drawing on existing networks and contacts made through our advisory group, and targeting certain populations and geographies to reflect a diversity of demographics and lived experiences. Within the Swansea region, we were able explore multiple climate-related challenges in varied coastal, upland and urban environments, including areas where climate change stands to impact place-identities connected to farming, heavy industry and energy technologies. Carrying out the study here also meant we could explore deeply held climate change knowledges and behaviours through the Welsh language (Thomas et al, 2024).

Workshops included a variety of method options. A sit-down comic-creation activity utilised various modes (including words, pictures, maps,

symbols) to represent times, places and stories (Thomas et al, 2024). Mobile interviews allowed us to place ourselves and our participants within the case sites, facilitating an exploration of the relationship between them and the environment in which we collectively moved (Singleton, 2024a; Thomas et al, 2022). Online mobile group discussions used mapping systems (Google Earth and Street View) to virtually move through places to stimulate conversation (Singleton, 2024b). Cut-ups and collages provided tactile ways to reframe existing narratives, focus on what is important and shed light on different perspectives (Williams, 2023). Finally, storyboarding elicited discrete stories and required participants to think about important characters, narrative arcs and pivotal moments (Roberts et al, 2022). Workshops also included an icebreaking task based around a selection of small objects (for example, toy rocket, shell, egg timer) and a dice game (Thomas et al, 2023) to stimulate broader context thinking and specific place-based stories.

Stories from the workshops were then developed into a bilingual comic with illustrator Laura Sorvala (Thomas et al, 2023) (see Figure 6.1). We also held several outreach and engagement activities, culminating in a six-hour shared learning event, attended by older project participants and a range of policy, education and charity stakeholders. The event included design sprints to generate ideas for how to create environments for ageing that better address older and younger people's climate change perspectives and behaviours. The design sprints were structured around three broad goals from the comic: communities that live, work and learn together; healthy land, sea and air for all; and streets for people and growing. Each breakout group included a non-human participant seated at the table (a globe, teddy bear and oak sapling), as well as a spinner with six options (child, tree, fox, bee, older person, world) to encourage participants to think about climate change and ageing from alternative perspectives.

HACC

HACC was carried out by an interdisciplinary team based at Heriot-Watt University, Edinburgh and the Stockholm Environment Institute at the University of York, supported by a project advisory group. The project aimed to explore how to create cities and communities that are healthy, age-friendly and climate resilient to the impacts of extreme weather. We focused on four case study sites across the UK where the project team had established partnerships (Belfast, Northern Ireland; Cardiff, Wales; Greater Manchester, England; and Leith, Scotland).

We drew upon a range of methods and approaches. First, online policy and practice mapping workshops were undertaken with policy makers and practitioners to identify the challenges and opportunities of embedding healthy ageing within decision-making around climate change. Second, deliberative dialogue events with older people were undertaken to explore

Figure 6.1: A spread from the climate comic

Figure 6.1: A spread from the climate comic (continued)

Source: Thomas et al (2023) illustrated by Laura Sorvala. Available at www.climatecomic.co.uk.

how older people perceived climate change, including the ways in which extreme weather impacts healthy ageing and place. These were held concurrently with an online survey designed to capture older people's thoughts around climate change via images, video and poetry. Finally, a series of co-design workshops brought together older people, policy makers and practitioners – including one intergenerational session – to explore how to create climate resilient, age-friendly communities. These workshops used knowledge café approaches, with informal group discussions structured around key challenge areas presented as menus at each table.

HACC utilised principles of community-based participatory research to support inclusive data gathering and knowledge co-creation, ensuring equal contributions and space for shared priority setting (Parker et al, 2020). We captured workshop discussions using graphical illustrations and facilitator notes, while encouraging participant input via flip charts and Post-it notes. Participants valued the illustrations for capturing conversations in the moment, offering relatable visual outputs and a shared reference point. We also used a range of creative approaches to stimulate dialogue with case study and community partners. For example, in one deliberative dialogue workshop, we adopted a 'long table' format (Figure 6.2), adapted from performance art, where participants joined and left a staged conversation at will, creating an informal setting for inclusive discussion (Weaver, nd).

In the co-design workshops, we used a knowledge café approach (Schiele et al, 2022) structured around themed 'menus' drawn from earlier dialogues. Each table focused on a challenge area such as access to health services, community coordination during extreme weather, mobility and independence, and enabling older people's role in climate action. Mixed

Figure 6.2: 'Long table' conversation in the Rochdale deliberative dialogue workshop

groups of older people, practitioners and policy makers rotated between tables to build on previous discussions and co-develop interventions.

Workshops also included creative ice breakers, such as climate imagery model-building. We provided feedback at key stages, including illustrated lay summaries from the dialogue events. HACC concluded with an online event that brought together older people, policy makers and practitioners to present findings and recommendations (Woolrych et al, 2023). Breakout groups identified next steps, key partnerships (including with older people) and evidence gaps for delivering climate resilient, age-friendly communities.

Reflections on methods

OPTIC: providing time and space to share imaginaries

The OPTIC workshops and events provided time and space for older and younger people, and a range of stakeholders, to identify and voice their climate aspirations (Maddock and Thomas, 2024). These included ideas to boost awareness and engagement around climate change, shape policy and improve planning and infrastructure. A key theme was the promotion of community driven action and collaboration, and two key outcomes of the project were new and strengthened relationships between communities and stakeholders, and the development of methods with which to foster these (Thomas et al, 2024). In this section we draw on a range of participants' perspectives to show how our methods prompted us to slow down, consider what was important and share ideas.

Noticing changes in environments and practices was a common theme. For example, walking methods provided space and time to share ideas and feelings about places, things and affects encountered en route. During a session in a post-industrial town in the Welsh Valleys, children and older adults took an online walk together using *Google Maps*. They stopped to look at the river, remembering August duck races over previous years. They explained how water levels now vary so much: ducks are lost when the river level is too high or cannot race when levels are too low. In another workshop, comics provided primary school students with a template to tell the stories of care home residents, who remembered deep snow and ice-skating on their school pond. The children expressed disappointment that they had not experienced deep snow, and their comics included fantastical ideas of what they would do if they did.

During other sessions, we introduced spontaneity using a game and objects. Playing a dice game in class, an 11-year-old remembered when there were *fewer* trees on a street in Swansea. While the positive changes this young person had noticed were refreshing, nostalgia was a more common theme in our research. Participants lamented today's throwaway society, in which "people are disconnected from how the whole ecological system works".

Participants in all sessions drew on ideas and traditions from the past, including growing their own food, garden cities, mending, pop bottling (being paid for collected used bottles) and having "one bath a week". The first story in the *Climate Comic* was prompted by a (virtual) stone picked up by an older participant in the icebreaking task. She mused about stories the stone could tell, leading her to share memories of growing up, and how "we were doing all the right things" such as riding a bike, not travelling far from home and line-drying clothes.

Our learning event provided further space and time to consider what we could learn from past practices, to build communities and share resources. Here, participants suggested a wide range of solutions for reaching the goals identified from the workshops. These included individual actions such as less commuting, holding street events and building street ovens to enable shared food and shared conversations. While the design sprints were somewhat ambitious in the time available, the process generated plenty of discussion. Particularly valuable was reframing challenges to 'how might we …?' questions and considering the perspectives of non-human participants:

Glenn:	Can I just have a quick chat from the point of view of the tree.
Facilitator:	Yes.
Glenn:	I wish that people would get to know me, so you know, I've been standing here for 150 years, I'm a big tree and those f*****s are about to cut me down, so I expect this community to mobilise and get up me, climb into my branches and save me.

The desire for strong, responsible and engaged communities threaded throughout participants' future imaginings and aspirations. However, actions were often directed towards more strategic policy, system and infrastructural changes (Maddock and Thomas, 2024). It was felt that policy should be more inclusive and facilitate community-led initiatives, and that unused spaces should be repurposed to create places for community connection. There was a desire for community-driven power solutions and localised, sustainable living methods. This focus on community may have reflected feelings of solidarity and shared understanding during the research process, where disarming methods provided intergenerational learning opportunities, and where "it was a pleasant surprise to hear many of the same concerns" between generations.

HACC: working together to identify interventions

HACC identified six key areas that require action to collectively address climate change and healthy ageing in the UK: empowering older people

towards climate action; mobilising community and social infrastructure; enhancing mobility and transport for healthy ageing; climate resilient housing for ageing-in-place; healthcare and wellbeing for older adults in extreme weather; and intergenerational communities and climate resilience. These are explored in detail in Woolrych et al (2023). Here we reflect on how our methods facilitated dialogue and shared learning around complex conversations on climate change.

First, by creating an informal setting and creative approaches to engaging in conversation, we were able to capture some of the anxieties, concerns and uncertainty around what climate change means to older people. The long table format enabled people to share their everyday frustrations: "the challenges of climate change are really difficult to disentangle and understand how it will impact older people like me"; express their concerns including the impact of climate change on generational wellbeing: "we are worried what it will mean for our grandchildren and their children"; and the lack of agency many older people felt in being able to influence climate mitigation at a local level: "we feel powerless". As the workshops developed, discussions oriented to optimism and positive change, focused on action, how they can enable community resources and what they can do to support each other in response to climate change.

Second, forms of deliberative dialogue afforded the opportunity to challenge myths and perceptions about what climate change means to specific age groups. In our intergenerational workshop, younger and older participants were able to share stories about what climate change means to them. Older people discussed the active roles they play and have played within their communities, including how they have navigated previous crisis events, including the COVID-19 pandemic, while younger people discussed their perceptions of climate change and everyday behaviours within their communities. The intergenerational workshop created opportunities for developing shared actions, which formed a key aspect of our final recommendations report, and focused on creating intergenerational spaces within communities, bridging the intergenerational climate divide and sharing intergenerational resources based on helping others. In positioning their voice, expertise and 'place histories' within climate discussions, older people were able to challenge what they perceived to be negative associations in the media about their role in the climate agenda.

Third, through the co-design process we were able to open up alternatives to seeing climate change as "a distant thing that we can do nothing about", to realising a collective responsibility and turning abstract understandings of climate change into visions for how older people can be better supported before, during and after extreme weather events. A strong focus of the workshops was on understandings of place and how we can draw on assets that already exist within communities including physical spaces (community

hubs and outdoor environments), social supports (neighbourhood ties and connection) and knowledge resources (skills and expertise). We were able to move away from the more deficit or needs-based approach (what communities do not have) to one that looked at how to creatively connect the resources and amenities within communities to mitigate the impacts of climate-related events (such as mobilising what communities do have).

Lastly, the collaborative approach enabled significant opportunities to bring together older people, policy makers and practitioners to identify what inclusive, age-friendly and climate resilient cities and communities need to look like to support positive outcomes in old age. While there was tension within the workshops in some of the discussions between older people and decision-makers, it provided a space for diverse positions and perspectives to be understood. For example, there was recognition of the resource constraints facing many sectors in local government to deliver climate mitigation interventions. At the same time, policy makers and practitioners were able to reflect on the ways that specific climate resilient interventions could be better shaped around the lives of older people and the places where they live, therefore shaping the co-production process in ways to deliver better outcomes. In developing solutions, bringing together the expertise of older people and professional stakeholders allowed areas of connection to be established, revealing opportunities for climate change participation that older people had not known were open to them. For example, older people expressed challenges in having their voice heard in relation to climate action, while practitioners offered opportunities for involvement via climate assemblies and local and regional climate action networks.

Challenges

Both projects encountered several challenges. While we engaged with a range of partners and participants throughout, time and resource limitations meant we were constrained in what we could offer. In HACC, this was particularly challenging when working with voluntary and community sector (VCS) organisations that provided significant in-kind support at a time when the VCS is over-stretched and under-resourced. We often found ourselves making unrealistic requests of our community partners including support with recruitment, venue hire and co-facilitation of events within the tight funding timeframe. Project duration also made building long-term and sustainable partnerships difficult. While team members have been invited onto working groups with the aim of moving climate change and ageing forward (for example, Greener Later Life Greater Manchester, HACC), this has proved challenging to sustain both from an academic and non-academic perspective without additional resourcing.

OPTIC was also limited in its capacity to forge strong relationships. In aiming to work within five demographically diverse study locations, our approach at times felt extractive and led to some practical difficulties. We found, for example, that our timescale and resourcing was insufficient to build relationships with a traveller community we had hoped to work with. The project could not have happened without 'gatekeepers' (who we prefer to call 'bridge-makers' or 'boundary spanners' (Olabisi et al, 2022) because they were pivotal in connecting us with people). But being unable to directly liaise with some of our participants proved challenging. At our city street workshop, none of the young people recruited via a bridge-maker turned up, and we were unable to contact them. In another workshop it was difficult to organise consents and vouchers, because we relied on a busy member of the organisation to liaise with participants on our behalf. The project's short timescale also meant a small window for data collection. This rendered scheduling extremely difficult when faced with coinciding high rates of local COVID-19 infections and three rounds of strike action by members of school, university and train unions.

Short timescales and tight budgets also meant compromises had to be made. For example, as much of HACC's engagement and recruitment was undertaken via community groups, we recognise that the sample reflects more active and engaged older people, rather than those with pre-existing conditions or those experiencing mobility or cognitive decline, the very groups being significantly impacted by extreme weather. Additionally, there was lack of participation from ethnic minority groups who are seen as some of the most excluded from climate change discussions. More work is needed to engage with often unheard groups in responding to climate change, including reaching out to diverse communities in creative ways. While it was not a specific aim of this project, we also emphasise the importance of looking at more intersectional understandings of climate change that recognise the heterogeneity of the older population, and how age, gender, ethnicity, place and other characteristics intersect to impact health outcomes in later life.

In OPTIC, additional challenges related to the intergenerational focus of the project. While intergenerational research is gaining momentum in the UK (Coon et al, 2022), Green (cited in Peach et al, 2023) has advocated for more open and honest conversations about the complexities involved. Older and younger generations can have different needs with regards to the length and nature of sessions, activity types, timings and the accessibility of materials. There are particular ethical considerations to exploring climate change with children, including safeguarding, eco-anxiety and perceived inciting of activism (Bergmann and Ossewaarde, 2020; Roper, 2021). Such issues were addressed by working closely with our advisory group to co-design activities, and creating protocols to provide agency (for example, by making a collage/comic or teaching another participant how to play the

dice game), focus on positive framings and imaginaries, and by using playful, disarming methods to gently explore difficult issues.

These challenges necessitated flexibility, which often had unforeseen advantages. In the city street workshop, two OPTIC team members recruited their daughters to join in when the younger participants did not arrive. Serendipitously, one was very familiar with the place and brought with her a third generation, thus thickening the stories told here. In another case, we split a primary school/residential home session over two days and two locations rather than one workshop, which ultimately led to additional insights through involving the whole class. In the post-industrial workshop, more participants turned up than expected, creating rich data that were impossible to assign to individuals. Stories were developed into haiku, which better described the lively atmosphere of the workshop. The haiku helped spark interest from educators, who later worked with us to co-design an activity pack alongside schools and care homes (Thomas et al, 2025).

Conclusions

In this chapter we focused on the ways in which two projects explored older people's perspectives of climate change to enable the co-design of more inclusive, resilient and sustainable places. Our creative, participatory and intergenerational approaches provided time and space for communities and stakeholders to gather and share frustrations, knowledge and aspirations, and provided frameworks through which to identify interventions. The sessions offered direct benefits through social interaction, fostered solidarity between generations and facilitated valuable understanding of experiences of change, traditions of sustainable behaviours and visions for sustainable futures. Climate change is a global problem, and while our findings may be limited to the places in which the work was carried out, we suggest that our methods for co-creating visions and interventions with older people and stakeholders would be valuable in other contexts.

While there are vast and timely opportunities of working with older people and stakeholders to co-create meaningful change, there are of course challenges. Building tripartite relationships between academics, communities and policy makers requires significant time and resourcing. Furthermore, these conversations are the essential *first* stage of the process of change. While we were able to forge meaningful dialogue and identify critical priorities around ageing and climate change, there was an attitude among policy makers and practitioners that actual change would be difficult to achieve. Indeed, while climate change as a policy agenda is being afforded more attention, there is a lack of multi-sectoral working around how to achieve meaningful change. Barriers to impact include silo working, lack of resources and funding constraints.

Despite these challenges, and while participants commonly focused on policy-level changes, they also identified many individual and community actions to address climate change on a local level. Importantly, our research highlighted that co-designing for climate change is not limited to groundbreaking new inventions. Although Margaret's story (Figure 6.1) reminds us that we should not fall into a 'nostalgia trap', the knowledges, practices and imaginaries of older generations are vital in designing more sustainable and equitable environments. While it is human nature to respond to problems by innovating and *adding* something new (Klotz, 2021), much can be gained by learning from past practices. One of the most straightforward steps towards creating healthy and sustainable environments is to facilitate conversations so that these lessons can be shared. We hope our chapter provides inspiration for doing so.

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7

Community environments of ageing: hospitality and retail environments

Xuan (Lorna) Wang, Ailsa Forbes, Andrew King, Kimberley Smith and Frances Sanders

Introduction

Background, aims and objectives

Creating accessible communities that support us to age well is not only an important business but also important for businesses. The fundamental theme of this chapter is that everyone needs to take ownership in creating connected and hospitable environments that help to reduce social isolation, prevent loneliness and improve social connectedness. This chapter critically discusses the opportunities and challenges of engaging the hospitality and retail sectors, two of the largest employers in the UK, in supporting ageing well in the community.

This chapter bridges the gaps between research exploring the role that communities play in ageing well and research on positive hospitality and retail consumption. We frame our work using theories of experiential economy, which is a scientific and management approach that deals with business and economic activities related to peoples' experiences (Sundbo and Sørensen, 2013). It refers to an economy in which many goods or services are sold by emphasising the effect they can have on people's lives (Pine and Gilmore, 1998). We explain the role hospitality venues and retail shops play in building a connected and age-inclusive community, which can also help this sector achieve business and social sustainability goals such as hosting community events during quieter hours for social good. We reveal the need for those hospitality and retail businesses that are at the heart of every community to adapt their environments, products and services to better serve the needs and wants of the ageing population. This chapter discusses how and why these commercial sectors could be utilised to play a more influential role in supporting social connections and reducing loneliness to facilitate healthy ageing.

To achieve this, we reflect on the key findings and outputs from two innovative projects that explored the importance of hospitality and retail

for older adults: 'Hospitality Connect' and the 'Healthy Retail' project. We discuss the practical and implementable solutions for hospitality venues such as cafes and pubs and retail shops that emerged from these projects. Based on this work, recommendations are made on how to mobilise the hospitality and the retail sectors in addressing the healthy ageing challenge for all to age better in their own communities. Furthermore, implications for social, economic and healthcare policy makers will be discussed before drawing the conclusion and recommending future research directions.

Why hospitality matters to ageing well

Hospitality can be seen as 'a fundamental and ubiquitous feature of human life, and hospitableness indicates the willingness to be hospitable for its own sake, without any expectation of recompense or reciprocity' (Lashley, 2015, p 1; Lynch et al, 2007). Hospitality businesses are essentially the businesses of care. It is about taking care of everyone who comes through the door and offering a hospitable experience that makes one feel welcomed and through which a sense of connectedness with people, place and community can be developed. The economic value of hospitality businesses has been widely acknowledged. As the third largest employer in the UK, the sector employed 3.5 million people and contributed £54 billion in tax receipts in 2022 (UK Hospitality, 2023); small and medium-sized enterprises (SMEs), including restaurants, pubs and clubs, generated more than 50 percent of the total economic contribution. Hospitality venues are also considered to be important spaces for sociability and companionship. Often perceived as connecting individuals and groups in beneficial ways (Rosenbaum et al, 2007; Dunbar, 2016), they are ideally placed to play an influential and facilitating role in supporting older adults' social interactions and connectedness (Song et al, 2018; Altinay et al, 2019) in local communities. However, the social value of community-based hospitality venues and their contribution to older customers' social well-being are largely unknown (Altinay et al, 2019).

The Hospitality Connect project emerged as a response to the COVID-19 pandemic, which had a substantial effect both on the social well-being of older adults and the financial sustainability of the hospitality sector. This presented an opportunity to explore ways to co-create mutual support and resilience building between community-based hospitality businesses that were struggling to keep open due to lack of customers, and older people who were even more socially isolated due to lack of social interactions. The UK government's strategy for tackling loneliness emphasises the importance of community infrastructure (Department for Digital, Culture, Media and Sport, 2018); yet there was a lack of understanding as to how the hospitality sector could help to support older adults' social connectedness

and well-being. From being mainly retail-focused environments, many high streets are changing into places where there are increasing numbers of hospitality businesses, which also presented an opportunity to explore the ways that these venues might be transformed into age-inclusive places where all community members may age well.

The next section presents a brief overview of the UK Research and Innovation (UKRI) funded Hospitality Connect project and the key findings from which the Welcome ALL toolkit was co-developed.

The Hospitality Connect project

Overview

The aim of the project was to explore the role of local hospitality venues (specifically cafes and pubs) in supporting social connections among people aged 65 years and older from both the customer and business perspectives. A core goal was to co-design and develop hospitality-focused solutions that provide mutual benefit to older people and the cafes and pubs that serve them.

The project was conducted in two socio-demographically distinct locations in South-East England: an area of social and economic deprivation within a large metropolitan city (location A) and a prosperous regional town (location B). A participatory action research (PAR) approach was employed to ensure that end-users were placed at the heart of the project (Koch and Kralik, 2006) and we worked alongside six peer researchers (aged 65+) in location A to develop the interview guides, conduct the interviews in location A and interpret findings from both settings. In contrast, a member of the research team identified and recruited venue owners/managers and conducted all interviews in location B.

A total of 14 older customers in four hospitality venues in location A and 12 older customers in three venues in location B were asked about the role of local cafes and pubs in their social lives. Interviews were conducted with a total of six independent venue owners/managers representing two pubs and one cafe in location A and one pub and two cafes in location B. Interview transcripts were analysed thematically with the most important findings across both locations mapped as a series of themes and sub-themes.

Key findings

Analysis of key themes revealed that hospitality venues play a significant role in the daily lives of older adults, serving as crucial social hubs for many. However, the context in which these venues operate contributed to the identification of factors that can either inhibit or facilitate older people's

Table 7.1: Facilitators and inhibitors of venue usage by older customers

What all older customers value	What inhibits or facilitates (by location)
Service and facilities: Cleanliness, staff friendliness and attentiveness	**Location and access:** Lack of public transport; Limited parking; Parking costs
Physical environment: Attractive surroundings; Wheelchair/scooter access; Accessible toilets; Comfortable (and sufficient) seating; Good acoustics; Appropriate noise levels	**Venue choice:** Loss of traditional venues; Gentrification means prices have gone up; Focus on younger people can make venues less welcoming
Products: Good quality food and drinks; Good value	**Price and costs:** Important draw to specific venue(s), for example, cheapest pint, £1 cup of tea; Discounts or vouchers for older customers
Feeling of comfort and safety: Sense of community or connection	**Sense of community and staff:** Pre-existing sense of community often is a motivation to visit a specific venue; Note feeling rushed or pressured by staff into buying something or leaving
Diverse space(s): Intergenerational spaces; Older people specific spaces; Spaces with a mix of clientele	

use of different cafes and/or pubs and when they might do so. These are summarised in Table 7.1.

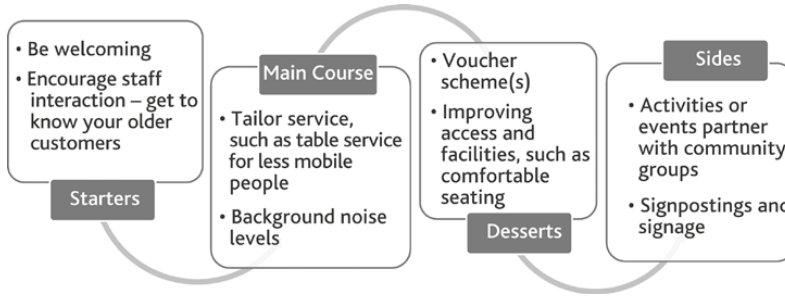
In location A, there was a sense that pubs in the area were increasingly targeting younger generations and, along with extensive gentrification, older people were feeling more unwelcome as traditional venues were closed or refurbished and went 'upmarket'. Familiarity and/or sense of nostalgia associated with 'community' spaces had led to a sense of loss among some older people. While price was a key factor for many participants in location A, getting to a venue was the main issue for those living in and around location B. One of the most common reasons given for visiting the cafe/pub was its convenient location, often tied to another activity such as shopping. Several participants lived outside walking distance of the centre of town, meaning transport was essential.

The findings also suggested there are things that businesses can do to adapt their environments and proactively use their services and products to attract and retain older customers by creating an inclusive environment and experience. These were taken forward into the next phase of the project.

Co-design of project output

The key findings were presented at two workshops conducted in location A and location B with a range of different stakeholders. These included

Figure 7.1: Hospitality Connect toolkit 'outline'



Source: Xuan (Lorna) Wang

representatives from hospitality businesses, professional bodies (HOSPA and the International Longevity Centre-UK), community support groups (Age UK, University of the 3rd Age) and the local council, as well as social prescribers, our peer researchers and older customers themselves. The purpose of the workshops was two-fold; to discuss ways in which venues can facilitate greater social connectivity among older people, and to generate a resource offering simple and practical solutions that venues can implement to help create age-inclusive environments.

Both groups were tasked with designing the content and format of a Hospitality Connect project 'toolkit' through a series of breakout sessions; these focused on key themes, for example, 'creating welcoming social spaces' and identifying the 'Dos and Don'ts'. All groups emphasised the need for a toolkit that uses clear, concise language free of jargon, with simple, easy-to-follow structure; for example, one suggestion was to adopt a 'menu' format (see Figure 7.1).

This structure was felt to also offer a linear progression in which tips, ideas and practical solutions could be organised into categories based on the level of resource and financial commitment required, commencing with the most basic or preliminary, 'starter course' steps before progressing through the menu and committing greater levels of resource, if appropriate.

The workshop outputs and feedback informed the creation of the 'Welcome ALL' toolkit, introduced in the next section. It was important to all stakeholders that the toolkit should be developed as an open resource to help SMEs, such as those that took part in the research, to extend or improve their services, products and customer experience to better support social connectivity among older people in their communities.

Welcome ALL: a toolkit for age-inclusive hospitality venues

The 'Welcome ALL' toolkit provides practical and inventive advice to help create age-inclusive hospitality venues in an attractive and concise format

Figure 7.2: The Welcome ALL toolkit

Source: Xuan (Lorna) Wang

that can be made available electronically, but also as a readily available, fold out resource (see Figure 7.2).

Feedback from our peer researchers, older customers and other stakeholders suggested the need to avoid terms such as 'age friendly', which was felt to place emphasis on being 'old'. The title 'Welcome ALL' was chosen to reflect the desire for hospitality venues to be accessible to ALL, irrespective of age.

The toolkit highlights the importance of a welcoming atmosphere and offers strategies and a choice of actionable points for venues to implement (or not) under the following menu options (see Figure 7.3). The potential financial and reputational benefits are highlighted to explain why it is also in the hospitality businesses' interests to be age-inclusive and to inspire them to do more; however, businesses are free to choose how they use the toolkit and over what timeframe.

Under each menu option are five actions (the 5As) to meet the needs of older customers, with each 'A' being upgraded, in relation to the level of commitment, as the business owner/manager works through the courses.

The starter section suggests actions to meet the basic needs of older customers that are simple and cost-effective to implement, whereas the main course actions are likely to require some financial investment, for example, providing large print menus or purchasing a ramp to aid access. Main course actions also include staff training to better understand the needs of older

Figure 7.3: Welcome ALL themed action points

Starter	Main	Dessert	Sides
Welcome ALL with a smile, instant impact with no additional costs	Welcome ALL with your commitment to serve ALL, for yours and your customers' benefits	Welcome ALL and be connected for the benefit of ALL	Benefit ALL through additional resources for building an age-friendly community

Source: Xuan (Lorna) Wang

people and actions that could facilitate positive employee-to-customer social interaction. Venues are encouraged to 'go above and beyond' with the 5As in the dessert section with greater investment in facilities and services, which might include making their premises available for social activities, especially during low demand days or business hours.

Businesses are encouraged to take proactive action to reach out and work together with relevant third sector and public sector organisations to co-create an age-inclusive environment that takes older customers' care into consideration. Additional resources to help management and staff better understand their older customers and their needs are provided in the toolkit's 'sides' section; these links signpost to relevant websites where the most up-to-date information and guidelines to help achieve greater customer satisfaction can be found. Like a community hub, the venue can host different activities or events for the benefit of ALL.

Key Welcome ALL recommendations:

- Offer a variety of multigenerational activities and events during quieter business hours. Examples may include 'chatty tables' or book clubs, while considering relatability, variety and volume of music choices.
- Encourage intergenerational mixing through team events like games or quiz teams.
- Contact your local authority or community groups to offer your space for their meetings to help build social connections.
- Foster intergenerational connections and conversations by inviting local volunteer groups to organise community-building activities.
- Provide discounts for third sector and voluntary organisations to use your venue for regular meetings or events.

Inclusive retail environments and Healthy Retail guides

The methodology for supporting retailers to better understand the evidence about what healthy ageing means is explored further in a second project in this chapter. This includes their vital role in encouraging healthy ageing,

how the retail sector sees and serves older customers in the future and how the customer/retailer relationship is an emerging and crucial inter-disciplinary contribution to society and neighbourhood. Serving the preferences and needs of older people also makes good commercial success and could, as part of a wider package of measures, lead to survival of the high street.

The decline of high streets across the UK has been occurring for decades, initially precipitated by out-of-town shopping centres in the early 1990s and gathering momentum, due to online shopping and retail restrictions during the COVID-19 pandemic of 2020. As a result, the UK high street has remained unadapted, not only to this changing and evolving environment but to the long-standing and growing demographic of the older customer and newly emerging societal and commercial territories. There is much debate around the future of retail, including considerations for its very survival and managing expectations of this evolving customer in a post-COVID-19 world. In partnership with the International Longevity Centre UK (ILC-UK) and funded through the Research Director's flexible fund, the Social, Behavioural and Design Research Programme employed an Impact Fellow coming from a retail background for 1.5 years with three aims: to support retailers to better understand the evidence about what healthy ageing means; to inspire action by retailers in relation to their role supporting healthy ageing and to transform how the retail sector sees and serves older consumers. Methods to achieve these aims included an initial padlet (a digital communications platform tool), workshop, meetings with academics and organisations, a literature review of current research and attendance at trade fairs.

Key findings

Prior to designing the project content, dialogue with independent retail associations and organisations took place regarding the tools and information which would be most useful to the sector in the short timescale. This resulted in requests for online written content to share with members that was easy to access and disseminate, useful and practical and low or no cost to implement, with a 'where to start' ideal. There were other generalised concerns such as tackling the ongoing cost of living crisis and how to be more sustainable in retail practice.

The dialogue with other stakeholders around addressing older people's needs within retail services extended to areas such as navigation in and around shops; clarity of font and choice of typeface on point of sale, products and packaging; trolleys and baskets; and the availability of seats and toilets. Consideration was given to the existence of staff training and re-training and the choice and consideration in product selection for this specific customer segmentation.

Gathering existing data and qualitative commentary to inform the project revealed that there was little innovation in product and service development addressing an ageing sector. Specific existing case studies with quantitative, investigative data were few and many were out of date. The perception is that high street retail is not 'ready' for well-designed ageing products and services and even if these existed, retailers were confused about the category fit on the shop floor. An additional dichotomy is that the sector believed the public would not embrace a conscious highlight of an 'older person's range' or area within retail.

Outputs: retail tools and Healthy Retail guides

Key outputs included a suite of published information guides, webinar presentations to organisations such as the Institute of Hospitality including webinar curation, a retail podcast and press releases demonstrating successful coverage. Five comprehensive retail guides were developed to assist retailers in transforming their spaces into more inclusive environments (see Figure 7.4).

Each guide combined research insights with practical advice, offering retailers actionable steps to cater for an ageing consumer base and contribute a healthier and more inclusive shopping experience covering Accessibility, Workforce, Customer Service, Healthier Choices and Environment (ILC-UK, 2023b). Further details of the guides and videos can be found at: htpps://www.ageing-sbdrp.co.uk/research-projects/retail-impact-project/.

Associations and organisations were supportive of the retail tools developed, using them to develop and disseminate. The outputs also gave them ready to market content for newsletters and mailouts for their members.

Engaging with larger retailers proved challenging, with staff not normally going to conferences, but some larger organisations drew upon their own PR to publicise what they were doing in their organisation. (John Lewis and Tesco named as positive retailers in a film short about the Retail Trust.) A large retailer (Holland and Barrett) positively engaged when the overarching project messaging aligned with their future five-year business plan.

When presented in seminars and webinars, recommendations from the guides were received well, with commentary around lack of awareness.

From the outset, there was a clear understanding that the format of themed written guides and podcasts or films for retailers addressing an ageing sector would be important. The considerations for both formats were audience, content, quantity, theme, format, frequency, marketing and design. Understanding the appearance and criteria of already published current 'instructional' retail formats lent valuable evidenced learning about content, access and design considerations. The Association of Convenience Stores published exemplary yearly guides, aimed specifically to inform this reader, using colloquial retail terminology with inset QR codes leading

Figure 7.4: Retail guides

Source: ILC Retail Guides. Reproduced with permission. https://ilcuk.org.uk/?s=retail+guides

to helpful short videos (Association of Convenience Stores (ACS), 2024). The films offered a different medium and angle showcasing best practice by illustrative footage, interspliced with a small number of static slides reinforcing positive statistics around the commercial benefit of focusing on an ageing customer. Although there continues to be a stubborn disparity in some attitudes towards an ageing population, nuanced reframing (such as the case study of OXO kitchen appliances) can result in a slow but steady change in culture.

The timescale for reading and watching each guide and film was set at approximately six minutes long, important for busy retailers who may be the sole proprietor. The format specifically for the guides was a set template: introduction, headline facts, why this matters, what you can do with further information and credits. Language for both films and guides was written by a retail specialist and honed by a briefed copywriter to ensure the diction was accurate. Graphics were carefully considered drawing on

influential exoteric illustrations to convey complex information directly and simply.

The release of each guide and film was supported by a press release and timed to coincide with an upcoming relevant event, ensuring as much traction as possible. Social media was activated in parallel to amplify messaging; if an organisation was using a guide or film, this would also be escalated as this reinforced provenance.

Implications

This chapter raises some important implications for older people, hospitality and retail businesses and policy makers. Regular visits to local hospitality venues and retail shops can help to preserve older people's independence at home and contribute to their social and emotional well-being. For hospitality and retail businesses, the growth of the silver market and spending by older consumers (aged 60+) are set to rise from 54 percent (£319 billion) of total consumer spending in 2018 to 63 percent (£550 billion) by 2040 (ILC-UK, 2023a). How hospitality venues and retailers recognise this growth opportunity and proactively offer products and services that fulfil the social and experiential needs of older people will be vital for business sustainability. Finally, it is crucial that local and national policy makers recognise that not all older people will enjoy an increase in spending power, and living into older age does not necessarily equate with living a healthy or happier later life. How to engage the commercial sector in rebuilding the community infrastructure and co-delivering vital social and healthcare services should be of the priority.

Some policy considerations include:

- Extend local authority food voucher schemes to include meals at hospitality venues.
- Utilise hospitality and appropriate retail venues in supplementing the role of the traditional community centre, or by replacing those in areas where these centres no longer exist, in supporting social connections within local communities.
- Offer tax relief for age-inclusive venues to encourage community engagement and participation and in recognition of the social value of hospitality and retail businesses for community well-being.

Research implications and future research

The benefits of older adults participating in hospitality activities have been tentatively explored in the US (Cheang, 2002; Rosenbaum et al, 2007) and in the UK (Dunbar, 2016; Thurnell-Read, 2021). These studies suggest that

older adults congregate frequently at hospitality venues providing structure, meaning and opportunities for them to engage in personal expression and, potentially, helps form relationships with other customers and employees as a replacement for lost social resources, as well as a means of reducing feelings of loneliness.

However, multi-disciplinary work is needed to further explore the relationship between ageing, hospitality and retail businesses and social support; for example, to understand whether and how a consumer's sense of attachment to place, whether a hospitality venue or a shop in the local community, enhances their social support network.

There are research gaps especially in the experiential economy to be addressed. While there are many global best case practice examples of retailers addressing issues within the ageing population, the longevity of these is short lived and sporadic.

The UK Garden Centre industry model, as an evidenced exemplar, represents a successful retail sector in understanding an older customer. This industry consistently aims higher than the legislative minimum in, for example, car space, accessibility and navigation around a store, toilet provision and customer service and might be regarded as a retail model.

Conclusion

To conclude, this chapter reflects the findings of the Hospitality Connect and Healthy Retail projects to enhance our understanding of the opportunities for hospitality and retail businesses to play an influential role in supporting social connections and facilitating ageing well in the community. Both have provided practical and implementable solutions co-developed with older people and other key stakeholders to help businesses play a more influential role in supporting social connections among older people. The ability to live independently and remain connected within local communities offers a wide range of benefits not only for older adults but also for society as a whole.

The UK government's loneliness strategy emphasises the importance of community infrastructure and developing interventions to tackle issues relating to social isolation and loneliness. It is possible that the hospitality and the retail sector, as important constituents of community infrastructure, could play a leading role in helping older adults become more socially connected and to age well in place.

There is evidence that the psychosocial impact of the COVID-19 pandemic left its mark with many older adults remaining anxious about going outside and interacting with other people. Many still report feelings of social isolation and loneliness (Age UK, 2021). Although it is widely acknowledged that older people and the hospitality sector have been badly affected by COVID-19, the opportunities for mutual support and creating

resilience between them have only been tentatively explored through the Hospitality Connect and the Healthy Retail projects presented in this chapter. Further evaluative research and evidence of impact is needed to demonstrate how businesses could help improve older adults' social connectedness and how older people could contribute to business recovery.

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The toolkit (including links to the short films co-produced with peer researchers and other stakeholders) is an open resource and freely available in digital and downloadable formats via the University of Surrey at www.surrey.ac.uk/hospitality-connect-outputs.

8

Individual environments of ageing: hearing loss

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Introduction

This chapter describes and reflects on a one-year research project, 'HEaring Loss and Place' (HELP). The project explores issues that people with hearing loss experience in various environments, such as in retail, hospitality, and transportation. This research aligns with the Healthy Ageing Challenge theme, 'Creating Healthy and Active Places,' funded by the Research Director's flexible fund, as part of the Healthy Ageing Challenge provided by the UKRI (UK Research and Innovation).

A common characteristic of ageing and a major public health issue is hearing loss (presbycusis). Over half of the population over 55 years have hearing loss, which rises to 80 per cent in people over the age of 70; this is likely to be underestimated, as it is often unrecognised or ignored, and a person may not present to healthcare services (RNID, 2022). However, its detrimental impact upon everyday life can be significant. For example, hearing loss is linked to negative health and wellbeing outcomes such as mortality, depression, falls, and reduced communication, social participation and connectedness, activity, independence, increased loneliness, and isolation (Donovan and Blazer, 2020; Prieur Chaintré et al, 2024; Wang et al, 2024). Further evidence reported in *The Lancet* (Livingston et al, 2024) highlights the importance of 'good hearing' and that acquired hearing loss has been identified as a major modifiable risk factor for developing cognitive impairments and dementia. Despite evidence of the benefits of addressing hearing loss, many age-related cases go untreated, reflecting public misunderstanding of its importance. While hearing aids are the traditional solution, making environmental changes can also improve hearing clarity.

Hearing aids are used to amplify sound; they make sounds louder and clearer, reducing the impact of hearing loss, but they do not make hearing perfect. Research has shown that modern hearing aids can filter out some unwanted noise, but they cannot eliminate background noise (Auerbach and

Gritton, 2022). People fail to use hearing aids for many reasons, including stigma, embarrassment, perceived ineffectiveness, poor past experiences, and discomfort from poor fitting (Houmøller et al, 2022; da Silva et al, 2023). Hearing aids can also take time to get used to, for example, sounds can seem too loud, and the noises can overstimulate the person wearing them, deterring use (RNID, 2024). Additionally, individuals may also be unaware of technological advancements that have addressed some of these issues, highlighting again the need for better education and awareness around hearing loss and potential solutions. Hearing aids may not always be the answer to problems caused by background noise, and here we therefore posit the need for 'community responsibility' in which the sources of such issues are identified and then addressed where possible. We therefore adopted a co-produced, collective, and collaborative approach to identify challenges and to develop a set of tailored guidelines to help address these, applicable across a wide range of public spaces. This was inspired by previous initiatives in which retail stores reduced noise during certain times of the day to offer quiet shopping times for individuals living with autism and dementia (Manning et al, 2023).

Evidence shows that many older adults with hearing loss withdraw from social interactions, often struggling to hear conversations in noisy places like shops with music, cafes with machine and crockery noise, and transport hubs with vehicular noises and tannoy announcements, even when using hearing aids (Oxenham, 2018). Being unable to hear can lead to embarrassment, exclusion from conversation, and can result in the withdrawal from, and avoidance of certain places (Baiduc et al, 2023; Lu et al, 2024; Prieur Chaintré et al, 2024; RNID, 2024). Even with this evidence, there is often a failure to address the cause of such detrimental impact in public places. This indicates a lack of awareness and/or understanding of its impact on individuals with hearing loss and by public-facing business sectors. Through discussions with older adults, we identified a need for more information about the experiences of people with hearing loss in public spaces and mechanisms to share this knowledge with the retail and other sectors to address these issues. To achieve this, focus groups and interviews were conducted, and people with hearing loss filmed environments that posed difficulties with hearing. This research presented an opportunity to use a participatory approach and to co-produce knowledge about this issue, and to then co-design a set of guidelines between people living with hearing loss and the retail sector, designed to improve the experiences of older people living with the condition.

A co-production approach

It is well established that participatory approaches to exploring healthy ageing issues with older populations, including using co-production as part of such strategies, can be beneficial in developing better environments for

older people (Durose et al, 2017; Buffel, 2018). We set out to explore the experiences of those living with hearing loss in public and retail spaces, to formulate preliminary guidelines based around these conversations, then to further debate and refine these guidelines with various stakeholders, namely people with hearing loss and retailers. Our concept here recognises that older people with hearing loss are also entitled to activity and engagement in society, in everyday life-spaces and places (Hodge, 2008), and that this has a positive impact on their physical and mental health. Shopping, outdoor environments, travel, and being able to sit in cafes, in a town centre for example, might contribute to beneficial social interaction (Phillips et al, 2021).

Place-based research and hearing loss.

Research highlights specific place-and-situation-specific examples of the challenges older adults with hearing loss face, such as having to raise their voice in noisy restaurants, which can reduce their willingness to spend time and money there (Bottalico et al, 2022). Nevertheless, there remains a paucity of research in this area, especially with respect to objective measures of the effects of noisy environments upon the person with hearing loss, and a lack of actual place-based research (for example, as in real locations such as cafes). Additionally, few initiatives involve collaboration between businesses and people with hearing loss to identify and address these issues. Current research has not led to meaningful change, as many public spaces remain noisy and non-inclusive. This stagnation likely stems from businesses' lack of awareness about the challenges of hearing loss and how to address them.

Hearing speech in noisy environments

Hearing loss in ageing tends to be a gradual deterioration in sensory sensitivity, with most people seeking help from audiology services when they notice hearing difficulties when trying to understand conversations in noisy environments. This is especially the case when there are multiple people speaking (Lorenzi et al, 1999; Kochkin, 2000). Speech intelligibility is affected by factors such as the level and quality of the speech signal, the type and level of background noise, and reverberation, and has detrimental effects on individuals' cognitive performance and wellbeing (Abbasi et al, 2020; Zhou et al, 2023; Bergefurt et al, 2024). Listening to speech in a noisy environment poses difficulty for people with impaired hearing.

The impact of noisy environments on cognition and attention

Research evidence has highlighted how noisy environments might detrimentally affect a person's cognition, for example the ability to hold

a conversation or for information to enter memory. This is because the extraneous but salient noise captures and directs attention away from such behaviour towards the irrelevant noise instead. The brain has limited processing resources, so attention must be selectively focused away from irrelevant information within the environment (for example, background noise) to more relevant information, such as the content of a conversation. In older adults, this ability to resist distraction from irrelevant noise tends to be reduced, and this is exacerbated further if a person has cognitive impairment or dementia. This means that noise in cafes, for example, can be far more distracting for some older adults compared to what it is in those who are younger, making it more difficult to concentrate.

Aims

In this novel methodology, we supplemented information gained from the qualitative aspects of the study with objective evidence from the studies exploring the ability to hear speech in noise and the impact of noise on cognitive and attentional status, to aid understanding of the issues of environmental noise on hearing and how they might be addressed using co-production.

The study explored the experiences of older adults with hearing loss in noisy spaces, focusing on impacts to their daily lives, wellbeing, and cognition. The aim was to co-produce guidelines to enable businesses to create more inclusive and accessible environments for individuals with hearing difficulties, improving customer satisfaction and loyalty. This was done by integrating academic and experiential evidence, and fostering collaboration among researchers, businesses, and older adults. This approach aimed to ensure businesses adopt strategies that effectively support individuals with hearing loss while promoting sustainable, widespread implementation.

Methodology and objectives

We determined that a multi-factorial method with the values of co-production at its heart was needed. An interdisciplinary team of psychologists, gerontologists, and audiologists and other researchers was assembled, together with older adults with lived experience of hearing loss and businesses, from large retailers to smaller establishments.

We initially prioritised a review of academic literature to inform the focus groups and interview questions, and to produce a lay version of current evidence to discuss at the workshop that was organised to develop the guidance. This was necessary to understand the difficulties people with hearing loss experience in a variety of noisy environments, how these problems may vary in different locations, and their impact on a person's life, to identify gaps in the subject area and to explore any available best practice guidelines.

In addition to the literature review, film footage was captured using cameras or '*Rayban*' recordable glasses worn by older adults with hearing aids in various businesses, such as shops, hospitality venues, and public transport, to understand their experiences in noisy environments. The goal was to create a repository of short films showing firsthand hearing challenges often overlooked by those with normal hearing. These films highlighted noise issues across different settings and the impact of small adjustments, and aimed to encourage businesses to improve auditory conditions in commercial environments. Ten short films (one–five minutes each) were recorded, showing older adults' hearing experiences across four real-life locations: retail environments, cafes/restaurants, public transport, and another chosen by participants. The aim was to identify challenging environments and highlight issues affecting enjoyment, decision-making, attention, memory, or task focus.

The next aspect of the study employed interviews and focus groups to obtain more detailed information about the lived experiences of people with hearing loss, ensuring that a greater level of nuanced information could be shared with businesses. Focus groups and individual interviews were convened with a range of individuals including people from local 'hard of hearing' clubs in South Wales, and online interviews with older people with hearing aids internationally. These findings, along with the outcome from the review of the literature and evidence from filming, provided the first iteration of a set of guidelines which were used to inform workshops with retailers, hospitality, transport, and those with hearing difficulties.

An ambitious aspect of this research was to identify hearing, cognitive, and attentional challenges in noisy environments for people with hearing loss. This was a laboratory-based approach that combined objective and subjective measures. Older people with hearing loss were invited to participate in both the hearing and cognitive part of the study.

We first explored the challenges people with hearing loss face in understanding speech in the presence of noise, comparing their subjective experiences with objective findings. This was conducted in a soundproof booth and delivered via headphones. The study measured how well people could understand speech in noisy environments: one where both the speech and noise came from the same direction, and another where the speech came from the front and the noise from the side. Speech stayed at the same volume, whilst noise was adjusted. Participants repeated back a sentence, or as much as they were able to hear, as well as giving a subjective score of listening.

Second, we explored attentional and cognitive function in both noisy and quiet environments; specifically, how effectively people were able to attend to information and filter out irrelevant, distracting noise, to concentrate on tasks – an important function when out and about in the environment. These included Cognitive Change Index (Rattanabannakit

et al, 2016); Participant Demographics (to capture age, level of education, if hearing aids were worn, etc.); Listening Effort questionnaire (Hughes et al, 2021); Hospital Anxiety and Depression Scale (Zigmond and Snaith, 1983); Warwick Edinburgh Wellbeing Scale (Tennant et al, 2007); and the Montreal Cognitive Assessment (MOCA) (Nasreddine et al, 2005), to gain a holistic measure of general cognitive function and wellbeing. iPad-based tests included three tests patented by Cambridge Cognition: 1) Match to Sample which assesses attention and processing speed; 2) Multitasking Test to assess the person's ability to manage conflicting information; 3) Rapid Visual Information Processing which measures sustained attention. This was followed by two further iPad tests, using 'The Multi Item Localisation Tasks' (MILO) (Thornton and Horowitz, 2020), a visual test of distraction. The tests were completed in the same order for all participants, in a quiet room and in the same room with cafe style noise – the order of condition was counterbalanced.

Lastly, we organised a workshop to explore themes from focus groups, interviews, and literature, using filming evidence to develop practical guidelines for businesses. Participants included shopfloor workers, an audiologist from the private sector, and people with hearing impairment. The workshop explored and ranked key themes, contributing to co-produced guidelines for the retail, transport, and hospitality sectors.

Findings and discussion

The HELP project was a co-produced multi-disciplinary, multi-methodological study that used a combination of laboratory-based and real-life settings that collected subjective, experiential, and objective knowledge and data. The findings identified key factors in hearing and environmental noise that impact on older people's health and wellbeing within wider social contexts. Overall findings provide research-based evidence which helps to explain people's experiences and raises awareness of the owners and users of important social/retail spaces in order that they can improve the environments to support older adults with hearing loss, allowing them to be able to engage fully in a variety of environments. Managing hearing loss required an approach which championed inclusivity and accessibility for hearing impaired older adults in social and physical environments that included retail, transport, and hospitality sectors. The literature review provided information and practical advice for protecting hearing in daily life, such as eliminating exposure to loud noise, having regular hearing checks and resting one's ears to allow recovery, choosing and using hearing aids effectively, getting advice on such things as getting the right fit, understanding the aids, gradual adaption, regular maintenance, and the importance of staying updated with technological advancements.

Filming occurred in various settings, like cafes, public transport, and community groups. Participants reported background chatter and sound reverberation as loud and intrusive. Examples of experiences included music being played over the speaker and it being misheard as someone shrieking! In one of the videos the noise of crockery being stacked is a loud intrusion into the ambient talking background. At a train station a loud announcement is distorted by the echo created by the high rooved building. Another is on a train where it is hard to decipher the formal train service announcement from the chatting of the passengers. The videos reveal that the sounds were distracting to conversation and intrusive into the enjoyment of the space. In the settings on public transport, not being able to hear the announcements could mean people miss their train service or miss their stop. These are very useful resources that can help people re-design such environments, particularly of note is the need to reduce the reverberation found within inside spaces. These films are impactful as the experiences they depict may be overlooked by those with normal hearing.

The focus groups and interviews painted a vivid picture of the challenges faced by older adults with hearing impairments. The impact of hearing loss on everyday communication and social interactions was pervasive and for some, life-long, even generational. Participants emphasised the need for more inclusive acoustic environments, better hearing aid access, and practical solutions for the challenges faced by individuals with hearing loss, such as raising awareness about the need for clear speech in retail environments or other crowded spaces. Many described in detail the cognitive effort required to filter out noise and multitask with hearing aids, sharing specific challenges in places like transportation hubs, hospitals, and during phone calls.

Throughout, participants also offered practical advice, helping to inform the first draft of guidelines for retailers and other stakeholders. These included: promoting face-to-face communication, providing written information and online resources, improving acoustics, implementing loop technology and maintaining it, incorporating visual cues, and offering low-sensitivity options. The findings emphasised the need for better understanding, support, and accessibility for individuals with hearing loss, as well as the importance of using technology to improve their hearing experiences. Raising awareness to create inclusive environments that address their specific needs in retail, hospitality, and travel settings was highlighted as crucial.

Despite the difficulties encountered in recruitment the collaborative workshop attempted to develop guidelines that align business practices with user needs. It sought to improve service satisfaction by bringing together retail staff, audiologists, and people with hearing loss based on their lived experiences. Retail workers provided insights into shop floor operations,

while audiologists contributed professional expertise from commercial settings, including larger retail spaces.

During the workshop, the research team presented a draft of guidelines based on themes from the literature, focus groups, interviews, and films. The guidelines reflected personal experiences of hearing loss. Descriptions of environments with poor acoustics, excessive background noise, and lack of provision such as hearing loop systems were seen as major barriers to communication at times. Examples given from various stores, cafes, and other scenarios, such as loud music in large DIY outlets, underscored the importance of considering acoustic design and implementing measures like quiet hours to create more inclusive spaces. This workshop allowed businesses to find out more about the challenges faced by older people with hearing loss. Suggestions from participants included lip-reading classes and clearer communication practices.

Prioritising accessibility for an ageing population was seen as essential for enhancing customer satisfaction and loyalty. The underlying lack of awareness about hearing loss and the need for education and advocacy were also discussed, and possible solutions included developing initiatives like 'general inclusivity scores' to incentivise businesses to make adaptations, offered as a possible solution, hand in hand with enhanced guidelines and training to create more inclusive environments for all customers, regardless of their hearing abilities.

Participants emphasised the need for continuous efforts to raise awareness, invest in future-proofing measures, and adapt to evolving challenges, such as the increasing vulnerability of younger generations to hearing loss due to personal listening devices. The refined guidelines which emerged focused on eight main areas to support people with hearing loss in retail, hospitality, and transport setting. These include:

- optimising communication spaces through face-to-face interactions and clear sight lines for customer interactions (every effort should be made to be face to face with the customer; includes not shouting, speaking slowly and clearly);
- considering acoustic challenges – by using sound-absorbing materials;
- environmental adaptions – establishing quiet zones; implementation of 'low sensitivity' mornings in shops and hospitality venues by turning off background music and reducing ambient noise;
- incorporating visual cues such as signage, displays, and digital screens to supplement spoken information (ensure there's sufficient lighting to enable lip reading – dimly lit environments can be challenging);
- implementing loop technology (ensure that a designated person at the business oversees this and teaches others how to use it successfully – on many occasions these do not work);

- strategic seating away from noise sources (when booking or being booked into a space, routinely ask people about their hearing requirements, whether that is online or in person). Prioritise seating arrangements that place individuals with hearing difficulties away from busy kitchens or loud equipment in hospitality environments. (Being seated in a corner spot or with backs to a wall can often help, especially when using the directional settings which are a common feature with some hearing aids.);
- invest in staff training programmes to ensure employees are equipped with the knowledge and skills needed to provide excellent service to customers with hearing difficulties (by raising awareness in the retail or hospitality space, you raise awareness with the public more generally about these issues);
- accommodating changing demographics (acknowledge the prevalence of hearing loss in the population and proactively cater to the needs of this demographic, recognising the potential commercial benefits of inclusivity).

The post-workshop feedback indicated not only greater awareness of some of these issues being aired among the group, but that the discussions have been taken back to retail environments.

Challenges

Reflecting on challenges and lessons learned may improve experiences for people with hearing loss, businesses, and researchers, while strengthening future collaborations.

Unforeseen challenges included delays in approvals to start the study due to General Data Protection Regulation (GDPR), ethical, and safety concerns and issues with filming in public. Feedback from researchers and older adults with hearing loss led us to co-create a booklet outlining guidelines for public filming, including acceptable content (acceptable images), emergency procedures, and contact details. Participants were provided with the booklet before consenting to filming. These steps ensured ethical and GDPR compliance.

Another challenge was that some participants struggled with technology, particularly the 'recordable glasses.' The positioning of the recording alert light was on the arm of the glasses and just outside the periphery of vision, some individuals were unsure if they were recording, and would remove them to check, creating unstable moving images. Some participants also lacked confidence filming in public, resulting in shorter videos, reluctance to speak during filming, using written notes instead.

Business-related challenges included permissions to film; businesses were not opposed to participants filming, but sometimes the person in charge did

not always feel they had seniority to allow filming, sending requests up the chain of command that were not responded to, despite follow-up.

There were challenges relating to recruitment to the workshops for both older adults and businesses. Since COVID-19, older adults were reluctant to join such groups, despite efforts to establish them. Regardless of efforts like flyposting, and reaching out to local businesses, including opticians, audiologists, retail, and hospitality chains, the workshop in West Wales was cancelled due to low response, but efforts in South Wales yielded better results. However, in general, emails to large businesses went unanswered, highlighting their need for a dedicated research liaison person to facilitate such collaborations. Switching to cold calling and in-person visits proved effective but time-consuming, generating interest from managers and employees. Managers reported they required head office approval, some employees reported they could only attend on days off, and felt unsupported, despite being interested, and businesses failed to follow through on staffing commitments to attend. Ethical approval delays pushed business outreach to December 2023, conflicting with the busy holiday season and January sales. While initial co-production with businesses was challenging, once involved, businesses, older adults with hearing loss, and academics collaborated successfully to create guidelines.

Impact

This study attracted interest from over 150 people, tantamount to the prevalence of hearing loss with ageing. Many were unaware of its link to cognitive impairment or dementia and shared this insight with family and friends who also had uncorrected hearing loss. People often suspected they had hearing loss, but most underestimated its extent, especially in noisy settings, prompting many to seek NHS audiology appointments or private hearing assessments for hearing aids.

This research also identified many ways in which shops and businesses can improve the experience for people with hearing loss at little or no cost. Businesses participated in a three-hour workshop with older people, creating and ranking a list of actionable items by importance and discussing how to implement the guidance. The findings from the literature review, evidence from those with lived experience, and evidence from the cognitive testing and the impact of noisy environments on ability to focus on tasks, such as paying attention and cognition, led to the co-produced guidelines providing actionable insights for businesses to create more inclusive spaces, in turn promoting mental health, and facilitating greater social participation for those with hearing loss.

The guidelines will help businesses make impactful changes to create more inclusive environments for older people with hearing loss, improving their experiences in shops, hospitality venues, and local transport. This includes

staff training for communicating with people with hearing loss, improving acoustics (use of soft furnishings), reducing excessive background noise (reducing music volume), and addressing the lack of provision of hearing loop systems, and ensuring someone is responsible for keeping up the maintenance, and implementing quiet hours.

Conclusion

This study highlights the challenges faced by individuals with hearing loss in noisy environments and their impact on cognition and wellbeing. By bridging the gap between qualitative and objective research with personal narratives, the co-produced guidelines aim to address the shortcomings of current interventions (such as hearing aids) in effectively mitigating the challenges posed by noisy environments by providing a tool for businesses to create more inclusive spaces, in turn promoting mental health, and facilitating greater social participation for those with hearing loss.

Together, by fostering a culture that values hearing protection and supports those with hearing loss, we can advocate for a less noisy, more understanding, and inclusive society. Each step we take towards reducing noise pollution and increasing auditory health awareness benefits each of us, including those with hearing impairments, and enriches our lives and those of future generations.

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9

Sustainability in cognitively supportive home design: insights from research on designing homes for healthy cognitive ageing (DesHCA)

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Introduction

Existing research on designing homes for healthy cognitive ageing has not systematically addressed older people's own preferences, nor the constraints and facilitators for the housing sector, and the many earlier proposals for addressing older people's housing needs have not proven scalable (Bowes et al, 2023).

DesHCA's research on designing homes for healthy cognitive ageing aimed to produce scalable, research-informed designs for both new-build and retro-fitted homes that can support cognitive ageing in place. It foregrounded the perspectives of older people, examining their own views about the housing they have and the housing they want, and worked with partners including older people, housing designers, providers and builders to test proposed designs across a wide stakeholder group. Business involvement was vital for the project, given the aim to produce practical solutions for implementation. The research design emphasised co-production of designs that would have real world applicability.

The purpose of this chapter is to address the problem of delivering supportive design for cognitive ageing that is sustainable socially, environmentally and economically and that supports people living with cognitive change to age in the place that is right for them and therefore live the lives they wish. We provide empirical evidence that informs designs that can be used in a complex system of housing provision and that accommodates the diversity of requirements and aspirations of older people.

Background

DesHCA focused on the issue of ageing in the right place, something that, as we age, we all desire, but few of us experience (Sixsmith et al, 2017; McCall et al, 2019). Older people experiencing cognitive change can be supported more effectively in a familiar, appropriately designed environment, and there is growing international consensus that designing for cognitive impairment is desirable in the light of worldwide challenges presented by population ageing that brings increasing numbers of people experiencing cognitive change (Fleming et al, 2022). In the UK and other developed countries, housing shortages and the shortcomings of existing housing provision are prominent policy concerns (Piddington et al, 2020; Peace, 2022); thus, delivering housing that is appropriate for current and upcoming changes in the population, and that is sustainable in the context of the climate crisis, has become a pressing concern.

It is known that 85 per cent of older adults would prefer to remain in their own homes, even if they develop physical, sensory and/or cognitive problems (Alzheimer's Society, 2016). However, homes may become more difficult to live in if ageing brings cognitive impairment that can include changes in processing speed, memory, reasoning and executive function (Deary et al, 2009). Cognitive change can amplify the impact of issues of deprivation and poor physical health, and lead to people leaving their homes for alternatives perceived as less desirable such as communal residential settings. For 7 per cent of the population, cognitive changes may include dementia, a major challenge for ageing societies, with UK care costs currently amounting to £34.7bn per year, predicted to increase to £94.1bn by 2040 (Wittenberg et al, 2019).

Previous research has identified that modifications to the home environment may make a difference to life with cognitive change. However, the evidence base remains weak and previous research has several limitations (Bowes et al, 2023). Firstly, older people's own views have been neglected (Mulliner et al, 2020), and the business sector perspective has hardly been considered. In particular, volume builders, who supply 79 per cent of UK housing provision, are largely absent from the research record. That they have not embraced the idea of building supportive housing may result from scepticism about innovation, perceived high costs and reluctance to depart from their existing business models and approaches. While some social housing providers have engaged in limited, experimental developments, they also perceive high costs (Centre for Ageing Better, 2019). Secondly, where innovation has occurred, it has been on a small scale, and there are few examples even of city-wide innovation. Where developments have been delivered at this scale, they have been publicly funded, social housing developments, again with notable absence of commercial builders (for

example, Danziger and Chaudhury, 2009, a Canadian example). Thirdly, while there are many examples of attempts to produce housing for older people that has built-in support for age-related changes (Peace, 2022), these have been focused on physical and sensory changes, with cognitive changes rarely considered.

Homes mediate older people's cognitive ageing and their opportunity (or lack of it) to enjoy healthy ageing. The home and the neighbourhood can be associated with poorer physical and mental health, linked to fewer opportunities for physical exercise, reduced access to healthy diet, reduced sociality and poorer housing, often with precarious tenure and poor physical amenities. Higher unemployment, lower quality employment and lack of educational opportunities are also common. All these issues make cognitive ageing less healthy and risks of developing dementia greater (Livingston et al, 2017; Gale et al, 2019). Therefore, DesHCA takes a critical ecological theoretical approach (Keating and Phillips, 2008), focusing on the interplay between individuals and their environment in the broadest sense, and understanding the impact of these wider influences. From this perspective, healthy cognitive ageing, or cognitive sustainability, links to sustainability of all aspects of the individual's environment.

Methods

To deliver DesHCA's aims, a multi-disciplinary academic team with partners from the housing sector used a range of methods to inform the development of practical tools to support policy and practice change.

As a tripartite collaboration between researchers, older people and the housing sector, business involvement in DesHCA operated in three main ways. Some business partners were integral to project activities, supporting the Virtual Reality (VR), design and electronic monitoring work and the Serious Game development (see later in this chapter). Others had an advisory role and enabled the researchers to link with wider networks. Three businesses generously allowed researchers to spend time understanding how they engage with cognitively supportive design. Still others were important for developing impact activities and continue to be so after the end of the research.

The academic team included social scientists and architects and two self-identifying older people who acted as community researchers. The multidisciplinarity of the academic team, the participation of community researchers and the close working with business reflected the principle behind the project of working across sectors and producing research findings relevant to the real world of delivering sustainable housing.

Table 9.1 summarises the research methods used, the number of participants and the contribution of each dataset.

Table 9.1: DesHCA research methods

Dataset	Number	Process and purpose
Literature review	46 items	A systematic review of evaluated home design initiative for people living with cognitive change (Bowes et al, 2023).
Secondary analysis of large datasets	13,000 people	ELSA, Scottish Household Survey and Scottish House Conditions survey data analysed to provide an overview of the current state of housing for older people across the UK, with a particular focus on its ability to support us as we age (Davison et al, under review).
eDelphi panel	122 older people, professionals in housing and older professionals in housing	The panel worked through three rounds of consensus building to identify, specify and understand in depth outcomes of supportive home design (Bowes et al, 2024).
Creative mapping	54 older people	Older people were asked to make maps of their homes and to use these to talk about what they liked and disliked about their homes, and how they had changed, or might change them, to be more supportive (Lovatt et al, under review).
Passive sensing	10 homes + 3 pilot homes	Passive sensors were installed for periods of 112–343 days to gain data on the home and people's use of it. Measurements included light, heat, humidity, air quality and occupancy.
EADDAT home audit	356 people living with dementia	UK-wide questionnaire using the Environments for Ageing and Dementia Design Audit Tool (EADDAT) (DSDC nd) to ascertain the supportive or unsupportive nature of current housing of people living with dementia.
Professional interviews	21 sector professionals	In-depth interviews with professionals across the housing sector to ascertain their views about and experiences of delivering home designs that could support healthy cognitive ageing (Jagannath et al, under review).
Topical-ethnographies of design practices	3 practices	Immersive research with three practices to observe design processes in action, and to understand challenges and facilities on the ground (Njoki et al, under review).
VR design workshops	94 older people and housing sector representatives	The home designs, informed by findings from across DesHCA, shown in VR format to three rounds of workshops. Each round of feedback informed the next iteration of the designs.
Feedback workshops	49 stakeholders	Knowledge exchange events held to gain stakeholder feedback on findings and outputs as they developed, and to address particular issues, such as costs and benefits.
Serious Game workshops	128 older people and housing sector representatives	Developing and testing a Serious Game, designed to support decision making about housing at all levels. The Game drew on findings from across DesHCA, through several iterations, testing its usefulness for older people, housing providers and designers (McCall et al, 2024). Details of the Serious Game are in the 'Solutions and implications' section later in the chapter.

The processes of analysing different datasets were complemented by triangulation discussions among the team, in which common themes, complementary findings and findings that challenged across datasets were explored. While the publications from DesHCA generally centre on one or two datasets, they are each informed by this triangulation work.

Findings

Limitations of current homes and older people's aspirations

Many of the findings of DesHCA provide insight into the current homes occupied by older people, and their aspirations for their homes in the future.

Analysis of English Longitudinal Study of Ageing (ELSA) data revealed that current homes in which older people live frequently include modifications intended to support ageing in place: 56 per cent of ELSA participants reported having one or more 'adaptations' in their homes. The adaptations identified in ELSA are limited, but can be grouped into three categories, mainly focused on adaptations for physical accessibility or personal care. These are property-based adaptations, such as wider doorways, ramps to front doors; movement-based adaptations such as stair lifts and handrails that help people get around the house; and bathroom adaptations, such as adapted baths and showers. Analysis showed that about 93 per cent of all adaptations were bathroom adaptations, focused on personal care needs. Adaptations appeared to be partly personal, relating to individual impairments, but were also linked with the age of the building, with those built between 1919 and 1944 being most likely to have had adaptations. It is likely that newer properties were already relatively accessible and that older properties were more difficult to adapt, though the data cannot demonstrate this. Notably, people living with dementia were three times more likely to have a home adaptation to support their physical function than to support their cognitive impairment.

In that context, the e-Delphi panel considered what would be desirable outcomes of supportive housing and examined the meanings of different kinds of outcomes for different stakeholders (Bowes et al, 2024). Five key outcomes emerged as important. These were staying independent, physical activity, enjoyment, feeling safe and having an adaptable, flexible home that could be changed to provide support as needed. There was widespread agreement that homes should be aesthetically pleasing, and provide support for people with physical, sensory and cognitive challenges, though less agreement that support for cognitive challenges was possible.

In what we believe to be the first such survey of the homes of people living with dementia across the UK, the Environments for Ageing and Dementia Design Assessment Tool (EADDAT) (DSDC, nd) home audit findings demonstrated the limitations of current homes for providing cognitive support. The data confirmed that the proportion of participants

living with physical, sensory and cognitive impairments increased with age, but that age was a poor overall predictor of both living in a more supportive home and making adaptations to the home. The oldest were the least likely to have adaptations in their homes. It appears, therefore, that homes in the UK are not generally supportive for people ageing with cognitive change, and unlikely to be delivering the outcomes that the e-Delphi panel agreed were desirable. The survey also explored features of homes and changes that had been made, classifying them according to the extent to which they supported mobility, sensory difficulties or cognitive issues. This analysis demonstrated that, whereas homes were being adapted to become more physically supportive, few cognitively supportive adaptations could be identified measured by criteria used in the EADDAT.

Electronic sensors installed in ten homes monitored temperature, humidity, air quality, light and occupancy over periods varying from 112 to 343 days. These were complemented by qualitative interviews with the occupants to gain insight into why particular patterns of each variable emerged. While this was not a representative sample, the homes included were of varying types, and the exercise enabled objective interrogation of the physical performance of the homes involved. Analysis uncovered multiple potential issues in the homes that could affect the health and well-being of the occupants, including cold and damp (such as conditions likely to produce mould growth); and poor air quality, especially in bedrooms (a concern for cardio-vascular health). Occupants were often regulating heating in ways that promoted these problematic conditions, with problems sometimes exacerbated by building construction, fuel costs and weather patterns. It was clear that without substantial resource, the condition of some houses was not in the control of the occupants. Many of these issues relate to the poor eco-sustainability of existing housing stock and exemplify the fundamental need to recommend solutions that are sustainable in every sense.

In-depth understanding of people's own views about their homes was provided by the 'home mapping' exercise (Lovatt et al, under review). Fifty-four people aged 51–91 were asked to talk about their homes, using a self-drawn map or other illustration, and explain how the home worked for them, their likes and dislikes, and their ability or otherwise to live the lives they wished within the home. They spoke in detail about the layout of their homes, the size and use of spaces, furnishings and aspects of comfort including temperature, light and noise.

The home mapping generated important insights that emphasise the individuality of people's homes, and the need for proposed design solutions to be tailored to the individual and flexible, as changes may be needed. The home was presented as a lifetime project: people regularly make changes to their homes over time, including redecorating, adapting spaces to serve

different functions, adding storage, improving aesthetics and so on. Changes to the home may also be made in response to challenges – but these are challenges across the lifespan, not simply those that may occur in older age. So having small children, a physical injury, family members coming and going may all stimulate change to the home or movement to a home with different features.

Aesthetics were an important consideration that emerged when participants discussed making changes. One prominent finding was the almost universal dislike of adaptations provided by statutory authorities, such as handrails and standard wet rooms. These were considered ugly, and to be visible and stigmatising markers of incapacity associated with older age. Where they could, people preferred to install more attractive supports, and where this was not possible, there were examples of handrails being removed, or supportive bathrooms rejected.

Participants did not think of their homes simply as places of maintenance, where, as long as they could do activities of daily living, that was the limit of the support they required. They represented their homes as central to their quality of life in terms of interaction with others, through hosting family and friends. Thus, the home is a significant social space for older people: this seemed to have been emphasised by the experience of the COVID-19 pandemic, with social interaction being more highly valued and recognised.

The issue of cost was significant and presented by these participants in the context of a cost-of-living crisis. Making changes to the home was considered in terms of affordability, potential disruption and stress, balanced against the potential perceived benefits. Some participants were also constrained by limited possibilities for change in rented homes. And for some people, an element of internalised ageism meant they felt that, as they did not expect a much longer life, changes were not worth making as the benefits would be short-lived.

Professional perspectives

The professional perspectives that emerged from the interviews and the ethnographic work with home design practices identified further challenges in terms of the provision of supportive homes. Processes of building, retrofitting and providing housing are complex, involving multiple individuals, professions and organisations, and ensuring housing is cognitively supportive could be seen as just another challenge, easily neglected as projects work through, and inclined to be taken out of consideration when working with constrained budgets. There was a perception among many that supportive design would inevitably add cost, whether the supportive features related to physical accessibility, sensory support or cognitive support.

At the same time, there was appetite among some professionals for learning about and delivering housing that could support healthy cognitive ageing. This was especially true for social housing providers, but also for architectural practices and building companies. Interestingly, however, professionals did not necessarily see supportive design as something from which they would benefit themselves personally, reflecting a widespread 'othering' of older age and older people (McCall et al, 2024). While there was some scepticism of the potential commercial benefits of supportive design for business, the e-Delphi exercise had confirmed that older professionals were more optimistic that it could create more jobs (36 per cent), more contracts (33 per cent), increased profits (35 per cent) and an enhanced public image (29 per cent) across the sector.

Several barriers to delivery were identified, including a lack of knowledge about supportive housing; few opportunities for enhancing knowledge; lack of opportunities to hear from older people themselves about their preferences as end users; a lack of tradesmen skilled in delivering supportive design; tight budgets and timescales; and contextual changes, including the need to respond to developing policy in the area, notably around the shift to net zero.

Overall, the findings highlight challenges of developing cognitively supportive design that can be delivered at scale. Obstacles include some perceptions that this is not attractive and not core to healthy ageing; the 'othering' of older age, whereby design is for other people; and limited knowledge of and commitment to the potential of supportive design. Cognitively supportive design could sometimes be considered not needed, not wanted, not understood and too expensive. But opportunities also exist, especially where there is existing commitment to developing cognitively supportive design.

Producing new designs

Against this background, it was important that the DesHCA designs were attractive, understandable, practical and affordable for consumers and for the housing sector. To develop designs that fulfilled these criteria and therefore responded to the key challenges for all those involved, DesHCA used a collaborative process of design which enabled older people and professionals in housing to provide feedback on designs and for the designs then to be improved. The first designs consisted of a one-storey house originally developed in response to older people's feedback in the project 'Demonstrating Impact in Housing, Health and Social Care' (Palmer et al, 2024), which preceded and informed DesHCA, and also a two-storey house, of a standard type offered by volume-builders. The designs were presented in VR format, and already included many features widely recognised as cognitively, physically and sensorially supportive from the outset. In response

to feedback, the design was presented using readily available fixtures and fittings, such as could be bought from mainstream outlets, to emphasise that ordinary, accessible materials and objects could be used to provide support.

Using a workshop format, feedback on the designs was sought from older people and housing professionals. Feedback was then collated, and the designs modified for the next round of workshops, with three rounds being held in total. Feedback was extensive: the first round alone produced 1200 lines of comments, including professional commentary on design features; advice about how these could be improved; the relative attractiveness of the designs; how people would live their lives in the designs and what they would need or want to change to suit their current or future preferences.

The feedback emphasised that people's needs evolve and change throughout the lifetime. Aesthetics again attracted frequent comment; the appearance of the home was of considerable significance, and there was clear preference for supportive features to be subtle. Flexibility was important, as participants had different views about how the space could be used and there was a need to accommodate both personal preference and different needs. Participants commented on changes they might make in their own home: while this was constrained in some respects as previously noted, there was developing awareness that small changes could be made at low cost. Throughout, there was an emphasis on supports for physical and sensory impairments, and less comment on cognitive supports, emphasising the need to provide education in this area.

Solutions and implications: delivery at scale

The DesHCA project developed a series of tools to support processes of change, especially the decisions that different stakeholders face in terms of housing, including older people and those who deliver housing across the private, public and third sectors. Collaboratively developed, these tools were closely informed by the empirical results from the research, and all are freely available for widespread use. This was in keeping with the aim for DesHCA to produce accessible, usable tools relevant to the real world of people living at home and to organisations and businesses delivering homes.

The Serious Game (McCall et al, 2024) called 'Our House' supports decision making about housing, and can be used both by people thinking about their own future housing and by housing designers, developers and providers in public sector and business contexts. Starting with a house plan, players work through a series of empirically grounded vignettes of circumstances and incidents experienced by real older people and explore what changes they might make to the home to enable it to be cognitively, sensorially and physically supportive. It was important to include physical

and sensory support, as in reality, cognitive and physical changes rarely occur in isolation. 'Our House' can demonstrate, for example, how a home might need to be changed to support wayfinding or locating objects, or what changes might be needed as a person developed perceptual changes as their dementia progressed. Players are given cost and space constraints and as gameplay progresses, they experience making difficult choices and identifying long term, possibly unintended consequences of those choices. Gameplay promotes both learning and discussion among players and encourages dialogue between people with different roles in housing.

The design principles and features are also incorporated in an interactive VR web viewer, which enables the viewer to tour a one-storey house, and to learn about how the design principles and features can support healthy cognitive ageing. For example, in the kitchen, they see information about the use of transparent cupboard doors which can remind people of cupboard contents, or the use of drawers rather than under-worktop cupboards as these are easier to access with physical limitations. The overall design provides a menu of possibilities, rather than a prescriptive blueprint, assisting users to learn about how their own home, or a home they might choose or develop in the future, might become more supportive. It suggests design features which are generally simple to deliver and low cost and are in keeping with aesthetic preferences that individuals may have. The design incorporates and assumes environmentally sustainable features and materials, including, for example, appropriate ventilation and the use of sustainable energy sources.

In response to demand from research participants, a booklet for the general public was produced: 'Design for lifetime: tips and tricks for creating a home that supports you' (https://www.deshca.co.uk/wp-content/uploads/2023/07/DesHCAs-Hints-and-Tips-Booklet.pdf). The format and tone of the booklet were informed by feedback on successive drafts from older people themselves. The booklet allows a person to consider their own home, and to identify potential modifications that could be more supportive; for example, increasing use of contrast to better support people who may be experiencing perceptual changes. As with other DesHCA outputs, the focus is not solely on cognitive supports, but sensory and physical supports are included. The booklet emphasises the possibilities for small changes to make big differences, and changes that are simpler and cheaper to implement, using mainstream products.

For professionals, additional technical guidance and professional support are delivered through the design services of the Dementia Services Development Centre at Stirling University (https://www.dementia.stir.ac.uk/), which extend beyond home design to the design of public spaces and communal living environments.

The tools are significant for delivering DesHCA's aim to deliver designs that can be implemented at scale. Given the challenge and opportunity of

population ageing, reliance on innovation delivered in small-scale projects, such as have characterised the social housing sector (for example, Evans et al, 2007), or development of specialist older people's housing for an affluent elite (Homeowners' Alliance, nd), will be unsustainable and will not deliver the necessary ageing in the right place for the older population. Solutions are needed that can support improvement of the existing housing stock, in which most people live, and ensure that newly built housing is relevant for population needs.

DesHCA findings help identify the routes to change that are needed to deliver these necessities. Using a process of realist analysis (Pawson, 2013; Bowes et al, 2025), mechanisms of change that can deliver cognitively supportive housing at scale can be identified.

First, our findings concerning lack of knowledge and awareness of the potential of cognitively supportive design suggest that widespread dissemination of the knowledge that people need and want is a significant first step. Ensuring that housing professionals and consumers are aware of the potential of cognitively supportive design will help support stakeholders in their own aims, delivering homes that people want to live in and supporting them to live the lives they wish in the place of their choice.

Second, housing professionals and others demonstrated their desire to use design knowledge in their practice. Accordingly, the development of training across multiple professionals is revealed as an essential mechanism that can improve delivery at scale.

Third, findings revealed a need to shift thinking about the whole process of changing homes as people age. The language and stereotypical perceptions of 'adaptations' emerged as a barrier for older people to think about making changes to their homes to support healthy ageing. Recognition that homes change across the lifespan needs to be built into approaches to knowledge dissemination and professional training to challenge the negative stereotypes and promote recognition that changes can be both supportive and pleasing.

Fourth, the promotion of small changes chimed well with both professional and older people's concerns with the potential costs and disruption of large changes to existing housing stock. The focus of innovation does not necessarily need to be on whole houses or whole new developments, but there is potential for small, cheap, incremental changes that have been shown to improve quality of life for people living with cognitive (and other) changes as they age.

Fifth, beyond dissemination of knowledge, there is a need for specific tools and technical support that can demonstrate, in language that professionals engage with daily, how cognitively supportive design can play out in practical terms. Similarly, for older people, clear information about measures that can easily be implemented in recognisable and familiar environments has been widely welcomed, emphasising the need for translation of research findings

into materials that are evidence-based and engage with people's own views of the world and ways of operating professionally or personally.

Sixth, to address challenges in the housing sector, research has to engage with policy and practice. Ideally, regulations about housing in the future will incorporate the need for cognitive support to be built in (as indeed some physically supportive features are already), as there is increasing recognition of the unsustainability of existing practice. At lower levels of policy and practice, such as in the missions of social housing providers, or the strategies of home builders, recognition of the benefits of design innovation will assist with mainstreaming. Thus, for example, social housing providers will not be installing 'adaptations' that a subsequent tenant requires to be ripped out because they perceive them as ugly and stigmatising, and builders will be able to promote the longevity of a cognitively supportive home as a selling point.

Seventh, and finally, policy and guidance influence at the highest level of government policy will safeguard cognitive support as a core aspect of future housing strategy.

Conclusions

DesHCA aimed to develop practical, cognitively supportive home designs that can be delivered at scale, and that are affordable and appealing for older people and those who design, develop and supply housing. By partnering with stakeholders across older people, business and the public sector, the research was closely informed by real world perspectives, experiences and necessities. By adopting a multi-disciplinary approach and using multiple research methods and data sources, findings provided a comprehensive picture of the current state of housing for older people in the UK and revealed some of the significant challenges for delivery.

In 2024, DesHCA findings were taken into the development of delivery models for cognitively supportive housing in collaboration with Clackmannanshire and Stirling Councils as part of the delivery of the City Region Deal (CRD). This is a major investment in economic development on a regional basis and will include demonstrators of the DesHCA designs in the context of local economic development that realises the benefits and potential of longevity. Linked to Scotland's International Environment Centre, the development of cognitively supportive housing is becoming part of an outward-looking international exemplar of sustainable and supportive home design in the context of population ageing.

The focus on economic development necessitates attracting business into the area. DesHCA offers an exemplar of linking a social science research evidence base with the real world concerns of business on a broad front. The business links integral to DesHCA were critical to the successful completion of the research. However, as Bastow et al (2014) argue, for longer term

influence of the kind that DesHCA seeks, broader and deeper relationships with business need to be built and sustained, as they do with planners and policy makers. The follow-up work provides an opportunity not only to build these connections and influences, but also to advance understanding of the barriers and facilitators to using research to make a real economic difference, which ultimately delivers housing that can support healthy cognitive ageing.

Note

[1] https://www.deshca.co.uk/meet-the-team/

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10

Supporting healthy ageing at work: improving the experience of mid-later life working and beyond

Wendy Loretto, Belinda Steffan, Jakov Jandric and the SHAW team[1]

Introduction

Within the UK there is an urgent need to raise the profile of the health of mid-later life workers (MLLW) to help increase labour market participation and to contribute towards increased healthy life expectancy through maintaining and supporting health and well-being at work. Currently, one in three UK workers is aged 50+; with more people living longer and the State Pension Age (SPA) rising, the number of so-called 'older' workers[2] is expected to rise over coming decades. Recent analysis highlights an employment gap of 15 percent between the employment rates of workers aged 35–49 (86 percent) and those aged 50–64 (71 percent) (Centre for Ageing Better, 2023). This gap has grown since the COVID-19 pandemic, when high numbers of over-50s permanently exited the workforce, many taking so-called 'early' retirement (before current SPA).

Health and premature labour force exit are closely bound: of people aged 50–64, 44 percent have at least one long-term health condition, while 21 percent of workers who leave employment 'early' cite health problems as the primary reason for leaving (Department for Work and Pensions, 2017). In England, healthy life expectancy of those currently aged 50 is below the SPA (Parker et al, 2020). Health challenges may also arise because of 'natural' aspects of ageing (Maertens et al, 2012); these are also important to include in considering how to maintain health at work.

Supporting Healthy Ageing at Work (SHAW) was an interdisciplinary, multi-stage project that took place between 2021 and 2024. It focused on MLLW (aged 50+) carrying out a range of job roles in manufacturing, finance and health care, and self-employed individuals, to understand how physical, mental and financial well-being interact with workplace policies and practices to constrain or enable opportunities for productive mid-later life employment. The project directly responded to the Healthy

Ageing Challenge missions of helping people remain active, productive and connected across generations, including maintaining health at work, while also supporting UK policy goals of extending working life beyond current retirement ages.

This chapter will discuss the background to the study, outline the methods adopted and present an overview of some of the main findings. Details of the whole project and ongoing updates can be found at: https://www.shaw.business-school.ed.ac.uk/

Work and health in mid-later life

Extensive research evidence illuminates the health-relevance of employment over the life course (Waddell and Burton, 2006; Marmot et al, 2020), yet the occupational health needs of MLLW are poorly understood and remain under-researched with few age-tailored workplace health interventions (Crawford et al, 2016; Flower et al, 2019; Söderbacka et al, 2020). Many older employees who have exited the labour market due to health problems could have remained in employment if appropriate workplace interventions had been available (Mouland, 2018). Furthermore, there is evidence that some MLLW with health problems stay in physically demanding jobs that are unsustainable for them in terms of their longer-term health (Lain et al, 2019).

The focus on older age as a risk factor during the COVID-19 pandemic heightened the urgency to focus on MLLW. It appears that fears over health may have prompted individuals to retire earlier (Crawford and Karjalainen, 2020); contributions to pensions have reduced, especially among the self-employed; and the move to remote working may have made some health problems more difficult to detect or cause additional difficulties due to isolation or inadequate working conditions (Economics Observatory, 2020).

A key aspect of the current lack of visibility has been the tendency to treat all over-50s as one homogenous group (Ní Léime and Loretto, 2017). This 'segment' of the working population spans a broad range of ages (50–75+); it is further differentiated by sex, class, ethnicity, occupational type, skills and a wide array of domestic and life circumstances. All these are social determinants of health contributing to health inequalities among older people (Loretto and Vickerstaff, 2013). SHAW research was guided by the concept of ontological precarity (Butler, 2004; Millar, 2017; Lain et al, 2019), which expands the traditional notion of precarity (for example, Standing, 2011) to include subjective experiences. The key argument is that poor health engenders a precarity via uncertainty and insecurity. Of course, health is also linked to objective precarity (Sexsmith, 2021; Irvine and Rose, 2024), and as such, we aimed to examine how contractual uncertainty, financial instability and mental and physical work demands intersect with health and well-being.

Conceptually, subjective health precarity is likely to be intensified by aspects of health that are less visible or receive less attention across most occupational health interventions. To investigate this aspect of precarity we considered dimensions of health and well-being (HWB) needs that are relatively neglected as compared to lifestyle behaviours such as diet and exercise (Work Foundation, 2019). Specifically, we focused on menopause and the health impacts of combining unpaid caring responsibilities with work. We also considered financial well-being and cognitive change/decline, but they are outwith the scope of this chapter.

Our first health focus, **menopause**, has seen a rise in visibility over the life of the SHAW project. While many employers are adopting workplace menopause policies, evidence of engagement and effectiveness is lacking, and the focus is generally restricted to white-collar workers in large organisations (Atkinson et al, 2020). As Fitzgerald (2024) notes, the fact that menopause can affect women for more than a third of their lives means that this is a pressing issue for employers. Gjellestad et al's (2023) scoping review found several studies that demonstrated the importance of supportive work environments and colleagues in helping women cope with a range of menopause symptoms.

In terms of unpaid **caring responsibilities** and health of MLLW, the biggest proportion of informal carers in England and Wales are aged 55–59 and over (Carers UK, 2024). UK projected increases in the elderly population, together with the impact of austerity measures and COVID-19 on formal care support (House of Commons, 2020), have increased pressure on individuals to provide informal care for elderly relatives and grandchildren, at the same time as being expected to extend their own working lives. Existing evidence highlights the practical, physical, psychological, HWB challenges of combining work and caring roles in later life; 600 people a day give up paid work because of their caring duties (Carers UK, 2024). Existing interventions have been criticised; they assume one-size-fits-all and often rely on informal agreements between an employee and their line manager (Larkin et al, 2019).

Project aims and objectives

Project aims were to:

- further understand the ways in which physical, mental and financial well-being interact with workplace culture, policies and practices to constrain and enable opportunities for people to work productively in mid-later life (50 and beyond);
- use this insight to co-design, pilot and evaluate a series of innovative, data-led workplace products and interventions to improve the less visible aspects

of HWB of workers over 50, in collaboration with workers themselves and their employers.

We worked closely with a range of businesses and other partners including: age-focused charities (Age Scotland, Business in the Community); professional bodies (Chartered Institute of Personnel and Development); trade unions; policy makers (for example, UK Department for Work and Pensions) to ensure outputs were widely disseminated and interventions were relevant and scalable.

Methods

The project team brought together expertise in management, design informatics, medical informatics, occupational medicine, social policy, social gerontology and sociology to conduct a mixed-methods three-year study in four employment sectors: financial services, engineering/manufacturing, social care and self-employment. The settings were chosen to provide a range of sectors, occupations and to include men and women in a range of ages from 50 upwards from different socio-economic and ethnic and/or cultural backgrounds. We included self-employed because over-50s represent a growing proportion of those registered as self-employed (Lain, 2016), with 50 percent of workers aged 70+ falling within this category (Centre for Research on Self-Employment, 2017).

The fieldwork was conducted in two main phases.

Phase 1

In-depth qualitative interviews were conducted with 144 people (85 women and 59 men) aged 50+ across the four case study settings. Ages ranged from 50 to 82. The interviews deployed a life-course approach to explore the reciprocal nature of work and health, and the range of factors over a person's life and career that may influence their current circumstances. While they adopted a focus on less visible aspects of health, as discussed earlier, interviewers were also open to capturing any relevant health information.

The interviews were conducted between October 2021 and November 2022, either online or in-person. All interviews were digitally audio recorded and transcribed verbatim. Employee participation was voluntary and anonymous. Interviews used the life-grid method of data collection and analysis, providing a greater insight into lived experience of participants over their life course (Nico, 2016). Data were analysed thematically, following systematic processes to develop themes and identify patterns in the data (Braun and Clarke, 2022).

Phase 2

Forty-eight of the respondents (30 women and 18 men, aged 50–66) from Phase 1 subsequently participated in a year-long co-design process. During this period, additional rich work-related HWB data were collected via wearable devices for nine months, and the participant co-designers completed weekly and monthly health questionnaires. The research team worked in tandem with the participant co-designers throughout the year, engaging them with design 'probes' (Hay et al, 2024) to further understand their health support needs at work (topic exploration), and facilitating three workshops, to develop and co-design possible workplace solutions (concept development and reviewing).

Findings

Menopause

Sixty-nine women (81 percent) spoke about the effects of menopause on their health and consequent work disruption. Only a few felt they had no health effects; the vast majority reported a whole range of physical and psychological menopause symptoms – with sleeping problems (see later), hot flushes, heavy periods and anxiety being some of the most common. Many reported symptoms started in their 40s, and uncertainty was common. A striking finding was the lack of participant knowledge on treatments of menopause, with GP inadequacy frequently mentioned.

While most welcomed the fact that it was easier to talk about menopause now it was receiving more public and organisational attention, many still spoke of hiding their symptoms at work, often because of embarrassment and loss of confidence. The most effective practical support was that given by informal same age/gender colleagues, or formally though empathetic line managers. It was regarded as "a bit of a female conversation still" (Female, 50, Finance).

Several of the women in the self-employed group spoke about how their symptoms affected work and lack of awareness and/or unsympathetic treatment had pushed them into becoming self-employed. Respondents in this category reported alternatives to employer-provided support:

> So, we do talk about a lot, and we've got little Facebook groups and those sorts of things where we talk about certain things to do with menopause and whatever. And I've noticed that the company that I'm now working for in [industry] are starting to talk about it as well, despite the fact there's not going to be many people in the company that are perhaps going through menopause. (Female, 50, Self-employed)

Health disruption arising from menopause was somewhat of a paradox in terms of 'hidden health'. On one hand, respondents such as the self-employed women

embraced the greater attention to the topic in general, but on the other hand many sought to hide their own symptoms and experiences, thereby intensifying their sense of ontological precarity. This determinism to hide came despite some often highly visible effects, such as flushing, weight gain, hair-loss or changes in facial appearance. We have discussed elsewhere how this tension also leads to women in senior posts supporting colleagues with menopause difficulties but not seeking support for themselves (Steffan and Loretto, 2024).

Unpaid caring

Ninety-five respondents (60 percent; 66 percent of all women, 53 percent of all men) across all case settings had some form of current caring responsibility – for partner, elderly relatives, children or grandchildren. Women were especially more likely to have multiple concurrent caring commitments. Not surprisingly several women spoke of 'juggling', and one likened herself to an octopus.

The health effects, and suitable health support, varied significantly between different types of care situation. Those caring for a partner (four women and six men) spoke about significant sleep disruption linked to their partner's illness, and were those most likely to have benefitted from the opportunity to work from home.

Eldercare was the largest care category, mentioned by 38 women and 17 men, and in many respects was the most significant in terms of contributing to health precarity. Most respondents with eldercare responsibilities reported the toll on their mental well-being: "I was out of my tree with stress" (Female, 56, Finance). Many spoke of feeling trapped in their work and home lives, and often hid their own health concerns from their parent(s). Several had become self-employed to get the flexibility they needed, while for employees the main support came from a 'good' line manager.

Those caring for, mainly adult, children (nine women, of whom four were also caring for their mothers, and two men) were least likely to mention any negative health effects or have any work adjustments or support. This was likely related to the fact that most children in this situation had a life-long disability and, as such, the respondent had cared for many years and had adapted their work and home lives.

Although the category of grandparent care appears more gender-balanced (mentioned by 14 women and 14 men), men were much more likely to refer to their wives as the main grandparent carer. Nevertheless, some men who were self-employed did play a more substantive role. Women in this category were most likely to be working part-time in order to provide grandparent care. Four of the women were also caring for one or more parents, and one also had childcare responsibilities. The most frequently mentioned health effect was physical tiredness of keeping up with the energy of their grandchildren.

Sleep

Our open interviewing approach revealed sleep as a major 'hidden' health issue. This was reported by three-quarters of respondents, again across all case study settings. Of these participants, 68 percent were women. Sleep disruption arose from many different health issues, and in many ways epitomised the pivotal role of health in ontological precarity of MLLW. Sleep appeared to be interrupted by anxiety, stress and worry related to a range of intersecting personal factors including: bereavement, partner's health, financial concerns and other health issues, such as menopause or needing to urinate more during the night. It was clear from interview data that interrupted sleep could adversely impact work, specifically through a lack of focus, reduced performance, but also had the potential to impact interpersonal interactions and relationships at work.

The importance of sleep as a major hidden health issue was also confirmed in Phase 2 of the project. Among the 48 participants who were followed up for 12 months, we found from data collected by the Pittsburgh Sleep Quality Index (Buysse et al, 1989) that, overall, participants were generally poor sleepers, experiencing both poor quality sleep and reduced sleep duration (many participants reported less than five hours sleep). Specifically, data from wearable devices showed that participants reported more problems with sleep quality than sleep duration.

All the women who discussed menopause also mentioned sleep disruption. While poor sleep is a symptom of menopause, interview data highlighted how poor sleep can also lead to and/or exacerbate other menopause symptoms, such as emotional instability in the case of this respondent: "I've acted in a bit of an unprofessional manner. … If I don't get enough sleep, I become very agitated … my tolerance level just drops off completely" (Female, 52, Finance).

The relationship between sleep and work was discussed as a complex personal issue, with a range of co-morbidities of sleep. Participants were generally unclear as to how their organisation might be able to support their sleep issues, citing concerns over disclosure and unaware how they might ask for support. Flexible working was the most commonly cited desired accommodation for sleep issues at work: "I don't expect them to send round somebody to, give me a massage or something before I go to bed. The flexibility is the thing that I need the most…" (Female, 52, Finance).

Effects of work on health

The findings presented earlier, with the exception of self-employment, demonstrate limited variation across case study settings. However, it would be remiss not to highlight some of the key aspects of the workplace and work

organisation that were crucial to maintaining health at work. In the main, these tended to be job, rather than sector, related. However, it is notable that respondents in the bank did allude to an ageist culture, where they felt less valued and often overlooked compared to younger colleagues. Some of the work aspects affecting health are well-known, for example negative effects of shift-work, impact of sedentary occupations; while others are intensifying, namely stress due to high workload, work intensification and staff shortages.

A significant proportion of respondents highlighted key barriers to accessing HWB support at work. Barriers included: fear of multiple and intersectional stigmas, such as being labelled as old *and* ill; and difficulties of raising issues with line managers who might not be equipped to have conversations and may well be of a different age and gender, influencing empathy. Participants overwhelmingly reported a sense of personal responsibility for their health, 'it's up to me to fix/cope'; and low expectations of their employer in relation to supporting their HWB at work.

An overarching finding from combining the Phase 1 interview findings with the Phase 2 co-design process was that individuals may lack adequate insight into their own health and how it influences and is influenced by their work.

Practical interventions

All interventions were closely based on the Phase 1 findings and Phase 2 co-design process, and aimed to increase visibility of some of the main health concerns expressed among MLLW, and to ameliorate the sense of ontological precarity by promoting different routes to support their HWB needs. Two of the three interventions outlined next also involve collaboration with charities, thereby addressing a key aim of the Healthy Ageing Challenge to involve business and other organisations in the development and delivery of services and products. As indicated at the outset of the chapter, the development of outputs is ongoing; as such, this account presents the current status (at the time of writing, mid-2025) of two main interventions.

First, findings about the importance of line managers in being the first point of contact and acting as the visible face of culture around age and health were used by the charity Age Scotland to design, deliver and evaluate a line manager training programme. Training was targeted to improve age awareness to equip line managers to have sensitive conversations around age and health. The SHAW team has collaborated closely with Age Scotland to deliver a mixture of online and in-person training seminars to 1,168 line managers across Scotland, with 96 percent of participants saying the training improved their knowledge.

Second, we co-designed (with Phase 2 participant co-designers and employers) the concept and prototype for a bespoke web-based App (Hay

et al, 2024) which provided the basis for the ongoing development of era App (ww.era-app.org). The concept used a combination of self-assessed questions drawn from validated HWB scales, and Artificial Intelligence (Large-Language-Model) technology to help individuals *Explore* and *Reflect* on their health and work, and then to *Act* to find the support they need. This concept goes beyond the host of existing self-help digital offerings in several respects, primarily that the Act stage is linked directly into the employer's HWB support offerings.

These interventions are underpinned by the position that responsibility for maintaining healthy ageing in the workplace is one that should be *shared* between employer and employee.

Conclusion

What does this mean for supporting and maintaining health at work?

The findings from SHAW illustrate the myriad of ways that health, set in the context of wider work and life contexts, affect people's ontological precarity. The politically and socially dominant neoliberalist discourse in the UK, whereby responsibility is overwhelmingly borne by the individual, has negatively affected MLLW (Lain et al, 2022). It was quite clear how few respondents felt comfortable in disclosing their 'hidden' health issues to their managers or employers, with many internalising neoliberal values of individual coping. Lack of willingness to disclose is by no means unique to this research; there is a tradition of research on, for example, mental health and disclosure. However, we feel there are a set of constraints that act to increase the sense of precarity around health and work as people age, and that together these act as barriers to healthy ageing.

First, pertinent health issues tend to be more hidden because they are associated with ageing and potential decline. Employees and workers do not want to attract attention to getting older – there is a real fear that they will be viewed as being no longer capable to maintain levels of work performance. Ageism, experienced and perceived, is a key factor here. Second, many of the health issues affecting these age groups are rather uncertain in their nature, duration, etc. Uncertainty is a key facet of peri-menopause, menopause and post-menopause (Steffan and Loretto, 2024; Steffan et al, forthcoming). Third, paradoxically, while individuals are trying to take responsibility for their own health needs, many of these needs are caused or exacerbated by external factors, such as caring responsibilities where no amount of individual determinism or effort will provide the whole answer. Fourth, we cannot ignore the reality that, as we age, we are more likely to experience multi-morbidities (Cassell et al, 2018). This is amply illustrated by the emergence of sleep as a key hidden health issue among

SHAW participants, which showed how frequently different health issues acted together to influence the reciprocal relationships between health and work. Finally, the notion of maintaining health implicitly assumes there is a base of 'good' health to maintain. However, for many in mid-life and beyond, especially those in more financially precarious positions, the reality is poorer life-long health.

While many employers provide occupational health support and advice, very few tailor this to the needs of people of different ages and life-stages, perhaps under the misapprehension that to do so would be costly and/or potentially age-discriminatory. Increasing visibility will require that mid-later life health needs are considered as part of a broader range of socio-economic, political and life (domestic) circumstances (for example, Thomas et al, 2024), broadening occupational HWB beyond the strictly medical or a narrow health and safety focus (López-Fernández and Pasamar, 2019). Crucial to this is involving MLLW *and* employers in the co-design and co-production of meaningful interventions that empower workers to better understand their own health needs and enable them to take full advantage of workplace supports and resources.

Notes

[1] https://www.shaw.business-school.ed.ac.uk/research-team

[2] The term older workers has been commonly used as shorthand, and in policy circles, for workers aged over 50 or 55. Given the extensive span of years between 50 and potential retirement, we prefer to use the term mid-later life worker(s).

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11

Healthier Working Lives: codesigning initiatives to support ageing residential care workers

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Introduction

The Healthier Working Lives (HWL) project engaged with people over the age of 50 working in the residential care sector in Scotland. Our aim was to generate ideas and activities to improve the working lives of those in the care sector in mid-to-later life. The project ran from February 2021 for three years including the second half of the COVID-19 pandemic. This chapter explores the ways in which care workers can work together to share their ideas for developing organisational cultures, employment terms and conditions, careers and care for one another in the residential home sector. It investigates the power of listening to the experiences of mid-to-later-life workers: through collaborations with peers and through developing relationships with businesses, researchers and NGOs to promote change. Throughout this chapter we identify how care workers can generate innovation from the bottom up, integrating their voices into solution design.

An ageing workforce faces multiple challenges

The social care workforce in England is larger than that of the NHS with 1.8 million posts representing about 5 per cent of the overall English workforce (NHS, 2024; Skills for Care, 2024a; Office for National Statistics, 2025). Most of the workforce is female (79 per cent), and many of these women handle personal care responsibilities too (Skills for Care, 2024a). Given that care is a labour-intensive sector where a combination of emotional and physical work is required, intense pressures are placed on workers regardless of their age. However, an increasing proportion of this workforce is aged 50 and over (Bowlby et al, 2025) and thus likely encounters the health and wellbeing issues faced by mid-to-later-life workers in general as outlined in

Chapter 10. In residential care, an increasing proportion of the residents, an estimated 70 per cent (Alzheimer's Society, 2024), are living with dementia, and many have severe mobility challenges, often with a cluster of health conditions, presenting notable challenges for the workforce (Aldridge et al, 2023). Although the length of stay for residents is shortening, it is widely agreed that care needs are intensifying (Pujol, Hancock and Morciano, 2021). Despite these challenges, many workers speak of the positives of care work and gain fulfilment in seeing the cared for and their families satisfied and engaging in day-to-day activities (Daly, 2023).

In the wider context, marketisation, privatisation and a reduction in local authority support have resulted in a fragile sector with low pay and limited career opportunities (Lewis, 2022; Skills for Care, 2024b). Shifting immigration policies and discourses have also had a negative impact on the care workforce and in extreme cases have led to a minority of examples of modern-day slavery (Bowlby et al, 2025). The Health Foundation (2024) suggests that over 600,000 additional care workers will be required to meet demand in the UK over the next decade. But turnover of workers in social care is very high at 24.2 per cent in 2023–24 (Skills for Care, 2024a). In a survey of its membership published in August 2021, the National Care Forum found half of workers who left went due to stress and 44 per cent because they found better pay elsewhere (National Care Forum, 2021). The UK continues to face a significant shortage of carers, a situation that has been exacerbated by the ongoing challenges posed by an ageing population and post-pandemic effects. Skills for Care (the strategic workforce development and planning body for adult social care in England) asserts that as of 2024, there were over 131,000 vacancies in adult social care across the UK with a vacancy rate in social care reaching 8.3 per cent (Skills for Care, 2024a). This is high for any area of employment but here represents a fall from 10.7 per cent in 2023 resulting from a short-lived surge in international recruitment. As we begin to assess the wider implications of an ageing population including an ageing workforce, it is evident that the demand for care workers far exceeds the available workforce.

In Scotland, 44 per cent of care staff leave their job within one year of starting and 24 per cent leave within two to five years. Even before the COVID-19 pandemic, 20 per cent of care staff were considering leaving the care sector, with 57 per cent expecting to leave within the next decade. However, 68 per cent would still recommend working in social care, suggesting that staff generally want to stay if issues within the sector could be addressed (Scottish Care, 2024). These problems in retention and recruitment are familiar across the globe and in the summer of 2024 the International Labour Organisation adopted a resolution concerning decent work and the care economy (International Labour Organisation, 2024).

Healthier Working Lives

The HWL project, of the Healthy Ageing Challenge (HAC), adopted a range of methods to generate ideas and activities to improve the working lives of those in the care sector in mid-to-later life. These included ethnographic methods, codesign and mentoring and engagement with businesses and NGOs. The project team brought together organisations and individuals to implement these methods. In addition to researchers from the Universities of Edinburgh, Reading and King's College London, we partnered with Scottish Care, an independent membership organisation in social care representing around 350 organisations and around 900 individual services delivering residential care, nursing care, day care, care at home and housing support services. Creative Venue (a small and medium-sized enterprise [SME] specialising in design communication) joined at the outset, sharing notable experience in using design as a tool to drive change. They acted as bridge builders between care workers, entrepreneurs and the many groups and individuals involved. Legal and General, a multinational financial services and asset management company, and their partner 'Inspired Villages', a retirement community operator, offered support in kind as a sounding context for the potential to take ideas to other dimensions of the care sector. In the final stages, Codebase technology consultancy joined HWL to provide mentoring and support for care worker teams. Codebase is the largest scale-up accelerator of its kind in the UK. Based initially in Edinburgh, it now has regional offices across Scotland and has a particular expertise in healthcare scale-ups with the core aim of driving innovation across the country.

From the outset we created a Knowledge Network (KN) of researchers and professionals from within the care sector and among those wanting to do business with the sector, to ensure our ideas would be heard, shared and discussed. The KN was co-chaired by an academic from the HWL team alongside the chair of Codebase. On the advice of the KN and project-wide team, the HWL communications group provided blogs, podcasts and regular postings on social media and email networks to ensure the deepening and broadening of our engagement with the sector and relevant organisations and policy makers.

Chapter 10 reviewed key research on work and health in mid-to-later life across four sectors including residential care. We focused on developing codesign work with residential care workers aged over 50. A key aim was to promote opportunities for older care workers to develop their intrapreneurship (entrepreneurship in an existing organisation) as changemakers in their organisations with potential for wider implications for social care. Our aim was to promote care workers' control over the direction of the research. Key to this was the formation of teams made up of care workers and mentors from business and academia (Soares and

Kettley, 2024). These multi-sector teams worked to develop their ideas and explore ways to take them to market and across the sector more widely. Care workers made their interest in coproduction clear following the codesign stage, by organically defining problems in the sector and proposing ideas and activities to address them.

As a wider group, our aim was to act on insights that inform national and local governments in the planning and innovation of their services. During the project we developed the 'Ripple Framework' (Figure 11.1) which offers 30 methods to initiate exploration of complex and sensitive areas of work. Two subsequent impact projects have included: 'Care Stories', which focused on low or no-cost ways to enhance morale, retention and recruitment; and 'More Time for Quality Care', which is, at the time of writing, exploring how to identify and value time for emotional labour to enhance the care experience and staff wellbeing.

Caring for care workers

HWL worked to create safe and secure environments for workers in what is the complex and stressful context of residential care post-COVID-19. We found the emotional and physical content of workload, its intensity, the requirement for documentation and the daily management of a range of risks, combined with working through the pandemic for some, left many feeling tired, frustrated and fearful for the future of the sector. This future was viewed with a mixture of anticipation for change and frustration at the lack of government and sector support.

The care sector has suffered varying degrees of turmoil for over three decades as the population ages, care needs grow, costs increase and finances are constrained. Frontline services are under growing pressures. In 2023, a National Care Service in Scotland was being assessed with conversation on this development offering some hope. This initiative was paused for governmental review and was finally abandoned in January 2025 (BBC, 2025).

Codesign work was undertaken amid this crisis. We appreciated care workers required a degree of courage and confidence to voice their experiences, share ideas and invest passion in the potential for change. This was dependent on the manager at each home identifying the best space at the time. In the early stages of the project, we sought to nurture trust, promote group working and morale as well as generating relevant outputs.

The HWL journey started with a question: how can we improve the working lives of social care staff aged 50 and over while promoting better health for the entire workforce? HWL was premised on the belief that care workers themselves should help inform, shape and guide development in the sector, and share *their* ideas to improve *their* industry. As outlined in

the introduction, major challenges facing the care sector include employee retention, workplace effectiveness, staff wellbeing and workforce recruitment and these challenges have implications for health at work and for the quality of care provided. These factors framed our approach to coproducing the process and methods (Soares and Kettley, 2024). We began by exploring the issues from 'the frontlines' of the care sector in interviews with care home workers and supervisors about their experiences. We carried out focused ethnographic observations across six different care homes of varied sizes and ownership (to reflect the mixed economy of provision) located in the central belt and border locations in southern Scotland. Here we observed the ways in which work, care and life flowed in the residential care homes during a period which became known as a 'cost of living crisis', notable for sudden increases in inflation with impacts on the family, personal and working lives of the over-50s workforce.

Uniting across the sector

Alongside the introductory observations and interviews in which we got to know people and the sector, we embarked on a discovery exercise interviewing entrepreneurs in the health and care sector who were founders and owners of enterprises currently developing innovations for use in health, domiciliary or residential care. We referred to these individuals as 'care trailblazers'. Their initiatives included micro and small businesses creating innovations for residential or domiciliary care with ideas for technology for such applications as scheduling rotas, assessing wellbeing and sustainability and arranging cross-sector contracts. We explored with them their experiences of developing, financing and marketing their innovation in the sector and invited them to retain links with our project. Each care trailblazer had a challenging journey ahead to develop the market for their innovation, but all were committed to investing in the care sector workforce. Some were interested in our project in part because it gave them insight into their potential market. Many came from the care sector and were keen to improve the experiences of care giving or receiving.

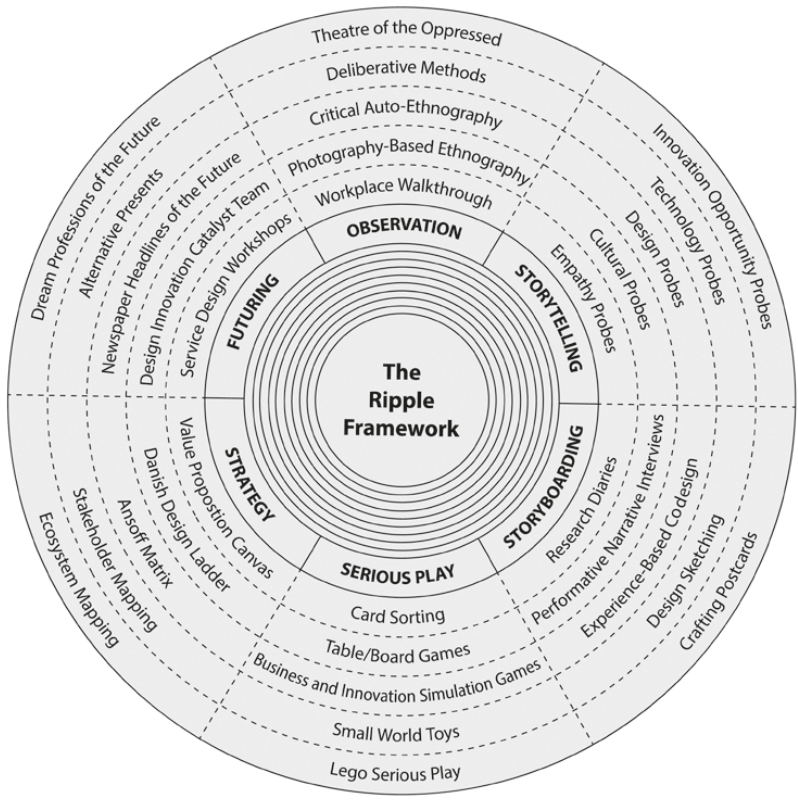
Some care trailblazers proposed ideas which, although not immediately applicable, could be adapted to support workers and residential care more generally; for example, around energy use in residential settings and worker retention in low-paid jobs. Our plan was to bring care workers, care trailblazers and relevant organisations together to define problems and potential solutions. We interviewed over 30 trailblazers and in our analysis, we reflected on how their experiences offered ideas and energy to care workers. We identified among participants a strong sense of impending crisis and a consequent desire to work together to address the social, health and economic challenges of an ageing society. We invited the care trailblazers

to continue to maintain links with us into later stages of the project and over half agreed.

The ethnographic and codesign researcher team of HWL provided creative, coactive and interactive tools to help care home workers and managers share problems and highlight priorities, such as board games; mapping; poster probes; research diaries; and both group and individual semi-structured interviews. Recognising the complexity of care work, this flexible response was adapted to precarious circumstances including ongoing bouts of the spread of COVID-19 (Soares, Kettley and Speed, 2024). A framework emerged, which the codesign team termed the Ripple Framework (https://ripple.designinformatics.org/).

The Ripple Framework is dynamic and adaptable, encompassing 30 distinct research methods. At its centre, researchers initiate their exploration, progressing outward through concentric rings that represent escalating levels of methodological depth. There is a power imbalance given knowledge of

Figure 11.1: Ripple Framework



Source: https://ripple.designinformatics.org/

methods, and innovation and knowledge of care work are limited among various groups. We contend that this framework encourages engagement by facilitating both radial expansion and horizontal navigation, allowing researchers to creatively generate research objectives with participants, in this case care workers.

Care workers and the research team began to work closely with Scotland-based Codebase (see https://www.thisiscodebase.com/), the UK's largest new business and innovation accelerator. Two Codebase mentors worked on HWL throughout the final year of the project. Although a year is not enough time to develop a working relationship for innovation across four groups – care workers, care trailblazer businesses, Codebase mentors and researchers – the project was successful in bringing together predominantly female over-50s care workers with younger male start-up mentors. Both groups had limited awareness of their respective worlds and experiences and noted how their knowledges grew alongside mutual appreciation of the respective group's challenges and the opportunities of coworking.

From problem identification to ideas for change

Care workers, mentors and the research team entered the final year of the project familiar with each other and aware of the wider context of innovation through the trailblazer interviews, along with reflections from the KN and partner organisations: Scottish Care, Creative Venue, and Legal and General.

Our discovery stage combined the desk research of year one, ethnographic and codesign work of year two and the contextual insights from trailblazers. These strands ran in parallel and in the final year they fused at what we termed a Pivot Workshop in March 2023. Each small team of care workers and mentors identified one core problem and considered ideas and approaches to resolve their problem area. Mentors spent time listening as the care workers identified key issues, such as lacking quality time to care and needing low and no-cost initiatives to boost morale and coherent training and scheduling. There was general agreement that technology and AI might assist but general frustration at the constant calls for digital solutions which were said to lack an appreciation of the human connections and positives in caring. There were and are also concerns at the costs of digitisation. The goal was to nurture ideas drawn from workers on the frontline and explore how these might achieve organisational and workplace changes from the bottom up. Mentors and supporting organisations were keen to coproduce solutions with clarity and potential for market investment to maintain and improve health and care outputs. The three teams explored digital and technological solutions like the use of QR codes to facilitate training sign-ups; data sourcing and mobile applications for increasing access to support; and the potential for theatre work to deepen the impact of training online and in person.

More time to care about care

In the spring of 2023, we realised if we were to ensure that care workers were secure in sharing their ideas and working across the public and private sectors to lead the development of a solution, it was going to take more time than we had anticipated. We realised we had limited knowledge of the sheer volume of work involved and with just nine months until the project finish date, we were far from reaching a realistic changemaking idea to share with investors. We had to ensure ideas could be developed, critically assessed by future users and tested and refined through an iterative process before being implemented. Here the project entered the field of organisation change and business start-ups. What we were engaged in was innovative, but for the care workers and mentors, responses included both a strong sense of drive and frustration. As ideas were forming, time was ticking away for the project funding. The research team recognised the need to reflect on and develop impact from the project as well as documenting lessons learnt.

The combined mentoring teams thus discussed low or no-cost opportunities to promote health at work and care worker career development and retention more generally. Across all teams the benefit of caring for each other and generating a culture of openness and support was a priority. Two teams considered this in depth, reflecting on the economic challenges of those working in a sector dependent on emotional labour and the need for workers to care and be cared for. They suggested managers safeguard time for staff to develop rapport with residents, as this strongly affects their motivation, job satisfaction and overall attitude. Retention outcomes and job satisfaction improve significantly when staff are supported in prioritising time with residents over other competing tasks, they argued.

Staff expressed the deep importance of management recognising their work through small incentives and other tokens of appreciation such as shopping vouchers; staff discount cards; free meals or snacks while on shift; and all-staff events. These gestures make staff feel valued and 'seen' in their work and encourages strong work ethic. Groups found that when managers prioritise staff's mental health through supporting wellbeing activities – like mindfulness courses, massage chairs in the staff rooms or free reiki and yoga classes – this positively influences the perception of what makes a 'rewarding' work environment and improves the quality of care given to clients. Managers who proactively reinforce these benefits, and ensure they are utilised, experience improved staff retention.

Groups found that accommodating individual staff needs, offering flexibility with shift patterns or employment contracts and providing autonomy over individual schedules was directly associated with higher retention. Conversely, staff who experienced a lack of adaptability from management felt this negatively impacted their personal life, as well as their long-term employment

prospects. Managers who identified and nurtured the individual interests and career aspirations of their workforce tended to experience slower turnover and higher engagement of staff. Dedicating adequate time and resources for professional development, training and upskilling of team members was felt to be beneficial for organisation finances, as well as workforce retention.

These ideas are largely known among those within the sector, but few care homes or care businesses have adequate time to reflect on them. Time to discuss and promote a positive culture does come with a cost for many businesses but what could be achieved in terms of morale and retention was tangible. Many of the ideas generated were low or no-cost and drawing this together was illuminating and positive for both the care workforce and their managers. To share this knowledge, we gained funding for an impact project, *Care Stories*, which ran from the end of HWL for six months. This project aimed to capture these 'low or no-cost ideas' to improve retention through a series of digital illustrations, and then share this knowledge through an illustrated online briefing paper, summary flyers and postcards (https://www.kcl.ac.uk/overview-of-care-stories; https://www.kcl.ac.uk/ghsm/assets/care-stories-policy-briefing-paper.pdf). These were then circulated among relevant residential care businesses and stakeholders (including those who worked with us) allowing the mentoring teams and researchers to see how this research and coproduced ideas can be developed and shared. Teams agreed there was great potential from within the sector, but that much depended on the immediate organisation leadership. Leadership of change is difficult to implement in care facilities, with business cultures driven by tight economic constraints and operating from quarter to quarter.

There was one area consistently cited as core to job satisfaction – to provide more time to deliver 'quality care' – but it was recognised that to address this would require financial and leadership investment. In short, 'quality care' are care encounters which allow the care worker to feel they have achieved comfort, contentment and physical support for both the cared for and for themselves. Having to rush from client to client was said to undermine those committed to working in care, while also evidencing the diminishing value placed on both client and worker. Following the identification of 'quality time' as a core factor for retention, we embarked on the impact project *More Time for Quality Care*, funded by King's College London (2024 to 2025). This is bringing together care workers, residential home managers, business owners, local government policy makers, technology experts and interested individuals to explore whether our findings resonate with this wider group of care stakeholders. Through debate and focusing on problem definition we are exploring ideas for improving retention and generating time to develop emotional as well as physical labour, to better know and care for clients. Issues raised by the project, such as what role organisational cultures play in managing time to care; whether economic challenges and time pressures can be alleviated

by artificial intelligence; and to what extent regulation creates risk by limiting opportunities for quality time, are central to these ongoing discussions.

In the final six months of the HWL project, relationships grew stronger, and engagement increased through in-person meetings, which became possible by 2023. Ideas were documented using Miro digital collaboration software, Business Model Canvas and an Innovate UK template (https://ukinnovationhub.ukri.org/support/business-plan-template). By acting as a catalyst for the creation of this shared space, we fostered more transparent communication across sectors. Challenges were shared from all perspectives, creating more understanding between care workers and their management teams. We also prioritised actions, focusing on what were perceived as 'easier' wins. For example, addressing the underlying economic model for residential care would be challenging, so workers and mentors identified more immediately achievable goals. We heard about existing innovations which are positively impacting the workforce, such as more horizontal ways of team working with supervisors spending less time in an office and more time in the common areas talking with residents and clients. We saw first-hand the benefits of integrating care worker voice into solution design. This empowered and validated individuals and improved workforce culture more generally. Importantly, care entrepreneurs who we involved in the projects had to recognise early on that they had to listen to the care worker teams and rarely, if at all, were the pre-conceived ideas with which they came, fully appropriate for the needs of the sector. Three months before the end of the project we held a retrospective workshop and focused on workforce training; integrating technology and digitisation to offer more personal care; and learning from care homes where satisfaction and retention levels are positive.

In summary, the issues raised were not unfamiliar to employees and analysts in the sector. However, changes across the sector have stalled in part because, as HWL evidenced, investors and entrepreneurs may not understand the issues from care workers' and managers' perspectives. Further, the growing need for specialist care in later life, low pay levels for workers and the economics of care home businesses are posing serious challenges to the future of the sector. Care workers are often tired, burdened and short of time and yet they are central to identifying, promoting and achieving change. Government, groups and owners prepared to listen and support do enhance the possibility for change.

Lessons learnt

The importance of collective voice and autonomy

Creating space to share insights from all levels of the sector should be a priority. For entrepreneurs, hearing first-hand about the daily realities of residential care homes on incredibly tight budgets proved invaluable and eye-opening. Conversations between care staff and care managers proved hugely

beneficial for empowering individual voices and creating a more positive workplace culture. Communication between managers and workers may help introduce change that is not enforced from the 'top down' but emerges from the workforce, likely standing a better chance of being adopted.

One key lesson learned by the care trailblazer entrepreneurs who engaged with the codesign process was the importance of intrapreneurship. Many ideas emerging from the projects had been simmering in staff minds and only needed the appropriate forums, permission and like-minded support to be shared. Entrepreneurs did not impose their ideas on the care teams; they respected care workers' commitment, passion, experiences and ideas.

Engaging workers in decision making fosters team autonomy, leading to more sustainable solutions and is beneficial for both job retention and wellbeing. Encouraging more open communication will also ease existing tensions within the workforce: for example, between care workers of different backgrounds; with intergenerational differences in approach; between day and night shift staff, agency and permanent workers, or migrant and non-migrant workers. 'One size doesn't fit all'. Individuals and organisations raised different issues, and their priorities varied depending on their experiences and needs. The codesign process reflected a need for individualisation of processes and solutions. However, knowledge exchange can help here, especially in sharing positive ideas and best practice. Another individual or organisation may already have a solution to your problem – get out and see what is working elsewhere.

Time is critical to good care and strong project identification

Many of our care trailblazer entrepreneurs were pleasantly surprised by how much innovation was latent or already in place. Allowing the care home staff to lead the process of reviewing and ideating around new (technological) solutions was indeed the best way to ensure that strong ideas were developed and embraced. Arguing for new ideas must also be rigorously measured. Too often ideas are tried without proper evaluation or the space and permission to succeed. Patience is a virtue, particularly in environments where innovation ranks low amid tight budgets and workforce productivity pressures. However, the care trailblazers who engaged in codesign embraced the opportunity to engage in on-the-ground work, prioritise permission, dive into codesign and secure the impact measures and accreditation vital to ensuring products and services could be adopted at scale.

Flexibility and problem focus

Several of the care trailblazers approached the projects with fixed views about how their ideas could be embraced by teams. Through the codesign process they learned to pivot and sometimes fundamentally refine their ideas.

Care trailblazers and individuals who did that, and proactively worked to understand the workplace dynamics and its challenges, earned staff respect.

'Focus on identifying the problem' is a key mantra for start-ups. With over two-thirds failing due to misidentifying issues, their target market or competitors, the statistics are daunting. Our work with Codebase, our codesign colleagues and our Knowledge Network helped us recognise that the key is spending 90 per cent of our time robustly interrogating the circumstances, the overt and underlying issues, and pinpointing the problem to be solved.

We learned that sustaining energy and passion is crucial for growing entrepreneurial and intrapreneurial spirit. Nurturing people's abilities to develop promotes positive change. Following three years of experiences, this final lesson is probably the key, particularly in a market where access can be so difficult and the resource and commercial constraints so acute.

Outcomes of Healthier Working Lives

HWL identified three innovations, which we continue to disseminate and develop:

- *Care Stories*, produced a briefing paper and informative postcards which draw upon our research findings to identify low or no-cost ways in which morale, retention and recruitment might be promoted (https://www.kcl.ac.uk/overview-of-care-stories; https://www.kcl.ac.uk/ghsm/assets/care-stories-policy-briefing-paper.pdf). This project found that workers appreciate recognition and respond well to small tokens of appreciation which make staff feel valued and 'seen' and have seemingly disproportionate effects on their morale, motivation and overall satisfaction with both organisations and leadership. Encouraging care staff to work autonomously in a supportive environment, and assist career progression, without overwhelming the capacity of an already stretched workforce, is an important concern for both providers and workers.
- *More Time for Quality Care*, an ongoing impact project, explores with managers, businesses, policy makers and sector innovators how to develop change using the notion of quality time. Working with a cross-sectoral team, this project is investigating if technologies and other managerial innovations could better support valuing time for care work. Our HWL data evidenced that promoting the value of care work along with promoting pride in their work can enhance morale and support the career aspirations of care workers. This can leader to greater engagement in the running of a home and potentially lower staff turnover.
- *The Ripple Framework* is a methodological innovation which offers a dynamic and adaptable approach to working across groups. Encompassing 30 research methods it offers ways to generate creative objects and activities

to explore complex, sensitive issues (Soares and Kettley, 2024; Soares, Kettley and Speed, 2024).

Core to the coproduction were the care workers and start-up mentors who returned time and time again to our main question: how can we improve the working lives of the adult social care workforce aged 50 and over in ways which could improve health for the workforce more generally?

Note

[1] https://www.kcl.ac.uk/research/healthier-working-lives-for-the-care-workforce

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12

Connecting through Culture as we Age: beyond 'social' connection for healthy ageing

Tot Foster, Helen Manchester and Alice Willatt

Introduction

This chapter focuses on the 'Connecting through Culture as we Age' (CTCAWA) project. Funded to explore the Healthy Ageing Challenge framework theme of 'Supporting Social Connections', CTCAWA signifies an important movement away from an association between social isolation and older adults. However, the notion of an epidemic of loneliness is still prevalent in wider society and media, reinforcing deficit assumptions about older adults and homogenised ideas of ageing well. For instance, older adults are often assumed to be peripheral to community activities; recipients of help rather than active participants. These discourses and associated practices present older people as 'frail and vulnerable', suppressing alternative accounts of social connection that run counter to these ageist narratives (Russell, 1999; Stephens et al, 2017).

CTCAWA set out to uncover new understandings of social connection in later life, particularly for older adults who are minoritised through disability and/or who are racially and/or socioeconomically minoritised. We know that social isolation is prevalent among these groups as the impacts of structural inequalities increase their risk of chronic ill-health and disabilities that can affect connections with others (Olsen, 2018; Gonyea et al, 2018; Victor et al, 2012). Researchers have also highlighted the importance of adopting a lifecourse perspective to studying loneliness, pointing to how structural inequalities across the lifecourse, and traumatic or distressing events in early and younger years, impact on older people's social ties and experiences of loneliness in later life (Tiilikainen and Seppanen, 2017).

Our work challenges assumptions made about older adults and social connections and offers insights into the varied roles of social connections in older adults' lives. We have come to consider social connection as a dynamic concept, engaging beyond binaries of disconnection/connection. Our co-research has pushed us to consider connection beyond the interpersonal,

as being multi-dimensional with the natural and material world and experienced through a range of creative and digital encounters.

The chapter first explains CTCAWA's broad aims, project timeline and methods. Using project data, we then explore the diverse modes of connection, referred to as 'dimensions of connection', that emerged, providing examples from across the project lifecycle. We offer brief examples of how these dimensions were expressed in six final digital prototypes/products designed with and for older minoritised adults, alongside creative industry businesses and partners. We finish by highlighting an extended, relational view of 'connection' that draws out a range of possibilities for understanding and generating connection when co-designing alongside older adults.

Connecting through culture: methodological and theoretical underpinnings

CTCAWA was a three-year co-produced research project based at the University of Bristol. The project explored how participation in arts, culture and everyday creativity can influence wellbeing and feelings of social connection in later life. Crucially, it also deepened understandings of structural barriers related to class, race and disability and their intersections, that restrict access to arts, culture and digital technologies as we age. Inequalities and environments of ageing were at the centre of the Social, Behavioural and Design Research Programme (SBDRP) call and this project put the voices, lived experiences and expertise of 20 older adults aged 60–75 who identify as disabled, and/or socioeconomically and racially minoritised, at the heart of a research and co-design process. These co-researchers collaborated with artists, creative industry business partners, community groups and us (researchers) to co-design digital cultural experiences that promote connection in later life.

Our research processes were also underpinned and shaped by theoretical understandings of minoritisation, intersectionality and the lifecourse (Willatt et al, 2024). An intersectional lifecourse approach recognises how intersecting systems of oppression (for example, ageism, sexism, classism, racism, ableism) produce inequalities across the lifecourse, shaping the ways in which life is encountered and lived in older age. A comprehensive overview of those processes can be found in other publications (Willatt et al, 2024; Willatt et al, under review).

Through our research and co-design work, the CTCAWA project developed an understanding of 'connection' in a broader sense than 'social connection' is often described in ageing research. In our foundational work with co-researchers we noticed the importance of 'more-than-human' relations in the lives of older adults. For instance, co-researchers discussed

their connections to animals and plants, and to places that evoked memories or that they visited regularly. We therefore worked with theories that share a belief in the necessity to rethink what it means to be human, adopting a relational ontology that understands human life as made through a 'riot' of more-than-human forces (Bennett, 2010). These approaches enabled us to be attentive to the complex interdependencies between embodied, sensory, affective and material practices and performances in understanding connection in everyday lives. We worked with these ideas to explore how connection was felt in co-researchers' lives, but also to notice how connectedness grew through the co-design process and how this influenced resultant prototypes and products.

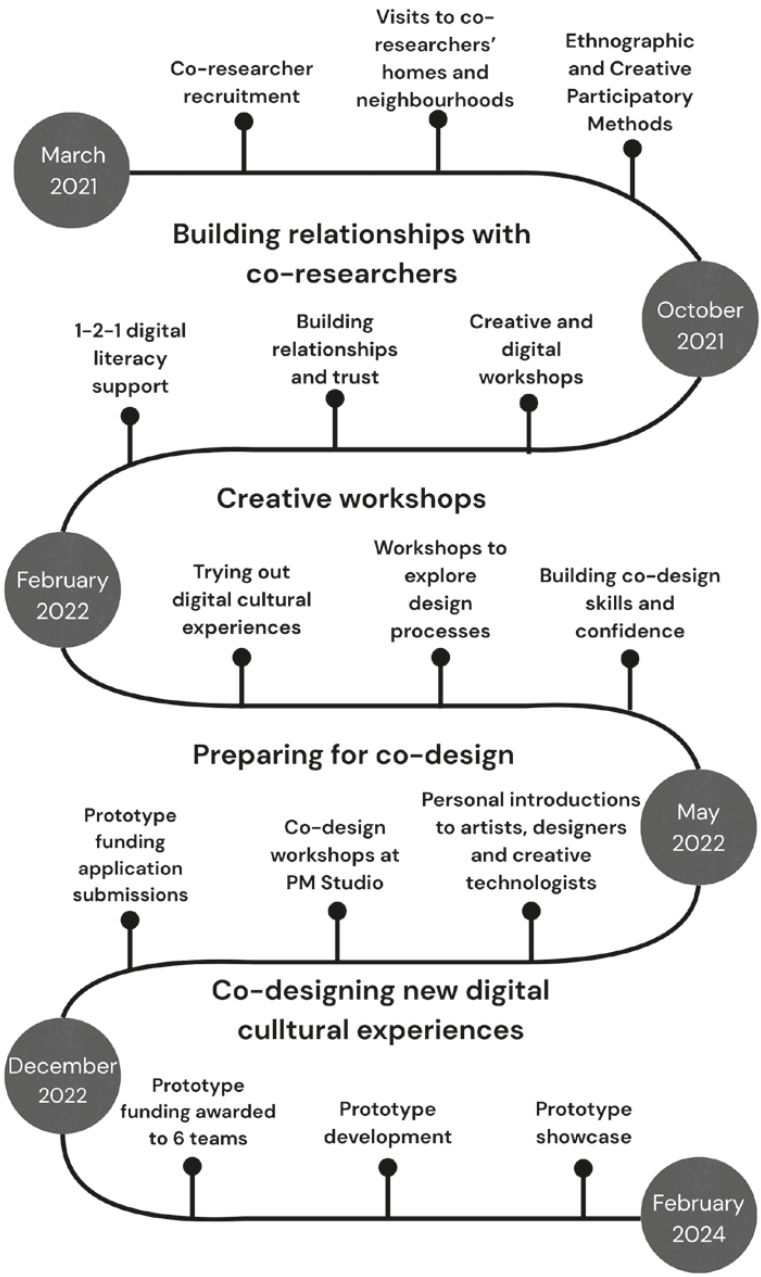
Our co-design approach was based on learnings from our previous research (Manchester and Jarke, 2022) and feminist approaches to design grounded in 'care ethics' (Tronto, 1993). Care ethics calls for responsiveness to situated social contexts. Drawing on feminist, more-than-human approaches meant being attentive to more-than-human worlds, as well as the lived experiences, diverse knowledges and historical/cultural narratives of the older adults we worked with. We developed a situated, relational, care-full praxis of co-design during our project (Manchester and Willatt, 2024) that stresses the unfolding or 'taking place' of age across subjects, objects, time and space (Barron, 2021). In this chapter we take this idea of 'unfolding' to explore our expanded understandings of connection as they grew through our research, practice and the co-design process. We worked to re-focus design away from a starting point of conceiving, creating and iterating novel objects and services and towards 'practices that are participatory, socio-politically orientated, situated and open ended and that challenge the business-as-usual mode of being, producing and consuming' (Escobar, 2018, p 27). We then supported the co-development of cultural experiences, innovations and products that grew from these practices. Some of these have gone on to be commercialised post-CTCAWA in recognition that these practices can lead to products that can be adapted and distributed at scale.

Research design: the four key stages of co-research

The first stage: building relationships with co-researchers

We drew on ethnographic (Pink, 2013) and participatory arts-based methods (Kara, 2015) to understand more about their everyday lives in place, the significance of different forms of connection, culture and creativity, and how this is shaped by intersecting inequalities. This involved spending time in co-researchers' significant places and spaces: homes, gardens, neighbourhoods. We also asked them to complete a diary and an album activity as an invitation to document their lives in ways that made sense to each co-researcher (for example, through scrapbooking, writing, photography). This relational and

Figure 12.1: Timeline for CTCAWA with key events involving co-researchers



Source: CTCAWA

place-based starting point aimed to ground the research in the everyday lives of co-researchers; their self-documentation revealing both important connections in their lives, but also barriers to connection and digital and cultural participation.

The second stage: creative workshops

We brought co-researchers together as a cohort to build relationships and trust. They participated in a series of workshops that focused on exploring everyday creative interests and connections (for example, cooking, film and textiles). Some sessions were facilitated by the research team, and others were designed and co-facilitated with co-researchers with particular creative interests (collage, poetry and photographing the minutiae of the natural world on our doorstep). Following this, the researchers worked in collaboration with the Knowle West Media Centre (KWMC), a community media and arts organisation, to run further workshops that introduced co-researchers to design processes and explored design for social connection.

The third stage: preparing for co-design

We brought co-researchers together with creative professionals including artists, designers, technologists and representatives of community and ageing organisations. Together, they participated in a series of co-design workshops held at the Pervasive Media (PM) Studio in Bristol, a city-centre cultural and digital innovation hub. We chose this location so that co-researchers could access and participate in mainstream spaces of design and innovation, thus disrupting perceptions about who has agency in these types of settings. PM Studio had not worked with older adults before and only a small number of co-researchers had ever visited the site, which includes a city-centre cinema, cultural venue and busy café. Workshops were planned in conversation with co-researchers and drew on themes informed by our earlier work together; 'Age Rebellious', 'Age Unusual' and 'Extraordinary Bodies'. These themes spoke to co-researchers' interests, passions and lived experiences relating to their social, digital, cultural and creative lives. Following the workshops, a competitive process of application for funding and support for six prototypes was announced. Workshop participants were invited to form teams, with co-researchers at the centre, to undertake a selection process to create a digital cultural prototype that supports social connection and wellbeing in later life. The process of forming teams was carefully supported to ensure that professional designers and creative businesses were aware of existing findings around the kinds of approaches that worked well with co-researchers. We found that we also needed to support creative businesses (often small and medium-sized enterprises [SMEs]) with project budgeting and planning.

The fourth stage: co-designing new digital cultural experiences

Six teams were funded for one year to work on their prototype. The teams were located across a range of different community-based and cultural design sites in the city and involved in-person, hybrid and digital processes with diverse groups of collaborators. Together, we developed our understanding of what's needed for minoritised older adults to create new digital and cultural products that reflect their lived experiences and recognise and support social connections. Researchers worked within and alongside the teams to document and record their process, and a film was made of each prototype project; both their co-design processes and outputs.

Forms of connection in the CTCAWA project

Throughout co-researchers' CTCAWA journey, forms of connection were revealed, explored and evolved. Table 12.1 lays out where forms of connection became visible across the four stages of the project lifecycle.

Table 12.1: Forms of connection across the four stages of the CTCAWA project lifecycle

Stage 1	Stage 2	Stage 3	Stage 4
Building relationships with co-researchers; exploring everyday experiences of connection	Creative workshops; exploring everyday connections and creativity	Preparing for co-design; connecting with collaborating artists and technologists	Co-designing new digital cultural experiences; connecting through prototype projects
Reflecting on significant connections in co-researchers' lives	Building a cohesive co-researcher cohort	Connection through working collaboratively with others outside of the research team	Connection through recognition of common values and experiences
Building one-to-one connections between research team and co-researchers	Creating opportunities for power sharing and a flattening of hierarchy	Design ideation – imagining connection for others	Creating complex and self-regulating intergenerational networks of connection across expertise and personal passions
Breaking down barriers to digital means of connection	Using digital and hybrid spaces to participate and connect	Envisioning future connections for oneself	Connection with the past through reminiscence
Exploring everyday connections of the materialities of place	Forging new side-by-side connections in creative spaces	Connecting with a shared mission to uncover and counter ageism	Connection embracing difference

Dimensions of connection as we age

The forms of connection we came to understand are characterised by dynamism, re-invention and innovation; countering a deficit and static view of connection as we age. Some of the forms of connection we observed have commonalities that we term 'dimensions' of connection. Although particular to our work on the CTCAWA project, our five suggested dimensions of connection that follow offer understandings of more-than-human connections in the lives of co-researchers which we hope may be helpful for others in the field of ageing:

- connection through arts and everyday creativity
- connection with materialities of place
- digital and hybrid connections
- connection across difference
- connection through design.

In this chapter, we present each of the five dimensions separately. However, we think of these as relational and their intersections can be seen in our data. For some dimensions, we also draw out where connection was difficult or where tensions emerged. These issues are explored more in other publications (Willatt et al, 2024; Willatt et al, under review; Manchester and Willatt, 2024).

In the next section we offer example stories from our data that illustrate each of these dimensions. Some stories occurred in a particular time and place; others developed across the project. The stories draw on a range of data types: we collected creative artefacts made by co-researchers, wrote fieldnotes of workshops and one-to-one meetings with co-researchers, took photos and recorded audio of some of our conversations. We also conducted interviews with co-researchers towards the end of the project. The research team met regularly to draw together data and reflect on our learning, revealing patterns and stories of connection.

Connection through culture/arts and everyday creativity

In exploring co-researchers' cultural and creative lives with them we saw the importance of everyday creativity as a form of connection. Co-researcher Erica is a White woman in her late 60s who lives alone and enjoys photography and crafts. She uses her mobility scooter to visit a cycle-path near her home which she refers to as "my happy place". She watches the cyclists and walkers and takes photographs of the trees, some of which she prints and frames for her walls. "It gives me great pleasure when I get home and think 'ooh, I've done that'. Being creative brings me peace of mind and

it makes me feel that I'm still worth something and needed". She also spends much of her time making gifts for people. As trust grew on the project, she made shells with decoupage decoration as personal gifts for some of the research team and other co-researchers. The act of making, and importantly then gifting the products of her crafting, gave her creativity at home new meaning that, transcended time and place.

We also saw how participating in creative activities together enabled social connection. During workshops, sitting side by side enabled new conversations without the pressure of a socially defined occasion. Connections were established through the material practice of the creative work itself – cutting fabric, bending sticks together, taking photographs – and co-researchers sharing their creations enabled a recognition of commonalities of interests. An online poetry group began with five co-researchers who self-identified as interested in poetry, bringing particular works they liked to each session. Connecting through poetry developed so that after a few months the participants started to write and read out their own poems, more co-researchers joined who had not initially thought of themselves as being interested in poems and, by the end of the project, co-researchers were writing collective poems.

Connection with materialities of place

At the start of the project we spent time with co-researchers at a place of their choice; for most it was their homes. Miss Edwards, a 66-year-old Black woman from Jamaica, moved to the UK in the late 1990s. She lives with her husband in a small flat in a sheltered housing block for older people. Miss Edwards' living room is full of material cues to her social connections with family in different countries, her church and friends on social media. Across the lifecourse, Miss Edwards has faced an intersection of racialised and socioeconomic inequalities that closed opportunities for accessing formal education. She finds ways around her difficulties with reading and writing. Next to her recliner chair, where she spends much of her time, are two phones. Our conversations with Miss Edwards are interspersed with the loud ring of her 'zoom phone' that she uses for WhatsApp voice calls. She turns on the speaker, drawing the caller into the room, holding three-way conversations. She also uses audio messages on WhatsApp to communicate with family and friends around the world, drawing them into her life in the UK and in their lives from far away.

Sat between Miss Edwards and her husband is a huge blue plastic barrel. This contains items, such as clothes and toiletries, to be sent to her adult daughter who lives in Jamaica and runs a small rural shop. Every time Miss Edwards goes to the city centre she buys something to add to the barrel and when full she sends it and soon starts filling a new one. This constant

reminder of her children and her Jamaican heritage is materially beside her as she watches daytime TV.

Co-researcher, Jeanne, a woman in her 70s with Indian heritage, lives on her own in a purpose-built social housing block. She enjoys writing poetry and gardening, finding connection in the space just outside her ground-floor flat where she spends nearly all her time. In a diary from the beginning of the project she told us "Carer this pm rather tired so not much done except among my pots several new plantings. All growing well. This getting my nails and hands muddy feels so good. Tomatoes courgettes, peppers both sorts …". She also closely observes the growth of leafy shoots in a close-by hedge, the dandelions pushing up between the paving slabs, the small birds who come and go. The minutiae of life on her doorstep offers endless interest, supporting a connection with nature and the wider world outside of her flat. As she remarks on the nuances of the changing seasons she connects with time passing; this is not a wistful connection but one which recognises dynamic change and cycles of life.

While Miss Edwards uses digital technologies and international mail services to connect with places and people often far away, Jeanne connects deeply with life and nature in the smaller world of her flat and yard. Both demonstrate how connection happens through the vibrant material lives in which they locate themselves.

Digital and hybrid connection

When they discovered that one of the research team, Tot Foster, was a film maker, two co-researchers asked to make films. With varying support, 13 co-researchers made films that were screened at a local arts cinema. Several chose to address ageism head-on, or consciously promoted positive images of older people. Others explored their personal creativity through poetry or animation, or chose a topic unrelated to age. The knowledge that the films were to be screened to an audience and then uploaded onto the project website was seen as an opportunity to say something publicly; to build connections with an imagined, and then a real, audience and with other co-researchers. We saw new kinds of digital connection, not dependent on social media, and existing through time. The range of narratives challenged a homogeneous view of older people's passions and motivations and showed co-researchers as communicators of their own unique narratives rather than as passive recipients of digital media. Co-researcher Elanora said about making her film: "For me this is activism, and I like the idea of activism". Elanora is a White woman in her 70s who later spoke at an online Creative Ageing Lived Experience network meeting, showing her film '*Beware the Beige*', exhorting others to reject stereotypes of retired people as passive. Afterwards she said: "It's like making a difference … it was important to

me all the way through my paid work life – and it feels really important that I'm doing this now."

When Jeanne joined CTCAWA she used e-mail and a word processing package on her computer. We provided one-to-one support for co-researchers to develop their digital skills and Jeanne asked to learn how to use Zoom. This has had a transformative effect on her life as she now participates in many online groups external to CTCAWA. She reflected that she's: "enjoyed discovering things. … There's a ballet class I'm doing, I've learnt African drumming online, I did a course with composing and conducting – all online, all via Zoom. And those are absolutely door opening things for me." Yet, it was not just new digital skills that opened this world, Jeanne explained the importance of the trusting relationships involved: "I needed someone physically there I could feel safe with … I'm now so much more confident."

Jeanne participated in most CTCAWA workshops via Zoom as ill-health makes it difficult to leave her home. In the early stages of the project this worked well, but when designers and creative technologists were brought in and groups were large, Jeanne explained: "I was sort of trying to take part … I couldn't make my presence felt – I was just like a ghost." Despite the work that had gone into supporting her participation over the previous months, on that day, hybridity brought significant barriers to participation.

Connection across difference

The co-researchers have had very different life experiences. While the project sought to recognise and respond to difference through the co-design process, it's important to acknowledge how asymmetries of power created both openings and barriers to connection across difference and participation in the design process. In examples from the later stages of the project we can see how dimensions of power, particularly relating to the relationship between whiteness and cultural capital, shaped participation and connection.

In the third phase of the project – the co-design workshops held at the PM Studio – we asked all participants to introduce themselves through an object (a practice carried through from previous workshops to create a sense of continuity). Some co-researchers used the opportunity to build connections with others in the room. For example, Fanny unfurled a life-size applique textile work, explaining that the goddess image is "Lilith – a badass – it was the first thing I made during COVID." This enabled her to forge connections with others interested in textiles and sewing, and those who recognised her interests in classicism and ideas of female power. Fanny's ease in the space was enabled through her familiarities with the venue (having regularly visited the café and cinema), with large cultural spaces in general and with talking about her own artworks. Other co-researchers spoke about feeling a sense

of disconnection or 'not belonging' in the workshops, alongside discomfort with some of the more mainstream design ideation processes. For example, towards the end of one workshop Miss Edwards said, "I done my 5 hours", referring to the experience as 'school', and expressed how she sometimes found it hard to relate to others in the space.

Later on, at the prototyping stage of the project, co-researchers began to work in smaller-scale community-based settings, with teams, including creative industry businesses, whom they got to know over the period of a year. The personal knowledge, activities and co-design approaches adopted in these settings often opened opportunities for connecting across difference. The Expressive Pockets team, which included both Fanny and Miss Edwards, designed a toolkit to bring older adults together to embellish fabrics using digital printing technologies, developing replicable model workshops that created space for people to share their lifeworlds, interests and lived experiences. Participants chose an image and three words linked to the theme 'age rebellion'. Their photos and chosen words were then mailed to them as vinyl iron-on transfers, along with other textile materials and tools, to use in a hybrid workshop where they created a 'pocket' to add to a bag, clothing or put in a frame. The slow pace of workshops gave time for relationship building across difference and created space for deep exploration of what visibility and rebellion meant to different participants.

Miss Edwards made two pockets (see Figure 12.2): one of her playing her tambourine with the words 'I am here' to express her visibility and passion for music and church, and the other featuring a photo of Paul Bogle, an activist who led the Jamaican rebellion against the government's oppression of Black people. She explained, "This is about the rebellion. In Jamaica, long time ago,

Figure 12.2: Miss Edwards' two pockets in the process of being made

Source: CTCAWA

this man, Paul Bogle, he fight the rebellion for us, for our parents, for slavery, and he's strong and he hands me power. He honour me fighting and he a star. Yeah." When talking through the pockets with the workshop group, Miss Edwards explained how the two images connected, "I am here is also linked to Paul Bogle – because he is why I am here." This dimension of connection speaks to the care-full co-design praxis (outlined earlier) that we adopted across all stages of CTCAWA grounding design in the everyday lives of older adults. It also recognised the importance of engaging with experiences of injustice across the lifecourse and the need for processes of co-design to be responsive to the situated experiences and social locations of everyone involved.

Connecting through design

We observed connections made both through the process and the products of design. In an early workshop introducing co-researchers to co-design for social connection, a task was given to work in pairs and use available making materials to create a concept for a product to bring people together. Erica is a disabled, White woman who worked in service roles before retirement and now enjoys engaging in arts and crafts activities at home and through her church. She worked with Ralph, a man of dual heritage who came to the UK in adulthood, and who is a freelance artist. When first given the task, they had never had a one-to-one conversation before and Erica joked "We've known each other for years", and Ralph said: "We go way back". That set a light, humorous tone which lasted throughout the morning. Starting the conversation about ideas, Erica asked Ralph a question that reflected their own positions; "For two people who've never met each other, what makes the spark to make them want to talk to each other?" They came up with a pooping robot dog concept and their laughter could be heard across the room. The dogs pester their owners to get out of their homes to walk them in the park, creating a place for interaction. Conversations between the robot dogs are relayed to their owners' phones encouraging them to engage with one another. And having something to look after creates a sense of connection. The dogs' poop is compost; to keep the park green. Erica and Ralph sat side by side talking about more-than-human connections between imagined others that in turn led them to develop an enduring connection based on shared humour and values. Ralph said afterwards "I've really enjoyed listening to all the other people and their incredible ideas".

Dimensions of connection in relation: outcomes of the prototype projects

As stated previously, we recognise the dimensions of connections that emerged during CTCAWA as relational, complex and intersecting. In this

section we illustrate this complexity by examining the outcomes of two of the six prototype projects and the relational expressions of connection they embody.

'Anyone Remember the Washhouse?' used organic workshop-based methods where there was a blurring between the project team and participants, and between artist and contributor. The project lead, a Black woman who is a writer and activist, wanted to honour her mother's stories and provided a place and activities through which others' stories could emerge. Writings, songs and memories of washing were told and gathered by a group of elders, most of whose mothers came from the Caribbean and/or were working class. Some stories were embodied in collected items, such as washtubs and dollies, by adding small talking devices that could record voice and then re-record, to share and re-share. Thus, one person's zinc tub became everyone's, and value and connection were created by this circular process of recording and preserving. Making visible everyday domestic practices across time and place created opportunities for recognition of commonalities now, but also a shared intangible heritage to be archived for the future. Participants/artists had complete ownership of the outputs of the project, which included workshops, poetry and song performances, films and a book.

'Tabletop Travels' is a box designed to transport people who cannot easily get out, through the tastes, smells and stories of a foreign place (see Figure 12.3). This box took the form of an Indian meal to be experienced in the home, where each dish triggers a personal audio narrative description of its meaning to the speaker, cultural origins and cooking. The box itself

Figure 12.3: Jeanne with the Tabletop Travels box

Source: CTCAWA

was painted by an artist with Indian heritage based on Punjabi miniatures. Material connectivity is based on stimulating the senses, personal connection with a guide and, perhaps most importantly, being made to feel special. The experience of Tabletop Travels provides not just a literal connection to a place through its food and personal story, but also creates windows onto other ways of being and living across cultures.

Conclusion

Starting from the Healthy Ageing Challenge framework of 'Supporting Social Connections' we have developed an expansive approach that goes beyond the 'social' to explore the many dimensions of connectivity in co-researchers' lives and, importantly, their relationalities. Our approach allowed us to be responsive to the connections important in the individual life experiences, interests and wishes of each co-researcher involved in CTCAWA, whilst also creating varied opportunities for different kinds of more-than-human connection, beyond the 'social'. We aimed to support co-researchers to develop agency and autonomy in exploring and sharing more-than-human connection. Successfully creating conditions for multifarious dimensions of connection was enabled through the flexibility built into the research design, the commitment to put older minoritised adults at the centre of each stage of the project, and the recognition and responsiveness to asymmetries in power; what we have called a process of care-full co-design (Manchester and Willatt, 2024). A single action is not effective in supporting this world of possibilities for connection, instead we learnt to think and act in the longer term, enabling the development of connections at a pace determined by those with whom we work. This requires a position on ageing as a process of change and opportunity, not as decline, and a recognition of the structural inequalities that shape and constrain participation in design processes.

When it comes to business development, this approach also allows for new ideas to emerge that address inequalities in arts and cultural provision and support healthy ageing. Gill Wildman, business adviser to the prototype projects, reflected that CTCAWA's methodology brought "new styles of products and services for older people that are much more nuanced and subtle". This approach is not always easy and requires considerable investment. However, it is likely to lead to digital cultural experiences and services that support meaningful forms of connection that can both positively impact wellbeing and also create visibility of the diverse ways in which later life is lived and experienced.

We want to finish by reflecting on how one of the prototype projects has been developed and re-designed for commercialisation since the end of the CTCAWA project. Tabletop Travels received funding through the Healthy Ageing Catalyst Award to iterate and scale the product while holding on to

what was good about the original idea (the personal, multisensory connections possible through 'travelling' to another place), based on our CTCAWA research. This enabled a team led by Tot Foster (University of Bristol), alongside charitable partners Alive Activities and design company Stand + Stare, to conduct further research to understand how to make a scalable, affordable and usable product from the prototype idea. We found that people did not want full meals but were happy to try smaller items of food and drink from other countries and we tested QR codes which were the easiest way for people to access digital content to enhance the experience. Through this we came to design an experience that worked through 'gifting' – a box delivered to older adults in their home that would enable them to travel to other places. The unique selling point (USP) of the new product is that this is a 'research led' co-designed innovation with any profit returned to the charity sector. Once we had re-designed the product, we were further funded to scale it through an Arts and Humanities Research Council (AHRC) commercialisation award and through additional grants from outside academia. These awards will enable us to work closely with a business advisor to further develop products and sponsorship. Further success will rely on corporate social responsibility, philanthropic funding and local distribution partners working with isolated older adults, who recognise the potential impacts of the product.

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13

Innovation in the outdoor visitor economy: towards inclusivity for people living with dementia

Linda Clare, Joanne Connell, and Stephen J. Page

Background

The demographic landscape of developed societies has been shifting as populations age. By 2050, the number of people aged 85+ in the United Kingdom will be double what it is today. This should be good news, but many of those extra years of life will be spent living with disability. On average, people aged 65 in 2024 will spend almost half their remaining life with disability (Centre for Ageing Better, 2022). One in 11 of them will develop dementia. There are over 900,000 people living with dementia in the UK, including around 70,000 people diagnosed before they reach the age of 65 (Alzheimer's Society, 2024). This is set to increase to over 1.5 million by 2050. Beyond this, many older people live with cognitive impairment due to other health conditions, such as stroke. Here we focus on people living with dementia and the family members or close friends who provide unpaid support and care (we will call them 'carers', although they may not always see themselves as such), but much of what we cover will be applicable to older people experiencing cognitive impairment for other reasons. We use the term 'dementia-inclusive' to refer to making places accessible and welcoming to those with dementia, acknowledging that this generally means they are also more accessible and welcoming for older people, people with mobility or sensory needs, people who are neurodiverse, and ultimately for everyone.

Dementia can affect anyone from any background or any walk of life, and people with dementia are a diverse and heterogeneous group. Most people with dementia live in the community, and of those, a significant proportion live alone, some with little support (Clare et al, 2020). People with dementia want to be themselves, to be as independent as possible, and enjoy a normal life. This is challenging because of the nature of the condition; dementia attacks the cognitive abilities that underpin everything we do. It does not just affect memory; dementia can affect language and communication, visual perception, planning and organising abilities, and mobility. People

with dementia may also have physical or sensory disabilities, or other health conditions. However, many of the issues affecting the well-being of people with dementia (Martyr et al, 2018), such as loneliness, social isolation, and anxiety, are not directly caused by the condition, but are secondary consequences that can potentially be alleviated through social means (Quinn et al, 2022a; Quinn et al, 2022b).

Why nature is important for people with dementia

For most people, a normal life includes being able to enjoy going outdoors, connecting with nature, and engaging in outdoor nature-based pursuits. Being in nature, and doing outdoor nature-based pursuits, makes people feel good and helps keep people healthy and active (Capaldi et al, 2014; Maxwell and Lovell, 2017). Connecting people with familiar everyday outdoor spaces and special places in the natural environment, and the activities and relationships that occur in these places, enhances social engagement and quality of life. Incorporating outdoor activity and time spent in the natural environment into everyday life is an enjoyable and accessible way of increasing physical activity levels and creating social, cultural, behavioural, and psychological benefits across the lifespan (Nicklett et al, 2016; White et al, 2016). This is equally true for people with dementia. Evidence indicates that for people with dementia, the benefits of outdoor activity include maintaining independence and meaningful occupation, promoting social inclusion, stimulating memory and the senses, and enhancing identity and self-esteem (Wu et al, 2021; Whear et al, 2014). Therefore, there is strong potential to extend healthy active life and enhance quality of life by addressing some of the challenges of dementia through connection with the outdoors.

People with dementia and their carers, however, experience extensive and significant barriers to accessing the natural environment, with many excluded entirely (Innes et al, 2016). Some barriers are structural and not specific to people with dementia; these include limited physical accessibility, lack of transport, absence of basic facilities such as toilets and benches, and costs. Barriers that are more specific for people with dementia can be environmental, such as poor signage causing difficulty with wayfinding; cultural, due to negative attitudes and stigma; social, such as where carers judge it too risky to take the person they care for outdoors; or psychological, reflecting the negative effects of dementia on confidence and self-esteem. Both generic and specific barriers are exacerbated for people from minority ethnic and disadvantaged groups. Getting out into nature can help to support independence, health, and well-being, and provide opportunities for social contact, for people with dementia, but these barriers need to be overcome. Addressing barriers to inclusion requires both changes in social and organisational attitudes and practices, and support for individuals and families.

How the outdoor visitor economy can contribute

One sector with potential to make a difference is the outdoor visitor economy. Many outdoor natural spaces are managed by organisations and businesses that provide access and facilities, which may include a range of outdoor pursuits. Businesses and organisations operating in the outdoor visitor economy are a key element underpinning access to outdoor environments and can contribute to increasing healthy life expectancy by attracting consumers to engage with outdoor activity that promotes well-being and health and reduces the impact of social inequalities on health. At the same time, there is significant economic potential for businesses able to capitalise on new market opportunities offered by older people with dementia and their families. Spending in households where there is a person living with dementia was estimated at £16.7 billion in England in 2019, with recreation and culture the top item of expenditure (Centre for Economics and Business Research, 2019). By 2040, this is expected to double, offering significant opportunities for innovation.

Among businesses and other organisations offering access to the natural environment, there is growing awareness of unmet need, and enthusiasm for providing opportunities for older people with dementia and their families (Connell et al, 2017). There is potential to both expand the visitor base and demonstrate responsible and inclusive practice. However, a lack of evidence about what is appropriate and beneficial for whom, in what contexts and under what circumstances makes it difficult for organisations to know how to address the needs of this group.

The aims of the ENLIVEN programme

In the Extending active life for older people with cognitive impairment and their families through innovation in the visitor economy of the natural environment (ENLIVEN) programme, we set out to work with organisations and businesses operating in the outdoor visitor economy to understand how they could innovate to become more dementia-inclusive. Business acceptance and integration of new ideas or practices over time is termed diffusion of innovation. Our adapted version (Connell et al, 2017) of the World Health Organization six-stage model of the integration of dementia awareness within society (World Health Organization, 2012) demonstrates how diffusion of innovation evolves in practice as businesses become more dementia-inclusive. This is a model of dementia-friendly business transition showing the stages through which businesses gain awareness and move towards developing and implementing services or products for people with dementia (see Table 13.1). Once awareness is triggered, perhaps by personal experience or exposure to relevant information, the transition progresses through starting to build the basis for being dementia-inclusive (such as through staff training), active

Table 13.1: Model of dementia-friendly business innovation

Six stages of dementia-friendly business transition					
Ignoring the problem as not relevant, significant or a distraction to daily operations	Some awareness, possibly from personal experience or awareness raising activity	Building a dementia infrastructure (e.g. engaging with training and becoming a dementia friend to become dementia-ready)	Advocacy for dementia (e.g. promoting the business opportunities for people with dementia and their carers as a USP)	Policies, plans and strategies for customers with dementia and their carers to make it a key proposition and a core part of business delivery	Normalisation (e.g. being part of a dementia-friendly community as a fully engaged business where it is the norm)

Source: Connell et al (2017, p 114)

promotion of opportunities, and including dementia-friendly provision as a core activity to the point where the business is fully engaged as part of a dementia-friendly community and inclusion is the norm.

We can think of this as a practical application of the concept of transformative tourism, which focuses on addressing inequities and creating the potential for social change in the form of an inclusive approach to visits by people with dementia (Page et al, 2023). To support readiness to make changes and reduce obstacles in the context of lack of awareness and knowledge, we applied a model of participatory change including full participation of people with dementia and their families, designed to create and promote an 'ecosystem of shared value' as businesses implement changes to become more dementia-inclusive.

In the ENLIVEN research programme we aimed to understand the perspectives and needs of older people with dementia and their carers, and of businesses and organisations providing access to nature-based outdoor activity, and examine the available research evidence, to identify directions for innovation. We wanted to use this understanding to co-design and implement innovative and sustainable initiatives that enable businesses to reduce barriers to participation and inequalities in access. Our intention was to evaluate these initiatives to provide evidence about the kinds of changes that successfully encourage increased participation of people with dementia across a range of contexts and environments. Finally, we proposed to use the knowledge gained to enhance the capacity of businesses and organisations in the outdoor visitor economy to meet the needs of people with dementia and their carers.

We conducted the work in conjunction with an Advisory Group of people with dementia and carers in a process of co-production. We set up a Knowledge Exchange Forum to connect organisation and business leaders,

people with dementia, family carers, and researchers. This allowed for meaningful discussion and consideration of a range of viewpoints throughout the programme.

Gathering evidence

In the first stage, we gathered evidence from research literature and websites and visited businesses to carry out site audits and interview managers and staff. We talked to people living with dementia and family carers about what they valued about being in nature and what activities they wanted to do.

We began with a scoping review (Collins et al, 2023) to characterise the types of outdoor nature-based activity for older people with dementia and other forms of cognitive impairment for which research evidence was available, and the range of outcomes examined. We looked for reports of research studies that described formal provision of outdoor nature-based activity away from the person's usual place of residence and evaluated at least one outcome of participation in the activity. We screened 18,862 records and found 28 articles that met our inclusion criteria, all focused on people living with dementia. In most cases participants were attending day care or living in residential care. Outdoor nature-based activity was offered as an opportunity for meaningful occupation to enrich daily life, as a framework for day care provision, or as an intervention to address clinical needs. Activities fell into three groups: green day care (15 articles), equine-assisted interventions (seven articles), and community nature-based activities (six articles). Researchers examined the impact of the interventions on outcomes such as connection with nature; activity engagement; clinical symptoms; functional ability; physical, psychological, and social health; and quality of life. The paucity of evidence regarding community provision, especially for those not attending formal care settings, confirmed the gap in knowledge and evidence and supported the need for effective knowledge exchange to stimulate initiatives in this area. To address this gap, we needed to understand the perspectives of people with dementia and carers on the one hand, and businesses on the other.

To better understand the experiences, needs, and preferences of people with dementia participating in nature-based outdoor pursuits in their leisure time, we interviewed 15 people with dementia and 15 carers and analysed their accounts thematically (Stapley et al, 2025). Four themes related to inclusion reflected diversity in individual needs and preferences for engaging with nature-based outdoor pursuits, adaptations to maintain access including accommodating risk, ways of supporting cognitive and physical accessibility, and how practical and psychosocial barriers prevent inclusion. Looking in detail at how people with dementia engage with nature, we saw how they framed their experiences of nature-based pursuits through three interlinked

themes relating to embodiment, identity, and relationship, reflecting bodily feelings and emotions, sense of self, and connection to others (Owen et al, 2024).

Learning from people with dementia and their family members helped us to work with businesses to promote inclusion in nature-based outdoor pursuits. We interviewed managers and staff from 40 businesses in the outdoor visitor economy and conducted site audits at 15 of the businesses to explore the visitor economy-nature-well-being nexus. Advisory Group members and researchers visited sites to explore accessibility, conduct audits, and report back with recommendations. Using thematic analysis, we explored how organisational change can improve the visitor journey through values and actions that create an accessible visitor experience for people with dementia. The findings showed that the current typical practice of providing events and tailored sessions for the local community is valuable but confirmed that further development was needed (Page et al, 2023). We identified key pathways to becoming a dementia-inclusive business, including the importance of an organisational champion, an accessible site (or support for access), and a nature-based experience or event that appeals to a wide audience. This allowed us to operationalise the transformative tourism paradigm, providing a framework for the next stage of the work.

Co-creating inclusive nature-based experiences

In the next stage of the ENLIVEN programme, we invited organisations and businesses to apply for small grants to fund innovative demonstration projects that would help make their business more dementia-inclusive. Before making an application, businesses had the opportunity to bring ideas for discussion at the Knowledge Exchange Forum. Applications were reviewed by Advisory Group members and by the research team. We initially funded 11 businesses in various areas of England and Wales that were at varying stages on the journey to becoming dementia-inclusive. We also visited and advised four additional businesses that did not have capacity for a full innovation project but wanted to make their sites more dementia-inclusive.

The 11 businesses undertaking demonstration projects (see Table 13.2 for a summary) proposed a variety of initiatives and set out a range of goals they wanted to achieve. These included: improving well-being and supporting connection with nature for people with dementia and carers, and contributing to reducing health inequalities; enhancing accessibility, improving the visitor experience, and increasing the number of visits by people with dementia and carers; increasing understanding and confidence among staff and volunteers so they are better equipped to engage with or lead activities for people with dementia; building relationships with partner

Table 13.2: ENLIVEN demonstrator projects

Beamish Museum
This project involved a ten-week photography course called 'Framing it Differently', celebrating the connection between nature and art, culminating in an exhibition of participants' work which is now permanently on display at the museum.
Bishop's Palace, Wells
The Bishop's Palace team hosted a four-week nature connection course based on the Natural Academy approach to connecting with nature focusing on the five pathways of emotion, contact, compassion, beauty, and meaning. Participants attended a weekly two-hour session focused on either contact, compassion, beauty, or meaning, with emotion running through all sessions.
British Bird of Prey Centre
The British Bird of Prey Centre hosted a series of bi-monthly events to provide an opportunity to closely interact with and learn more about birds of prey. The team also visited a dementia group and three care homes, taking the birds to residents who were unable to travel.
Dartmoor National Park
Dartmoor National Park, in collaboration with the South-West Lakes Trust, Tavistock Memory Café, and the non-profit organisation Cycling Without Age West Devon and East Cornwall, held a cycle-based event at Burrator Reservoir.
Dartmoor Active Leisure
Linked to the Dartmoor National Park project, Dartmoor Active Leisure (DAL) established links with a local memory café and delivered a series of cycling events.
Royal Botanical Gardens Kew (Kew Gardens)
The project used reminiscence as a tool to engage people with dementia from diverse backgrounds with plants and nature, connecting people with experiences from their past through the international plant collections during seven weekly events. The project was co-developed with an African-Caribbean community group of people with dementia through an initial series of consultations and art workshops.
National Coal Mining Museum
A series of co-production sessions provided fruitful ideas and specific plans to develop the museum's nature trail and make it more accessible, including planting trees to form an accessible woodland area within the museum grounds.
New Forest National Park
The New Forest National Park and its partners, Lepe Country Park, PedALL cycling, the New Forest Tour, Dementia-Friendly Alton, and Dementia-Friendly Hampshire, delivered a series of events including cycling, open-topped bus tours, and volunteering sessions.
Seaton Tramway
Seaton Tramway provided a series of nature-themed events in partnership with the East Devon Wetlands Rangers team. Events included watercolour painting, bird watching, photography, and well-being activities.
Strawberry Hill House and Garden
The work at Strawberry Hill House and Garden focused on making the 'Feel Good Garden' more inclusive and co-creating a sensory trail through the gardens. As part of the project the Strawberry Hill team co-created a map of the trail, redeveloped their website, and made a film to serve as an access guide.
Tower of London (Historic Royal Palaces)
The Tower team co-developed a nature, storytelling, and memory box event focused on the recently rewilded moat area and ran this two-session event for three dementia groups. This was very well-received, with the visits managed successfully in this most challenging of sites.
Consultancy outside the small grants scheme
Devon Wildlife Trust, Exeter Cathedral, Lost Gardens of Heligan, and Stuart Line Cruises.

organisations and community groups; and producing tangible outputs such as a co-produced accessibility statement.

The ENLIVEN team supported the businesses as they co-produced and implemented their planned innovations. Engagement with people with dementia was central to all the ENLIVEN business projects. Advisory Group members visited business sites to advise and to get involved in co-creating the innovations and turning the initial ideas into practical activities. Alongside this, they explored the websites of our partner businesses and provided feedback on design and content. Wider involvement of people with dementia, carers, and supporters was achieved through links with local dementia groups around the country. These links were instrumental in informing people about the projects in their areas and getting people engaged with them.

The projects encouraged people with dementia to connect with nature either through participating in planned activities, which could be one-off events or a course of sessions, or through getting involved in co-designing improvements to the visitor experience.

Connection with nature was promoted through events that focused on different groups interacting with nature and the outdoors in various ways. Outdoor activity or connecting with wildlife was a feature of several projects: Dartmoor and New Forest National Parks offered cycling trips, and New Forest ran open-top bus tours and involved people in volunteering sessions, while the British Bird of Prey Centre ran bespoke bird of prey flying experiences at its base and took the birds on outreach visits to community groups and care homes. Another approach involved running nature-themed events: Seaton Tramway linked with the Seaton Wetlands nature reserve to offer watercolour painting, birdwatching, photography, and well-being activity sessions, some led by people with dementia. Heritage provided rich potential: the Tower of London welcomed people with dementia to the newly opened historic moat area planted with 20 million wildflower seeds and used storytelling to unlock the power of nature. A sequential two-stage event was designed and run initially to ensure development of a purposeful visitor experience, and this experience, involving two visits, was delivered to three groups of people with dementia.

Some businesses set up courses involving a series of small-group sessions or a rolling programme of events to promote connection with nature in different ways. Kew Gardens used reminiscence sessions to enable local people to connect with their heritage by exploring plants from the Caribbean during seven weekly events. The Bishop's Palace, Wells ran a four-week nature connection course to promote appreciation of nature and build a lasting connection with the garden. Beamish took an arts-based approach and developed Framing it Differently, a ten-week nature photography course; participants' work is now permanently on display at the museum.

Other providers engaged in co-production to improve accessibility and enhance the visitor experience. Strawberry Hill House and Garden co-created a sensory trail through the gardens, co-developed and tested an action plan to make its 'Feel Good Garden' more dementia-inclusive, and produced an access guide and film. The National Coal Mining Museum co-produced a dementia-inclusive action plan, leading to the development of an accessible woodland area with saplings donated by the Woodland Trust.

We evaluated all the projects funded by the small grants scheme. The primary focus of evaluation in each case was the business, as we wanted to understand the impact that the innovation or activity had, what changed, and how this helped move the business along the dementia-inclusive continuum. The research team observed activities, talked with the people with dementia and carers who participated, and interviewed managers, staff, and volunteers. This helped us to see how the process of innovation developed, what the challenges were, and how well the providers achieved their goals.

For each project we developed a bespoke evaluation schedule. Core elements for all the businesses were interviews with managers, staff, and volunteers, conducted before and after the innovation or activity, and, where possible, also at the mid-way point. There were a total of 61 interviews. We conducted interviews or focus groups with people living with dementia who participated in activities at the business sites. We interviewed 31 people with dementia, 15 carers, nine couples consisting of a person with dementia and a family carer, and nine facilitators of dementia groups that participated in the projects. We additionally collected event-specific questionnaire responses and observational data, including photographs and video-recordings taken with consent.

The businesses all experienced challenges in implementing their innovations. Reaching potential participants sometimes proved harder than expected, it took time to build contacts with local dementia groups, and pitching the activity at the right level was not always straightforward. However, all managed to achieve the goals that were important to them. Learning how to connect with people living with dementia and building contacts with dementia groups in their area was key for some businesses. For example, New Forest National Park developed close relationships with dementia groups across Hampshire. Making links with other organisations and businesses was another important goal. For example, Dartmoor National Park established a partnership with a local business, Dartmoor Active Leisure. Other goals included exploring the appeal of new or different activities, making their sites more accessible with benefits to a wider range of visitors, and increasing the confidence of staff and volunteers to support visitors affected by dementia. All the participating businesses expressed the intention to continue building on the initiatives undertaken, sustaining current initiatives, and progressing further towards dementia-inclusivity.

Interviews with people with dementia and carers demonstrated positive benefits. The events were popular; where providers offered a series of one-off events, many people made repeat visits. The activities enabled people with dementia to have valued experiences 'in the moment', often shared with others. Carers found it helpful to have an opportunity to relax and enjoy being in nature, knowing that the person with dementia was occupied. The co-production process meant that people were listened to and felt valued. Co-creating group experiences was a good way to increase confidence and counteract the negative effect a dementia diagnosis can have on confidence to engage in outdoor activities. Comments about the activities were overwhelmingly positive but also offered constructive suggestions for further development. For example, people advised the New Forest National Park about the right level of physical challenge for volunteering activities.

These 11 demonstration projects have provided practical evidence in support of the transformative tourism model, showing the varied pathways to becoming a dementia-friendly business. Reflection on learning from the business projects demonstrates the importance of an organisational champion, an accessible site, a nature-based experience or event that appeals to a wide audience, and attending to well-being elements of the visitor economy. The findings have been shared with the people who participated in ENLIVEN and with a wider audience globally.

Developing evidence-based resources

In the final stage of the ENLIVEN programme we worked with the Advisory Group to co-produce resources based on learning from the demonstration projects. This resulted in a comprehensive 70-page guide for businesses on 'Using nature to make your visitor economy business dementia-inclusive'; a 23-page booklet summarising 'Practical tips for businesses when designing and delivering dementia-inclusive outdoor visitor experiences'; a policy brief titled 'Making outdoor spaces and activities dementia-inclusive'; and a set of short films focusing on the experiences of people with dementia involved in two of the demonstration projects, Seaton Tramway and Dartmoor National Park.

The resources were launched at a well-attended knowledge exchange event co-created by our partner businesses and key organisational stakeholders. It was run in conjunction with partner organisation Historic Royal Palaces at the Tower of London, one of our demonstration project sites. Leads for seven of the demonstration projects presented their initiatives. The active participation of Advisory Group members brought the event to life and enabled us to connect businesses with people living with dementia to demonstrate how co-creation can be fostered and used to create impactful

outcomes. Most businesses represented said they felt inspired to develop their work on dementia inclusivity further.

All the ENLIVEN resources, as well as recordings of the presentations at the knowledge exchange event, are available on the ENLIVEN website (https://enlivenproject.co.uk/), which constitutes a sustainable legacy of the programme.

How ENLIVEN has contributed to policy and practice

The main scientific impact of ENLIVEN lies in the contribution to operationalising transformative tourism and showing how innovations in business practice can allow for greater inclusion of people with dementia and their families. This requires a critical look at the entire visitor experience, from the initial idea of visiting through to returning home. One essential element in increasing dementia-inclusivity is consulting with people with dementia and carers about possible developments and involving them in co-creating new opportunities; connecting with local dementia groups offers one way of doing this. Another is to ensure that staff and volunteers are trained in understanding the needs of people with dementia and how to respond. Champions are vital, but responsibility needs to be shared to promote sustainability. Supporting and encouraging businesses and organisations to imaginatively meet the needs of people living with dementia and their families will both promote leisure-led economic growth through leveraging the dementia pound and demonstrate socially responsible business practice. Businesses in the outdoor visitor economy can leverage ENLIVEN resources to integrate dementia-inclusive practices into their operations and facilitate designing accessible experiences, training staff to support visitors with dementia, and fostering partnerships with local dementia groups. The programme demonstrates the value of capacity building and training initiatives to equip staff and volunteers with the knowledge and skills needed to support visitors with dementia and enhance confidence and competence. Incorporating dementia-inclusive practice into business operations both enables businesses to attract a broader customer base through community engagement and aligns with goals of social responsibility.

While promoting sustainable change in business practices was a key target, ENLIVEN also contributes to promoting awareness in the health and social care field of the value of enabling people to get outside in nature and engage in outdoor nature-based pursuits, both in terms of individual health and well-being and in relation to cost savings for the NHS. Policy makers and providers can help by ensuring that people living with dementia can get outside and into nature if they wish, so that engaging with nature continues to be an important part of their lives. Investing in community resources that can enable people with dementia to get outdoors and engage

in nature-based outdoor pursuits will help to keep people healthy, support well-being of family carers, and reduce demand on health and care services. To overcome structural barriers to access, investing in transport options and ensuring availability of suitable outdoor leisure facilities will optimise the potential for people with dementia to get outdoors, also benefitting their family carers. ENLIVEN underscores the importance of advocating for policies that support dementia-inclusive practice and accessible facilities in outdoor spaces and outdoor nature-based activities.

The message for people with dementia and their families is to keep going outdoors and enjoying nature as much as possible, and to look for interesting places and enjoyable activities that are dementia-inclusive. Getting involved in a local dementia group can offer opportunities to work with organisations and businesses to help them become more dementia-inclusive. The emphasis in ENLIVEN on co-creating and collaboration between businesses and people living with dementia highlights the transformative potential of inclusive practices. This approach can serve as a model for other initiatives aiming to enhance accessibility and inclusivity.

Business–academic relationships

The businesses we worked with covered a wide spectrum of ownership and management, size and location, from small owner-manager businesses operating on a local scale to world-renowned visitor attractions. Businesses also varied in their degree of knowledge and previous experience in promoting events and activities for people with dementia. Despite these variations, the core principles of collaboration and engagement with a site-based and site-appropriate dementia-inclusive agenda was a shared vision for all businesses working with us. To realise this vision, each project was based on the development of a bespoke package of support, including knowledge exchange, co-production, feedback, and feed forward that enabled businesses to design and launch new services and experiences and to enhance their confidence in reaching out to a new market. Such support and guidance for businesses seeking to make their site more dementia-inclusive is important, especially as some businesses may perceive dementia-inclusivity as requiring significant capital investment. Our project has shown that many improvements can be quite simple and low cost. While group-based events and activities are at the heart of a dementia-inclusive offer, basic site considerations must be observed. Examples of where a dementia-inclusive approach might start include: raising staff awareness and ensuring high quality staff interactions so that visitors feel welcome, looked after, and safe; ensuring websites have clear information on accessibility; and engaging with local dementia groups to help trial and refine new ideas. Lastly, easy access, caring staff, and well-designed site

infrastructure, as is commonly said, works well for people with dementia but is appreciated by all visitors.

Conclusion

Alzheimer's Society in the UK (Alzheimer's Society, 2023) has calculated that as many as one in two citizens will be touched by dementia in their lifetime, either developing the condition or supporting someone with it, and that is before we add the impact of cognitive impairment arising in later life due to other causes. Dementia itself is an umbrella term for over 100 specific conditions. We typically think of these conditions in terms of disease, but although progress with medical treatments is anticipated, supporting and including older people living with cognitive impairment or dementia will remain a major test for society. In this context, the needs are not so much medical as social, and a response is needed from all corners of society. Everyone has a part to play in enabling older people living with dementia or cognitive impairment to experience a good quality of life and feel included in their communities and in society. This includes being able to continue in some form with the kinds of leisure activities that they enjoy. Businesses, including those offering access to the outdoors, are increasingly aware of this need but may not know what they can do to address it. ENLIVEN has shown the value of supporting businesses to engage directly with, and hear the voice of, people living with dementia, and demonstrated the creative outputs and benefits that result. This provides inspiration for building on these initiatives.

In conclusion, ENLIVEN has demonstrated the value of integrating dementia-inclusive practice into the outdoor visitor economy and provision of outdoor nature-based activity. Businesses and other providers can help to set the scene for meaningful and enjoyable experiences and support independence, well-being, and health for people living with dementia and their family carers.

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14

Intergenerational connectivity for promoting health and well-being across ages, places and spaces

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Introduction: healthy ageing in an increasingly digital world

The expanding digitalisation of everyday life that has occurred over the past 30 years has affected all segments of society from youngest to oldest. Digital connectivity—connectedness through digital technology—is recognised as having growing importance in linking individuals to community, information and other resources. It increasingly mediates connections to material and virtual supports that are relevant to healthy ageing and reducing health inequalities in later life (De Santis et al, 2023). Xu et al (2021) highlight the implications of this trend as meaning that 'digital technology will continue to shape the way we access health information, connect with loved ones, and stay active' to the extent that 'digital access has become a new social determinant of health' (p134). Developments in eHealth promotion (Muellmann et al, 2018), for example, highlight the potential of digital applications to support those living with long-term conditions and improving and maintaining their health and well-being. Evidence is also emerging of the potential benefits of digital applications such as videogames for health on physical, cognitive and social aspects of adult, including older adult, users' health-related quality of life (Marston and Hall, 2016).

The potential of digital tools and technologies to maintain and promote health, well-being and social connections in later life was dramatically highlighted by the COVID-19 pandemic. In countries such as the United Kingdom, restrictions on movement and in-person interaction prompted many older adults to adopt new strategies, including technology use, to maintain social ties. Emerging evidence on the impact of the pandemic on older people's use of digital resources across different countries presents a mixed picture in terms of the levels of uptake of different digital technologies

(Heponiemi et al, 2022; Balki et al, 2023), as might be expected given variation in economic, policy and cultural responses to the pandemic. In terms of the perceived benefits of technology during the pandemic, a nationally representative survey of Canadian older adults found that among those aged 65+ digital technology users endorsed a range of benefits in terms of supporting health, wellness and communication (Sixsmith et al, 2022). Specifically in a survey in Scotland, some older adults reported moving their typical physical and social activities to digital platform versions of these due to the pandemic physical restrictions of lockdown and social distancing (Tomaz et al, 2021; 2022). Importantly, those who were able to maintain moderate or high levels of physical activity also reported higher health-related quality of life, similarly those maintaining more social contact reported less loneliness (Tomaz et al, 2021). Positively, digital technologies to promote or sustain physical activity have the potential to reach populations who may have difficulties accessing traditional physical activity interventions (Norman et al, 2007). This can include institutionalised older adults such as those residing in care homes, and there is some review evidence that such interventions can be effective for and acceptable to these older adults (Dawson et al, 2024).

Even in countries where access to infrastructure and digital devices is relatively high and demographic changes leading to population ageing are highlighting its public as well as its personal importance, there is a long way to go in fully realising the potential of digital technology to support 'healthy ageing'. Despite the growing landscape of digital technologies for health promotion with older adults, much of the research conducted to date on the impact of these developments has tended to focus on independently living older people in non-institutional settings with higher levels of income, education and self-reported digital competence (De Santis et al, 2023). There are also practical barriers to the development of digital products and services which might aid healthy ageing. For example, there is a pressing need to understand and incorporate older individuals' requirements and preferences to support more widespread adoption of digital health technology by this population (Henson et al, 2023), but the skills required and costs of doing so in a systematic way can be prohibitive, especially for smaller developers.

This push towards using technology as an alternative means of maintaining physical and social activity directly fitted into the purpose of the UKRI Healthy Ageing Challenge's Social, Behavioural and Design Research Programme (SBDRP). The GOALD (Generating Older Active Lives Digitally) project, the subject of this chapter, was a three-year research collaboration between the University of Stirling and the University of Plymouth's Centre for Health Technology. It sought to address identified research gaps, connect technology developers with older people to design, test, deliver and evaluate digital resources for health, well-being and social connectedness in older age. It also aimed to work with stakeholders to

produce outputs to inform the development of future products and services. The project additionally sought to address the continuing disparities in health-related experiences of later life through targeted interventions and technological applications designed to connect older people with communities and resources for health improvement.

Aims and methods

The aims of GOALD were: to develop and determine the feasibility and acceptability of co-designed digital tools for promoting healthy ageing, facilitating structured activity programmes in two areas—physical activity and sport-based reminiscence; and to demonstrate opportunities for the development of related products and services to enhance supports for healthy ageing and inform future development.

The GOALD project employed a 'co-production' approach (Hennessy et al, 2023). Inclusive approaches to developing technologies with older users have gained momentum in recent years as the benefits of product and service design and development directly informed by user experiences have become increasingly apparent (Östlund, 2015). To pursue GOALD's aims, the research team worked with stakeholder organisations and groups of older people. Ten national, regional and local non-academic partner organisations helped to recruit and engage geographically, socio-demographically and functionally diverse older participants from community-based and residential care settings in Scotland and southwest England (Devon and Cornwall) in the co-production process. For example, two partner organisations, iSight Cornwall and Hearing Loss Cornwall, assisted GOALD in addressing the digital requirements of individuals with visual or hearing impairment.

In collaboration with partner organisations, GOALD recruited an intergenerational advisory group. Members ranged in age from 32 to 79 years and comprised 28 individuals with experience of working with older people across health, well-being and social contexts. Tasked with identifying and exploring factors which facilitate or hinder older people's digital resource use, the advisory group met between October 2021 and March 2022. Their discussions informed the range of technologies that GOALD tested, the ways in which these were offered to and tried out by participants, and measures employed to capture existing physical activity and use of digital technology.

GOALD's partner organisations also assisted with the recruitment of 184 individuals who joined the project's co-production groups. Across the GOALD project, participants included 145 older adults (aged 60+), six younger people (aged 16–25) and 33 health and social care professionals in roles which support or work with care home or community-based older people. GOALD's original intention of achieving broad intergenerational

participation by including high school students in the project was not realised due to the impact of COVID-19 restrictions during recruitment (Tomaz et al, 2024). In total, seven care homes and 11 community groups participated in the project, although due to the geographical logistics of the project, not every case site included every element of technology that the GOALD project assessed.

The co-production group meetings took place in person or online, typically bi-weekly for up to six months. Participants were introduced to a range of digital technologies (from a menu of 20 options) including, for example, virtual reality (VR), AI voice technology, mobile applications and physical activity websites. They were asked to offer their views and preferences on which they were interested in trying out. Participants then engaged in sessions where they had the opportunity to use the selected technologies and provide feedback on their experiences. Following these sessions, participants took part in further formal evaluation focus groups designed to elicit: their reactions to the technology; their motivations for use; their perceptions of potential benefits and barriers to use of the trialled technologies; and their suggestions for improvements. Finally, in a series of 'creative co-design workshops', older participants ranked their priorities for these technologies and contributed ideas for future technology-enabled products and services.

Qualitative and quantitative data from the co-production group discussions and workshops, ranking exercises, interviews and group observations were collected and analysed using thematic analysis and descriptive statistics. Findings were used to develop 'toolkits' which distilled what was learned from GOALD activities for future use by digital designers and developers (Veliz-Reyes et al, 2024). Ten of GOALD's business collaborators, UK-based small and medium enterprises (SMEs) producing digital technology, then used the initial versions of the 'toolkits' to create new/adapted digital resources for health promotion geared to older adults. In the final project phase, through a survey and in-person interviews, the participating businesses offered their views of the co-production process results, with a final combined version of the 'toolkit' incorporating feedback and insights from this process.

Findings

Findings from GOALD provide insights into four areas: 1) digital health technology to promote and/or sustain physical activity; 2) digital health technology in supporting structured reminiscence activity; 3) the functionality of digital health technology; and 4) the impact of co-design for digital technology developers. Here we provide an overview of key findings in each area. Other GOALD project outputs provide more detailed discussions of findings in the cited references. The learning synthesised from

findings across GOALD and the overall implications of the findings for policy and practice are presented and discussed later in this chapter.

Sustaining physical activity

Our overarching finding is that, despite some initial trepidation, digital technology can play a role in providing structured physical activity for older adults. This would be particularly as a prompt, resource or support for activity for less active individuals, and through providing 'off the shelf' activities for carers to use with older adults (Tomaz et al, under review). GOALD participants with access to in-person classes did not see digital technology-based physical activity as equivalent, or superior, to physical activity delivered in person. Rather it was viewed as another opportunity to engage in being active or something which could enhance in-person offerings or be used on its own. Participants viewed their motivation to engage with digital technology as centring around its potential to be a source of social activity and fun; extrinsic rewards like score boards, and external prompts which can be provided through digital technologies, were seen as opportunities to help improve engagement levels. For example, games with an element of competition were seen both as fun and useful, as this distracted from the fact that they were exercising. Further, technologies which incorporated group activity were seen as highly beneficial, as noted by several participants: "You'll get the company; you'll get the exercise and you do your exercise better when there's a group of you."

Participants saw the potential for a range of valued and valuable outcomes from engaging with digital technology, including physical benefits and cognitive aspects. For example, participants noted that many of the technologies kept them moving but also "keep your brain active". They also valued the range of ability levels considered in some technologies, for example, providing both seated and standing exercises so that people with difficulties with leg movements could still take part to maintain their current physical activity levels and ability, but also build up confidence in those concerned about their balance or abilities. Participants noted physical benefits which would lead to further independence, for example a care home resident noted:

> all these muscles you're building up will help you to push yourself up. All these arm ones for getting out of your chair. Especially you [name], for getting out of your chair, all these arm ones keep you a wee bit more mobile. Keep you on the dance floor. You can get from A to B on your own.

While such benefits are seen as potentially realisable by most older users of digital technologies, barriers to their realisation in practice do exist and need

to be considered and addressed for health-promoting digital technology to have maximal impact. For example, older adults with physical and cognitive limiting conditions may be unable to engage at all with some existing digital technologies. For instance, those in wheelchairs will struggle to participate in some digital games or activities based on or requiring lower limb movement, although some developers had incorporated design elements which would still allow some level of engagement while seated. Further, people with sight or cognitive impairments struggled to engage with technologies where the physical activity was delivered mainly on a screen with visual demonstrations of exercises, which underlined the need for clear audio instructions to accompany the visual, or for in-person support alongside technology use. For example, community group members mentioned that the avatar and written instructions for one piece of technology for aqua aerobics was, for them, "… too small to see, needs audio read out of what to do as well as the demo."

GOALD participants also raised concerns around safety, accessibility of technology and the availability of appropriate space for the technology to be used to its fullest potential. Issues with WiFi speed, access to large enough screens for content to be visible, and space, particularly within care homes to house equipment or to exercise, were acknowledged:

> The thing that gets me, a lot of people do these on an iPad or a small-screen computer, instead of getting it onto the TV screen and being able to watch it in the lounge. Now, if you could make that a bit easier for them, how to do it, if you like, I think that would help.

Further, many care homes have wing-back chairs in their communal living spaces, but these can interfere with the execution of physical movements that the technologies are promoting. Care home-based participants noted that more upright chairs, even with arms, were better if people needed them to get onto their feet: "You're actually better on something like this, or the dining chair or the ones with arms."

Findings from GOALD also suggest that digital health technologies that seek to be sources of structured physical activity for older adults must consider the suitability of activity. GOALD participants felt that the most successful digital technologies for promoting healthy ageing in older populations would be those which provide and allow participants to choose from a variety of relatable content as well as allowing users to control the type, duration and intensity of activities: "Here, you can have a lot of different programmes that can stimulate different people in different ways. It could be used for calming, it could be used for more exercise-based. You could have games, you can have music in the background. It's adaptable."

Such technologies could provide tailored experiences to suit the needs and likes of a diverse older population. Further, GOALD participants identified

the relatability of digital content, regardless of how it was delivered (for example, via video, live sessions or gamification of activities), the clarity of demonstrations and instructions for using digital technologies, and the need for an engaging approach as critical factors in motivating continued engagement over time from older users. Recommendations included incorporating demonstrators of a similar age to the intended end-users rather than featuring only younger people or young avatars to enhance confidence and motivation, for example:

> I think that's important, because you want to be able to see that somebody like you can do it. If you see a really fit man doing it, and then you think, "Oh, well I can't do that because they're able to do it, but I'm a less fit woman," you might say, so you're not able to do that. But seeing someone like you doing it makes you feel more confident.

Reminiscence activity support

Similar to prior research in this area (Tolson and Schofield, 2012), GOALD found that older people's 'connectivities', their links with community, resources and meaningful activities such as heritage experiences, are essential contributors to health and well-being. Adding to that research, GOALD found that the use of digital resources, including live video streaming, themed short-form-video and the use of digital archives, as memory triggers in the delivery of sport-based reminiscence to community groups, enhanced participant experience of this activity (Haynes et al, 2023).

GOALD found that the social dimensions of group-based reminiscence activities and the familiar locations in which community sport-based reminiscence groups were often held enhanced participant experience. Researchers observed sense of belonging and camaraderie between participants, which participants confirmed in small-group interviews, a common response being: "It's the friendship and reviving old memories."

Another key dimension of the sport reminiscence meetings was their regularity in the calendar, with groups often meeting at the same time and on the same day of the week on a pre-scheduled basis. A key feature of the regularity of meetings, often at sport clubs, was the motivation to attend to avoid social isolation: "If I didnae come here I'd just be sitting at home reading the paper."

Two of the co-production groups in GOALD also combined reminiscence sessions with physical activity. For one football-based reminiscence group this included participating in a game of walking football immediately following the memories session. For another, indoor games, such as carpet bowls or adapted games with beanbags, were integrated into reminiscence sessions. One conclusion from such integrated activities is that the social dimension

of such groups is a key motivator for attendance, and the regularity of such meetings also helps structure older people's calendars as motivators to leave the house and engage with others.

The GOALD study explored the potential for using off-the-shelf technologies for remotely streamed video access to sporting heritage sites as part of structured sport-based reminiscence activities for older people in three different community contexts. The researchers remotely streamed from five different sporting heritage locations including a football museum, a public statue, the archaeological sites of former football stadia, a motorsport museum and a national rugby stadium tour. Such live-stream heritage visits require prior research to make heritage content intelligible and engaging. They also require stable internet connectivity at the heritage site and the receiving community context and contingency for when connectivity gets lost.

The key findings from live-streaming during the GOALD project established that remote access to sites of sporting heritage can trigger personal memories of sport, creating forms of nostalgia, pleasures of experiencing both the familiar and the unknown, and social connectivity between sport reminiscence participants. For example, following a visit to the statue of the former Celtic and Scotland international Billy McNeil in the small town of Bellshill, respondents immediately created episodic memories of the player and an era of football with which they identified. As one respondent noted: "We became engrossed in the Billy McNeill thing … it was very interesting as we all knew a lot of the things Billy had done."

As the engagement and trust with the community groups in GOALD developed, the project was able to respond to requests to explore new heritage sites and themes in an iterative process. Groups expressed preference for themed sport reminiscence delivered in person and incorporating digital content—such as short-form video content including well-known former sports people—which stimulated engagement in new ways. The researchers heard on numerous occasions how the blend of digital content with material heritage enhanced the experience, with comments like "It's totally changed their approach to it". Nevertheless, while participants viewed digital archive material as supporting the themed approach, there was a preference for tangible heritage materials, such as photographs and sporting ephemera, to also be available. So while digital content as part of themed reminiscence sessions "made technology a bit less daunting", there was also a sense that "having the activity in the room" was preferable, or as one respondent put it "It's better because there's no delay" compared to streaming or learning to access the internet. This was partially due to perpetuating fears among some older people in the groups of using digital technologies to access content. The GOALD co-production groups demonstrated that it is possible to deliver remote and in-person digital access to sporting heritage using relatively readily accessible and affordable technologies such as smart phones and smart

TVs. GOALD findings highlight the need for digital devices and technologies to be adaptable to the context of delivery for community sport reminiscence sessions, for example, being able to access the internet and stream live and recorded media from reminiscence session locations when required, and to be accessible to and appropriately featured for participant inclusivity given the potential socio-economic, cultural, physical and cognitive diversity within reminiscence groups. GOALD found that realising the full potential for digital technology to enhance reminiscence requires novel partnerships, willingness and ability to invest time, and confidence in the reliability of supporting infrastructure. Creating remotely streamed or digitally themed sport-reminiscence experiences requires detailed planning and collaboration between heritage professionals who deliver live streams and facilitators of community reminiscence sessions. To thrive, these partnerships require a supportive digital environment. For example, unstable internet connectivity at either end of the live stream can be a major barrier both to delivery during sessions and willingness to commit to producing and incorporating future digital content.

Functionality of digital health promotion tools

GOALD findings confirmed that even where developers recognised the importance and benefits of working with older people to develop services and products aimed at older users, they did not necessarily have access to the time, financial or knowledge-based resources to do so themselves (Bradwell et al, 2023). GOALD established both demand for and a perception of the usefulness of a 'toolkit' designed to disseminate GOALD findings to developers, researchers and other stakeholders interested in the creation of technologies for older people, with a focus on promoting physical activity. Although a planned GOALD core output from its inception, findings from co-production activities across the GOALD project were instrumental in shaping the form and content of the toolkit.

A full thematic analysis of technology interactions with GOALD participants, focus groups and formal co-design workshops suggested that the toolkit should address three core themes: 1) general recommendations for technologies for older adults, 2) physical activity technologies (including websites, apps, games, etc.) and 3) VR for those working with immersive technologies. Accordingly, the toolkit contains three sections. Each section addresses one of the identified themes, collating and synthesising findings from across the project into recommendations and providing GOALD participants' priority rankings for each recommendation to support developers in exploring the importance of design features to end-users.

Both the final version of the GOALD toolkit and detailed findings which informed its recommendations can be found on the GOALD website

(https://www.plymouth.ac.uk/research/centre-for-health-technology/goald/toolkit). The toolkit includes both general recommendations and those specific to particular technology types, with recommendations covering considerations such as ways to encourage motivation for physical activity through technology use, content that end-users wanted to see, hardware-related design considerations and modes of interaction that developers of future products and services might usefully consider.

GOALD found that developers had sometimes given more thought to ideas for a new digital product or service than to whom it might be most suited or how to access those segments of the market. Accordingly, the toolkit incorporates guidance on potential audiences that may be able to use new developments, and suggestions on introducing technologies to different target market groups. GOALD findings on barriers to using the technologies evaluated during the project and suggestions on innovating for inclusivity are also included in the toolkit.

The toolkit also provides details on GOALD's co-design methodology, discussion of the importance of engaging in end-user feedback throughout the innovation process, an overview of the technologies demonstrated to our participants and case studies on how the GOALD toolkit has been used by SMEs and organisations. By including this information, GOALD hopes to help developers to understand the value of engaging in co-design processes and support developers, particularly SMEs, to engage in their own co-design process in the future.

Impact of co-design for digital technology developers

GOALD project activities found that a toolkit which synthesised its findings to produce more general recommendations could be of immediate practical use to developers of digital products and services aimed at supporting healthy ageing for older users (The GOALD Project, 2024). Many projects create resources which they hope will benefit different groups, but not all have the opportunity to evaluate that benefit. GOALD built the opportunity to test its toolkit in the 'real world' into the project. In order to measure the impact of the toolkit and to ensure the information was presented effectively to developers, the GOALD project hosted a challenge fund competition calling for developers to incorporate feedback from the toolkit into current products or create a new product based on the recommendations. SMEs and organisations within the GOALD network were invited to apply for one of ten £5000 pots of funding. Successful applicants were generally those who could demonstrate specifically how they would apply the toolkit recommendations into their improved or new product. Examples of the developments produced based on the toolkit included creating a way of tracking the level of physical activity completed within VR, increasing the

usability and inclusivity of a physical activity platform website, developing an app to promote intergenerational connectivity and the creation of guides for carers to use a VR product.

GOALD found that insights provided by involvement in research and supplying appropriately tailored resources can lead to the adoption of new practices in digital technology development processes and ultimately to products and services that are more inclusive and fit for purpose. Interviews were held with each winning developer to understand the impact the toolkit had on their products, how they used the toolkits, challenges they faced and suggestions to improve the toolkits. The organisations commented on how the toolkits were useful in validating their products, including to potential investors and funders, and offered a wealth of information to speed up the development of products. For some organisations it provided them with new ideas, and for others it altered their development priorities to better reflect end-user requirements. One organisation, for example, that offered a subscription-based web platform for delivery of online pre-recorded music and movement videos, commented on the outcomes of using the toolkit to redevelop their existing web-based platforms: "An enhanced user experience has positively impacted sales and subscription rates. The clearer, more accessible presentation of our resources has led to a higher conversion rate to ongoing subscription. The GOALD toolkit has proven to be an invaluable resource for our development process."

All organisations expressed the usefulness of the toolkits, regardless of the stage of development, and were motivated to continue engaging in the co-design practices. Challenges around time to develop and access to funding were discussed as barriers. Bringing GOALD findings directly to business partners and providing co-design input directly from end-users was one of the key goals and successes of the GOALD project. Many industries, particularly smaller developers, find the skills and costs required to systematically engage with older users to be prohibitive at the design stage for their products. The co-design and the testing of technologies with older people and resulting GOALD toolkit provide a legacy of recommendations for future technology developments that businesses can use. Engaging directly with businesses to incorporate GOALD recommendations into further and new technology development has enabled us to evaluate and therefore claim real-world impact of our project findings for industry partners. We recommend that any business looking to focus products on the health and well-being of older adults utilise the GOALD findings distilled into the toolkit to inform their technology development. The toolkit cannot cover all aspects of every potential future technology, which highlights the importance of business, academics and older people continuing to work together to co-design new health technologies.

Implications and conclusion

Promoting 'healthy ageing' for all is both an international ambition and, in the UK, a national priority articulated through initiatives such as the Healthy Ageing Challenge. GOALD has provided evidence of the potential of digital technologies to support older users' health and well-being both through directly provided digital services or content and through the use of digital resources to enhance existing in-person experiences. In partnership with community organisations, older participants and technology developers, GOALD explored the development and use of digital technologies in the contexts of promoting and sustaining physical activity and of sports-based reminiscence. In both contexts, older participants were found to be interested in exploring digital products and services, welcomed opportunities to experience unfamiliar technologies and perceived potential benefits from continued engagement with them.

Equally, GOALD has provided evidence that barriers remain to realising the full potential of digital technologies to support healthy ageing. For example, GOALD found disconnects between developers and the potential users of, and markets for, their digital products and services. Economic and time-related resource constraints on both developers and potential users in some cases led to suboptimal knowledge of older users' needs and preferences for technology. GOALD found issues with availability of public and community-run spaces with reliable digital service provision to support technology-enhanced in-person group activities. Creating an environment which nurtures and sustains the willingness of organisations and individuals to invest their own time and resources in producing and delivering digital content is critical to realising the potential of digital technologies to support healthy ageing.

In responding to needs identified through the GOALD project by creating a 'toolkit for developers' in collaboration with its community and business research partners and participants, GOALD provided compelling evidence of the commercial and wider societal benefits to be gained from partnership working between businesses and academia. Informed by older participant feedback on GOALD-tested technologies and refined after 'real-world' use by GOALD's partner SMEs, the 'GOALD toolkit' provides a legacy resource both to inform future developers and to support and encourage them to engage in future co-design processes to help enhance the inclusivity, acceptability and, ultimately, commercial viability of their digital products and services.

Businesses without the skills and resources to do so themselves have been able to leverage academic expertise and experience in accessing groups of older people, working with diverse populations and analysing data from user-engaged co-production to improve their digital products. GOALD research findings have informed the development of a toolkit and illuminated some of

the wider challenges to successful development of digital resources to support older people's health and well-being, including lack of access and opportunities for digital education. Policy makers must continue to work towards reducing digital inequality and increasing digital literacy across all of society. GOALD has used the findings from co-production activities based around specific digital resources to produce 'toolkits' that can guide the designers and developers of future generations of digital products and services targeting ageing populations. These toolkits highlight potential issues to be addressed but also provide valuable insight into the diversity of these populations in terms of their ability and desire to engage with new digital resources. They help to bridge the potential generational gap between designers and end-users and to break down ageist stereotypes of later life. The results of GOALD's co-production approach thus affirm Mannheim et al's (2023: p1198) conclusion from their scoping review of research on user-involved digital development processes with older adults that 'more inclusive design, positive and nonageist discourse, and viewing older persons as partners led to favourable results.'

Finally, the GOALD project has progressed the aims of the Healthy Ageing Challenge by assisting businesses to develop and deliver digital solutions to promote health, well-being and social connectedness in later life. The SBDRP specifically enabled the unique interdisciplinary/intersectoral collaboration necessary to bring digital health, physical activity and gerontological expertise together across research, business and real-world settings to address the challenge of developing appropriate usable health technologies for older people.

Note

[1] https://www.plymouth.ac.uk/research/centre-for-health-technology/goald

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15

Research and innovation in the healthy ageing domain: understanding a complex ecosystem

Jen Nelles, Lauren Tuckerman and Nadeen Purna

How business connects with social sciences, arts and humanities as part of a healthy ageing domain has been a feature of this book. This chapter focuses explicitly on the interplay between actors in the healthy ageing domain in the UK and the opportunities for innovation and growth through a lens of place-based development. It highlights the fragmentation, complexity, diversity and hybridity of this domain, discussing ways in which these can be understood, and how policy interventions can support its development despite the challenges posed by these tensions. It emphasises the need for understanding social as well as economic innovation and supporting ideas and objectives that can generate social and economic impact. This often means encouraging intersections between business, social enterprise, third sector, government, research and communities. A series of recommendations are provided throughout the chapter based on developing a place-based approach to supporting the healthy ageing domain. Lastly, a research agenda for deepening our understanding of complex hybrid domains is provided.

Introduction

Providing support for innovation and economic development for ageing populations creates distinct challenges and opportunities for policy makers. Typically, those charged with creating innovation policy and support focus on the more technological innovations, with obvious commercial value, and less on blending economic, social and political value for a more holistic view of innovation. In this context, we argue for an expanded understanding of what innovation matters, of the variety of participants in the healthy ageing domain and of the importance of seeking synergies between them. We suggest a means of understanding the complexity behind supporting such a domain by discussing different forms of hybridity; namely subdomain diversity, functional diversity and organisational diversity. We illustrate these through a case study of the healthy ageing domain in Greater Manchester – a

city region that is internationally recognised as being at the forefront of healthy ageing policy that also hosts research, community and commercial activities in the domain. Through this case study we demonstrate how place can be important, and in particular how local governance systems can act as a convenor to bring actors across the hybrid domain together to fuel and harness innovation.

Healthy ageing as a hybrid domain

Innovation is the generation of new practical knowledge. These are ideas that do not simply create knowledge but that have impact and application. The UK's research and innovation agency's (UKRI) Healthy Ageing Challenge programme was designed to encourage innovation in the pursuit of greater wellbeing for the ageing population. Its vision states that investing in UK-wide innovation and research will 'support both our ageing society and the economy through the delivery of market innovations within the growing healthy ageing domain, while also addressing inequalities in healthy life expectancy' (UKRI, 2022).

This vision predominantly characterises innovation in the market – the commercialisation of products – as the mechanism through which investment will result in benefits to the wellbeing and life expectancy of an ageing society. Enabling businesses to develop and deliver products, services and business models, adopted at scale, can provide quality of life enhancing tools to people as they age. The challenge for innovation agencies is to ensure that the activities that they support in this domain contribute significantly to their core social objectives – particularly around gains in wellbeing and reducing inequalities – rather than simply supporting growth in the private sector. This involves understanding the role of commercial offerings in which the independent activities of a diverse range of actors and activities interact emergently to affect healthy ageing outcomes.

Healthy ageing is not the only domain in which innovation is leveraged to serve both economic and social objectives. Social innovation is a concept, and associated literature, that combines these two (and sometimes more) aims: 'new ideas (products, services and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations' (Social Innovation Exchange, 2010, p18). Social innovation involves leveraging market mechanisms towards social outcomes but can also emerge from the non-commercial pursuits of actors (such as in government, research or social sectors) to more effectively reach constituencies, generate insights or provide services.

We determine that UKRI's ambitions in the Healthy Ageing Challenge are to encourage social innovation and, as such, turn to that literature to inspire our approach to parsing the types of activities and how they relate to

each other in innovation systems and places to help inform healthy ageing innovation strategy.

One of the challenges we encountered was in scoping the range of participants in the domain of healthy ageing innovation. Here, traditional demarcations between public, private and third sector (and, consequently, their roles) were fuzzier and required some conceptual unpacking. The problem being that the actors and entities involved in the domain of healthy ageing innovation often play multiple – or hybrid – roles, making it difficult to easily identify certain organisations as part of a healthy ageing ecosystem. Hybridity in social enterprise and innovation literature often refers to the co-existence of commercial and social missions within organisations (Pache and Santos, 2013). However, that concept can be extended to classify and understand other forms of diversity within innovation systems.

We identify three different types of diversity within the healthy ageing domain and discuss their significance for innovation studies (drawing on Nelles et al, 2022; 2024). Subdomain diversity refers to the wide variation in types and focus of healthy ageing activity. For example, activities that can impact healthy ageing outcomes include healthcare, pharmaceuticals and therapies; logistics; industrial, architectural and civil design; professional services; lifestyle products; housing and care environments; transportation; and more. While this diversity is a strength of the healthy ageing domain, it also creates challenges for strategic investment into healthy ageing goals and innovation. For example, supporting innovation in heart disease research will not lead to innovation in estate and retirement planning or programmes designed to reduce isolation and loneliness, and so prioritisation and multiple streams of investment will be necessary. Although activities can be grouped into subdomains (such as home care/care homes, housing, social programming, healthcare, financial and legal services, etc.), there are also interdependencies between them and conceptualising them in silos also carries risks (Hamilton-West et al, 2020). For instance, healthcare technologies and medical interventions are already privileged more than other sectors involved in healthy ageing, which has meant an emphasis on clinical solutions. This conceptualisation is beginning to change slowly as the profession begins to more widely recognise the value of preventative models, social prescription and other environmental interventions (Costa et al, 2021).

Functional diversity highlights the fact that many actors and organisations that develop healthy ageing innovations are not solely focused on healthy ageing objectives or markets. While there are certainly companies and other actors (such as charities) that specialise in issues related to ageing, for a significant proportion of firms and organisations, ageing populations may be only one of several target markets. For example, a legal firm may provide many types of services to its clients in addition to consulting on estate planning and transfer. A mobility aid manufacturer makes equipment

for people of all ages with mobility challenges but may also develop innovations for older individuals. A software company might design apps to help seniors engage in social activities but may also make apps to help college students organise clubs. This diversity creates difficulties in effectively identifying organisations involved in healthy ageing – particularly when the entities themselves identify with different segments of the economy (such as software developers or legal services). In this context, establishing eligibility guidelines to target innovation funding is difficult, and may result in under-/mis-estimation of the size and significance of the healthy ageing domain.

Organisational diversity reflects the fact that some organisations involved in healthy ageing are themselves hybrids and combine elements of different sectors (such as public, private and non-profit). Often this means they integrate profit alongside purposes that are traditionally associated with the social economy or third sector. In this sense, they serve a social function but generate some proportion of the revenue used to support that function from selling goods or services rather than being purely reliant on grant funding. Hybrid organisations, such as social enterprises, perform important functions in the healthy ageing domain (Murtagh, 2017). However, these organisations are easy to overlook or under support in innovation-driven policy. Furthermore, because they are neither a business nor a charity they can be cut out of funding streams geared towards either actor type. In domains such as healthy ageing, where hybrid organisations make up a significant proportion of participants, it is vital to understand the role they play in the innovation system and for delivering social priorities. This hybridity creates significant hurdles in relying on innovation to address the highly complex set of social challenges associated with ageing, particularly when innovation support tends to focus on research and innovation policy levers, such as funding, that hybrid organisations may have difficulty learning about or lack the resources or expertise to apply for.

These observations about the nature of innovation and hybridity are important as they reveal significant challenges, and opportunities, for policy makers leveraging innovation support to advance parallel goals of stimulating research and innovation excellence and optimising societal outcomes in healthy ageing. Effectively supporting healthy ageing innovation, however, requires more than just understanding the diverse landscape of actors that can be involved in the domain. The next section explores the concept of innovation systems to highlight the importance of understanding how different organisations and interventions interact to support innovation in healthy ageing.

Innovation policy in a hybrid domain

Given the previous discussion about diversity and hybridity in the healthy ageing domain, what role can innovation policy play in supporting the goals

of the Healthy Ageing Challenge? How do we need to approach innovation support differently in healthy ageing and what lessons might this hold for other hybrid domains?

Innovation funding typically focuses on distributing resources to entities engaged in innovation activities generally but often does so within a framework of broader objectives (Knetsch and Tuckerman, 2022). The Healthy Ageing Challenge is one example of a specific area of innovation being targeted to support the Government's strategic objectives. In these contexts, councils often structure funding programmes to multiply the impact of investment, prioritising opportunities to achieve multiple outcomes (such as funding research that is likely to be commercialised and lead to job creation or research with private sector partners that may increase their innovation potential or activities that are likely to generate spillovers to specific places). Innovation funders have, therefore, been eager to adopt best practices that maximise synergies. Among these are strategies that use principles of innovation systems and agglomeration and innovation clusters.

The concept of innovation systems holds that innovation in the market is the product not just of firm activities but the confluence of research assets, business support resources, intermediaries, skills pipelines, financial flows and institutional structures, among other things. It is built on the argument that innovation outcomes are affected by interactions and synergies within and across the system. In this context, innovation funding agencies have been exploring how they can use the levers at their disposal to increase capacity and smooth interactions between elements of the system. This involves, for example, designing calls that encourage partnerships between business and academic researchers, or resources to help businesses acquire skills to effectively raise capital – strategies that both boost the capacity of those funded and forge synergistic connections between system elements.

While these efforts are often conceptualised at the national scale (national innovation systems) they operate at multiple levels such as regional and local innovation systems or, more recently, innovation *eco*systems. Often these systems are seen as specifically place-bounded and, as a result, one of the expectations of targeting actors for funding is that localised spillovers will increase synergies within those places, thereby contributing to local economic development goals. Among these are strategies such as supporting innovation clusters – places where a critical mass of innovation activity is occurring across related industries and actors. Clustering multiplies innovation and growth in specific industries and places, which makes it an attractive strategy to advance innovation goals and as a tool to smooth out spatial inequalities. The logic is that increasing innovation in these contexts can enhance outcomes for both the organisations that are recipients of support but that proximate actors can also benefit due to spillovers and externalities in the form of knowledge, talent and enhancements to collective resources (such as business

incubation, shared specialised services, core technologies or infrastructures, and financial support, etc.). These spillovers generate positive feedback loops that ideally become self-sustaining, augment the attractiveness of the place to investment and talent, increase firm foundation and competitiveness and raise the international innovation profile (Cooke 2001; Martin and Sunley, 2003). Clusters play a central role in the UK Innovation Strategy, the Levelling Up white paper and the Industrial Strategy, all of which link clustering to growth and innovation (HM Government, 2017; BEIS, 2021; HM Government, 2022).

Indeed, research has identified significant inequalities in healthy ageing outcomes between places (Norman et al, 2022), which has piqued curiosity in the potential of cluster policies. Inspired by similar work on clustering in the Creative Industries Challenge (Creative Industries Cluster Programme, 2021), the Healthy Ageing Challenge commissioned the Innovation Caucus to explore the feasibility of adopting a similar approach (Nelles et al, 2022). That research concluded that the hybridity of the healthy ageing domain meant that typical cluster strategies were not suitable. Very few localities explored had a sufficient critical mass of economic (and other types of) activity to serve as the foundation for clustering, and those that did had such a wide spread of different types of businesses – in terms of focus industries (subsectoral hybridity), focus of organisations (functional hybridity) and business innovation potential (with an emphasis on locally focused services) – that ultimately constrained the likelihood of spillovers from related variety. However, the exercise of conceptualising healthy ageing through the lens of innovation clusters could still serve as a policy inspiration encouraging decision makers to explore and understand different types of localised assets and actors in the healthy ageing domain, the relationships between them and how they might be better connected to fuel innovation that could serve both external markets and local constituencies.

The report concluded that places can benefit from collocation and critical mass of broadly related activities if they are sufficiently connected and that this can fuel a broad spectrum of innovation – in research, business, service provision and policies – as well as contribute to improving social outcomes. This is likely to be particularly true of hybrid domains in which public benefit, not just economic growth, is a core output of activities (commercial and otherwise) (Nelles et al, 2022). In places with significant concentrations of healthy ageing activity, then, we might expect that networks will evolve to drive social innovation for social benefit and that this collective action might coalesce around one or several key public needs. In that case, innovation may occur not only (or even primarily) in the development of new products or services but in devising mechanisms for organisations to better reach, incorporate feedback from, respond to, and support their constituencies.

This requires reframing the focus of innovation support and expanding it to encompass broader conceptualisations of what innovation is as well as reconceptualising measurement of impact beyond growth and productivity.

Following this thread, the Innovation Caucus team set out to research how different actors and activities intersect (or don't) in order to innovate in a large urban area and to learn what impacts these networks have (or could have) on the ageing population. The next section unpacks these questions in a case study of Greater Manchester in the UK.

Case study: Manchester

Across the public, private, academic and third sector lines, and intersecting at different levels of hybridity, the Manchester area has hosted examples of research and innovation that typifies working in hybrid domains. Greater Manchester is predicted to see its population over 75 increase by 55 percent from 2024 to 2041, meaning there will be approximately 100,000 more residents over 75 by 2041. Reflecting national trends, older people in Greater Manchester from poorer backgrounds live shorter lives than their wealthier counterparts. Diversity in older people in Greater Manchester is also increasing, with more older people from ethnic minority backgrounds, and more older people likely to identify as lesbian, gay, bisexual and transgender (LGBT) than previous generations (Ageing Hub, 2024).

Greater Manchester was chosen as a case study site as it had a particularly supportive policy environment hosting the Ageing Hub and the Health Innovation Hub, providing broad support for the area to become a 'global centre of excellence for ageing, research, technology and new ideas on ageing' enshrined in strategic partnerships such as that with the Centre for Ageing Better (Centre for Ageing Better, nd). The University of Manchester also hosts the Manchester Institute for Collaborative Research on Ageing – a world-renowned centre which aims to link researchers to each other, and to other partners (MICRA, nd). In 2018, UNESCO recognised Greater Manchester as the UK's first age friendly city (GMCA, 2018) suggesting that activities in the area were worth considering. As we wanted to understand positive ways collocation of activities support economic outcomes and innovation, and the ways in which those innovations fed into place-based healthy ageing outcomes, Greater Manchester offered a fertile environment to explore these questions.

In this section we outline some key actors involved in these activities, discussing the hybrid nature of their work and outline the ways in which, although hosted by Manchester, these activities are rarely inherently localised. To do so, we draw on insights generated from a series of workshops with different stakeholders engaged in the agenda of healthy ageing in the Greater Manchester area.

Five workshops were held online between April–August 2022 with a total of 24 participants. Research was approved by the university's ethical board. Workshops focused on generating discussion between participants. Workshops were themed as business – health, other ageing adjascent business – technology, third sector/social, academic and public policy. The goal of the workshops was to learn how participants engaged with innovation and the degree to which they were aware of or benefitting from place-based spillovers from related activities. We organised these sessions thematically to enable participants to freely share experiences and learn from one another. Even though the sessions were thematically bounded, each contained participants from a wide variety of backgrounds. For instance, participants from the business subgroup ranged from those interested in app development to social housing developers and social housing providers. The social subgroup represented organisations who were advocating on behalf of older people as well as wellbeing providers (such as befriending, food provision, etc.). The governance workshop had participants who were involved in the design and delivery of core ageing policies in the Greater Manchester area; the participants had a particular focus on social policy and inequalities (rather than stimulating economic strategy, for example). Finally, the academic group was made up of participants who were all employed by Higher Education Institutes in the region, and had a focus in some way on ageing, mostly from a social science perspective, with many focusing on health inequalities. Participants were invited to take part through working closely with a gatekeeper organisation, namely the Greater Manchester Combined Authority Ageing Hub.

We discuss insights generated from these workshops according to the following themes: functional hybridity, local embeddedness and networks, knowledge exchange and spillover and innovation as a bridging technique.

Functional hybridity is common

Our research confirmed the high degree of variation in the focus of actors involved in healthy ageing in Greater Manchester. For example, for those working in the housing sector, producing housing for older residents was only part of a diverse portfolio of offerings. In particular, the housing development firms described how they perceived the ageing market as growing, they also acknowledged it was not central to the work they did. Encouraging intergenerational living in the Greater Manchester area was seen as important but it was one segment in the overall business rather than embedded at the heart of the organisations.

More participants in the healthcare sector saw healthy ageing as central to their organisation, but those with a 'wellbeing technology' focus saw older people as just one segment of their market. Typically, technologies developed

by this group could be used with any age group, but participants were aware of the healthy ageing agenda as important and intertwined with their mission. One participant, for example, represented an organisation which provided an app designed to encourage people to move more through walking but in a non-competitive way. The app's user base includes many older people as a core demographic. In contrast, those in the 'social' workshop saw healthy ageing as very much central to their organisation. They typically described older people's issues as forming their core social mission.

Local embeddedness and networking relationships vary

Participants in the two business workshops (housing and technology) reflected that national and international relationships were more important than local ones to their business. Similarly, suppliers were located throughout the UK. Businesses with a stronger social focus and those who were in the social organisation workshop serve local communities directly and are therefore more spatially focused. However, those categorised as businesses also developed tools for and with customers outside of Greater Manchester, and social organisations had links outside of the area which provided access to both knowledge and resources such as funding. Workshop participants in the social organisation group were also heavily interrelated with participants involved in more than one organisation at a time.

Ties to local communities were essential for the social organisations in terms of programme development and generating (social) innovations. This situated them as firmly locally embedded, however they did seek support and resources from outside the local area, and their strength came in combining local knowledge with external resources to implement what was needed in particular for their area.

The governance groups represented in the workshop worked at the very local to the national scale, and this was reflected in the participants who took part in the workshop. Around half of the participants had very strong connections with the local area, mostly through the Greater Manchester Combined Authority Ageing Hub, but were working nationally. While the other half had a remit enclosed in the Greater Manchester area, their networks tended to be global. It was beneficial to hear from those operating at a national level as they were able to reflect on how Manchester compared against other regions. They reported that the issues faced in Manchester could be described as similar to those in other places, however, they noted that Manchester's governance networks were comparatively well established and quite active. Participants did not come to a consensus on whether the policy initiatives that were taking place in Greater Manchester could be described as novel or innovative, but many participants felt that there was 'something different' about activities in the area.

Our participants identified the Ageing Hub as a key strength of the area, bringing together actors under a central mission of delivering a 'cultural shift' to make ageing 'everyone's business'; changing minds and therefore practices related to ageing. Their convening power appeared strongest among governance actors but was also important to social actors and, to a lesser degree, researchers. For governance actors, networks such as those created by the Ageing Hub were beneficial in creating legitimacy as well as providing support and direction to organisations working on activities related to the healthy ageing domain; they were, however, not primarily interested in creating innovation policy or for delivery. Businesses did, however, have close relationships with local governance actors; in fact, when mentioning collaboration, local governance actors were often cited by business participants. Health businesses focused on how collaboration could provide an avenue for diffusion of innovation, suggesting that bringing diverse actors together (including governance, research, aftercare and health) would expedite scaling innovation. The housing sector participants, for example, cited regulation and the importance of housing and community design to urban agendas as the reason they felt they had participated in networks brought together by the Manchester Ageing Hub and related partners. The health and technology group discussed working through social prescribing programmes and contracting with the healthcare industry, suggesting a close relationship with the NHS.

Social organisations also relied heavily on the local government for funding and played a significant part in the consultation and engagement processes during local policy design. They were also often involved in lobbying at the national level. They often took an entrepreneurial approach, actively seeking out opportunities which they were often successful at leveraging. These opportunities centred around advocating for older people and making sure their population of interest was heard in important decision-making forums. This strengthened their connections to local governance actors, and they felt that these governance actors were willing to listen to them when approached. Social organisations, aimed to foster organisational redundancy in the sense they aspired to a situation where 'everybody is aware' and therefore they did not need to have those conversations.

Raising awareness about older people's needs and making their voices heard is central to social organisations' missions. However, as with business, these relationships were more likely to be about generating mutual understanding, creating a deeper and legitimate evidence base to support their existing activities, and another vector for expressing their interests to government departments than about generating innovation. Overall, there was a drive among the participants to hold conversations with organisations across all sectors, with an aim of 'changing mindsets'. The participants, however, observed that other organisations do not talk to older people (as much).

Instead, they 'make assumptions' about what they need, who the participants describe as a 'diverse crew'. To this end, social sector organisations can potentially be filling a knowledge gap within the healthy ageing domain via networking and collaboration.

While the researchers involved older people mostly as research participants, they noted systemic challenges that prevented them from involving older people as research partners (for example, limitations in providing monetary reward for research contribution). One participant described the problem:

> We need to be experts for their experience; their lived experience; and they are contributing to our research and making it better. We're all getting paid. So we should be able to pay them, but you can't, because it's a contract which is an issue with HMRC. That's a policy ask.

The location of these partnerships mattered more to researchers than it did to the business sector, that being because key partners were community organisations. Collaborations for research did take place outside of the Greater Manchester area but on an ad hoc basis and researchers talked about using relationships with other researchers and relying on their networks to conduct research projects on a larger scale.

Spillovers and knowledge exchange

Businesses felt that they did not benefit highly from local spillover effects from other firms, which suggests that traditional clustering effects are weak to non-existent. Governance actors in their workshop similarly said that there was not a concentration of commercial activity influencing their work; one participant argued strongly that there were partnerships in place, but these seemed less economic and more related to disseminating or enabling adoption of age friendly practices. Interestingly in terms of knowledge sharing, several of the social organisations had participated in programmes to promote learning and their ideas had been adopted nationally and locally. This finding strongly suggests that the benefits of related variety in the healthy ageing domain, and not fuelling innovation in a significant way, contribute to the view that there might be an opportunity to better connect actors across sub sectoral, organisational and functional divides.

Business–research collaborations discussed by the business workshop participants tended to be with local universities. For the health technology businesses, this relationship typically focused on evaluating the impact of their work rather than research and development of new innovations. They described support from universities as furthering commercial aims and helping them to prove the significance of their work rather than for developing specialised knowledge or innovations. Researchers, conversely, described

'business' and 'for-profit' as somewhat 'dirty' words, meaning they were less likely to collaborate with private firms. Researchers connected this to the cultural and political history of Greater Manchester; this they perceived as centring social and solidarity economies over traditional firms. The participants in this workshop suggested that there is a perception that 'commercialising something is always seen as being a bit wasteful and possibly a bit grubby', which holds those innovations back from becoming more widespread.

Social organisations described their relationship with universities as mutually beneficial, with them providing student placement opportunities and access to data, and the social organisations appreciated the legitimacy of working with a university. Social organisations described how they were particularly good at facilitating access for researchers to understand the lived experience of older people. When speaking to the researchers themselves, social sector organisations were seen as a highly trustworthy partner that researchers valued greatly. Researchers were also eager to collaborate with local policy makers and governance organisations, with a particular interest in impacting policy.

Innovation as a bridge between product and service offerings and lived experiences

While there is limited reach internally between different groups of actors in terms of networking, there are similarities in approach and conceptualisation of innovation across actors. When asked about innovation, participants of all workshops tended to describe technological advances less frequently, and more innovations in ways of working, systems change and integration of user voices. Our analysis suggests that most participants are interested in integrating the voices of older people in a manner similar to responsible/user innovation approaches, and some had a strong interest in changing the ways in which older people interact with larger society.

Technology was not a strong feature of discussions of what innovation means in the healthy ageing domain. When technology did feature, it was discussed as an enabler for more social connections (through devices, for example), increasing integration of older peoples' voices in product, service or policy development, and a way of enhancing operations of organisations in the domain (for example, Customer Relationship Management [CRM]). Governance actors mentioned how existing technology enabled more social connection, citing for example how technology was also discussed as a barrier to inclusivity for older people (for example, machines used to pay for parking can be difficult to use).

All participants were interested in bringing user voices into their processes. For social organisations this is central to their models and ways of working, but for businesses too, the voices of older people were important, particularly on inclusive design. For business participants in the health workshop,

elements of social innovation were discussed. This involved working towards more preventative models of addressing health in older age, and encouraging innovations outwith the medical model of treatment. This is perhaps related to the participants involvement in 'social prescribing' activities with the NHS.

Similarly, researchers discussed the innovations that social and community enterprises were spearheading, rather than any technological developments that academics were working on. This type of innovation was categorised as 'community led', that 'capture subtleties', address unmet needs and 'come from the right place about actually changing people's lives and engaging them in that process'. There is a strong link here between the consultative processes of responsible innovation and the collaborative practices required by social innovation approaches. Researchers discussed 'showing commitment to wanting to amplify the voices of our communities which are seldom represented, but also to address the issues that are prevalent in our communities'. The desire to address issues alongside amplifying voices moves these participants' conceptualisation of innovation in the healthy ageing domain beyond responsible innovation (with a 'do no harm' perspective) to actively having positive impact. This aligns the researchers closely with the social sector participants, understandably as they have a strong collaborative relationship. Researchers described examples from the social sector including an LGBT-affirmative extra care scheme provided by Manchester City council and a Good Neighbours project that brought people together and allowed older people to live an independent life.

Conclusion

The Manchester case study illustrates the primary issues related to supporting innovation in the domain of healthy ageing. Despite the fact that the city region is home to a relatively rich collection of businesses, researchers, third sector and government actors engaged in healthy ageing, very few of the typical innovation-enhancing spillovers – such as access to specialised labour pool, knowledge spillovers, innovation supporting infrastructure, etc. – were cited as locational benefits. This was largely attributed to high subdomain diversity, which meant that businesses rarely interacted with, or learned and benefitted from, each other. Functional diversity also complicated this landscape and meant that actors not solely focused on healthy ageing outcomes could be less likely to network locally to fuel innovation. Instead, innovation tended to occur in silos with each business or actor category plugged into national (and sometimes international) rather than local or regional networks. These findings indicate that place-based approaches to stimulating innovation in healthy ageing, such as encouraging innovation clusters, are unlikely to generate synergies even though there is a critical mass of healthy ageing actors and activities.

The conversations we had with stakeholders in Greater Manchester suggested that there were nonetheless opportunities to support and enhance healthy ageing innovation for the benefit of ageing residents in the city region, firms and organisations. Rather than supporting innovation to drive commercial value, local governments can act as a focal point to identify social challenges and bring together diverse stakeholders in pursuit of innovative solutions. While these solutions could also generate commercial benefits for innovators, they would also serve local policy goals. Our findings show that the Greater Manchester city region is already an active convenor of stakeholders who hold these efforts in high regard. What is missing are the resources to encourage and support those stakeholders to innovate and to integrate innovations into and across the broader healthy ageing ecosystem. Such a model creates an opportunity to put older voices at the heart of the innovation process. It also provides a fertile environment to boost the diffusion and adoption of innovation, to connect solution developers and user communities to test and refine, and to keep government, researchers and other stakeholders informed of the latest developments and trends. This model flips the innovation funding script from assuming that supporting market innovation will yield benefits to communities to making societal benefit central and supporting commercial spillovers where viable. Empowering local and city region authorities to support healthy communities for all will create more space for the type of experimentation and innovation the Healthy Ageing Challenge was designed to inspire.

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16

Reflections of a multi-disciplinary challenge research programme

Judith Phillips and Elaine Douglas

This chapter draws together the key strands of the book and reflects on the Social, Behavioural and Design Research Programme (SBDRP) as part of a complex multi-initiative programme (the Healthy Ageing Challenge, HAC), with an ecosystem encompassing a diverse set of actors, innovators, technologies and businesses. Set out as a mission-oriented programme encompassing interdisciplinarity, co-production and co-design throughout the research process, and with an aim of building capacity in ageing research, we look at how this was achieved and the challenges faced in times of uncertainty, such as the pandemic, and the challenges in leading a diverse programme of research.

The chapter provides learning points for future research leaders and funders in managing projects and programmes in ageing and beyond.

Taking a mission-oriented approach to the Healthy Ageing Challenge

A mission approach helped galvanise interdisciplinarity and saw disciplines working together with a common goal and a business focus. For example, architects working alongside climate scientists (Chapter 5 SPACE) brought non-traditional disciplines into ageing research. Similarly, in many projects different sectors worked together, public bodies with social enterprise and private businesses providing different routes for impact.

For many researchers this was a new approach (to work alongside business and social enterprise rather than policy and practice) and project teams particularly our Early Career Researchers (ECRs) welcomed workshops and training offered to develop skills and networks in these areas.

Feedback from business and others engaged in the SBDRP was positive. They felt there was a clear focus, they were engaged in 'team working' to the same ends and valued the opportunity to co-produce the research and innovation, not only with researchers, but older people directly. They could see where the research had potential impact. For example, in the GOALD study (Chapter 14) researchers with established and trusted relationships with

care homes managers and residents were able to introduce business to work alongside them in the design and development of exercise equipment for use within the care home environment. Access to care homes had previously been difficult for business, potentially as they were viewed as looking to 'sell' products. However, in partnership with researchers, it was an opportunity for care home residents to try new equipment and to feedback design tips to aid the development of the products. In this way, older people enjoyed meaningful participation in the design of the product with business in a co-production process managed by researchers.

The added value of a programmatic approach: being part of SBDRP and HAC programmes

The SBDRP itself was part of the wider HAC programme and we reflect on the integrity of the programmes with added advantages and challenges of an embedded programme (SBDRP) within a programme (HAC). The distinctiveness of the SBDRP being part of the HAC was that it combined social, behavioural and design research with investment in innovation which was a distinctive difference from previous programmes on ageing funded by UK Research and Innovation (UKRI) with the Economic and Social Research Council (ESRC) as primary sponsor.

The objective of the previous 'Growing Older' programme was to try and contribute to the development of policies and practices in the field of ageing and thereby extend quality of life. Innovations at this time were around bringing in older people's voices centrally to research and looking at their priorities. Similarly, the New Dynamics of Ageing (NDA) programme was the first to provide a sound evidence base for policy, practice and product development so that research contributed to well-being and quality of life.

Most social science research has policy and practice, such as changing behaviour, in its sights rather than business, so this was a new dimension requiring the development of a new skills set for researchers to engage with. Academics were previously not well versed in business engagement or research translation to impact and commercialisation (Bernard, Ray and Reynolds, 2020), this being new and complex territory in the HAC. Additionally, translating research into innovation with involvement by the private sector can be an anathema to some in social sciences/arts and humanities.

Advantages

The programme fostered a culture of shared learning with peer support at the heart of the programme. Research funded under the SBDRP benefitted from being part of a programme where all twelve projects

including commissioned work (retail impact) met regularly as a programme (four times a year – twice in person and twice online) as well as on an ad hoc basis and through the Community of Practice.

Projects within the programme supported each other and shared best practice tips through workshops and informal meetings. There were thematic **synergies between research projects** which the programme was able to bring together. For example, three projects (Chapter 6 OPTIC and Healthy Ageing in a Changing Climate; Chapter 5 SPACE) addressed climate change and ageing; and three addressed retail and hospitality (Chapter 7 Hospitality Connects; retail impact and Chapter 8 HeLP).

> I think that the ethos and the way then that the Programme has been run … it's been incredibly, incredibly helpful.
>
> Opportunities around impact linking us in with other projects within the Challenge, other capacity building opportunities that our team have been able to be a part of … have been really positive and I've always found them very supportive of the work that we're doing. (Quote from a project participant, SBDRP, 2025, p 44)

Projects worked together on specific issues; for example, projects shared their theories of change/logic models which detailed their journey to innovation and impact. There were deep dives into topics of mutual interest such as co-production (Chapters 10 and 11 SHAW and HWL; Chapter 9 DeshCA and Chapter 12 CtC), the development of business impact, commercialisation of social science and a writing workshop. **A 'team approach' to the Challenge** through international symposia and meetings with the wider HAC programme team enabled researchers to feel part of the wider HAC mission.

The SBDRP amplified messages from the projects beyond their disciplinary sector boundaries and gave projects more **visibility** at higher levels through the Challenge as a whole. Without the programme approach, individual projects would have worked in isolation and the wider narratives of the SBDRP and HAC (such as on housing, care and work) would not have been realised.

Synergies between projects led to a collective narrative which had powerful potential in **policy and practice translation** in areas such as housing, design of urban neighbourhoods and centres, environment and cognitive health. Designing homes and environments for healthy cognitive ageing – including blue and green space, outdoor as well as indoor spaces and places such as hospitality venues and retail centres – collectively enabled us to say something about age inclusive and dementia friendly spaces and places from the collection of projects. Our SPACE project engaged in policy discussions around age friendly cities, drawing on this collective narrative.

Projects in the SBDRP, for example, challenged how we look at environments, rethinking how we view environments, **reconceptualising** and developing a new ecological model of 'ageing in the right place and time'. This is picked up again in the following chapter when we consider the theoretical contribution of the SBDRP and the conceptual development of 'Environments of Ageing'.

Benefits in co-production with business

The programme introduced a **wider ecosystem of support** and enabled researchers to make **new collaborations and meaningful partnerships** (with business in particular) and develop new skills, particularly in relation to commercialisation of their research.

Working with business and social enterprise rather than alongside public sector organisations, the usual territory of social gerontologists, was a new experience for many and peer support was valued as were the opportunities for interaction through a Community of Practice and Zinc, a venture builder. Both these initiatives in the HAC enabled researchers to directly engage with businesses of various kinds, receive mentorship and enabled them to apply for additional funding for innovative ideas and 'build a mission led business' (https://www.zinc.vc/build-your-business/). This work was supported by the SBDRP via events/workshops and signposting of projects sharing similar challenges.

Business partners in the SBDRP were able to see the contribution and **value social science and arts and humanities** brought to them, particularly brokering relationships with older people (their consumer market). One advantage was that it moved business sector thinking by drawing attention to the importance of an evidence base and criticality of co-production from the start with older people. The SBDRP was innovative in that it enabled **business-researcher-older people tripartite co-production**. In some cases, researchers acted as brokers; in others older people (as co-researchers) played that role. Most importantly, by having older people as an integral part of the co-research process, businesses learned first-hand of the views and needs of older people to shape the design and delivery of their products and services.

Changing the culture in ageing research to consider commercialisation and to introduce meaningful business engagement was central to research projects. **Building capacity** in skills and knowledge in ageing research, enabling networking and developing a researcher's repertoire in working with business was also a key aim of the SBDRP. Increased engagement with businesses and industry professionals also helped create **new avenues to policy impact** and amplified those impacts. It opened a new world of possibilities to many Co-Investigators, ECRs and older people and

potentially demystified what working with business might look like. For example, the Connecting Through Culture study brought older people together with design companies and worked in art venues to aid the design and development of older people's ideas and innovative products. This is encapsulated by Table Top Travels, a product inspired by an older person which ultimately received a Catalyst Award to look at how to bring the product to market (see Chapter 12).

One of the distinctive features of the SBDRP was that all the project Principal Investigators (PIs) (apart from one of the twelve) were **women** and women in each team contributed significantly. Experiencing women in research leadership roles may have encouraged other women to apply for research funding, but we did not follow up on this as part of the programme. Although there has been a long tradition of female academics in gerontology this was the first programme of research to have more women in leadership roles including the Research Director and team.

Advantages of flexible funding

The Research Director had oversight of associated flexible funding for the purpose of contributing to building an evidence base of value and impact across the programme of activities and enhancing the impact of investments across the HAC. Flexible funding enabled an agile approach to changing circumstances (COVID-19 and subsequent uncertainty on how the projects would get back on track), needs (capacity building) and gaps (thematic/sector) in the HAC SBDRP portfolio.

The plan for flexible funding spend was reconsidered following the COVID-19 pandemic and used to further **build capacity** and programme infrastructure in several areas:

- to plug thematic **gaps in the original portfolio of projects**, a one-year APPROACH (Ageing and Place: Pandemic Recovery and Action on Climate Change) call was launched in order to meet the overall aims of the funding. This acted as a rapid response fund following COVID-19, targeted at first time PIs;
- to enable a targeted approach in relation to **specific sectors**, for example, the retail sector where there was potential for impact, but which had not featured in the original tranche of projects. This led to the employment of a Retail Impact Fellow;
- to build skills and networks of **ECRs to become future leaders of research in ageing**, all of whom had been impacted at the start of the projects . This was achieved through international networking and through international initiatives, such as the Swedish Graduate School for Ageing

and Health (SWEAH) and international networking post COVID-19 through the Canadian Association on Gerontology. Funding enabled some of our ECRs to attend courses and workshops in Sweden and Canada;
- to set up the British Society of Gerontology Special Interest Group on Ageing, Business and Society (funded by wider HAC funds). This enabled businesses that were interested in ageing beyond the HAC to establish links with researchers and to link both into wider gerontological networks such as the British Society of Gerontology which would endure beyond the duration of the Challenge.

The major part of the spend of the flexible fund came in the last year of the HAC and some of the initiatives, for example to achieve behavioural change or sector impact within the timescale of funding, were, on reflection, very ambitious. This was particularly reflected in the retail impact project which stimulated widespread interest through its activities from several retail associations and major retailers and had potential to achieve major impact if there had been a sponsor to continue the work.

Thought leadership: the Research Director role and team

The Resarch Director (RD) and team added value to the Challenge, playing an important coordination and monitoring role across the SBDRP as well as enabling connections and synergies to be made with other Challenge initiatives where appropriate.

- Being an integral part of the HAC team was invaluable for the RD role, enabling a strategic view of the Challenge, its place in UKRI and in relation to government priorities. Representation at Programme Board and Advisory Board levels and contributions to team discussions also ensured that research was represented at all levels.
- The RD was able to take a strategic overview of ageing research working with other research funders and networks (for example, Vivensa, BSG, UKAgeNet).
- Relationships and connections with other Industrial Strategy Challenge Funds (ISCFs) and programme directors provided informal support to the RD. Practices, models and experiences of directing an ESRC/UKRI programme were shared.
- Timing of appointment: the RD was appointed just prior to the first COVID-19 lockdown in March 2020 when commissioning had already taken place for some of the HAC initiatives. An earlier appointment would have helped the integrity of the HAC with greater alignment between the evidence base/research and businesses that were innovating and scaling up to market.

- Coordinating research across the whole Challenge portfolio to enhance the impact of investments across the Challenge portfolio proved difficult. The scale of the investment and time constraints did not allow for this objective of the role to be realised.

The **Research Director** model provided thought leadership and coordination of targeted funding calls. The model adopted a **whole team approach** from the start. The Programme Manager and administrator played a significant part in the research programme throughout the three years. Similarly embedding the RD into the core HAC team representing the research programme on the Programme and Advisory board helped a team approach.

A **flexible fund** was extremely useful and allowed an agile approach to unexpected events and enabled gaps to be filled in the portfolio. There was a role for the RD and team (as well as the projects themselves) to continue to challenge ageism and ageist stereotypes and move perceptions of ageing from **challenge to opportunity** (with new agendas around innovation and impact).

Challenges

Resilience in times of uncertainty

Timing of the SBDRP call and the effect of COVID-19 disrupted initial work on commissioning the projects in year one and the eventual timeframe of the projects. Given the timing of COVID-19, the call specification was developed and networking with key individuals and organisations to shape the call were all undertaken online. This meant that there was a three-month extension to the commissioning and start of the projects in the programme (March 2021). As a consequence projects worked up to the cliff edge deadline of funding, with no opportunity for a no cost extension. This caused some anxiety, particularly due to early recruitment issues in some projects and the difficulties of working in care homes during and after COVID-19, which meant a change in method/focus for a few projects (such as GOALD, HWL, ENLIVEN).

Sufficient time for impact pathways and demonstration of innovation to be realised was challenging. Cliff edge funding meant projects were finishing their work right to the deadline of the project. This was partly due to the extension of the programme around COVID-19. Impact was concertinaed and a longer programme was required to fully realise the benefits of a mission approach as highlighted in the Technopolis 2024 report (see Chapter 17). The route to impact is not linear but complex, particularly as the market is ill defined. Realisation of the projects and impact goes beyond the three years of the SBDRP and HAC.

Meaningful **engagement with older people** was realised in projects across the programme. However, the abrupt ending of funding inevitably disrupts the means to maintain these relationships. Some projects set up ongoing online meetings with older people, but these were not inclusive to all. Therein, this poses consideration of how older people's contribution should be valued in the longer term.

There were several challenges in the interdisciplinary and cross sectoral nature of the programme. Languages differed between business and academia, and in some cases it was difficult to engage wider HAC businesses and convince them of the importance of social sciences.

Recommendations for future programmes of ageing research

A nascent healthy ageing market was stimulated by the **mission-oriented programme approach** adopted by the HAC with different disciplines and sectors involved, led by social science.

We would advocate **a longer programme** to enable a mission-oriented approach to deliver **impact and inclusive innovation** underpinned by evidence. Many of the projects felt that they were just starting on their journey and wanted to capitalise further on their research through commercialisation and further impact. Enabling researchers to move to catalyst funding in a longer programme would have delivered targeted impact to business. A second phase of the programme so research can be catalysed and innovations scaled would have been beneficial (Chapter 9 DeshCA, Chapter 12 CtC and Chapter 10 SHAW).

A lengthier Challenge programme would also have enabled long-term relationships between researchers, businesses and older people. Meaningful support to maintain relationships developed with older people through co-production so that they remain engaged for future opportunities/input is critical.

For further programmes, funded mechanisms could be put in place to ensure there is a **monitoring function attached to the programme** not just the individual projects following the conclusion of the funding. This would enable the programme to reflect impact. Targeted workshops around impact and legacy are important to help sustainability of ageing research.

There continued to be a need **to create a sustainable ecosystem of ageing research** across disciplines, sectors, funders and universities as anchors. An ageing population is not going away and there needs to be a concerted strengthening of the ecosystem, based on research. There was a general feeling that businesses were not ready to pick up research or knew how to use research, particularly in the Social Sciences and Arts and Humanities (AandH) disciplines.

Capacity building should be a major consideration in a programme with sufficient resources dedicated to this activity. Funding should be ringfenced to bring in new disciplinary areas, new researchers in ageing and to target new thematic areas of research that have potential to lead to innovations at scale.

Ageing is still an immature market covering many sectors and a programmatic mission approach to funding helped to **develop the social sciences ecosystem** in general. What we also learnt from the Retail Impact project was the importance of targeting specific sectors to increase visibility of the importance of ageing research to their core business.

Given the diversity of ageing and the relevance to many other areas of ageing, research should **align with other major missions**, initiatives and investors in Research and Innovation, such as social care, net zero and housing. We recommend co-sponsorship across Government departments for another programme.

One of the main highlights of the Challenge and SBDRP was the centrality of social sciences, yet this created tensions in other fields (notably bio-medical areas, which were not the focus of the research). **Future programmes should consider these tensions** which were highlighted by the House of Lords (2021) report.

A major lesson for many of the project teams was the fact that social science and arts can stimulate innovation and open new avenues for commercialisation. The increasing **importance of commercialisation as an impact** from projects was not fully recognised by project teams and further emphasis needs to be placed on this element.

Having a strategic overview of the state of ageing research was critical for the RD and it may be useful to consider a **strategic position** in research councils overseeing all the investments in ageing research. We suggest a flexible fund be part of every research programme with an RD to enable this.

Conclusion

The mission-oriented approach and programmatic structure of the SBDRP and HAC successfully fostered interdisciplinary collaboration and sector integration, bringing together diverse fields and sectors to address ageing research. Researchers, especially early career researchers, benefited from workshops, training and peer support, which helped them develop necessary skills and networks for engaging with businesses and social enterprises. The development of co-productive relationships between researchers, business and older people enabled older people to participate meaningfully in the design processes of new products and services. Businesses valued the benefits realised through co-production.

The programmatic approach amplified project messages, enhancing visibility and potential policy and practice impact. Projects challenged

traditional views on environments and developed new models like 'ageing in the right place and time'. The programme aimed to change the culture in ageing research to include commercialisation and meaningful business engagement, building capacity and networking opportunities. This was successfully delivered notwithstanding the delays and disruptions presented by the COVID-19 pandemic and the inherent differences in language and priorities between business and academia.

The RD and team played a crucial role in coordinating and monitoring the programme, enabling connections and synergies with other initiatives. A flexible fund allowed for an agile response to unexpected events and filled gaps in the portfolio. The recommendations for future ageing research programmes emphasise the need for extended durations to fully realise impact and innovation, allowing projects to progress beyond initial stages and capitalise on research through commercialisation. Maintaining long-term relationships between researchers, businesses and older people is crucial for ongoing engagement and input.

Implementing mechanisms to monitor and reflect overall programme impact, not just individual projects, with targeted workshops to support sustainability, is suggested. Creating a sustainable ecosystem of ageing research across disciplines, sectors and funders is essential to strengthen the research base for addressing the ageing population. Dedicated resources for capacity building are recommended, bringing in new disciplinary areas and researchers, and targeting new thematic areas with potential for large-scale innovations. Targeting specific sectors is important to increase the visibility and relevance of ageing research to their core business. Aligning ageing research with other major missions and initiatives, such as social care, net zero and housing, with co-sponsorship across government departments, is suggested. Recognising the centrality of social sciences in the HAC, but also addressing tensions with other fields like bio-medical areas, is important for future programmes. Greater emphasis on commercialisation as an impact from projects is needed, recognising the role of social science and arts in stimulating innovation. A strategic position in research councils to oversee investments in ageing research, with a flexible fund to enable agile responses to emerging needs, is proposed.

Our reflections underscore the importance of interdisciplinary collaboration, sector integration, skill development and strategic leadership in advancing ageing research and innovation. The recommendations aim to enhance the effectiveness and impact of ageing research programmes, fostering innovation and collaboration across various sectors and disciplines.

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Conclusion – future directions for research and innovation in healthy ageing

Judith Phillips

New directions and innovations in research driven by social sciences, arts and humanities, and highlighted in this book, illustrate the utility of ageing research to address wider social challenges and missions. The first section of this chapter highlights some of the distinctive innovations that resulted from the Social, Behavioural and Design Research Programme (SBDRP) and the contribution the SBDRP made to the Healthy Ageing Challenge (HAC), bringing together the themes of the book in relation to the wider landscape of ageing research in the UK. The second section returns to the concept of 'healthy ageing' and argues for an increasing focus on and reconceptualisation of environments of healthy ageing. Finally, the chapter will reflect on the direction of travel that could potentially shape future research and programmes of work, building on the opportunities developed by the SBDRP notably: the trend for wider 'mission oriented' research approaches (such as ageing and climate change and social care); the need to create a sustainable ecosystem of research across sectors and disciplines; and the requirement to build capacity in skills and methods with a focus on our early career and peer researchers.

What the Healthy Ageing Challenge (HAC) set out to do and SBDRP's contribution

The SBDRP as part of the HAC sought to build on the success of the New Dynamics of Ageing Programme (see Chapter 1) which introduced greater multi-disciplinary research, made explicit a lifecourse approach, produced longitudinal data analyses, and contributed to new research methods. The aim of the Ageing Grand Challenge mission and HAC was to focus on and deliver innovation with impact.

An independent, external evaluation of HAC (Technopolis et al, 2024) aimed to understand both the economic and non-economic impacts that HAC had enabled as a whole and its potential for impact in the future.

The SBDRP was an integral part of the HAC and the conclusions of the independent evaluation reflect the contribution of the SBDRP, providing fertile ground for taking this approach into a future research programme.

The evaluation team concluded that the:

> HAC has largely achieved its planned outputs and short- to medium-term outcomes. Even against a backdrop of a global pandemic and cost of living crisis, HAC has successfully established proof of concept for new innovations, generated new knowledge and transformative ideas, and developed accessible and inclusive innovations for healthy ageing. It has fostered multi-disciplinary collaborations across sectors and enhanced skills among participants.
>
> Social benefits, particularly health and wellbeing benefits, have been achieved in some projects primarily for end users participating in the project's Research and Innovation (R and I) activities. Long-term benefits such as savings for health and social care providers and population-level health impacts are expected to emerge. … Older people from diverse backgrounds, including ethnic minorities, low-income groups, and those with cognitive and physical disabilities, have participated in HAC R and I activities. This inclusivity is likely to foster understanding and acceptance across diverse demographic groups, thereby supporting adoption of Healthy Ageing solutions and mitigation of inequalities.
>
> The medium- to long-term outcomes are likely to be achieved over the next 3 to 5 years, following the conclusion of the Challenge. (Technopolis et al, 2024, pp 54–55)

It is encouraging to reflect on the contribution of the SBDRP bringing underpinning evidence to many of the innovations, introducing a new generation of researchers to new ways of working and engaging with older people from diverse backgrounds and business to achieve impact on 'healthy ageing.'

Social, behavioural and design innovations in healthy ageing research

Four distinct areas were introduced and advanced in the HAC/SBDRP (see Chapters 1–4 in this book) which have moved gerontology forward and have changed the research landscape through:

- challenge-led, interdisciplinary mission-oriented research focused on innovation and impact
- tripartite co-production with business and older people

- new conceptual thinking
- capacity building.

Together these innovations in knowledge, theory building, skills and methods have impacted attitudes and changed behaviours as well as policy in areas such as Housing and Environment; Work; Hospitality and Retail; and Staying Active (Technopolis et al, 2024; Innovate UK and ESRC, 2024).

SBDRP policy impact areas

Housing and Environment

Chapter 9 Designing Homes for Healthy Cognitive Ageing; Chapter 5 Supporting Environments for Physical and Social Acitivty, Healthy Ageing and Cognitive Health; Chapter 6 Climate projects.

At the micro level of home, innovations in design and methods were promoted through the DesHCA project. This was complimented by a further HAC initiative, Nurolight, lighting for healthy cognitive ageing, which although funded separately under the HAC Catalyst fund was incorporated into the DesHCA project.

Most older people want to remain in place – or 'age in place' as it has been termed. As we age in later life, home becomes more important as our radius of movement shrinks, and we tend to spend more time in our own home and immediate surroundings. Home represents a place of belonging, an affirmation of self and identity, shaped through familiarity, the repetition and routine use of space, the accumulation of memories and achievements attached to home and possessions. Based on these elements, the DesHCA project looked at design improvements to homes to make them cognitively friendly while ensuring they were scalable and sustainable.

The project used a variety of methods including the use of Virtual Reality techniques with carers and people living with dementia, to design and redesign homes for healthy cognitive ageing. People navigated through the house with a drop-down menu guiding designers, developers and older people themselves with handy tips to improve their homes. It used innovative methods, for example the 'Serious Game,' a board game designed to support decision making about housing at all levels (see Chapter 9) and to encourage stakeholders to consider issues of design, adaptation and ageing from different perspectives, increasing industry knowledge in this area. The outcome produced a prototype to be developed locally by builders which could be scaled up to regional and national level to support living better for longer.

DesHCA took a person-centred approach through co-production, alongside a critical gerontological approach to age inclusiveness. This approach challenged the notion of designing dementia friendly housing and

instead focused on healthy cognitive ageing, creating healthy environments with a lifecourse, intergenerational approach beneficial to us all. The project also focused on what people with cognitive issues can do within their home, promoting active social lives.

The HAC addressed challenges facing urban planning and age-friendly environments at city, regional and global levels. Supportive Environments for Physical and Social Activity, Healthy Ageing and Cognitive Health (SPACE), based in Belfast (Northern Ireland), explored how *where* we live affects *how* we live and age. Their project involved: exploring existing research to understand the relationships between biology, lifestyles and the environment; how different environmental factors such as air pollution, noise, light and soil pollution are associated with brain health; and how green and blue spaces relate to and influence health, in particular cognitive impairment and dementia. The researchers collaborated with older people and with local authorities and town planners to co-produce preventative strategies and intervention policies around urban design to improve environmental influences on brain health and to make Belfast a healthier place to live.

SPACE has collected, linked and analysed data from more than 80 datasets containing environmental, urban design, health and well-being variables. This data has been made available to researchers and policy makers on an online platform, 'the SPACE Geoportal7' (https://space-geoportal-queensub.hub.arcgis.com). The project data has also been linked with the Gateway to Global Aging data, a global database for cross-country analysis on ageing, which will enable new avenues of research and broaden the project's future impact beyond the UK.

Another SBDRP project – Healthy Ageing in a Changing Climate: Creating Inclusive, Age Friendly and Climate resilient Cities and Communities in the UK – identified the need to develop actionable interventions at all levels from local to global. Six key recommendations to support inclusive, climate-resilient age-friendly cities and communities were made, joining up these levels from outdoor spaces in the community to a housing strategy and individual decision making. Staying with the climate change theme, the OPTIC (Understanding older and younger people's perceptions and imaginaries of climate change) project created 'The Climate Comic Intergenerational Activity Pack' to provide ways to discuss and learn about actionable behaviours from older and younger generations fostering intergenerational solidarity.

Work

Chapter 9 Supporting Healthy Ageing at Work; Chapter 10 Healthier Working Lives.

At a community level, projects addressed issues relating to workplace and retail environments.

Supporting Healthy Ageing at Work (SHAW) looked at health concerns in the workplace and ways to support conditions relating to menopause, dementia and the impact of providing care (for example, for parents needing support). The project also examined questions relating to the role of the work environment in influencing health together with the importance of financial well-being. Where there could be workplace-based interventions and innovations on enabling employers and employees to manage their health at work, SHAW developed an app to enable workers to reflect, review and take action to get the support they needed. The app was designed to be applicable in a range of contexts, such as intense work periods, preventative health management and career reviews. The learning from the app has been shared with the Department of Work and Pensions, as well as in several conferences involving employers and trades unions.

Other workplace-related innovations developed by the Healthier Working Lives team concerned improving the experiences of social care workers in the workplace, notably through examining how health concerns affect their work, and the benefits of applying digital technologies to help people understand the way their work, health and wider lives interact.

Hospitality and Retail

Chapter 7 Hospitality Connect and Retail Impact; Chapter 8 Hearing loss and Place.

The aim of the Hospitality Connect project was to explore the role of local hospitality businesses in supporting social connections among older people aged 65+, and to co-develop solutions that mutually benefit those who may be more isolated and/or lonely in their local community, and the cafés and pubs that serve them.

Using the findings from the project, the team co-created the 'Welcome ALL' toolkit with older people and other stakeholders to help small to medium sized hospitality businesses become more age-inclusive. Specifically, the toolkit provided a range of simple and practical solutions in a menu-style format that businesses could easily adopt over different periods of time and with varying levels of financial and/or other resource requirements.

SBDRPs retail impact project produced five guides for retailers to address accessibility, maintaining a healthy workforce, healthy customer services and healthy retail environments – creating shopping environments that promote health and accessibility (Chapter 7).

> We've been working with older people and businesses within the retail project. What was so exciting was that the work was immediate. And

> so, the impact and the recommendations for businesses in the retail sector could be implemented immediately. There were very real best-case practices and initiatives that could be drawn upon that businesses could implement the next day if they wanted to. Multiple high street retailers attended a ministerial meeting to debate and understand better the commercial benefits around healthy ageing and the responsibility of businesses working together to roll this out. We had a really good response. The work's ongoing. It's the tip of the iceberg in a very good way. (Ailsa Forbes, Retail Impact Fellow)

Staying Active

Chapter 11 Connecting through Culture; Chapter 13 Innovation in the Outdoor Visitor Economy: Towards Inclusivity for People Living with Dementia ENLIVEN; Chapter 14 Intergenerational connectivity for promoting health and well-being across ages, places and spaces GOALD.

ENLIVEN partnered with several businesses to make innovations within the visitor economy to support older people and their carers to have a more enjoyable and accessible experience in places such as Kew Gardens, and the moat at the Tower of London, giving meaning to spaces and meaningful activity to people with dementia. The ENLIVEN team developed innovative practical resources for business, third sector and social enterprise to address barriers that limited access to nature-based activity for people with dementia.

The GOALD project explored the potential of virtual environments for promoting older people's health, well-being and social connection. GOALD looked at intergenerational connectivity through innovative digital design, using VR and digital archives as memory triggers in the delivery of sport-based reminiscence to community groups and consequently addressing physical and mental health issues. Such activity illuminated the issues of digital divides, in relation to access. Care home residents experimented with an omnidirectional treadmill system with a VR headset. As the user 'walks' on the treadmill they are moved through virtual landscapes including a coastal walk, a visit to a historic property or tourist attractions like the Eden Project in Cornwall. GOALD used the findings from co-production activities based around specific digital resources to produce 'toolkits' that can guide the designers and developers of future generations of digital products and services targeting ageing populations.

A second digital project addressed innovation in arts and culture – bringing in diverse ethnic groups and addressing inequalities through new digital experiences. 'Tabletop Travels' developed through members of the Connecting through Culture project, explored how participation in all forms of arts and culture, particularly those accessed digitally, can influence well-being and feelings of social connection as we age. This was an immersive

dining experience in a box, designed to transport people who cannot easily get out to experience the tastes, smells and stories of a foreign place, to improve the well-being and nutrition of older adults for use within the care services.

Theoretical development on environments and 'healthy ageing'

Collectively, the SBDRP illustrates both innovations in relation to products and services, but also new thinking and theoretical development related to environments and 'healthy ageing'.

One of the notable features of the advances in ageing research has been the expansion of environmental gerontology. Gerontology has shifted from not only a conceptual focus on the social context but to how the person interacts with the physical, spatial and technological environment. SBDRP has contributed to environmental gerontology and specifically to policy around 'ageing in the right place' or promoting healthy ageing in the right environments. The projects have challenged how we look at environments, which environments to examine (where), why and whose environment. We have learnt that we need to advocate a more nuanced theoretical framework and approach that recognises environmental complexity, diversity and precarity, bringing the physical, social, material and psychological dimensions together if we are to understand how older people experience their surroundings.

Environments are spatially layered and the SBDRP projects together contribute to the advancement of environmental gerontology at: individual (person/home); community (work and neighbourhood, places and spaces); and global (virtual and digital environments, climate change) levels. In designing age-inclusive spaces and places we need to look at specific products, such as Nurolight, which casts significance on spaces as rooms, as well as the home, community, city, region or global level influences in the context of the interconnectedness of each other. There is a lack of research on how the design of the home, neighbourhood and city environments together influence health and well-being, and hence the difficulty in ensuring appropriate intervention at one level does not have adverse consequences at another level. The projects highlight the need to look at the complex relationships between home (indoor) and surrounding (outdoor) environment, between work and retail spaces, and how that interlinkage creates a sense of belonging. The Serious Game in the DesHCA project is a method which joins all levels.

Environments are also layered in respect to how global environmental issues affect the local environment, for example, flooding arising from climate change and its impact on a catchment area or the effects of noise and air pollution in neighbourhoods (Chief Medical Officer's Annual Report, NIHR, 2024). There are multiple lenses, natural, social, built and

psychological, through which to holistically examine environments. As many of the projects have demonstrated, we are multiple actors in the same space through different interactions with different types of environments creating different relational space. Recognising the complexity, diversity and intersectionality of ageing experiences in different environments is important in ensuring inclusivity alongside preparing business for a receptive and successful marketplace.

People imbue meaning to or use place in different ways. In the retail sector, for example, people can act as retailer, customer or worker. There are also distinct types of shops: different relational spaces; convenience stores to superstore that play different roles; the convenience store as a place for socialising and shopping. The SHAW project highlighted the differential roles of workplaces in health promotion activities, especially for those undergoing various transitions from mid-life onwards, such as menopause, cognitive decline and sleep issues. In other projects involving the natural environment (ENLIVEN and SPACE), we can engage differently with the natural environment as a visitor or vulnerable person, particularly in a climate emergency and again we may interact differently if we have cognitive issues of various kinds.

Environments have a lifecourse too. There are lifecourse parallels between people and places which change over time – the decline of retail in the town centre and switch to online shopping which has changed the high street. However, inclusive design can give new life to towns and homes.

We need to move from seeing environments as static to dynamic with more attention to how spatial and temporal tipping points, such as climate change and pollution, will recalibrate family relationships and networks and with implications for the design of our homes. There is a need to look at cumulative transitions in environments (town centres, for example, becoming 'left out' areas, the decline of capital infrastructure and increasing pollution) and how this creates tipping points for older people who may no longer have access to services or green areas for leisure and consequently have to move home.

We need to rethink how we view environments and re-conceptualise 'healthy ageing in the right place and time' to recognise the different ways people interact with their environment through the lifecourse. We need to understand *which* contexts, *for* which people and *how* these change over time to incorporate how the individual, city, community and regional interlink and how these affect specific populations in specific locations. We would argue that there is a need for a greater focus on the interconnected environmental context of 'healthy ageing.'

Going forward

Three areas could offer opportunities to develop the approach outlined in the previous section.

Align gerontology with other mission and challenge areas

If we are to rethink how we understand environments and respond to social challenges as described, then we need to adopt a challenge-led and/or mission-oriented interdisciplinary research focus on innovation and impact. This requires developing research to solve issues and to recalibrate missions that engage wider disciplinary areas and multiple sectors.

An advantage of gerontology is its flexibility and applicability to many societal issues. It can be seen as an addition to other major themes, but it should also drive a range of scientific enquiries. There is a key role here in influencing funding programmes to ensure ageing is mainstreamed and recognised in a broader range of scientific agendas. A new programme of ageing research could tackle some of these big missions (UK) or pillars (EU): Horizon Europe – European Commission.

An emerging healthy ageing market was stimulated by the mission-oriented approach adopted by the HAC and led by social, behavioural and design science with different disciplines and sectors involved.

Given the political focus on 'missions', this could be one area of opportunity for ageing research pertinent to achieving all five of the Labour Government's mission driven economy (GOV.UK, nd):

- Growing the economy (Get Britain Building Again (Housing))
- Energy (Eco-sustainability, fuel poverty)
- NHS (National Health Service) (social care reform and support for an ageing population)
- Take back our streets (use of public space)
- Break down barriers to opportunity (focus on inequalities).

Missions also enable a programme of ageing research to align with the Sustainable Development Goals (SDGs) and UN Decade of Healthy Ageing, a framework that aligns key areas such as the environment, transitions across the lifecourse and promoting well-being. A good example is ageing and climate change. Older adults are at increased risk of living in areas of high vulnerability to climate change, such as coastal towns, flood zones and urban heat islands due to a lack of mobility, disability and/or frailty. They are also likely to experience the impact of these climate effects more acutely; for example, older adults are at increased risk of dehydration and heat-related illnesses, and are at increased risk from poor air-quality and/or poor food quality (Harper, 2023).

Age- and eco-sustainable living from local to global must be addressed together (People, Place and Planet). There are opportunities around climate change and net zero, exploring how we create sustainable eco- and age-friendly housing solutions for people to cognitively age well. HAC and SBDRP highlight the potential of working with the construction and retail

industries to address the major global challenges of climate change and ageing and to link with themes such as energy efficient housing and fuel poverty. There is strength in collaborating and influencing other agendas, for example working with engineers and in territories of other disciplines, but this requires funding for social science in environmental agendas across intergenerational issues.

Create a sustainable ecosystem of ageing research

There is a need to create a sustainable ecosystem of ageing research across disciplines, sectors, funders and universities, as well as building capacity in emerging researchers.

SBDRP has demonstrated that a sustainable ecosystem requires changing business and academic relationships, to co-produce solutions with older people at the heart of initiatives. The HAC and SBDRP have taken gerontology into new territory by stimulating the ageing market through business collaborations. Business involvement and collaboration with multi-agencies and other disciplines, as well as to co-produce solutions to challenges, was the explicit ask of the funders (Chapter 4). HAC brought in new stakeholders from the public sector, charities, private business sector and social enterprise. Researchers developed different approaches and embraced new skills and knowledge around entrepreneurship (commercialisation and social enterprise). They developed ways to bring different sectors, previously disparate and separate, to work together to improve the lives of older people. As such, methodological innovation in bringing diverse groups together can be seen as a major achievement of the SBDRP and HAC.

The SBDRP was timely for gerontologists to engage, as business had not fully realised opportunities and had not engaged with older people. There is an ongoing imperative for gerontologists to ensure that products and services meet the needs and wants of older people and that products and services are developed with them and not for them, hence the need to engage with business and to act as brokers in shaping the market. SBDRP also enabled businesses to identify what is good research and how to evaluate their innovation.

The SBDRP consequently led to a change in attitude to ageing research, moving thinking from ageing as a challenge to one of opportunity and in doing so, to address ageism. Several projects challenged ageist attitudes and highlighted a lifecourse approach with products and services being advantageous to all, seeing older people as *us* not *them*. Researchers also changed how business viewed social science: from consulting or engaging older people to innovative co-production and co-design. There remains a need to further develop this approach. Co-production is seen as trendy

but there are several issues to consider here (Bowes, 1996; Buffel, 2019) including: how to co-design with 'hard to reach' groups or how to manage dominant voices; how to capture the diversity of ageing and ensure representativeness; how to distinguish the fetishism of experience or disempowerment of researchers. There is a need to promote expectations and deeper understanding of co-production when designing with older people.

Given the policy context, there are also opportunities for place-based initiatives to strengthen the ecosystem on a local and regional level. This requires business and academia to develop coordinated 'clusters' of innovation, such as on the high street (Phillips et al, 2021). Ageing around certain places is not just a tick box age-friendly approach but can deliver place-based outcomes where innovation happens. Chapter 15 addresses the requirements for this model of social innovation.

Capacity building

There is a requirement for capacity building for a sustainable future in gerontology. The future of gerontology is dependent on more researchers taking an interest in ageing issues. The New Dynamics of Ageing (NDA) brought many Early Career Researchers into the programme, but it could be argued that there are not enough opportunities for career development in gerontology with the need for 'T shaped researchers' who have an interdisciplinary portfolio as well as a good grounding in their home discipline. Building capacity in ageing research brings with it a recognition for much longer-term investment if translation and impact is to be realised. Research cannot be a cliff edge when researchers run out of time, contracts end with the consequential loss of relationships to develop translation. Innovation in capacity building initiatives is also required, including initiatives that focus on skills in meaningful co-production with business and older people as well as theory development, critical thinking and a change in research culture and team working.

There are strengths on which innovation can flow, such as the sustainability of ageing research as a funded research stream over many years. Since 1980, ageing research has been paved with a series of funding research programmes, each with distinct characteristics. It is a success story for UKRI and other charitable funding bodies, bilateral funders and Horizon 2020 funders (see Chapter 1). These funding initiatives have shaped the course of UK social gerontology. If innovation is to succeed and to develop the next generation of gerontologists, we need sustained and wider funding streams including from the private sector. Long-term funding is also crucial to make a difference in the lives of older people.

The flexibility and agility of ageing research to apply across all areas and societal issues can sustain funded programmes of ageing research. This is

eloquently described in a book, *The Evolution of British Gerontology*, by Bernard, Ray and Reynolds (2020). It is those distinctive characteristics of many of the programmes, the necessity for applied, interdisciplinary work and challenge-led approaches, that have strengthened gerontology. It is not seen as the territory of one discipline as ageing cuts across numerous disciplinary areas. In addition, the rich longitudinal and comparative data sets available in the UK through the English Longitudinal Study of Ageing (ELSA), the Northern Ireland Cohort for the Longitudinal Study of Ageing (NICOLA), the Healthy Ageing In Scotland study (HAGIS), The Irish Longitudinal Study of Ageing (TILDA), Cognitive Function and Ageing Study (CFAS), Understanding Society and the potential use of AI (the SPACE project is an example) provide a rich framework for evidence-based innovation.

Gerontology's strength is also its weakness, as others claim territory and do not engage with the gerontological community. There can be disparate professional groups each with their agendas that aren't connected with innovations in one area not visible to another, for example developments in genomics are not readily visible to social scientists. Yet, they are crucially important. There are dangers of reinventing the wheel, with ignorance of a critical gerontological perspective (Ray et al, 2014). For example, social care and social work, with its lack of connectedness to 'gerontological theory' or empirical research on ageing; hence a focus on a bio-medical deficit model of ageing with a focus on frailty rather than adopting an assets-based approach.

In conclusion to this book, we have:

- highlighted key aspects and processes of the SBDRP of research;
- translated new thinking on ageing and demonstrated the leading contribution of social sciences and arts to grand challenges;
- demonstrated the relevance, applicability and utility of ageing research to wider societal issues;
- introduced the role of business in ageing research and the reader to the opportunities, contexts and potential for academics and business to work together with older people;
- provided examples of how ageing research can impact different business sectors;
- illustrated large research challenge projects with older people at the heart;
- provided an overview of the state of gerontological research; and
- pointed researchers in new directions for research agendas and addressed a gap in developing an ageing market.

The HAC and SBDRP go far beyond traditional programmes of research. The focus on inclusive user-centred design and co-production of Healthy Ageing solutions has leveraged UK expertise in research, innovation and design, further stimulating investment in the developing Healthy Ageing

sector. It has also created a broad ecosystem of research and innovation with the mission of improving the lives of all of us as we age.

We hope that by dipping into 'Healthy Ageing: social, behavioural and design innovations in research', readers will be inspired to take forward ageing research building on the themes and ideas described in the book.

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