technopolis group

June 2024

Healthy Ageing Challenge Evaluation

Final report

Technopolis, Ipsos, Science-Metrix and glass.AI

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The Healthy Ageing Challenge and its activities

People in the UK today can expect to live longer than any generation before. Ensuring these extra years are spent in good health is a social and economic imperative. Maximising the opportunity for 'healthy ageing' requires actions from society and individuals to prevent age-related mental and physical decline and help people to adapt to age-related changes through various innovative products and services.

The rewards for making progress in these areas are substantial, including more efficient use of public services, particularly from reducing pressure on health and social care services, and enhanced societal wellbeing. Another major goal of healthy ageing is to improve health equity across socio-economic groups and regions. In addition to these societal benefits, advances in healthy ageing present a major market opportunity. There is need for innovative, affordable goods and services for older adults, as the UK and global markets are currently under-served.

In this context, the Healthy Ageing Challenge (HAC) was created to promote ageing well, not just living longer. It aims to turn the UK's demographic challenge into an opportunity for societal and economic benefits. With a £98M investment from UK Research and Innovation (UKRI), HAC was aimed at supporting businesses and social enterprises in developing and scaling healthy ageing (HA) products to meet the needs of an ageing population.

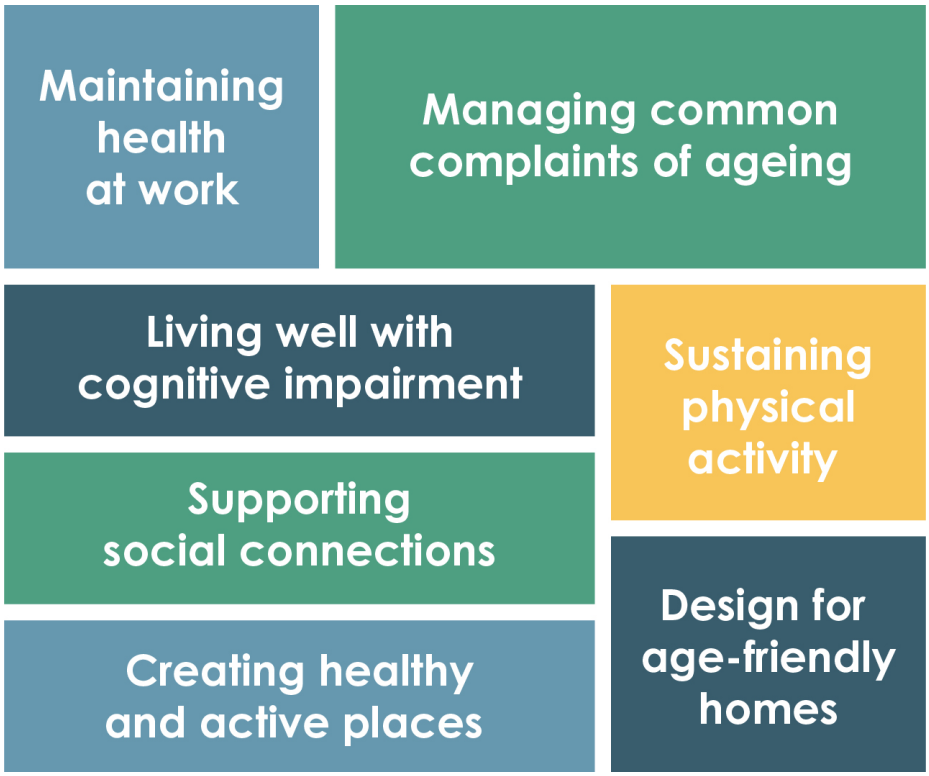
The Challenge was implemented through several funding strands that supported academic- and industry-led research and innovation (R&I) projects at different stages of maturity. Early-stage development of new innovations was supported by university-led Catalyst Awards and Social, Behavioural and Design Research Programme (SBDRP) and industry-led Investment Partnerships. Late-stage development of existing products, services, and business models aimed at supporting their adoption and scaling was funded through industry-led Trailblazers, Investment Partnerships, Designed for Ageing (DfA) initiative; and social ventures-led Small Business Research Initiative (SBRI).

In total, over 218 projects[1] were funded across the UK through these strands, receiving £81.3M in grants and £40.6M in pledged co-investment primarily from the industry sector. These projects were spread across all regions of the UK and predominantly focused on developing HA products

1 This number excludes the 24 Longitude Prize on Dementia projects which are outside the scope of the evaluation

and services. The solutions aimed to benefit a broad spectrum of income groups, including those from lower income brackets. Various stakeholders participated in these projects, notably older people, businesses, charities, local authorities, community organisations/networks, as well as individuals from low-income backgrounds, from black and minority ethnic backgrounds, or with physical or cognitive challenges.

Projects focussed on the following seven HA themes:



Evaluation scope and approach

Technopolis with support from Ipsos, Science-Metrix and glass.ai was commissioned by UKRI to conduct an independent, external evaluation of HAC. The aim of the evaluation was to understand both the economic and non-economic impacts that HAC has enabled as a whole and its potential for impact in the future. The evaluation considered HAC awards made since 2020 and was conducted between October 2022 and May 2024. This executive summary lays out the main findings from the evaluation and key considerations for the future.

The study team employed a theory-based mixed-methods approach, including both qualitative and quantitative methods, which included development of an intervention logic, data collection and analysis through desk research, bibliometric analysis, online surveys (of successful and unsuccessful applicants), stakeholder interviews and impact case studies.

It is important to note that HAC projects either concluded shortly before the evaluation or were still ongoing at the time. As a result, the data collected on outputs, outcomes and impacts from these projects was incomplete. Additionally, many projects were in a pre-commercial stage, which restricted the available evidence on potential economic impacts of the Challenge. The societal and economic benefits of these projects often manifest over an extended period, meaning that the true impact of the programme will only become clear in the coming years.

Main findings

Direct outputs of the programme:

- New knowledge outputs: HAC awards (mostly Catalyst Awards and SBDRP projects) reported 135 publications (including 59 journal articles and 38 conference proceedings) to date. Other outputs reported by HAC participants included establishment of proof of concept or feasibility of solutions, new resources and datasets, and educational resources for stakeholders. These outputs covered a wide range of HA topics, such as loneliness, medicine management, rehabilitation exercises, hearing loss, mobility issues, and menopause.
- New intellectual property (IP): Project teams are beginning to register new IP, such as designs, trademarks, copyrights and patents. They have also developed know-how, trade secrets and new R&D tools and methods. Examples include a copyright for a virtual cognitive stimulation therapy tool, a house design guide for designing age-friendly homes and a patent for a posture-sensing system for a smart chair.
- Products and services de-risked for follow-on funding: Evidence from surveys suggests that HAC funding generally supported the progression of innovations in terms of technology readiness levels (TRLs), bringing them closer to market. The maturity levels of the innovations varied across funding strands. On average, projects starting at the ideation/planning phase (TRL1) progressed to a working prototype (TRL 6).
- New collaborations and skills: Survey responses indicate that approximately three-quarters of HAC projects involve new collaboration partners. Around one-fifth of surveyed projects are entirely based on new collaborations. Catalyst and SBDRP awards saw the highest involvement of new partners, largely due to the requirement for collaboration between universities and other sectors, particularly businesses.

  Participation in HAC projects also led to new and improved skills in areas of HA research and innovation (R&I), understanding market needs and opportunities, technical expertise, community and user engagement, business development and fundraising, scaling strategies, and approaches to co-design.

Further outcomes that emerged from project activities:

- New knowledge: HAC project participants developed new knowledge and insights particularly regarding product and service design, user/stakeholder involvement and co-design.
- Capacity and ecosystem building: According to participants, HAC projects have strengthened multidisciplinary, inclusive R&I collaborations across various partners including policymakers, practitioners, businesses and social ventures. These collaborations enhance absorptive capacity and buy-in from users (both individuals and organisations) to facilitate the adoption of innovations developed in HAC projects. The HAC Community of Practice and Healthy Ageing Conference have also played a significant role in this effort. HAC also contributed greatly to integrating new sectors and types of organisations into the HA R&I ecosystem.
- Follow-on funding and investment leveraged:
  - Researchfish® indicates 12 Catalyst and SBDRP awards captured a total of £7.9M in additional funding, mostly from public or charity/non-profit sources
  - According to PitchBook data (as of April 2024), across the Challenge, companies have secured additional private investment (beyond the pledged co-investment) totalling £16.8M in follow-on funding including seed investment, angel investment, early-stage venture capital and late-stage venture capital investment.

- Business growth: Early evidence indicates that the Challenge has boosted firm growth in terms of *company turnover* (£26M to £41M; *£15M growth*), *research and development expenditure* (£2.8M to £10.2M; *£7.4M growth*) and staff headcount (expanding from 599 to 859 full-time employees, net *260 additional employees*) over the Challenge period for companies participating in HAC projects.
- Health and wellbeing benefits have been achieved in some projects primarily for end users participating in the project's R&I activities. These end users include citizens, especially older people from diverse backgrounds, including ethnic minorities and low-income groups, as well as those with cognitive and physical disabilities. Examples of these benefits include:
  - Music in Mind reported a 90% drop in agitation amongst their beneficiaries, with estimated annual wider system savings of approximately £60,000 per individual
  - Aesop's Dance to Health project reported a 96% improvement in mental wellbeing, alongside a similar percentage of participants indicating increased physical activity
  - Civic Dollars recorded an 8.5% increase in health and wellbeing among participants
  - Cricketqube found that 40% of users aged 50 and above reported reduced depression; 86% reported increased happiness after sessions, and 57% felt more relaxed
- Adoption and scaling: At the time of data collection, most HAC projects were at a pre-commercial stage, with many having conducted small-scale pilots or user trials. Nevertheless, some projects had achieved adoption beyond their initial user base, including:
  - A digital app and coaching support (Holly Health) for people in their 50s, 60s and 70s, which has been scaled up and used by some 170 GP practices across the UK
  - A project (Golf in Society) which uses golf to assist people with comorbidities and neurological conditions now operates in 23 golf clubs across the UK
  - An augmented reality storytelling product (Squiboon) aimed at improving social connections among older people has been used by 2,580 older adults and seven organisations

Future impacts

Most projects are still in early stages and have not had enough time to fully develop solutions for widespread adoption and scaling. As a result, significant contributions to population-level health and social impacts, as well as broader sectoral impact, have not yet been realised. Nonetheless, there is early evidence showing progress in HA innovations and growth among companies involved in the Challenge. This early evidence suggests that the Challenge is creating opportunities for long-term impact.

Conclusions

Based on available evidence, the evaluation team has concluded the following:

- **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 multidisciplinary collaborations across sectors and enhanced skills among participants. Short-term outcomes such as health and social benefits for users involved in testing, follow-on funding and new investment, and increased R&I and absorptive capacity have been achieved in specific projects.

- **HAC has supported R&I across the entire innovation pipeline** from early-stage research and feasibility studies to adoption and scaling research and commercialisation. This has resulted in a pipeline of innovations spanning all seven HA themes at various stages of development. New products and services have been designed with user input, proof-of-concept has been established in several cases, and existing innovations have been further developed with new markets and business models in mind.
- **Social benefits**, particularly health and wellbeing benefits, have been achieved in some projects primarily for end users participating in the project's R&I activities. Long-term benefits such as savings for health and social care providers and population-level health impacts are expected to emerge. These will depend on large-scale adoption of said innovations.

  Since most solutions undergoing development through HAC serve a wide range of income groups, including lower-income brackets, there is potential for HAC to address inequalities in healthy ageing in the UK, depending on adoption by relevant populations. Older people from diverse backgrounds, including ethnic minorities, low-income groups, and those with cognitive and physical disabilities, have participated in HAC R&I activities. This inclusivity is likely to foster understanding and acceptance across diverse demographic groups, thereby supporting adoption of HA solutions and mitigation of inequalities.
- **HAC has contributed to firm-level growth,** as evidenced by increased turnover, R&D expenditure, and staff numbers among participating companies.
- **HAC has helped galvanise the nascent HA sector** by making considerable inroads into developing a HA R&I ecosystem in the UK. It has fostered a community of practice, bringing together stakeholders from various sectors to collaborate on developing HA solutions. It has encouraged new entrants, from micro and small enterprises to large multinational companies, as well as social ventures and universities to participate in HA R&I. 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.
- **The medium- to long-term outcomes are likely to be achieved** over the next 3 to 5 years, following the conclusion of the Challenge. Anticipated outcomes include social and health benefits for users of HA innovations, cost savings for health and social care providers, and continued economic growth for companies involved in developing these innovations.

Considerations for the future

To ensure HAC achieves its long-term outcomes and impacts, and to safeguard the substantial investment already made, we propose the following key considerations for the future:

- **Ensuring the future sustainability of the HA R&I community galvanised by HAC**. While HAC has started to establish an ecosystem for HA R&I in the UK, it is in its early stages, and the ecosystem is not yet self-sustaining. The community, activated through HAC projects, the Healthy Ageing Conference and Community of Practice, includes networks comprising businesses of all sizes, social ventures, universities, government and local communities. Without continued efforts, there is a risk that this community could disperse. Therefore, it is important to continue supporting the initiatives started by HAC to foster consolidation and growth of the HA R&I community, for example through the Ageing Business Society Special Interest Group of the British Society of Gerontology or similar organisations.
- **Exploring options for sustained funding for HA R&I is essential to maintain the momentum generated by HAC.** Many of the innovations supported in HAC are at a stage where further development or support is necessary to bring them to market. Therefore, there is a need for continued funding for HA R&I over the medium to long term, possibly through a programme

similar to HAC, to maximise the impact from previous investments and progress. It is critical to sustain the momentum built so far in addressing the challenges posed by the UK's ageing population, as these issues continue to persist.

- **Supporting improved access to HAC and HA innovations is another key consideration.** HAC has facilitated the development of several HA solutions with potential social benefits. However, a significant challenge remains in ensuring that innovations supported by HAC funding are available to those who need them. Many of these innovations are designed to address issues within the publicly funded NHS and social care systems, requiring specific evidence and meeting particular requirements to be commissioned. HAC participants have identified this as a gap/barrier which may prevent the potential of products and services to benefit the population and save costs in health and social care systems from being fully realised.

1 Introduction

This report presents the overall findings of the Healthy Ageing Challenge (HAC) evaluation led by Technopolis with support from Ipsos, Science-Metrix and Glass.ai.

With the HAC ending in March 2024, UKRI sought a Challenge-level impact evaluation aimed at elucidating what results the Challenge as a whole has enabled and is likely to enable in the future. The evaluation was based on a theory-based approach focussed on answering specific evaluation questions posed with regard to economic and non-economic impacts.

1.1 The Healthy Ageing Challenge

HAC was a £98 million investment from UKRI and part of their Industrial Strategy Challenge Fund (ISCF). It was aimed at supporting the development of healthy ageing products at scale that will support the needs of an ageing population. The motivation behind the Challenge was to tackle market failures and stimulate more investment in the healthy ageing (HA) sector to support the development of self-sustaining market propositions that will help people to stay healthy as they age. To achieve this aim, HAC supported a variety of organisations including businesses, social enterprises and universities in creating and making the most of existing capabilities in research, innovation and design to attract inward investment into the UK and develop new HA solutions (products, services and business models). When adopted at scale, these innovations were expected to allow people to remain active, independent, socially connected and productive for longer; create opportunities to grow new or expand existing markets and businesses; and support closing the gap in healthy life expectancy between the most and least affluent parts of the country.

The Challenge provided funding for academic- and industry-led research and innovation (R&I) at varying levels of maturity. Apart from funding early-stage development of new (and potentially marketable) innovations, HAC also supported near-to-market adaptations of existing products, services, and business models to better meet the needs of an ageing population and their formal and informal carers. All innovations focused on delivering a solution in at least one of the following seven key areas identified by the Centre for Ageing Better[2]:

- Sustaining physical activity
- Maintaining health at work
- Design for age-friendly homes
- Managing common complaints of ageing
- Living well with cognitive impairment
- Supporting social connections
- Creating healthy and active places

The five-year Challenge was conceived in 2017 with the delivery plan and business case approved in 2019. It supported eight key funding strands (Table 1). The Challenge participants included a wide range of businesses and social enterprises, members of the design community, academic researchers and investor partners. Together, they supported design of solutions that are inclusive of end-users needs, development of both new and near-to-market innovations and commercialisation of these innovations. The Challenge also funded academic research to build a robust understanding of the HA market potential, challenges and ways in which industry can deliver support. In addition, significant effort was put into building the UK's HA R&I ecosystem through support for new multidisciplinary and cross-sector collaborations, coaching, mentoring, skills training and knowledge exchange through activities such as the Community

[2] https://ageing-better.org.uk/resources/industrial-strategy-challenge-fund-healthy-ageing-framework

of Practice (CoP) and an annual Healthy Ageing Conference. The Longitude Prize on Dementia was outside the scope of the evaluation.

Table 1 HAC funding strands

Strand *(HAC Funding)*	**Description**	**Timeframe**	**Participants targeted**	**R&I stage**
Trailblazers *(£24M)*	Collaborative and multi-disciplinary projects enabling businesses (including social enterprises) to develop healthy ageing (HA) innovations that will be adopted at scale	Feb 2020-Mar 2024	Led by UK-based businesses; academic can be partners	Late stage: near-to-market propositions
Designed for ageing *(£20M)*	Collaborative project between the design community and the healthy ageing sector aimed to encourage the development of 'people-centred' design principles and industrial research to develop new and applied knowledge leading to solutions at high TRL	Apr 2022 – Mar 2024	Design community, companies in HA sector, academics	Late stage: Business-led, near-to-market propositions with potential to scale
Investment partnership *(£12.4M)*	Partnership scheme between investors and Innovate UK where grants are provided to reduce the risk of private investments in HA innovations. Investors are expected to bring match funding to take HA innovations to market.	Dec 2020 – Mar 2024	Commercial and social impact investors	Early and late stage: includes support for proof of concept and feasibility studies, as well as companies generating sales
Social, Behavioural and Design Research programme (SBDRP) *(£12.3M)*	Projects exploring behavioural and design aspects of HA to deliver evidence on key challenges facing older people and ways in which businesses can deliver support. This strand was administered by ESRC.	Oct 2020 – Sep 2023	Academia	Early-stage research
Catalyst Awards *(£8.1M)*	The awards fund entrepreneurial academics who wish to translate high-risk research-based ideas into commercial products in the HA domain. This strand was administered by ESRC with Zinc VC as the delivery partner,	Nov 2020 – Oct 2023	Projects are led by university-based researchers, but businesses can be added as partner	Early-stage innovations
Small Business Research Initiative (SBRI) including Feasibility, Industrial Research, Scaling Social Ventures *(£5.5 M)*	Support businesses with social purpose to conduct feasibility studies and industrial research followed by research to scale up existing innovative products, processes, and services	Feb 2022 – Mar 2024	Led by social enterprise. can collaborate with businesses, RTO, academia, or third sector	Feasibility, late stage, adoption and scale-up R&I

Longitude Prize on Dementia[3] *(£3.6M + 0.5M from UKRI-MRC)*	Funding to develop digital technology (device or service) that learns from a person living with dementia, adapting and compensating for their condition as it progresses, and enabling them to continue living independently for longer. Delivered with Nesta	Sep 2022 – Feb 2026	Innovators worldwide	Early and late: innovation leading to prototypes followed by testing with end-users
Miscellaneous *(1.8M)*	This strand includes some focussed activities such as COVID-19 fast response, Design Age Institute pathfinder and international projects such as the UK-Canada exchange programme for HA technology organisations	various	various	various
Community of practice *(£2M)*	Maximise the impact from the Challenge by facilitating collaboration across the investment portfolio and disseminate knowledge from funded activities	Jan 2020 – June 2023	Project participants; organisations interested in HA	n/a

1.2 This report

The remainder of the report covers the evaluation methodology and findings which are structured into the following sections.

- Chapter 2 Methodology highlighting the theory of change, evaluation questions, evaluation framework as well as methods used and the limitations
- Chapter 3 Portfolio supported through HAC, including distribution of the portfolio across strands, UK regions, organisation types and healthy ageing themes
- Chapter 4 Impact outlining the key output, outcomes and likely impacts from the Challenge
- Chapter 5 Conclusions and recommendations including lessons learned

Supplementary data referenced in this report are included in Appendix A. A separate annex report containing detailed case studies (covering individual projects as well as HA themes and two HAC strands) as well as detailed survey and bibliometric analyses accompanies this report.

[3] outside the scope of the evaluation

2 Methodology

2.1 Theory of change

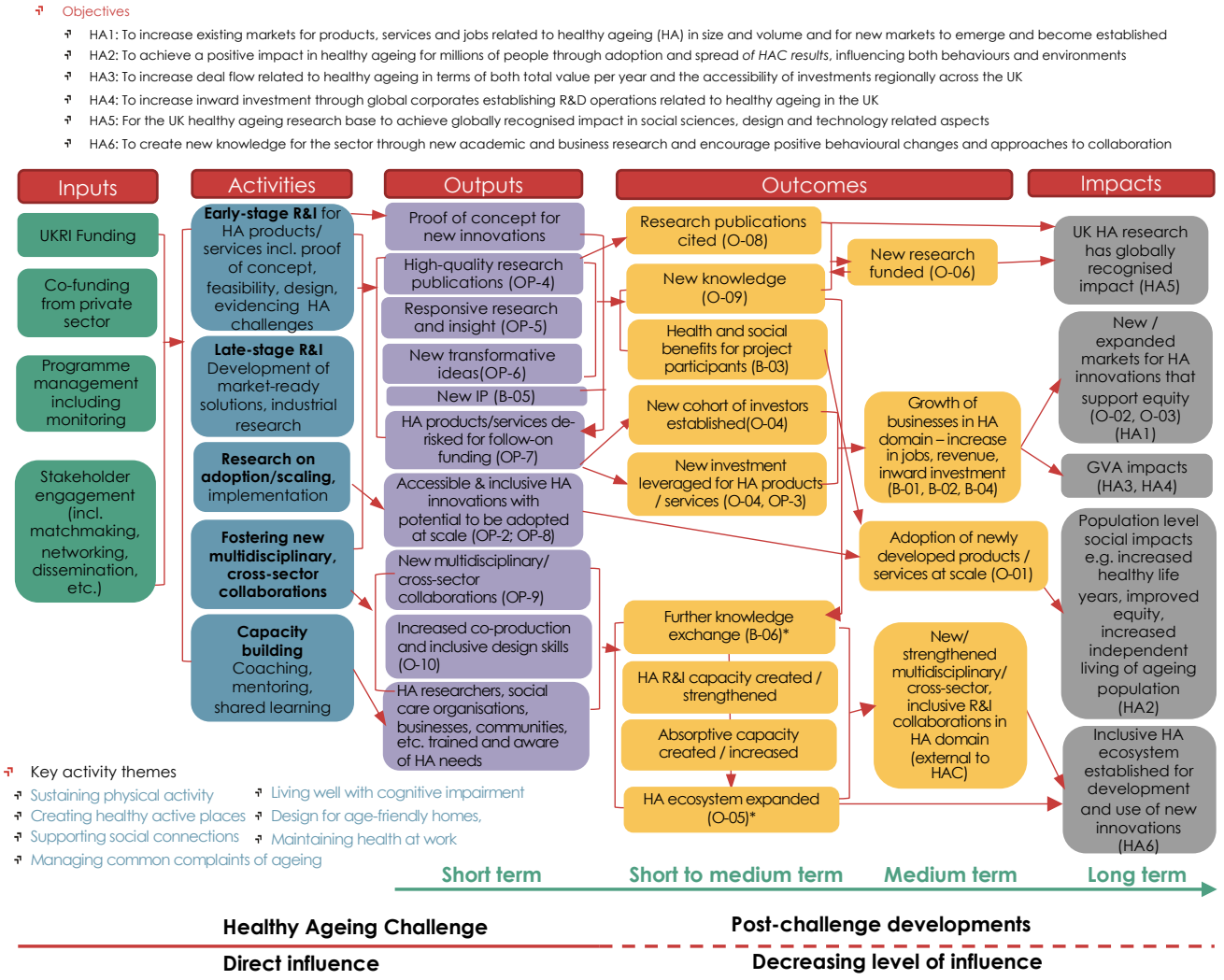
A theory of change (TOC) provides a structured approach to look at a programme or intervention. It is a theory of how and why an intervention works or is expected to work. It makes explicit the mechanisms underlying the intervention (in this case HAC) i.e. the causal pathways of how the inputs (e.g. funding, programme management) and the resulting activities (e.g. early- and late-stage R&I, capacity building) are expected to produce immediate outputs (e.g. new ideas, publications, skills and collaborations). These in turn are connected to medium-term outcomes (e.g. new knowledge, knowledge exchange, new investment leveraged) and longer-term outcomes (e.g. further research, growth of businesses, adoption of HA solutions) and eventually the realisation of the desired objectives/impacts (e.g. population-level social impacts such as increase in healthy life years, economic impacts such as Gross Value Added (GVA), new/expanded markets for HA innovations). A TOC can be visually represented in a logic model, which provides a graphic representation of the causal pathways within the context in which an intervention is implemented.

Anticipated outputs, outcomes, and impacts can be linked to a set of indicators that evidence whether, and to what degree, an intervention is progressing towards its intended impacts. Thus, a TOC provides a framework for monitoring, evaluation and learning. A TOC is not meant to be a static framework, and should be revisited at regular intervals to incorporate learning derived from implementation of the intervention.

We developed the HAC logic model (Figure 1), representing the Challenge's TOC, which traces the causal chain of connections (pathways to impact) between the inputs, activities, outputs, outcomes, and impacts that ultimately leads to achieving the stated objectives (impacts). It was informed by a review of the available documentation, scoping interviews with the Challenge team, a discussion with the Community of Practice and a validation workshop with the Challenge team.

The pathways to impact show the assumed sequence of events (based on the underlying assumptions explained in Section 2.1.1) of how activities will lead to the expected long-term impacts. The immediate results of the activities (or projects) – also the expected project deliverables – are the "outputs" that HAC directly funded and expected to materialise by the end of the funding period. The outputs are then expected to lead to outcomes, the emergence of which is affected by wider factors in the ecosystem and on which the project activities and HAC have less influence. Some outcomes may emerge in parallel with outputs while others will take a longer time. The emergence of short- and medium-term outcomes can give an indication of the likelihood of the linked long-term impact being achieved. With HAC activities covering different stages of the R&D pathway – from early-stage research to late-stage innovation and adoption/scaling – it was expected that some of the medium-term outcomes like adoption of new innovations at scale would be achieved or be close to being achieved towards the end of the Challenge in specific cases. However, the results that we define as impacts in the logic model represent changes observable at the population- or ecosystem-level and these require additional supporting factors to emerge, much beyond the timeline of the Challenge.

Figure 1 Healthy Ageing Challenge logic model



The spectrum of activities supported by HAC along the R&D pathway means that the outputs emerging will also span different technology or market readiness levels and will reinforce one other. For example, early-stage R&D such as establishing proof of concept or feasibility of an idea, or creation of new intellectual property, can be expected to contribute to derisking of new innovations/solutions for follow-on funding which would be supported by other types of early- and late-stage R&I activities. These inter-linkages are visualised in the logic model with feedback loops, demonstrating the non-linearity of innovation pathways. Once follow-on funding is leveraged and further R&D (including research on adoption/scaling) is carried out, products/services ready for adoption at scale are expected to emerge. HAC R&I activities are also expected to result in health and social benefits of different types and to varying extent for project participants which could give an indication of likely social impact on wider populations in the long term.

There is also a high level of interplay in the HA R&D ecosystem domain with R&D, collaboration and capacity building activities fostering the creation of new knowledge, ideas, networks and skills resulting in creation or strengthening of R&I capacity and absorptive[4] capacity as well as expansion of the HA ecosystem which in turn should support new research and new/strengthened multidisciplinary, multi-sectoral and inclusive R&I in HA.

Even for products/services that are adopted at scale by the end of the Challenge, the full extent of population-level social impacts will take time to accrue and hence cannot be evidenced in this evaluation. Similarly, economic impacts in terms of effects on Gross Value Added (GVA), markets for HA innovations and wider research ecosystem impacts will not be visible within the timeline of the evaluation.

2.1.1 Assumptions

As we move from outputs to impacts in the logic model, the influence of external factors, i.e. contextual factors outside the HAC, increases. The causal pathways defined in the HAC logic model were based on certain assumptions highlighting some of the dependencies for achieving the expected impact. These include the following:

- The HAC identifies near-to-market propositions with direct benefit to the target demographics
- There is sufficient time for award-holders to progress innovative ideas closer to market launch
- Award-holders actively participate in capacity building and knowledge exchange activities to share learning and best practice insights
- There is interest from older adults, their carers and businesses to co-design product / service development with others to ensure relevance and added value
- There is sufficient interest (and risk-taking) from private investors to further support innovations and take outputs to market
- There is sufficient demand from social care and/or consumers to procure (directly or indirectly) products and services created in the Challenge
- Local community, social care and health care settings have sufficient absorptive capacity and resources for adoption of products / services created in the HAC

[4] Absorptive capacity refers to organisations and sectors to take up and assimilate HA innovations in their routine activities.

2.2 Evaluation Framework

2.2.1 Evaluation questions (EQs) and approach

Based on the specific evaluation objectives, we refined the EQs stated in the evaluation's tender specification based on discussions in a Validation Workshop and feasibility considerations (what is doable within the evaluation timeline).

Table 2 below highlights the revised non-economic EQs and economic EQs (EEQs) as well as the relevant data collection and analysis methods employed in the evaluation to address each EQ (qualitatively and quantitatively).

Table 2 Evaluation questions and methodological approach

Evaluation question	Approach	Data collection methods	Data synthesis methods
EQ1. To what extent has the Challenge implemented its planned activities and achieved its planned outputs and outcomes? What factors have influence over whether these outputs, outcomes and impacts have been or will be achieved?	Qualitative/ Quantitative	• Consultations (Challenge level) – UKRI/Challenge team • Survey of successful and unsuccessful applicants • In-depth interviews (activity/ project level) • Secondary data collection – Bibliometrics – Monitoring data (including ResearchFish) – Text mining of company websites, social media, news, Companies House, UK Patents Office data by glass.ai	• Contribution analysis • Case studies
EQ2. To what extent and how have Challenge activities enabled self-sustaining, near to market propositions which have clear potential to move to scale and spread to new markets?	Qualitative	• Consultations (Challenge level) – UKRI/Challenge team – Wider stakeholders • In-depth interviews (activity/ project level)	• Contribution analysis • Case studies
EQ3. To what extent has the Challenge achieved social impact? What is the nature and scope of this impact? To what extent is there impact on the target population group(s) and disadvantaged/ marginalised communities?	Qualitative/ Quantitative as feasible	• Survey of successful and unsuccessful applicants • In-depth interviews (activity/ project level) • Secondary data collection – Monitoring data – Data from projects (e.g. publications, case studies)	• Contribution analysis • Case studies
EQ4. What are the unintended outcomes and impacts?	Qualitative (Quantitative where evidence available)	• Survey of successful and unsuccessful applicants • In-depth interviews (activity/ project level) • Secondary data collection – Monitoring data	• Contribution analysis
EQ5. To what extent has the Challenge made the most of the UK's strengths, particularly in	Qualitative	• Consultations (Challenge level) – UKRI/Challenge team	• Contribution analysis • Case studies

design, research and innovation, to attract inward investment?		– Wider stakeholders • Survey of successful applicants • In-depth interviews (activity/ project level)	
EQ6. What lessons can be learnt from the Challenge around how to support R&I in the healthy ageing domain?	Qualitative	• Consultations (Challenge level) – UKRI/Challenge team – Wider stakeholders • Survey of successful applicants • In-depth interviews (activity/ project level)	• Contribution analysis • Case studies
EQ7. What is the likely nature, extent and timeline of future impacts? What stakeholders/population groups will see these impacts?	Qualitative	• Survey of successful applicants • In-depth interviews (activity/ project level) • Secondary data collection – Monitoring data	• Contribution analysis
EEQ1. To what extent has the Challenge stimulated economic growth in the UK?	Qualitative/ Quantitative	• Survey of successful and unsuccessful applicants • In-depth interviews (activity/ project level and with wider stakeholders) • Secondary data collection – PitchBook investment – Sector data (FAME) – Monitoring data • Data from projects (e.g. publications, case studies)	• Case studies
EEQ2. What factors influenced whether relevant outcomes and impacts materialised, and how? Were there any unintended impacts?	Qualitative	• Survey of successful and unsuccessful applicants • In-depth interviews (activity/ project level)	• Case studies
EEQ3. What is the potential economic value of the Healthy Ageing Challenge to the UK economy?	Qualitative/ Quantitative	• Survey of successful and unsuccessful applicants • In-depth interviews (activity/ project level and with trade bodies, charities, and institutes) • Secondary data collection – PitchBook investment – Company data (FAME) • Data from projects (e.g. publications, case studies)	• Case studies
EEQ4. How has Challenge design supported/impeded the portfolio of projects progressing towards economic impacts?	Qualitative	• Survey of successful and unsuccessful applicants • In-depth interviews (activity/ project level)	• Case studies

2.3 Methods

2.3.1 Secondary data analysis

2.3.1.1 Portfolio analysis

We analysed the information collated by the HAC programme team on awards funded by HAC. Our analysis provided an overview of the number, grant size, thematic focus (as tagged by the UKRI team in the AirTable containing project information), and location of funded projects by funding strands. We also analysed the portfolio in terms of applications received and success rates (where data were available) and co-investment received.

2.3.1.2 Analysis of Researchfish® data

For projects where Researchfish® data were available, the following output and outcome categories have been analysed: publications, further funding, skills, dissemination, policy, tools, databases, software, artistic products, intellectual property (IP) and products. Duplicate entries and outliers (e.g. outputs created before project start date) were excluded from the analysis. Data from Researchfish® submissions until March 2023 by projects in the Catalyst Award, Social, Behavioural and Design Research programme (SBDRP) and ISCF HA Director strands were analysed. Additional data from submissions in March 2024 were provided during the finalisation of this evaluation report, and relevant headline data have been included in this report where data did not require to be cleaned or re-analysed.

2.3.1.3 Bibliometric analysis

The HA research area was defined using a keyword approach to select scientific publications based on terms from the title, abstract, and author keywords.

A set of specific terms directly related to ageing were used to retrieve relevant publications. To limit the dataset to healthy ageing areas covered by HAC, papers focused on biomedical, pharmaceutical, and genetic aspects of ageing were identified using specific biomedical terms and thereafter removed. The resulting cleaned dataset was expanded by incorporating a separate dataset comprising publications featuring different ageing terms or ageing-specific medical terms along with terms from the social sciences and humanities domains to cover relevant HA publications that were possibly missed in the original search. To summarise, search terms were combined in the following manner to create the data set of HA publications:

("Specific Ageing Keywords" AND NOT "Biomedical terms (exclusions)") OR ("Ageing terms (non-specific)" AND "Social Sciences and Humanities terms") OR ("Ageing Specific Medical terms" AND "Social Sciences and Humanities terms")

The ultimate HA dataset comprises 518,086 papers published globally between 2014 and 2023, achieving a recall rate of 83% (126 out of 152) when compared to UKRI HA projects. Furthermore, the recall rate is 44% (11 out of 25) for UKRI HA publications that are available in Scopus.

Subsequent bibliometric analysis encompassed the following indicators:[5]

[5] All impact metrics were normalised by year of publication, subfield and document type. Most impact indicators cannot be produced for the last two years in the database (currently 2022 and 2023) because insufficient time has elapsed for citations to accrue.

- **Publication volume:** Number and growth of research publications plus specialisation in HA
- **Scientific impact:** Weighted CiteScore, average of relative citations (ARC), citation distribution index (CDI), as well as top 10%, 5% and 1% highly cited papers (HCP)
- **Impact on practice:** Share of publications cited in policy-related documents
- **Broader impact on society:** Share of publications cited in news items and in Wikipedia
- **Impact on innovation:** Share of publications cited in patents and in scientific work involving the private sector

Given that HAC funded activities commenced in the beginning of 2020, baseline indicators were generated for the period 2014–2019. To demonstrate the impact of HAC, indicators were generated covering the timeframe from 2020 to 2022, since at least two years are required for citations to accrue.

2.3.1.4 Healthy ageing sector analysis

To deliver rich and comprehensive HA sector analysis, two distinct datasets were developed:

- Dataset 1: HA Sector Crawl – applying AI technology and machine learning to crawl web sources and build a comprehensive database of the UK HA sector. This sought to leverage a targeted approach to sector discovery, moving beyond previous research, to pinpoint companies/organisations with a relevant HA focus, based on substantiated evidence. This process relied upon an integrated crawling strategy – that is the use of a collectively crafted keyword taxonomy and observation of existing examples (e.g. HAC projects participants) to train language models in a nuanced way and obtain aggregate results.
- Dataset 2: HAC Fund Enrichment – drawing on data shared by UKRI on HAC participants, the AI was used to enrich these records to support further analysis and comparison with the sector crawl. This included providing data across a variety of fields for successful project leads, partners, unsuccessful project leads and also a wider community of interest (e.g. LinkedIn and X followers, HA conference participants).

This approach however has some limitations. Not all UK businesses have a website, so our approach was limited to those that have an independent web presence. This may impact the representation of smaller organisations (incl. freelancers) as they are less likely to have a website than larger organisations. Further, the absence of web presence can be sector dependent. That is, companies in certain sectors may be more likely to have a web presence than others.

A challenge when using specific keywords to identify activities is that if a relevant business does not list those words on their website or if the keywords are on a page that has not been read by the directed crawl then the business may not be included in the results. This can be mitigated by including a broad range of topics associated with the types of companies that need to be discovered and using the topic ontology and semantic analysis to discover topics and content related to the supplied list.

2.3.2 *Primary data collection and analysis*

2.3.2.1 Online surveys

The primary function of the (online) surveys was to collect tailored information not available in other data sources. It was designed to capture information on the baseline (retrospective, where feasible) and outputs/outcomes/impacts, for **both successful and unsuccessful**

applicants. The survey questionnaires included routing to accommodate questions relevant for all stakeholder types supported in the Challenge, including businesses and academia, and cover both economic and non-economic aspects for the evaluation (see supporting Annex report for more details). They also included targeted 'open' questions to capture information on unexpected outputs and outcomes, a qualitative counterfactual (what would have happened in the absence of HAC funding), and factors influencing the delivery and results of the projects.

To address data protection concerns, we deployed the surveys using the SmartSurvey platform which is UK-based and meets GDPR requirements. Successful applicants (i.e., project leads and partners participating in the HAC) were invited to complete the survey in two ways (1) directly by Technopolis to 150 contacts for whom details were provided by UKRI and (2) by UKRI to 93 contacts participating in Catalyst and SBDRP awards. UKRI directly invited 314 unsuccessful applicants to complete the survey.

A total of 135 responses were received, of which 94 were from successful applicants (39% response rate, covering 87 projects) and 41 from unsuccessful applicants (13% response rate). A breakdown of the respondent demographics is included in Appendix A.1.

Survey results were analysed in Excel to remove duplicates, test data and any other invalid entries. Closed questions were analysed in Python and Excel for the creation of graphs. Open questions provided context to the closed questions; responses to open questions were manually coded by themes and reported accordingly.

2.3.2.2 Consultations and in-depth stakeholder interviews

We undertook a programme of in-depth interviews (semi-structured, 60 minutes) with funded organisations and partners to examine the topics outlined below. The questionnaire (see supporting Annex report) covered both non-economic and economic dimensions as delineated below.

- **The rationale** for the project/work programme, healthy ageing focus, and expected contribution to healthy ageing challenge goals
- **Project delivery and lessons learned**: how new collaborations have arisen and developed; the role of older adults, their carers, and other end-users of HA products and services in the design and execution/dissemination of the project; how new ideas have been generated and used; use of design principles and processes; challenges encountered in the delivery of the project and key learning from the project
- **Outcomes and benefits (expected and unexpected)**: extent and nature of any new business models; patents and IP; new products and services developed or in development; (potential) impact on healthy ageing / citizens; any launches, adoption use of products and services; nature, relevance and use of results; follow-on UK / global funding or investment to develop / exploit knowledge & innovation; access to global markets; jobs created and sustained; company growth; scaling outcomes
- **Likely future outcomes and impacts:** forecasts of future economic and non-economic outcomes that are likely to emerge from Challenge-specific investments and a more directional view of long-term impacts. Likely positive or negative outcomes as well as spillovers to other sectors will be covered where feasible
- **Facilitating factors and barriers:** factors that have influenced whether the expected outputs and outcome were achieved or are likely to affect the extent to which expected impacts will emerge in the future; extent to which UK's existing strengths were built upon; wider contextual factors

We also conducted interviews with wider stakeholders (not funded by the Challenge) involved in the HA sector including experts from industry, government, charities, etc. (see Annex report for questionnaire). We gathered information from these stakeholders on what the Challenge has enabled as a whole in the context of the landscape, how existing research and design strengths have been used and what lessons can be learned from the HAC and its implementation.

The sample for the interview programme is shown in Table 3. Interviews were analysed using NVivo software and a thematic analytical framework.

Table 3 Interview sample

Population sub-group	Population size /project numbers	Sample interviewed
Trailblazers		
Trailblazer leads	7	5
Trailblazer project partners	2-6 each	9
Designed for Ageing		
Grant holders	34	13
SBRI Social Ventures		
Grant holders	43	14
Investment Partnerships		
Investment partners	8	2
Successful SMEs	17	8
Catalyst awards		
Grant holders (all waves and Accelerator)	86	17
Zinc	1	1
Social, Behavioural and Design Research		
Grant holders	11	6
Research Director	1	1
Others		
COVID-19 fast response projects	9	1
Wider stakeholders	n/a	13
Total		**90**

2.3.3 *Contribution analysis*

Contribution of the Challenge to changes in the HA sector and emergence of outputs and outcomes from the projects was assessed qualitatively through Contribution Analysis.

Relevant data were collated, analysed and synthesised across the different workstreams to determine the collective contribution of projects by activity and output/outcome. Evidence from secondary sources (e.g. monitoring data, economic data), surveys, interviews and case studies was triangulated and synthesised. Contribution analysis involved testing the key

assumptions and causal relationships anticipated in the TOC, drawing out an explanatory account for the observed outputs/outcomes where evidence allowed us to do so.

Where feasible, we also examined the impact of Challenge funding on projects' success via a qualitative additionality analysis, which involved comparison against the baseline or unsuccessful applicants depending on data availability to determine the change enabled by HAC in the context of individual projects/activities.

2.3.4 Case studies

The data collected from the primary and secondary sources above were used to generate 10 in-depth case studies for a sample of Challenge activities (R&I supported in specific healthy ageing themes and HAC strands) and projects. All data were analysed within an analytical framework structured around a reporting template that covered elements including project/activity rationale, team and collaboration, implementation, challenges encountered, results, likely future impacts and lessons learned. Collectively these case studies illustrate examples of firm-level economic growth and health/social benefits emerging from HAC.

Full-length case studies are included in the accompanying Annex report.

2.3.5 Economic impact analysis

2.3.5.1 Survey data analysis

The survey to project teams included specific fields on economic firm-level data, which were relevant to teams on the Trailblazers, Investment Partnerships, SBRI, Designed for Ageing, COVID Fast Track and some Catalyst projects. We analysed responses related to direct economic outcomes such as turnover, number of full-time employees, follow-on investment, and R&D expenditure both at the point of application and in the most recent financial year to measure growth in firms participating in or emerging from HAC. We also calculated Technology Readiness Levels (TRLs) using survey responses to analyse the extent to which innovations progressed in projects. For TRLs, survey respondents were asked to provide information about the status of their innovations at the point of application (baseline) and at the time of survey completion, i.e. November 2023. The following adapted 8-point TRL scale (TRL1 to TRL8) was used to determine the extent of progression between the project start and end:

1. Basic principles observed, but no innovation designed
2. New innovation designed
3. Proof of concept or feasibility established
4. New innovation tested in simulated or trial conditions with a small number of users
5. New innovation validated in operational environment
6. Fully working prototype of innovation developed
7. New innovation tested for adoption at scale
8. New innovation on market

The survey also addressed key economic outcomes, such as increased awareness and capacity of participating in research and innovation projects, the adoption and use of new solutions and improvements in product technological maturity.

2.3.5.2 Interview analysis

Interviews with project teams included a section on economic outcomes and impacts the projects had seen materialise, which were relevant to teams on the Trailblazers, Investment

Partnerships, SBRI, Designed for Ageing, COVID Fast Track and some Catalyst projects. The interviews provided additional context on the key conditions, enablers and challenges project teams experienced in progressing their projects and generating economic impact. This included factors such as skills, partnerships, policies, and stakeholder engagement. Coding and analysis of economic impact responses across all interviews took place using NVivo.

2.3.5.3 Secondary Data Sources analysis

We gathered data on the Healthy Ageing Challenge companies using a mix of data sources. In the first instance this included public company data gathered through glass.ai and FAME using company identifiers, reconciled with UKRI monitoring information and Project Closure Forms along with survey and interview responses. These sources together provided us with a dataset of growth in the healthy ageing sector before and after. Furthermore, the team used PitchBook to identity any firm-level investment in project participants and the size and type of deals that had been agreed. A further desk review took place to identify any additional health, economic outcomes which might have been publicised after the initial data collection round.

2.3.5.4 Synthesis of economic data

Due to limitations in the economic data available (set out in section 2.5), a programme-level economic evaluation for the Healthy Ageing Evaluation was not feasible. For each funding strand we triangulate the economic findings across all data sources and highlight key figures which indicate growth in the progress of the projects. This strand-by-stand analysis allows us to cast a view on the growth of projects in each strand, taking into account technological readiness levels, turnover, R&D spend and investment flows, and indirect or longer-term impact to materialise.

2.4 Methodological limitations

Theory-based evaluations and a contribution analysis approach allows for evidence-based conclusions about causality and validation of the underlying TOC. It contributes to understanding whether the rationale and assumptions underlying the TOC are likely to be correct and supplies evidence on the contribution of an intervention towards the ultimate impacts and benefits. It should be noted however that this approach is primarily qualitative and does not necessarily provide a quantitative estimate of the extent and size of the contribution. Moreover, there are no agreed targets to assess whether HAC has achieved its objectives in a quantitative sense.

Furthermore, the diversity of projects funded, in terms of type of innovation being developed, R&I stage (e.g. early vs late), stakeholders involved, etc. implies a variety of outputs and outcomes generated. One project can contribute to a variety of outputs and outcomes, but all projects will not contribute to all outputs and outcomes.

The timing of the evaluation also put constraints on what data we were able to collect on outcomes and impacts in particular. HAC projects either finished shortly before or were still ongoing at the time of data collection. Outputs and outcomes had not yet emerged for many projects at the time of data collection. Most internal evidence gathering (by projects) on outputs and outcomes was due towards the end of the funding period and hence limited quantitative data were available.

The nature of projects funded also meant that they were generally at a pre-commercial stage, limiting evidence available on potential economic impacts of the Challenge. This limited the extent to which a robust evaluation of economic impacts could be undertaken.

First, the economic benefits for HAC activities typically materialise over a longer timeframe of several years. One investor we interviewed noted they expected to see benefits materialise over a 7-10 year timeframe. This is true for projects that are still in early stages of research and development. As a result of projects still being at a pre-commercial stage, the evidence obtained primarily covers non-commercial and pre-revenue activities. A wider set of economic measures, including technological progress, increases in user numbers and partnership agreements, can serve as signals of progress in developing commercial outcomes.

Secondly, analysis of the economic impact on companies requires extensive firm-level data for the project teams and a comparator group of companies, some of which may be commercially sensitive. Response rate for survey questions asking for data on firms' commercial performance, was low, and qualitative exploration suggested that most funded firms did not have a sense of how the funded projects have/or may benefit turnover, employment and follow-on investment. This means that all interpretation of survey findings includes a low sample size of firms involved in the Challenge. A comparison to wider sector data was also explored, however this was constrained by difficulties in defining a suitable sampling strategy for such a wider comparison group, given the cross-cutting nature of the healthy ageing projects funded.

Of the interviews we carried out with project teams, we received additional performance figures, testimony, or expectations for future business. However, the majority of interviewees could not provide exact company figures in conversation. Each Innovate UK-funded project partner or lead team, at the end of its grant period, completes a Project Closure Form (PCF), which includes questions on future expectations on incomes from sales or licensing, and future R&D spend. While the evaluation team had access to PCFs for Innovate UK-funded closed projects, the response rate to questions on future economic growth was around 15% and it was challenging to interrogate these figures in greater detail. In cases where company data were available, there was an additional challenge to identify data that are healthy-ageing specific. For instance, company data for large multinational firms is not separated by the type of activity carried out, thus it is difficult to know the level of turnover and R&D funding specific to healthy ageing. Survey responses from project teams – for this reason – specifically covered turnover, R&D and staffing related to healthy ageing activity.

Thirdly, future benefits of the Challenge are expected to include avoided health and care system costs, such as for managing chronic conditions, increased independent living, and reduction in hospital admissions. Quantifying these wider health benefits at the Challenge level, for the purposes of an economic evaluation was not possible for a number of reasons at this point in time. Effects on health will emerge over a longer timescale, which is driven largely by the adoption of new products and services. Timescales for adoption and measurable follow-on effects on health are likely to extend well beyond the lifetime of the evaluation. An alternative approach through modelling and monetising future health benefits resulting from the Challenge would have required identification of most likely disease indications or cost categories, as well as some early evidence of how funded projects may lead to cost savings or health improvements in the future. Whilst some project teams have undertaken early pilots, there was insufficient evidence at the time of this report to undertake such modelling, and we recommend that this could be attempted once sufficient time has elapsed for HAC projects to progress further and build their evidence base.

3 Portfolio

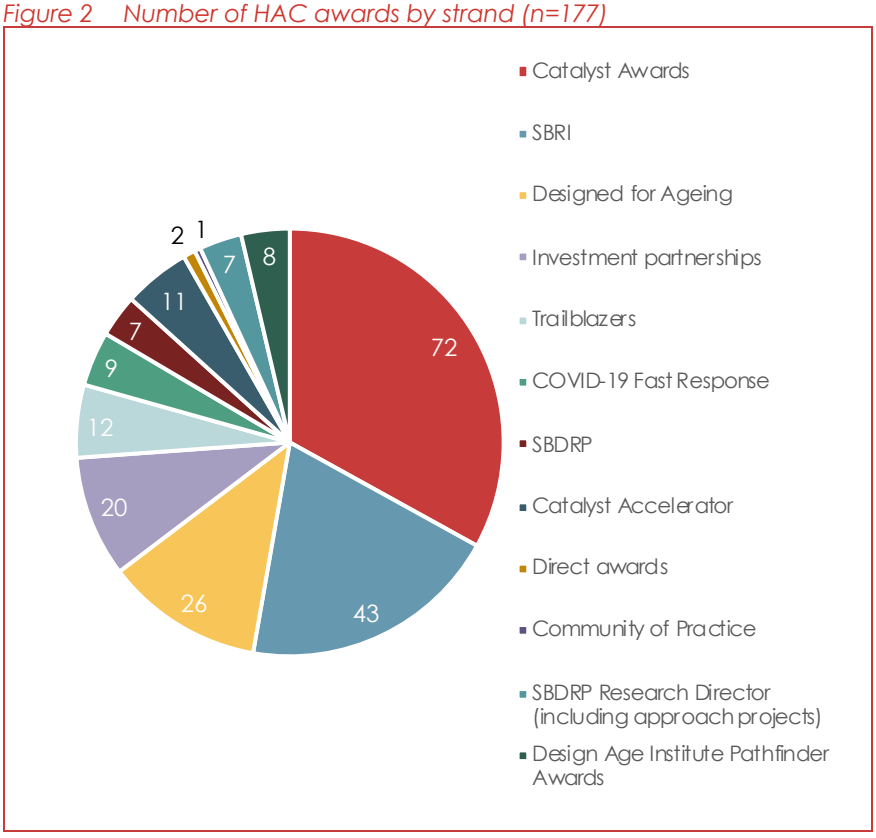
3.1 Awards and applications

218 projects were funded across different strands in scope for this evaluation (Longitude Prize on Dementia projects are out of scope). The Catalyst Awards, Small Business Research Initiative (SBRI) and Designed for Ageing (DfA) strands accounted for 72% of the projects (32%, 25% and 15%, respectively), that is, almost three-fourths of all projects (Figure 2). The SBRI strand (n=43) breaks down into three competitions: feasibility studies (n=17), industrial research (n=14) and scaling social ventures (n=12).

We have details for 752 applications submitted to HAC competitions for Trailblazers, SBRI, Catalyst Awards, DfA, SBDRP and the Catalyst Award Follow-on Fund i.e. Catalyst Accelerator (Table 4). Application data for other HAC strands or competitions were not available. The application processes differed across the competitions with some involving interviews or an expression of interest and others not involving either. The categorisation of application outcomes thus also differed across the strands.

Overall, of the 752 applications 159 (21%) were funded. While applications to the Trailblazers (Stage 2) and Catalyst Accelerator appeared to have the highest success rates (71% and 67% respectively), this was owing to a degree of pre-selection since applications were only open to a defined cohort of funded projects i.e. Stage 1 Trailblazers and Catalyst Awards. This was also the case for the SBRI – scaling social ventures strand where the competition was open to only previously funded SBRI projects (i.e. feasibility and industrial research projects). For the open competitions, SBRI feasibility studies and industrial research competitions had the highest success rates (52% and 42%, respectively) while the SBDRP and Trailblazers (Stage 1) competitions had the lowest success rates (9% and 6%, respectively).

Figure 2 Number of HAC awards by strand (n=177)



Source: UKRI social gradient data

Table 4 Application outcomes across HAC strands (n=745)

Application outcome	Withdrawn / Ineligible	Expression of interest only	Threshold score not reached	Not interviewed / shortlisted	Not funded after interview or shortlisting	Funded	Total	Success rate
Catalyst Awards (All waves)	4	131	1	-	91	67	294	22.8%
Designed for Ageing	29	-	57	18	15	26	145	17.9%
Trailblazers (Stage 1)	-23	-	62	3	24	7	119	5.9%
Trailblazers (Stage 2)	1	-	-	-	1	5	7	71.4%
SBDRP	-	-	-	62	7	7	76	9.2%
SBRI - industrial research	7	N/A	6	1	5	14	33	42.4%
SBRI - feasibility studies	6	-	1	-	9	17	33	51.5%
SBRI - scaling	12	-	12	-	3	12	39	30.8%
Catalyst Accelerator	-	-	-	-	2	4	6	66.7%
Total	**82**	**131**	**139**	**84**	**157**	**159**	**752**	**21.1%**

Source: UKRI portfolio data

3.2 Grant Size

Overall, the committed HAC spend totals £81.3M for the strands in scope for the evaluation. This represents the total funding allocated as per the original grant application. £6M was put aside for Challenge delivery and £3.7M was allocated to the Longitude Prize on Dementia. The allocation of funding varies across projects, ranging from £25K to £6M. The mean grant amount was £432K. The allocation of funds by strand is shown in Table 5 below.

Table 5 Allocation of HAC funding by strand

Strand	Total grant amount (£)	Proportion of total funding	Number of projects	Mean grant amount (£)
Trailblazers Stage 2	23,371,315	28.8%	5	4,674,263
Designed for Ageing	19,977,132	24.6%	26	768,351
SBDRP	10,966,447	13.5%	7	1,566,635
Investment partnerships	10,254,410	12.6%	20	512,721

SBRI	7,102,450	8.7%	43	165,173
Catalyst Awards	3,600,000	4.4%	72	50,000
ISCF HA Director (including SBDRP approach)	1,352,444	1.7%	1 + 6 SBDRP approach	110,631 (for SBDRP approach)
Community of Practice	1,398,947	1.7%	1	1,398,947
Catalyst Accelerator	1,100,895	1.4%	11	100,081
Design Age Institute Pathfinder Awards	684,901	0.8%	8	85,613
COVID-19 fast response	615,679	0.8%	9	68,409
Trailblazers Stage 1	591,885	0.7%	7	84,555
Direct Awards (including UK/Canada AGETECH Innovation Exchange)	249,417	0.3%	1	124,709
Total	**81,265,922**	**100.0%**	**218**	**432,218**

Source: UKRI social gradient data

3.2.1 Co-investment

Co-investment totalling around £41M was pledged largely across all Trailblazers, Investment Partnerships, and DfA projects from industry/private sources and the venture capital/financial sector. Co-investment was also pledged for some Design Age Institute Pathfinder and Catalyst Accelerator projects as well as for all Catalyst Awards.

Table 6 summarises the amount of co-investment pledged per strand.

Table 6 Pledged co-investment by competition

Competition	Source	Total co-investment (£)	Mean co-investment (£)
Trailblazers: Stage 2 (n=5)	Industry/private	20,801,543	4,160,309
Trailblazers: Stage 1 (n=7)	Industry/private	292,536	41,791
Investment Partnerships (n=20)	Venture capital/ financial sector	10,397,786	519,889
Designed for Ageing (n=26)	Industry/private	7,729,829	297,301
Design Age Institute Pathfinder Awards (n=5)	Industry/private	319,961	63,992
Catalyst Awards (n=72)	University	900,000	12,500
Catalyst Accelerator (n=7)	University	175,000	25,000
Total (n=142)		**40,616,655**	**286,033**

Source: UKRI social gradient data. n indicates number of projects that have pledged co-investment.

3.3 Project partners

Most HAC awards administered via Innovate UK only have one participant (not including subcontractors), the Trailblazers and Designed for Ageing strands being the only exceptions. These strands have a total of 86 partners[6] (excluding leads) linked to 26 projects, with 12 awards in the Designed for Ageing strand not involving any partners (i.e. only one participant). Table 7 shows the overall breakdown of partner numbers by competition.

It should be noted that projects may have sub-contractors that do not appear in the Innovate UK portfolio data. In addition, all SBDRP projects have partners, but these projects are not covered by the Innovate UK project management system.

Table 7 Number of partners associated with HAC awards

Competition	Total number of partners	Total number of projects per competition	Mean number of partners per project
Trailblazers: Stage 1	17	7	2.4
Trailblazers: Stage 2	31	5	6.2
Designed for Ageing	38	26	1.5
Total	**86**	**38**	**2.3**

Source: UKRI portfolio data

3.4 Geographical Reach

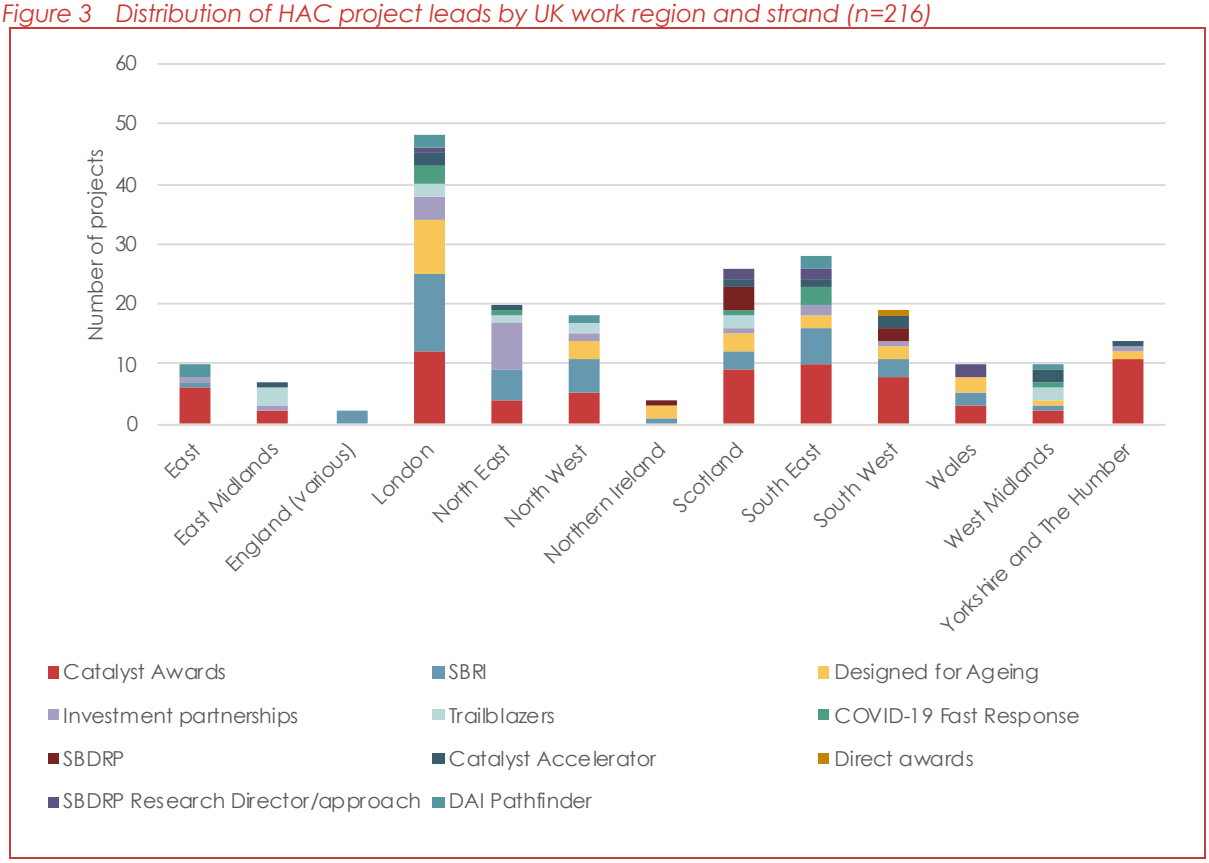
With regard to geographical location, about a fifth of project leads are working in the London area (22%), followed by the Southeast (13%) and Scotland (12%)(Figure 3). About a third of the Design for Ageing and SBRI awards are being led from London.

Out of £79.2M of HAC funding (based on the original amount requested in the grant application) spent in specific regions of the UK (excluding projects covering international and multiple English regions), London and Scotland each account for about a fifth of the funding (22% and 20% respectively, Figure 4 bars). However, when normalised to the regional population (Figure 4 blue line), the distribution is more even with Northern Ireland and Scotland accounting for a larger proportion of the funding compared to their population.

The greater representation of organisations from London and the Southeast among project leads may be a reflection of the distribution of organisations in the wider sector. Data from keyword-based web crawling approach to identify organisations relevant to healthy ageing in the UK shows that 38% of the organisations identified are based in London and the Southeast (Figure 5). In terms of HAC's community of interest (i.e. social media followers, unsuccessful applicants, conference attendees and community of practice organisations that have not received HAC funding), the largest number of organisations were also based or registered in London. The numbers in the figures above also show that the Challenge not only has presence in most UK regions in terms of project participants, but it has also successfully engaged a wider community across the UK. It should be noted that while some organisations will be dedicated to healthy ageing related activities, for others healthy ageing activities may form a small part of what they do.

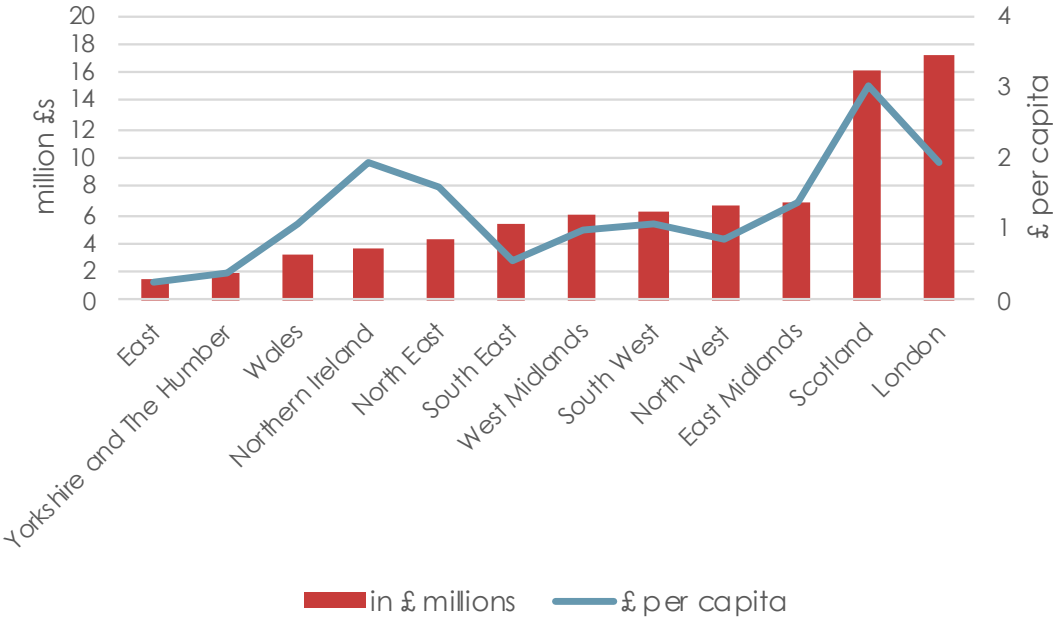
[6] These are not unique organisations and involve some double counting.

Figure 3 Distribution of HAC project leads by UK work region and strand (n=216)



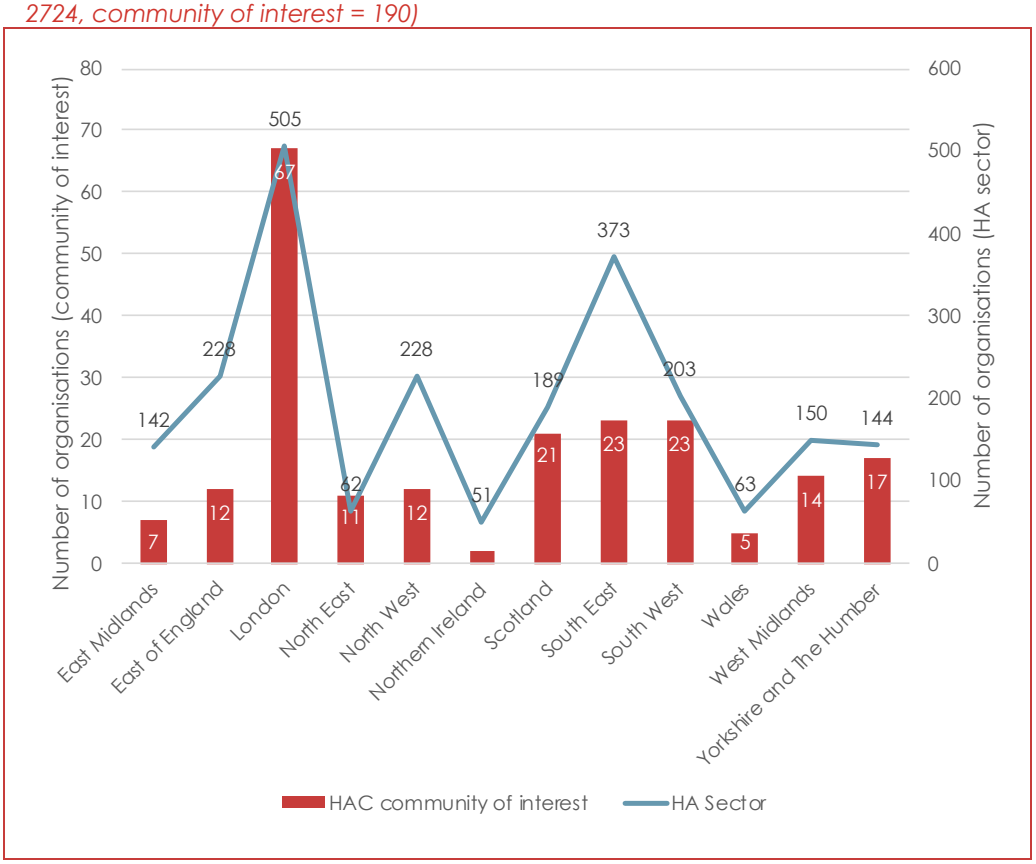
Source: UKRI Social Gradient Source data. N.B. Organisations that lead or partner on more than one project are double counted to account for HAC award numbers.

Figure 4 HAC funding allocation by work region (n=214)



Source: UKRI Social Gradient Source data

Figure 5 Geographical spread of organisations involved in the healthy ageing sector (whole sector n = 2724, community of interest = 190)



Source: Technopolis analysis of glass.AI data. Data includes all organisations identified (core, peripheral and wider sector organisations). Total of 499 organisations were not tagged with geographical data and were removed.

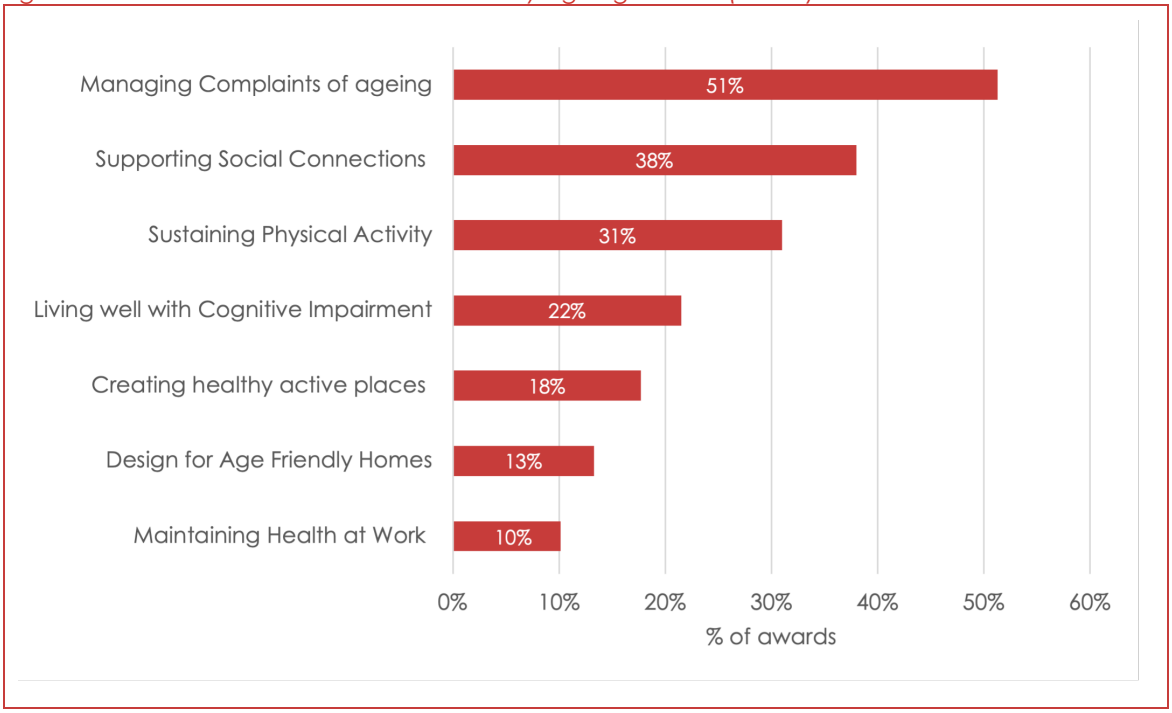
Survey respondents provided information on the UK regions in which HAC projects and their HA solutions are being delivered. Similar to the HA sector as a whole and HAC participant organisations, most solutions are being delivered in southern England (see Figure 17). However, although over 40% of the survey respondents' organisations were based in southern England (including London, see Figure 16), only around 30% of HA solutions are being delivered in this region, indicating the solutions are being deployed in regions beyond organisations main location(s). Survey respondents also noted that some solutions are being deployed (or planned to be deployed) at national level (n = 5) and at international level (n = 3). It should be noted that the survey response rate was 39% and hence the data may not be representative of all projects.

3.5 Thematic area

The HAC is spread across seven healthy ageing themes used by the HAC programme management team to tag projects with to highlight their areas of focus. One award may be tagged to multiple themes. Just over half of the tagged awards (51%, 81 of 158) are related to 'managing common complaints of ageing'(Figure 6). About a third of the projects concern 'supporting social connections' (38%, 60 of 158) and 'sustaining physical activity' (31%, 49 of 158).

Please note that not all projects have been tagged so this distribution does not represent a comprehensive map of the HAC portfolio in terms of healthy ageing themes.

Figure 6 Distribution of awards across healthy ageing themes (n=158)



Source: UKRI AirTable data

Among the HAC participants (leads and partners) who answered the survey, 'supporting social connections' accounted for 52% of the responses followed by 'sustaining physical activity' (44%) and 'creating healthy and active places' (34%). 'Maintaining Health at Work' (14%) was associated least frequently with HAC projects represented in the survey.

3.6 Organisation type

HAC awards involve academic organisations and small and micro enterprises (50 employees or fewer) to a very large extent as both project leads and partners (Table 8). The SBDRP, HA Research Director and Catalyst Awards that are managed by ESRC are led by academic organisations. Awards from other strands are largely led by enterprises. Public service organisations are key partners in Trailblazers and Design for Ageing strands (33%, 28 of 86), which are the only strands where we have comprehensive information about partners. However, the survey indicated that most HAC strands involve some level of participation from the university and the non-profit sector (Figure 7 in the Appendices report).

Table 8 HAC project leads and partners by organisation type

Organisation type	Number of project leads	Proportion of project leads	Number of project partners	Proportion of project partners
Academic	60	40.3%	19	22.1%
Catapult			1	1.2%
Charity	1	0.7%		

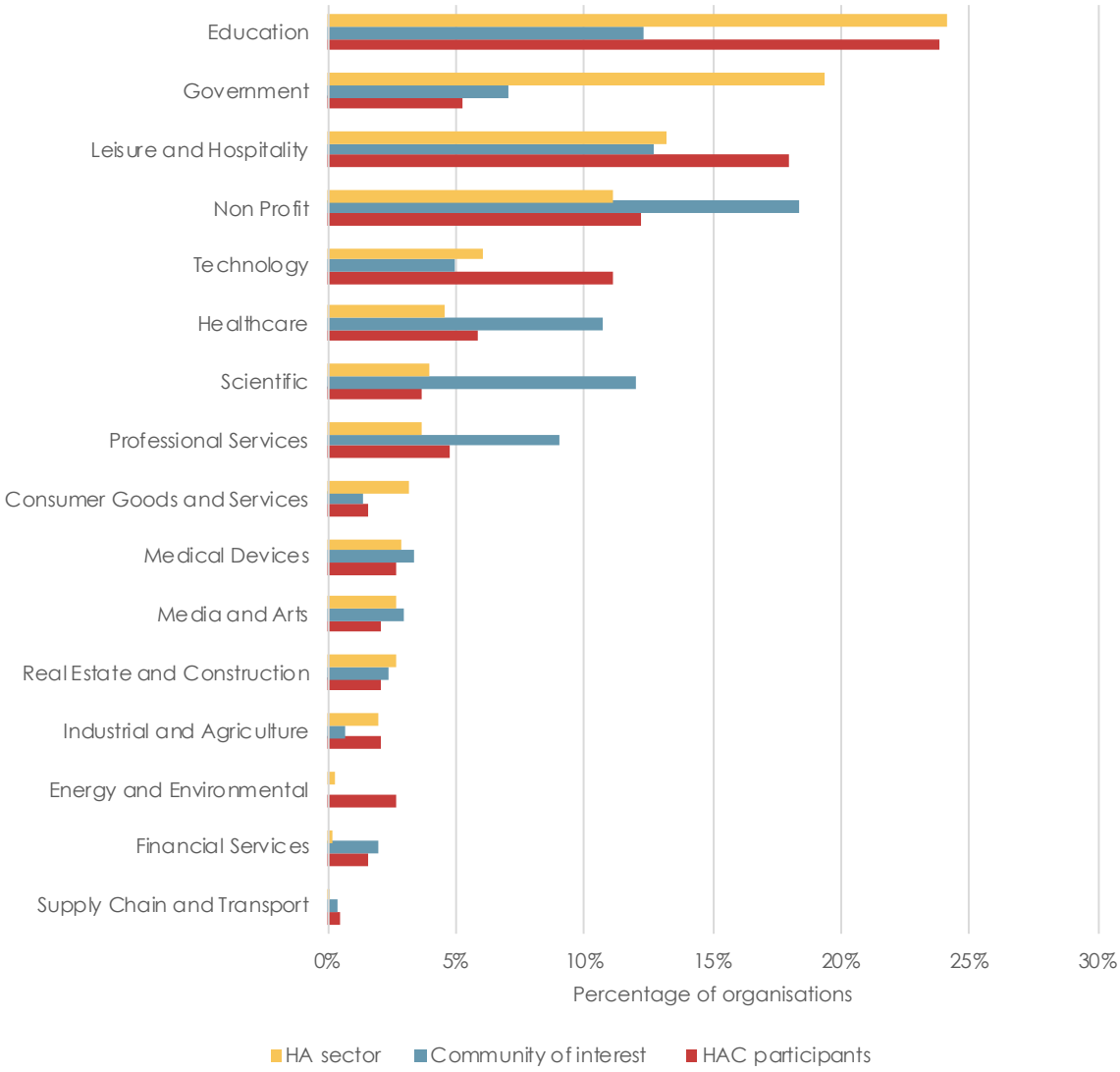
Large enterprise	6	4.0%	10	11.6%
Medium enterprise	3	2.0%	7	8.1%
Micro/Small enterprise	67	45.0%	21	24.4%
Public service organisation	12	8.1%	28	32.6%
Total	**149**		**86**	

Source: UKRI portfolio data. N.B. Organisations that lead or partner on more than one project are double counted to account for HAC award numbers.

The relatively high representation of micro and small enterprises in the HAC portfolio reflects the composition of the HA sector as a whole where 65% of organisations (for which employee numbers are known) fall within this category (Figure 15). Of the HAC project participants (i.e. project lead and partner organisations) and community of interest organisations within the web-crawled HA sector dataset, micro and small enterprises account for 45% and 57% of organisations respectively (Figure 19). Organisations with more than 500 employees accounted for 38% of participant organisations and 26% of community of interest organisations compared to 15% of organisations in the sector as a whole. The higher proportion of large organisations among project participants is probably owing to the high number of academic and public service organisations involved in the Challenge.

The high participation of academic institutions in HAC is also demonstrated in the web-crawled HA sector dataset where the largest proportion of project participants belong to the education sector followed by a similar level of distribution across the government, leisure and hospitality, non-profit and technology sectors (Figure 7). Looking at the absolute numbers, it appears that many UK universities are engaged with HAC either as a participant or in the community of interest. This observation alongside involvement of technology and scientific companies suggests that the Challenge is tapping into the UK's research and innovation strengths. The HA sector as a whole involves a large number of healthcare and non-profit organisations as can be expected considering the health and social care organisations and businesses as well as charities involved in caring for and supporting the older population in the UK.

Figure 7 Sectoral overview of healthy ageing (n = 3031)



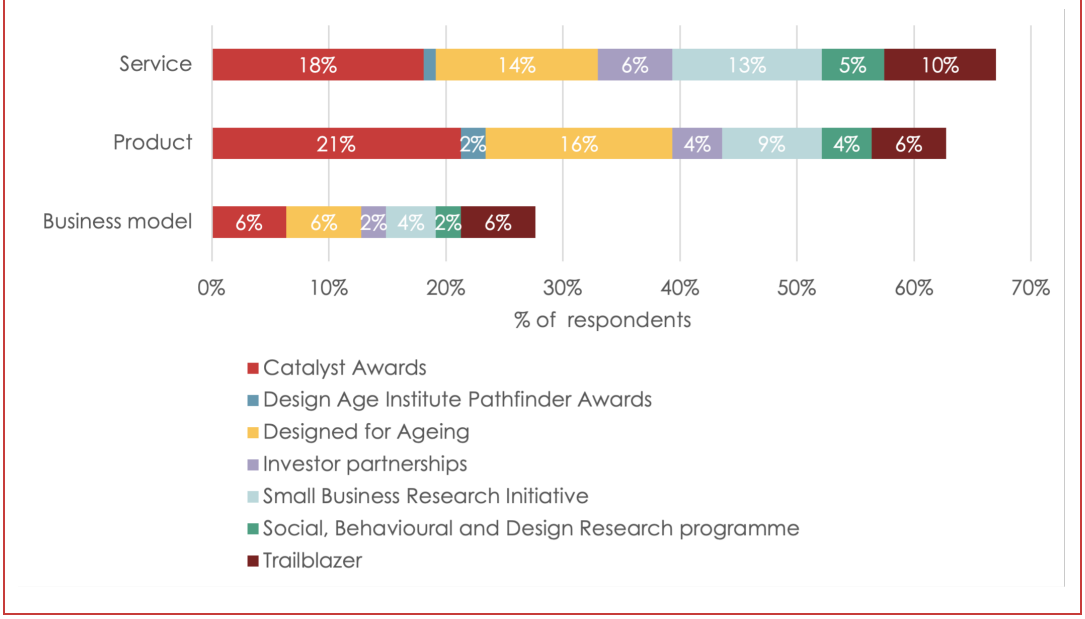
Source: Technopolis analysis of web-crawled data. HA sector includes all organisations identified including HAC participants (n=338) and community of interest (n=274).

3.7 Activities and expertise

Most successful applicants who responded to the survey are involved in developing services (67%) and products (64%) rather than business models (28%). It should be noted however that about a third of the projects and a fifth of the survey respondents are Catalyst Awards. Figure 8 shows the type of solutions being developed by HAC strand. Considering the numbers indicated, it appears that respondents may not have seen a clear demarcation between service and product or that the majority of products being developed are part of a service being delivered by the innovating organisation. Data from the HAC programme team suggests that most solutions (around 80%) are intended to cover a broad range of income-groups including lower income groups. About 10% each cover only the lowest income groups and higher-end innovations.

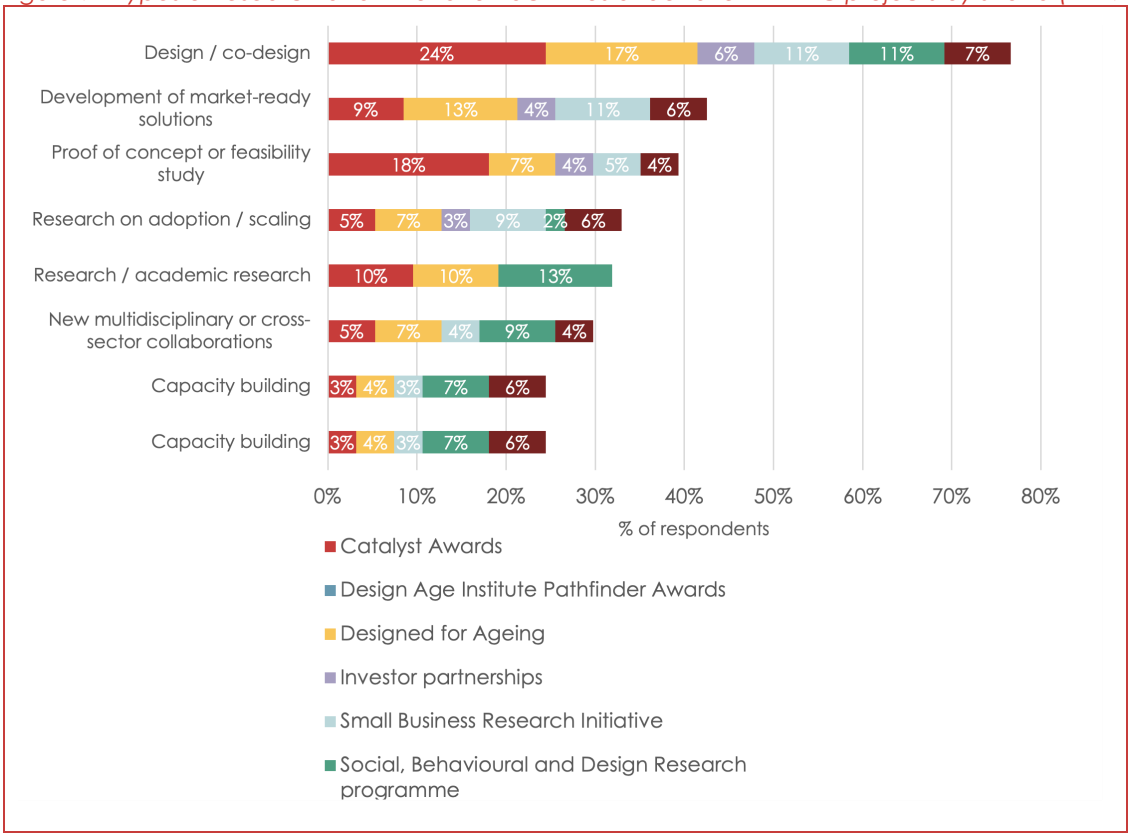
Survey respondents most frequently noted 'Design / co-design' (77% of respondents) as a key R&I activity involved in their project, with 'industrial research' (18%) coming in last (Figure 9).

Figure 8 Types of healthy ageing solutions being developed by HAC strand (n = 94)



Source: Successful applicant survey data

Figure 9 Types of research and innovation activities undertaken in HAC projects by strand (n = 94)



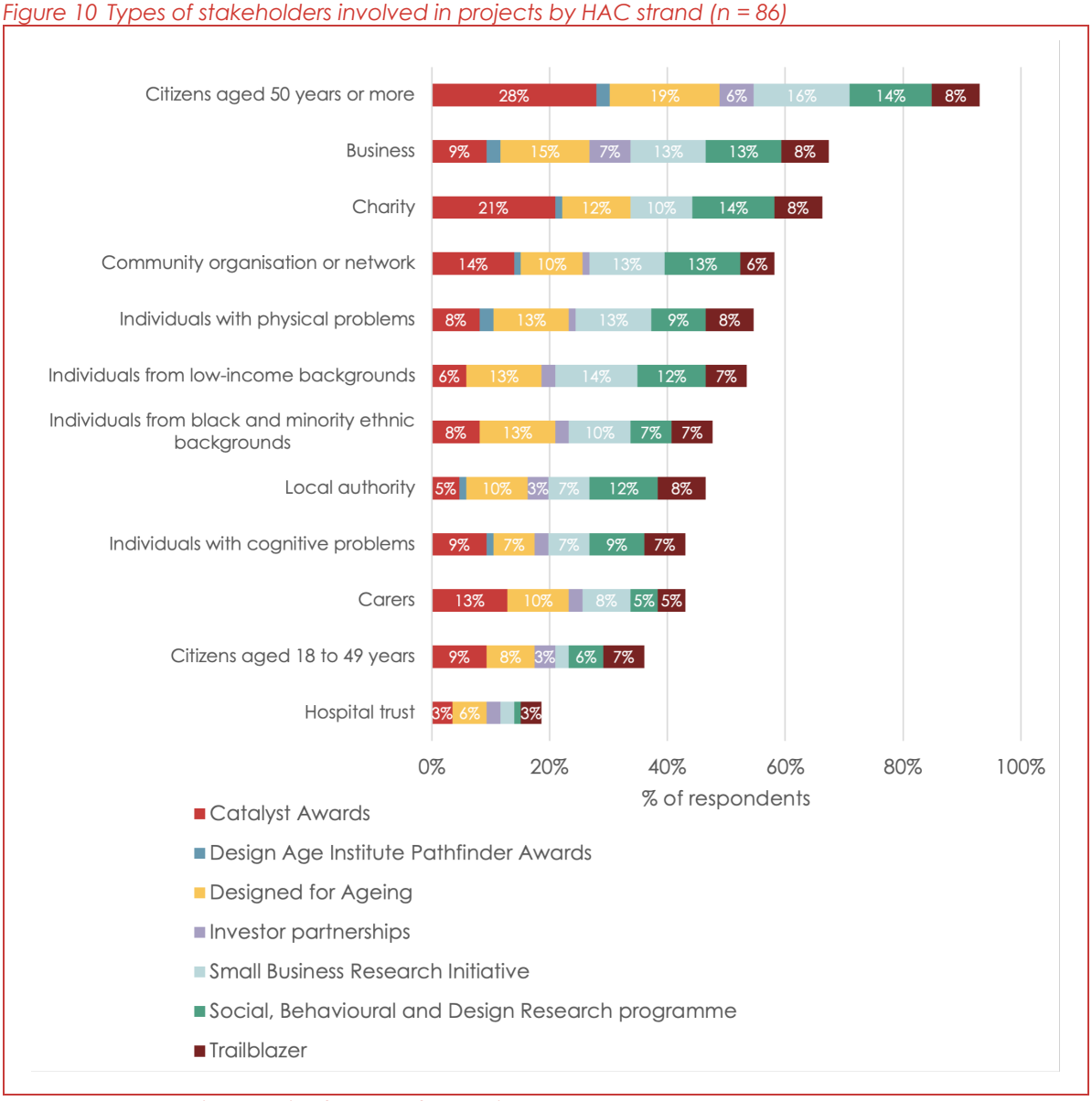
Source: Successful applicant survey data

As expected from the strand scope, Catalyst Awards typically involved design and proof of concept or feasibility studies, while Designed for Ageing projects typically involved design, development of market-ready ready solutions, and research. Notably, SBDRP projects involved research, capacity building and multidisciplinary/cross-sector collaborations to greater extent than all other strands.

When asked about the expertise included in project teams, design, computing and IT, and product development were cited the most frequently (Figure 18).

A variety of stakeholder types were involved in HAC projects according to survey respondents including most importantly citizens aged 50 or more, businesses, charities local authorities and community organisation/networks (Figure 10). In addition, individuals from low-income backgrounds, from black and minority ethnic backgrounds, with physical or cognitive problems were also involved in projects across most HAC strands. Adults under 50 years of age were also included in about a third of the projects.

Figure 10 Types of stakeholders involved in projects by HAC strand (n = 86)



Source: Technopolis analysis of successful applicant survey data

Respondents were also asked to rank the three most important stakeholder types engaged in their project in terms of their importance and contribution to meeting the project objectives (see accompanying Annex report). As expected, the most important stakeholder type for nearly half (48%) of respondents was citizens aged 50 years or over. Overall, 76% of survey respondents selected citizens aged 50 or more among their top three most important stakeholder types followed by businesses (43%) and community organisations or networks (41%).

3.8 Project delivery challenges

Across the input provided mainly by project leads in surveys and interviews, the main challenges encountered in the delivery of HAC projects included:

- **Technical challenges**: Some project leads mainly from the DfA, Catalyst awards and SBRI stands reported technical challenges to design products or services. Most of these challenges were attributed to technology development around software, mobile apps, online platforms and data management. For example, challenges were experienced in designing user-friendly interfaces and adapting solutions considering user feedback. A few DfA project leads reported challenges to implement solutions due to resistance to change from end users (e.g., healthcare professionals).
- **Collaboration challenges:** Some project leads across all HAC stands experienced collaboration challenges in working with subcontractors or engaging different types of stakeholders throughout the project, such as businesses, schools, local authorities and healthcare professionals. Project leads reported that a common challenge was to engage and work with healthcare professionals, due to staff turnover and financial pressures at healthcare provider organisations. This problem led to delays in developing and maintaining collaborations, as well as delayed recruitment of end-users. Challenges in engaging with local authorities and healthcare organisations also posed challenges to implementation and scaling of solutions developed in some HAC projects, sometimes due to resistance to change or limited flexibility to change.
- **Challenges owing to the COVID-19 pandemic:** Many projects across all HAC strands were affected by the COVID-19 pandemic and faced delays in project delivery. A key cause of these delays were disruptions in the recruitment of end-users (e.g. older people and people in care homes) and in-person activities including home visits because of the COVID-19 restrictions. This particularly impacted on co-design activities. Related to organising in-person activities, some project leads from SBRI strand commented that unpredictability of the weather meant events needed to be rescheduled.
- **Administrative issues:** Some project leads from Catalyst Awards and SBDRP award strands reported administrative issues related to processes and procedures involving universities. The issues included delays in hiring project staff, lack of support from technology transfer offices and general administrative problems around approving activities, expenses and contracts. In some cases, projects in the Catalyst award strand were delayed due to difficulties getting ethical approval for the types of approaches being used (e.g. application of AI, testing products in the NHS and home settings). These administrative issues reduced focus on project aims and were burdensome for all parties involved.
- **Challenges owing to level of funding**: Some project leads from the Catalyst Awards, DfA and SBRI strands noted challenges stemming from what was in their view the low amount of funding available. Issues reported included high staff and contractor turnover due to low day rates, lack of capacity to conduct certain activities and high pressure on project staff.

- **Challenges owing to HAC award timeframes**: A few project leads mainly from SBRI and Catalyst awards strands reported challenges around HAC award timeframes. This led to difficulties in mobilising stakeholders and establishing ways of working and building trust and buy-in, and impacted on the type of data that could be collected and ability to respond to learnings and make changes to the projects.
- **Capacity issues:** Some project leads mainly from the SBRI, DfA and Catalyst Award strands mentioned challenges with recruiting staff with relevant expertise, such as software developers and business managers.

4 Impact

4.1 Outputs

4.1.1 New knowledge outputs

Over 60% of survey respondents (successful applicants) indicated their projects have led to new results or learnings (n = 55), but 36% of respondents indicated there are no results or learnings yet, as their projects were still ongoing (n = 32). Outputs typically included establishment of proof of concept or feasibility, datasets, educational resources for stakeholders and publications among others. These outputs covered a wide range of HA topics, such as loneliness, medicine management, rehabilitating exercises, hearing loss, mobility issues and menopause. New datasets, for example, validation data obtained for a knee exoskeleton prototype and a computational method to extract information from excreta were also reported as examples of new outputs from Catalyst and SBDRP awards.

Case study: Supportive environments for physical and social activity, healthy ageing, and cognitive health (SPACE)

The SPACE project (**S**upportive environments for **P**hysical and social **A**ctivity, healthy ageing and **C**ognitiv**E** health) is a £1.6M UKRI funded interdisciplinary research collaboration led by Queen's University Belfast. The project aims to understand how the physical, natural and social environments where people live, such as town and cities, impact brain health, in particular cognitive impairment and dementia.

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 policymakers in an online platform, the SPACE Geoportal[7]. The project data has also been linked with the Gateway to Global Aging data, a global database for cross-country analysis on ageing[8], which will enable new avenues of research and broaden the project's future impact beyond the UK.

While the final project results are not yet published, researchers have conducted several knowledge dissemination activities with policymakers, industry and citizens, to promote development of policies for preventing cognitive health decline. Regular discussions are taking place with authorities in Northern Ireland to ensure emerging project findings are considered in future policies, such as the Making Life Better strategy and the next iteration of Northern Ireland's Climate Action Plan and Architecture and Built Environment Policy.

So far 135 publications have emerged from HAC by March 2024, mostly from the university-led Catalyst Awards and SBDRP projects, which are also more geared towards early-stage research. Of the 135 publications, 59 are journal articles and 38 are conference abstracts or proceedings. However, it should be mentioned that with most projects led by non-academic organisations and involving product/service development, publications are not expected from all projects.

4.1.2 New Intellectual Property

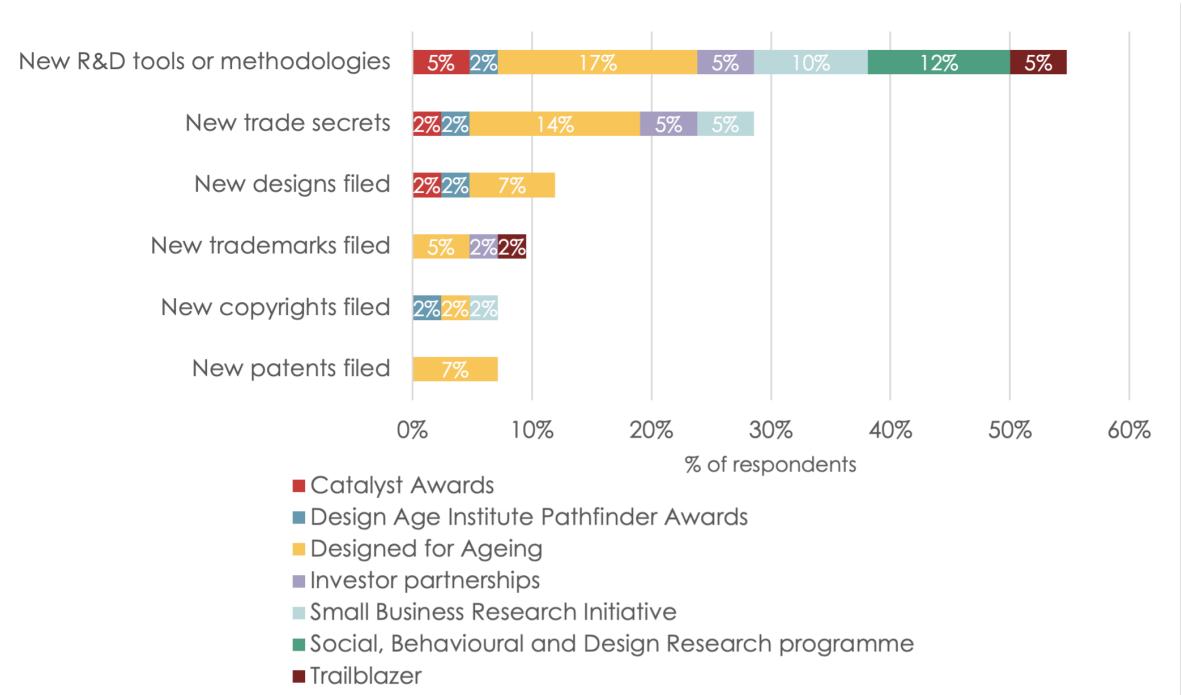
Early evidence, where available, indicates that project teams are beginning to register intellectual property (IP), and have developed know how, trade secrets and new R&D tools and methods that can be protected in the future. The number of projects which reported that

[7] SPACE Geoportal (2024). For Health and Environment Research, Policy and Action. Available at https://space-geoportal-queensub.hub.arcgis.com.

[8] Lee, J. *et al.* (2021) 'Gateway to Global Aging Data: Resources for Cross-National Comparisons of Family, Social Environment, and Healthy Aging', *The Journals of Gerontology: Series B*. Edited by D.S. Carr, 76(Supplement_1), pp. S5–S16. Available at: https://doi.org/10.1093/geronb/gbab050.

they have developed IP varies by topic and strand (see Figure 11). It should be noted that IP protection or registration may not be relevant for certain types of innovations, e.g. service development or apps.

Figure 11 Intellectual Property developed as a result of HAC-funded projects by HAC strand (n = 42)



Source: Survey of successful projects

Seven Designed for Ageing projects reported significant pieces of IP which they had produced over the course of the grant. While some companies indicated that their IP, such as a patent on software, pre-dated the challenge, they also underlined that this work had been progressed and updated over the course of the HAC grant. Investment Partnerships reported new IP including new trade secrets, methodologies, and a trademark, while SBRI projects reported six new R&D tools or methodologies and four trade secrets. Self-reported examples of IP developed are described below.

- From Designed for Ageing Projects:
  - A copyright for an active wellbeing brand in addition to new design registrations for the organisation's healthy ageing products
  - A company's new design for a wearable device capable of computer vision-aided navigation and a patent for a posture-sensing system for a smart chair
  - A wearables company indicated that they are in the process of patenting their innovative combination of electronics and clothing in addition to protecting the algorithms they are currently developing
  - A trademark for a lighting system and its constituent lighting control panels, sensor systems, acoustic meters and alarms
- From SBRI
  - A copyright for a virtual cognitive stimulation therapy tool

- A real-time assessment tool and curated dance programme which has become a core part of the company's offer

- From Catalyst Awards
  - IP related to storytelling games for social connection to older people
  - Registration of design (in process) for developing soundscapes through Internet of Things (IoT) devices
  - New methodologies to establish the software needs of visually impaired users and the corresponding machine learning and computer vision models that are needed to deliver them
- From Trailblazers
  - The Peoplehood project has developed a house and agile design guide that could be used by others for designing age-friendly homes.

WeWALK: Developing a Self-Calibrating Navigation System to Address the Orientation Challenges faced by Older People with Visual Impairment

WeWALK is a company developing innovations to enhance the mobility of older people with visual impairment. The company have reimagined the traditional white cane by developing a 'smart cane' aimed at increasing user safety, confidence and mobility.

WeWALK received funding from two HAC awards, namely from the Investment Partnership and the Design for Ageing strands. The HAC funding allowed the company to develop a prototype, conduct user-testing activities, developed new user interface and new trade secrets on interface design and software functionally. While the project is still ongoing, the funding supported WeWALK to transition from an idea to a user-tested prototype. In addition, project partner Imperial College London has benefitted from involvement in the project, with PhD students gaining knowledge about computer vision models and awareness about the needs of visually impaired individuals.

4.1.3 Healthy Ageing products and services de-risked for follow-on funding

Through the Challenge, project teams were expected to develop their solutions, bringing them closer to readiness for piloting and then wider use. This includes developing novel proof of concepts and prototypes which undergo validation. This provides greater certainty that projects will continue to progress towards market-ready products and services, which, in turn, have the potential to grow a user base and realise health and social benefits.

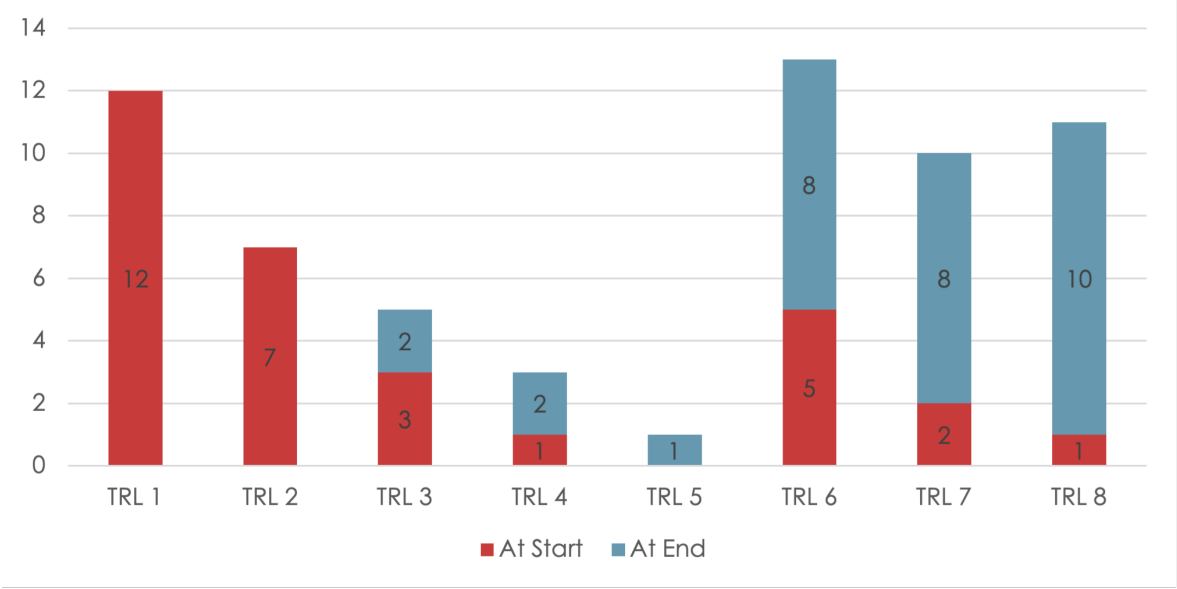
Where evidence is available, it indicates that, in general, from project start to timepoint of providing evaluation survey response, project teams have developed their products from a lower to higher technological readiness level (TRL)[9]. However, there is a high degree of variation in the TRL of project innovations at the point of application for HAC funding, the TRL at project end and indeed the increases in TRL. This high variation corresponds to the variety of projects even within each funding strand. Across the 31 respondents from across the strands (Figure 12), the average TRL increase was over 3.6, while the average leap for projects starting at TRL=1 was just under 5. Substantively, this means that on average, projects starting at the ideation/planning phase (the most common among survey respondents) managed to reach a working prototype (TRL 6). The 5 project respondents which applied for funding with an

[9] Technology readiness levels (TRL) are a type of measurement system used to assess the maturity level of a particular technology. See for example: https://www.ukri.org/councils/stfc/guidance-for-applicants/check-if-youre-eligible-for-funding/eligibility-of-technology-readiness-levels-trl/

innovation with at TRL 2 reported a marginally lower average TRL progression reaching a similar average of TRL 6 at HAC project end. The following sections provide a breakdown of TRLs identified for the Designed for Ageing, SBRI, Investment Partnerships and Trailblazers strands.

Of projects under the Designed for Ageing strand, only two of the survey respondents indicated that they had a fully commercially available service or product (TRL 8), with both projects having started the project with a fully working prototype (TRL 6). Nevertheless, the majority of Designed for Ageing respondents exhibited significant technological development with some projects progressing from the ideation phase (TRL 1) to beyond the prototype phase and to scaling (TRL 7). Among the set of projects with more mature existing solutions, some indicated that the challenge enabled them to adapt and curate a more general working prototype to a specific HA target market. Others reported that deploying more resources during the pre-commercialisation phase through more extensive research has ultimately resulted in a product that is more valuable and feasible to scale.

Figure 12 Self-reported Technology Readiness Level (TRL) at the point of application for HAC funding and the end of the respective HAC projects (n = 31)



Case study: Smplicare

Smplicare is a start-up developing technology to enable older adults to maintain independent, active lives for longer. The company uses commercially available wearable devices to provide a self-managed solution for people to improve their health and digital literacy, and to encourage physical activity.

Supported by funding from the Designed for Ageing programme, Smplicare progressed an early-phase prototype to a near-to-market product. The Design for Ageing programme structure, with its focus on user-centred design, has provided a unique opportunity for the company to deliver an ambitious research programme with around 40 partners, and test the innovation with 300 older adults from across the UK. This enabled them to develop an algorithm and a product that is suitable for a diverse range of older adults – not just affluent and digitally literate populations.

Funding from UKRI has enabled the company to develop a product that is accessible and affordable to lower socio-economic status groups. The future potential of the company to continue to focus on this target audience will be dependent on access to further funding to enable them to remain

commercially viable, and to keep developing their solution to maximise the longer-term health benefits for users.

Of the five respondents to the survey from the Investment Partnership strand, all showed significant increases in the maturity of their innovation including three projects which have reached TRL 7. Just one project was yet to reach TRL 6 and the stage of a working prototype over the course of the project.

Nevertheless, some project leads emphasised the importance of the timing of the grant funding in their solution's development in that their existing prototype had already received enough commercial traction to make it potentially viable but full development still likely posed too much risk to the company's longevity without Innovate UK support. Another company indicated that the funding helped them accelerate their entry into the sector which they had begun to explore with a healthy ageing adaptation of an existing product.

The starting TRL of the SBRI survey respondents was mostly at the design and ideation phase, albeit with a small number of exceptions, such as a local development trust who started the challenge with a functional mobile app which has increased its regular user numbers to 600 as part of the Challenge-funded activities. Each respondent was able to progress the readiness level of its innovation with eight projects reaching TRL 7. In fact, one of these projects started the challenge at TRL 1 and finished the challenge with a fully functioning matchmaking platform for miscellaneous services provided by older people and a dementia training support service.

All of the three survey respondents for Trailblazer projects reported increases in TRL albeit at opposite ends of the scale with one project even progressing from TRL 1 to 7. A project led by a local sports and physical activity authority managed to develop a fully developed health checks programme with resources which staff can use, moving from concept (TRL1) to tested innovation (TRL5).

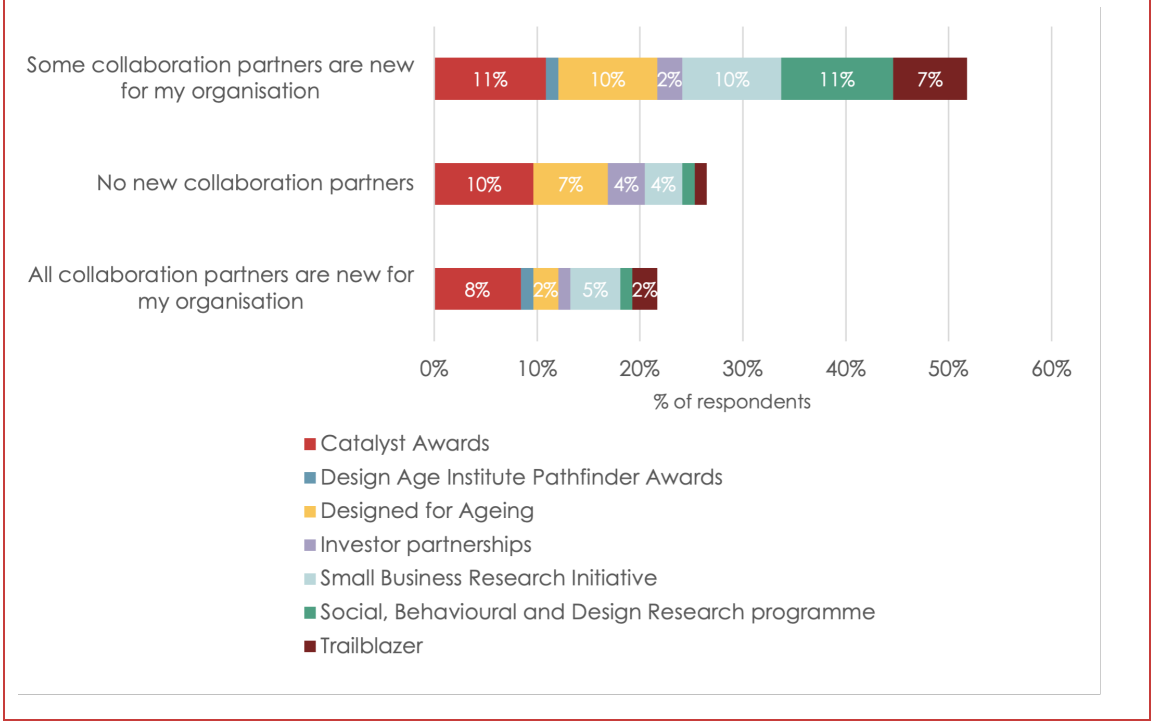
18 projects on the Catalyst funding strand completed the survey. The strand consists of university-based project teams which are conducting research and development for a variety of technologies including immersive tools and experiences, and wearable devices. Half of the project teams which provided responses were at the very start of designing their innovation while other project teams ranged from an initial design to a working prototype. Examples of projects which are progressing to higher TRLs include an AI-based storytelling game which encourages social connection, a wearable device for managing lymphedema, a smart home lighting system for improving sleep quality in people with dementia and a sensor for early diagnosis of diabetic foot ulcers. This indicates that the project teams have developed mature prototypes suitable for testing. Survey responses for three SBDRP projects indicate that on average innovations progressed from TRL 0 to TRL 1, that is a new innovation being designed.

4.1.4 *New collaborations*

Survey responses indicate that about three-quarters of the HAC projects represented in the survey sample involve at least some new collaboration partners (Figure 13). Just over a fifth of the projects in the survey are entirely new collaborations. Catalyst and SBDRP strands involve new partners to the greatest degree likely owing to the requirement for collaboration between universities and other sectors, especially businesses.

Submissions under the collaboration dimension in Researchfish® provided further information on collaborative partnerships – local or international, with academic or other sectors – for Catalyst and SBDRP projects that made submissions in 2023. A total of 26 awards provided details on 152 different collaborations i.e. a mean of 5.8 collaborations per award. Most collaborations were with the private sector (43%), followed by the charity/non-profit sector (28%) and Academic/University sector (18%). Collaborations occurred with partners or organisations in 10 different countries. Most of the collaborations were with partners or organisations in the United Kingdom (n=130). Five collaborations were reported for the United States and two for Ireland. One collaboration each was reported with organisations in the Denmark, Netherlands, France, and Sweden in Europe and in Australia, India, and Japan overseas. Age UK was the top collaborating organisation with four collaborations through its regional nodes.

Figure 13 Involvement of new collaboration partners in HAC projects by HAC strand (n = 83)



Source: Survey of successful applicants

4.1.5 *New and improved skills*

According to survey respondents, participation in HAC projects has vastly contributed to improvement in skills and knowledge, with 80% of respondents noting that they improved various skills at least to some extent (Figure 14). Knowledge to undertake HA research and understanding of market needs and opportunities were improved to the greatest extent. The

latter was also commonly noted as a key capacity building area by interviewees across strands.

In addition, project teams in each of the funding strands developed skills through both active training approaches as well as exposure to project delivery, with some early career researchers learning more about project management approaches. Other skills picked up include technical know-how, delivering technical content, community and user engagement, business development and fundraising, scaling, and approaches to co-design. Gaining new skills can allow researchers and team members to take on new or expanded roles, and better consider how their research could be applied and commercialised. Examples of activities include:

- As a result of the Active Lancashire project (Trailblazers) nearly a hundred leisure staff across Lancashire have been trained to deliver health checks to NHS standard.
- Tribe (Trailblazers) enabled Carers UK to develop online capability and provided the opportunity for them to develop relevant and concise courses for carers.
- Bia (Catalyst) was able to train an academic team in broader topic areas, including sharing learning about co-design, product design and developing greater awareness of how to commercialise research.

Multiple SBRI projects set up training programmes or train-the-trainer models to train up staff and support with scaling. This included Active Families North East, Golf in Society and Civic Dollars.

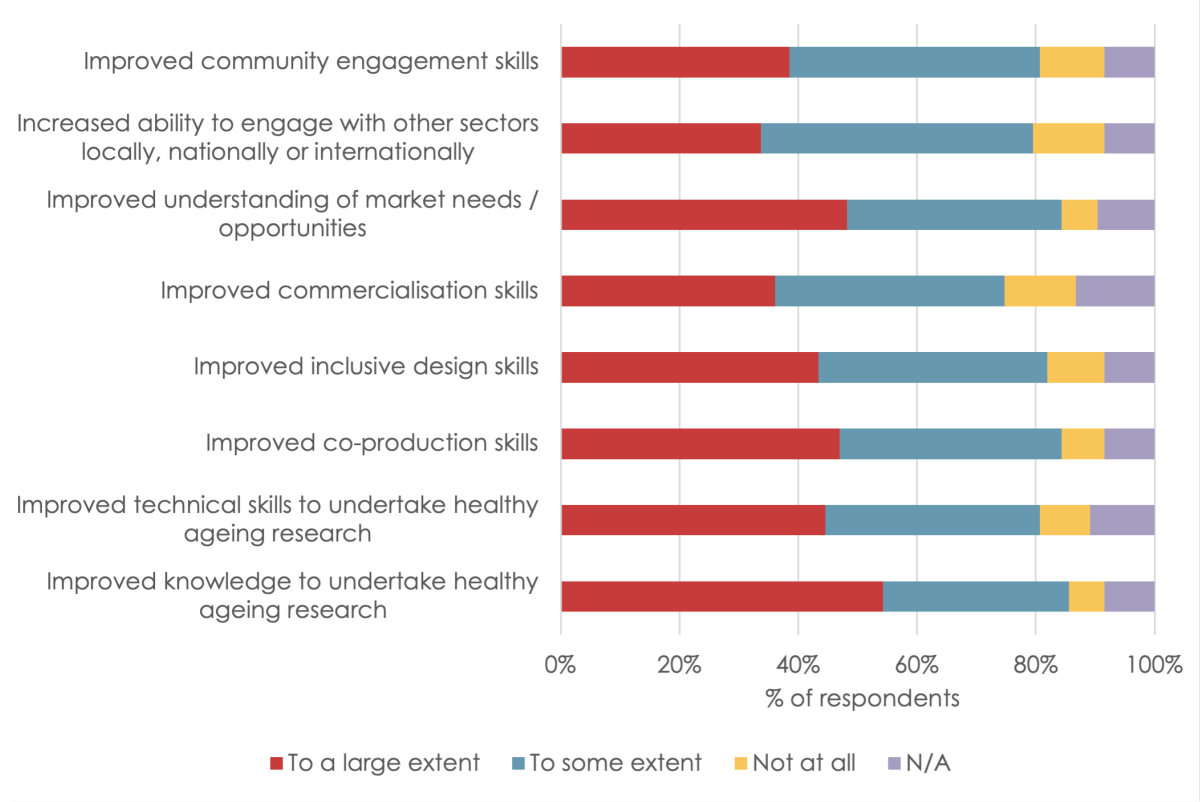
Survey respondents also shared their perception with regard to capacity building achieved for stakeholders engaged in HAC projects (Figure 15). In their view, stakeholders had increased interest and capacity to engage in HA research and innovation and greater interest in and capacity for adoption new HA solutions.

The Tribe project: Bridging healthcare inequalities with digital technology

The Tribe project is a social action initiative to upskill members of the community within areas of high inequality to become 'micro commissionable' care entrepreneurs. The aim is to directly address inequalities in local and national care and community support through the creation of a trusted digital platform to match local care needs with thousands of 'tribes' of local solution providers able to deliver adult social care where it is needed.

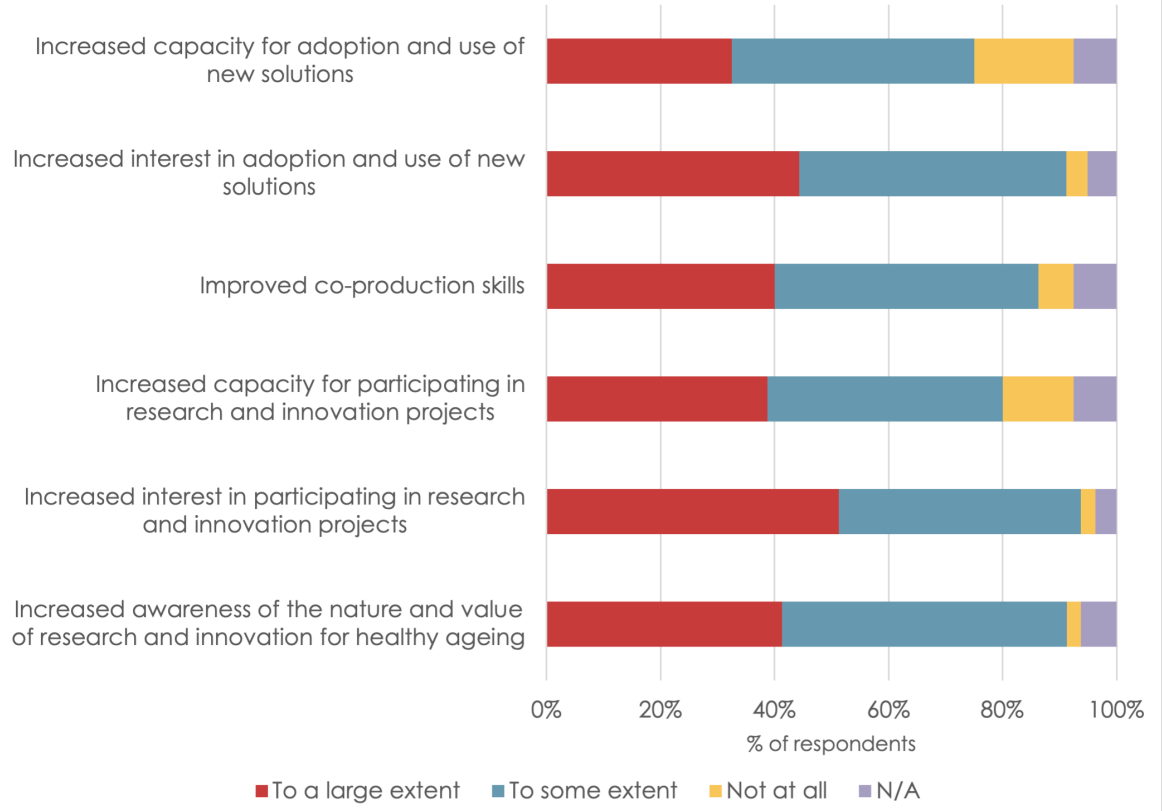
The Tribe platform is powered by machine learning and artificial intelligence and able to identify unmet community support needs by mapping data from multiple datasets. While the project is still ongoing, the platform is active and being tested in multiple areas of England across Shropshire, Dorset, Essex, Suffolk and North Yorkshire. The Tribe project has received national and international recognition from the United Nations and the World Health Organization for its innovative approach to addressing health inequalities. Tribe has supported creation of new micro care business within hard to reach and deep rural areas. There are now over 50 Community Micro enterprises on-boarded to Tribe and a further 100 in the pipeline.

Figure 14 Extent to which HAC projects contributed to capacity building (n = 83)



Source: Survey of successful applicants

Figure 15 The extent to which HAC projects contributed to capacity building for stakeholders engaged (n = 82)



Source: Survey of successful applicants

4.2 Outcomes

4.2.1 Citation impact

Baseline analysis shows that UK (and UKRI as a funder) is a leader in HA research as evidenced from publication volume (2nd among 14 most publishing countries in this field), weighted CiteScore (3rd), publications among the 10% most highly cited publications in the field (3rd), share of papers cited in policy documents (2nd), share of papers cited in patents (5th) and share of papers cited in publications from private sector authors (2nd). UKRI publications perform better on most indicators compared to the UK as a whole indicating the high relevance and quality of HA research funded by UKRI.

Of the 49 publications that emerged from HAC in 2023 (based on Researchfish data from March 2023, PCFs and survey responses), only 20 peer-reviewed publications were found in Scopus to enable calculation of citation impact. Due to the limited number of HAC-supported papers, and because most citation-based indicators cannot be computed for 2022 and 2023 (two years preceding the year of analysis), it is difficult to get a preliminary estimation of the citation impact of HAC. Moreover, any change observed for the UK and UKRI moving from the baseline to the HAC period cannot be attributed to the HAC at this stage since the 20 HAC-supported papers represent too small of a contribution to possibly and meaningfully influence

the scores of the UK and UKRI who, respectively, published roughly 25,000 and 5,000 HA publications over the 2020–2023 period (see separate Annex report).

4.2.2 *New knowledge*

Most new knowledge and insights discussed by survey respondents and interviewees involved learnings from product and service design activities as well as user/stakeholder involvement. The project findings and co-design activities helped to conceptualise solutions and identify challenges, opportunities and emerging areas. Participants also improved their technical knowhow, particularly around developing technology and prototypes for HA solutions.

Case study: Brain in Hand – scaling support for autistic adults to enable independence

Brain in Hand is a company that combines digital tools and on-demand human support to help people with autism achieve more, manage the day-to-day and reduce anxiety. Users are typically neurodivergent or are living with anxiety-based mental health difficulties. Supported by the Investment Partnership strand of the HAC, Brain in Hand conducted a project to expand and enhance their pre-existing service to older audiences and to explore how their service can be used in workplaces.

The project's feasibility study received encouraging feedback on the potential of introducing their service into the workplace sector. This has led to a strategic shift towards this sector for adoption and sales, and away from the health and social care sector. HAC funding enabled the company to accelerate growth and reach more users. Their user demographic is changing from predominantly students aged 18 to 25 to workplace users ranging from 16 to 65 years old.

4.2.3 *Healthy ageing and social benefits for participants*

The results produced by projects funded through the Challenge are eventually expected to contribute to health and social benefits, particularly for UK residents of older age, such as improved physical and mental wellbeing, quality of life and social connections as well as older people remaining independent and active for longer. In turn, these benefits should translate to cost savings for health and social care services as well as continued labour market participation.

There is early evidence to suggest that the Challenge can contribute to healthcare savings or health benefits, however it is likely that healthy ageing benefits and savings will take a longer timeframe to materialise beyond the present evaluation. At the point at which interviews with projects took place, from October to December 2023, several project teams were still in the process of commissioning or undertaking research on health benefits.

While much of the project-level evaluation work is still ongoing, some of the participants have identified meaningful findings regarding health outcomes with corresponding benefits:

- Music in Mind (SBRI) reported a 90% drop in agitation amongst their beneficiaries. Music in Mind estimate that the wider system savings from reducing agitation are around £60,000 a year per individual
- Aesop's Dance to Health project (SBRI) reported a 96% improvement in mental wellbeing with a similar percentage of participants indicating that they were more physically active. 600 older people had reduction in falls, improved mental well-being, increased physical, activity and socialisation
- Civic Dollars (SBRI) recorded an 8.5% increase in health and wellbeing over the course of the grant, through a 24-point survey measuring participant physical and mental health and wellbeing at three-monthly intervals. The project team is currently working with the Ulster University to develop an economic case using the longitudinal data collected.

- Cricketqube (SBRI) found through surveys of its age 50-plus user group that 40% of participants reported less depression, 86% are happier after the sessions and 57% said that they were more relaxed. Around 100 individuals noted improved happiness levels and significantly reduced GP visits
- Brain In Hand (Investment Partnerships) conducted an early study with 99 participants which reported significantly improved quality of life, reduced anxiety and reduced self-injury behaviour.

Other examples of social or healthy ageing benefits emerging from HAC-funded projects include:

- More than 4,000 users of a digital platform reported improvement in energy levels, exercise frequency and several mental health metrics (Holly Health, DfA)
- Healthy ageing solution (n = 3,000; E.ON, Trailblazer) deployed in 1,500 homes indicates older adults have become more independent
- Improvements to social connection and reduction in feeling of loneliness reported by 125 older people during pilot stage of a project on intergenerational connections (InCommon Foundation, SBRI)
- A new model of care delivery supported over 275 older people and their families (Bellevie, Investment Partnership)
- Approximately 200 older people benefited from integrated care solution which improved connectivity, enhanced individual autonomy and overall quality of care (Cross digital, DfA)

4.2.4 Adoption and scaling

Evidence gathered suggests that the majority of projects across the Challenge are still at a pre-commercial stage. This has meant that in many instances the Challenge funding has enabled projects to pilot or deploy their product at a small scale, either in a small number of settings or with a small initial group of users. For instance, multiple projects told us they are running pilots in one or two local geographies with up to 100 users. However, some projects have successfully demonstrated adoption beyond an initial user base. For instance:

- On the Designed for Ageing funding strand, a digital app and coaching support (Holly Health) to help people create longer-term habits – with a focus on people in their 50s, 60s and 70s, has recently scaled up to use by some 170 GP practices across the UK.
- On the COVID Fast Track funding strand, a project (Mobilise Care) to develop an online platform from carers has grown an online community of some 75,000 carers
- On the SBRI funding strand, a Northern Ireland-based digital currency and application (by Upper Springfield Development Trust) which provides users with incentives to participate in community activities has 1,000 downloads and 500-600 active users. A further project (Golf in Society) which uses golf to help people with comorbidities and neurological conditions now operates in 23 golf clubs across the UK
- On Catalyst, a project (Squiboon) to develop augmented reality enabled Storytelling, to help improve social connection for older people has been in use by 2,580 older adults and seven organisations

Projects operating at a small scale are also still in the process of exploring wider markets and developing a sustainable revenue and business model. This has meant that each has explored potential markets or customers of interest for their product, such as early conversations or presentations with local authorities or government representatives.

Projects are targeting a wide range of users, which includes government, local authorities, NHS organisations (including GP practices or Primary Care Networks, NHS Trusts, and Integrated

Care Boards), employers, insurers, other businesses such as care homes and leisure centres, and older people themselves. Some projects which operate as platforms between users and business partners or sponsors are also aiming to scale among both groups. Scaling each project has different meaning and can involve targeting the same organisation in different geographic areas, developing additional services to a wider group of people in the same area, or expanding to additional customer groups and markets.

Challenge participants noted that they are now better able to consider how they encourage adoption and scale, by conducting user research. Among some partners, participating in Challenge projects has enabled them to think about scaling and commercialisation where they were not previously used to. This is leading to a higher degree of confidence to scale among some project teams. Activities underway to test the product help create confidence in expanding more widely. One project team described how getting their 'foot in the door' with one NHS Trust led to easier conversations with others, resulting in growing product acceptability. Some funding strands explicitly build in activities or requirements that encourage project teams to improve the potential to spread and scale. For instance, Designed for Ageing projects undergo a structured design process, with user-centred design activities and a project 'stage gate' to assess that sufficient user engagement has taken place. This helps project teams to consider their user base and work on user acceptability. The Challenge has enabled teams to set up new partnerships, which provides additional stakeholder groups and routes through which projects can scale their work, explore commercialisation opportunities, and undertake digital and technical product development outside their previous capabilities.

While there is no extensive evidence across all project teams to confirm current successes in scale and adoption, which is associated with the early stage at which most projects are operating, there are some notable examples. For instance, Squiboon received Catalyst funding to develop storytelling games for social connection and reminiscing by older people. It is now in use by 2,580 older adults and seven organisations. The company has goals to benefit 50,000 adults in the next three years.

Some types of projects are more challenging in nature to scale – for instance, physical activity projects – while others, for instance, digital communities of practice have demonstrated much more rapid scalability. The cut-off for funding is a common issue raised by interviewees across multiple funding strands including SBDRP and Designed for Ageing. As most projects will still be exploring commercialisation options at the end of the Challenge, this poses uncertainty as to how they will go on to scale their product.

The most established project teams we spoke to have actively explored and made achievements in scaling their product or service internationally. Some have raised that since the Challenge began, they have been invited overseas to present on the product they have developed. For instance, in Hong Kong, Japan, Saudi Arabia, Sweden and Taiwan. Discussion with expert stakeholders demonstrates that there is a high awareness in these countries of the challenges they face with respect to an ageing population. Many of these countries have advanced work underway to address a range of healthy ageing topics. Interviewees have mentioned speaking at local and international conferences, pop-ups, and UK trade delegations. Trailblazer projects such as Tribe have spoken at multiple overseas healthy ageing events and with foreign governments. Some projects, such as WeWALK have shared new versions of their product, developed through the Challenge, to a pre-existing user base in 59 countries.

While there is not a more thorough estimate of the potential for revenue for UK-based companies from international expansion, these findings suggest that there is potential for expansion into other countries.

4.2.5 *New cohort of investors and new investment leveraged*

With many projects still at a pre-commercial stage, follow-on funding in the form of grant funding or investment is necessary in order for projects to continue to progress beyond the Challenge towards a viable commercial solution. Across the Challenge, organisations were able to raise £16.8 million in follow-on funding. This includes £15.2 million in Venture Capital Funding (seed, angel, early and late stage VC) and £1.56 million in further grant funding. At around a third of all deals, early-stage VC was the most common type of investment followed by later-stage VC (24%), seed rounds (16%) and small number of angel investments (12%). PitchBook provided two examples of grants from Challenge Works, an organisation founded by Nesta which runs innovation challenges in addition to a follow-on grant from Scottish Enterprise.

Sources which the project teams are exploring include follow-on grant funding from other UKRI schemes, grant funding from other sources and private investment ranging from angel investors to venture capital. The exact funding application and fundraising strategy differs across each project, with grant funding programmes providing greater space for developmental R&D and private investment being more suitable for later development stages. Early-stage and research projects have sought additional funding, as have some later-stage projects where the project teams are more confident in applying for grant funding or want to maintain full control over the direction of their solution. In conversation with project teams, we heard about successful examples where teams had received grant funding. For instance:

- Sustainable and nuTritious food Consumption for Older Adults (COAST) on the Catalyst applied to the Biotechnology and Biological Sciences Research Council (BBSRC) for rounds of funding totalling £42,500
- Catalyst research into sleep and the gut-brain axis secured grant funding of £150,000 kicking off in April 2024
- The Participatory Research Fund and ESRC Connecting Generations are among funds which have granted follow-on funding to build on research findings emerging from SBDRP projects.
- From the recent cohort of seven Catalyst Accelerator projects, there are examples of follow-on funding from the NIHR i4i programme, ESRC Impact Accelerator Accounts, Zinc venture builder programme and other grants and accelerators
- According to Researchfish® submissions, the 12 Catalyst and SBDRP awards captured £7.9M in additional funding with a mean amount of £660K funding captured per HAC award. Most of the funding (96%) was from public or charity/non-profit sources such as UKRI (Innovate UK, ESRC, EPSRC), National Institute for Health Research (NIHR) and the US National Institutes of Health (NIH).

Private investment offers greater opportunities for growth and scale and access to a wider network of investors. To secure investment, each project must demonstrate it is making greater progress towards a working, commercially viable product which has acceptably low levels of financial risk and acceptable future returns. In a perfect market, the investment will correspond to market expectations of the future profits implicit in the intellectual assets, products, and services being developed.

However, discussion from the projects indicate that gathering momentum for investment – both public and private investment – has been challenging. They attribute this in part to wider global economic trends and constraints in the investment environment. The majority of the organisations also faced challenges in securing investment due to their projects being perceived as 'too risky'. The degree of risk can relate to broader challenges for the projects to

scale and adopt within a public sector context, while Direct to Consumer (DTC) models are higher risk in the UK context due to cultural expectations about who pays for health and healthcare. Projects we interviewed perceive there to be a gap in timing at the end of the Challenge as they require additional funds to de-risk their offerings through, for instance, medical device approvals.

Across the programmes where projects are developing later-stage technologies, our analysis of PitchBook data indicates there are early cases of private investment among projects following their end date. While these investments cannot be completely attributed to the Healthy Ageing Challenge, they can be seen as a positive indication of investor sentiment in the value of the work carried out over the respective projects. The total amount of private investment (comprising seed investment, angel investment, early-stage venture capital and late-stage venture capital) for all Healthy Ageing projects totals £16.8 million.

As of April 2024, our analysis of PitchBook data indicates that three companies within Designed for Ageing received investment totalling £6.2 million across nine deals, four of which were early-stage Venture Capital (VC), two from an individual angel investor, the remainder as late-stage VC. Nevertheless, other project teams indicated a degree of uncertainty as a result of broader difficulties in the funding landscape. Some project leads described a situation where conversations with VC funds are more exploratory than committal as well as the risk that the shift in supply and demand of private investment might lead to companies giving away more equity than they would have previously done.

Three companies on the Investment Partnerships funding strand have received investment totalling £7.8 million across 7 deals with average deal size of around £1.1 million. The type of deals varied, indicative of different maturity levels of the projects in the strand, with two seed round deals, two early-stage VC rounds and three later-stage VC. In terms of the drivers of investment, one project lead underlined the role of Investment Partnerships itself as a signal of confidence that subsequently attracted more angel investment. Another lead highlighted the increased interest in healthy ageing from investors from the MedTech and platform investment spaces.

Projects in the SBRI stand were mostly led by not-for-profit entities and therefore unlikely to seek the same investment sources as other project teams. Despite this, three companies have received investment according to pitchbook data totalling £1.6 million across six deals which include a grant, angel investment, a buyout and two later stage VC rounds.

Table 9 Investment identified through PitchBook analysis

Project	Funding strand(s)	Summary of Investment Activity
HollyHealth	Designed for Ageing (DfA)	The digital coaching platform has secured four rounds of early VC funding. Totalling **£2.3 million**, the platform has attracted investment from funds specialising in women's healthcare (GaiaGodess Ventures), well-renowned business angel networks (Kima Ventures) and regional investment bodies such as NorthInvest and the innovation SuperNetwork.
Koalaa	Designed for Ageing (DfA)	A start-up designing and making comfortable prosthetics, Koalaa received a **£900,000** investment in January 2024. The founder pointed to the successful combination of social mission and transformative capital as key to helping the business get off the ground and test their product.
Physiomedics	Designed for Ageing (DfA) and COVID-	This start-up, which has developed a clinically validated self-assessment tool for muscle and joint problems, has received three rounds of investment including **£1.4 million** in angel investment and **£1.5 million** from Scottish Enterprise, Archangel Investors and Innovate UK in July 2022.

	19 Fast Response	
Mobilise	COVID-19 Fast Response	A startup which has grown and supports an online community of unpaid carers, including through digital marketing and tools and peer-to-peer support. Following an initial seed investment at the same time as the Healthy Ageing grant, it has since received seed and early VC funding totalling **£1.2 million** with VC funding from Ufi Ventures.
Bellevie	Investment Partnerships (IP)	The care provider secured successive rounds of seed funding from consortia comprised of Angel investors and funds with a social investment mission totalling around **£2.5 million**. In November 2023, the Company subsequently secured a round of later stage VC funding of **£1 million** to bring its valuation to around £7 million.
WeWALK	Investment Partnerships (IP)	A start-up producing smart canes, WeWALK was able to leverage its initial investment partnership into a significant later stage VC deal worth nearly **£2 million** from an international consortium.
XR Therapeutics	Investment Partnerships (IP)	A spin-out using augmented reality and immersive technology for therapy. PitchBook analysis shows that XR secured a round of early VC funding totalling around **£250,000** in December 2023 which built on the initial £500,000 investment partnership. XR Therapeutics also told us at interview that it has recently undertaken a further funding round which raised a total of **£925,000** from the same venture capital firm that partnered with it for Investment Partnerships and has gained follow on Angel Investment. Alongside additional funding from SBRI healthcare in 2023 it told us that total funds raised were **£1.4 million**.
Local Treasures	SBRI	An organisation helping over 50s find part-employment by advertising and matching their services to local customers secured an expansion loan from the FSE group and Conduit Connect. The 2022 deal, has helped the organisation build on impressive track record of scaling.
Miicare	SBRI	An integrated health system that supports families of older people and caregivers with data-based insights into wellbeing, was also supported by a small grant from the Challenge Works incubator, a NESTA enterprise.
Oomph	SBRI	A wellness company that provides training and support for care home staff, was acquired in a buyout by Person Centred Software in January 2023. The deal from Cow Corner Investments has reportedly helped Oomph expand its digital care planning system from 1,200 to over 5,000 care homes throughout the UK.

Source: PitchBook analysis of Healthy Ageing firms

We heard from some project teams across multiple funding strands that participating in the Challenge has strengthened their interactions with investors and built a better case for investment. In part, they perceive there to be a 'badge of approval' for taking part in an official UK government fund, for which they completed a rigorous application process. Some project teams we spoke to believe that investors were more willing to invest and or fund future rounds of fundraising as a result of Challenge funding. The overall process of participating in the Challenge and taking feedback from end-users has helped the projects to develop and share valuable information or testimonies as part of their fundraising.

The scheme has also raised the awareness of the healthy ageing sector for investors and their confidence to participate. We spoke to investors who between them match funded 11 of the Investment Partnerships projects. While one investor was already familiar with the HA space, they stated that they invested more confidently and rapidly as a result of the Challenge. The other investor noted that while they had some specific markets in mind, such as the care home market, the Challenge has broadened their awareness of potential investments.

4.2.6 *Growth of UK businesses*

There is some early evidence that the challenge has contributed to firm growth in terms of company turnover, research and development expenditure and staff headcount. Given that many projects are still at an early stage, any follow-on commercialisation and growth is likely to materialise beyond the present evaluation. Based on available firm data from secondary sources and survey responses, the growth of UK business by funding strand was as follows (figures bys strand are summarised in Table 10 below):

- Designed for Ageing: In total, eight of the DfA project participants provided responses to the headline economic questions in the survey. Collectively, the strand reported increases in overall R&D spending, turnover and headcount between the point of application and for the most recent financial year at the completion of the survey in 2023.
- Investment Partnerships: In total, eight projects provided responses to questions on economic outcomes. These projects reported increases in healthy ageing-specific research and development expenditure. Two projects highlighted that their revenue growth stemmed from identifying and attracting a profitable and sustainable user base, e.g. someone looking to supplement their main income with flexible care work in one project, and fee-paying members for an app for social travel and short-term homestays.
- SBRI: In total, 16 projects provided responses to questions on economic outcomes. The responses indicated growth in terms of research and innovation spending and an incremental increase in both turnover and employment. In the case of many of the projects, increases in revenue can be attributed to the early commercialisation of the innovations during the Challenge funding period where a limited number of end-users, such as a housing association or leisure provider, had begun to pay for use of the solution while testing remained ongoing prior to full commercialisation and scale-up.
- Trailblazers: In total, 3 projects provided responses to questions on economic outcomes. The responses indicated growth in terms of research and innovation spending and an incremental increase in both turnover and employment.

Table 10 Direct economic outcome figures for HAC funding strands

Funding strand	Direct Economic Outcome	Headline findings from available data
Designed for Ageing (n=8)	Turnover	Collective turnover grew by nearly £900,000, reaching a total of £4 million across the strand. Several organisations, such as an apparel company and a designer of medical devices, managed to increase their turnover by over £100,000 while a therapy and wellness start-up almost doubled their turnover, with a total around £1 million.
	R&D expenditure	Overall R&D spending increased by £1.3 million from around £3 million at the point of application to £4.3 million as of 2023. Furthermore, healthy ageing specific spending increased by £2.1 million from £1.3 million at application to £3.4 million in 2023. Some of the organisations behind this increase include a medical coaching technology developer which went from zero R&D expenditure to over £300,000 while three other organisations surpassed the £700,000 mark in 2023.
	Employment	The number of full-time employees increased from 77 to 118 over the course of the DfA strand, with organisations increasing their headcounts by around 50% on average. While most companies managed to hire at least two new members of staff, a women's health specialist (Stella - Managing Menopause for Healthy Ageing) added 14 employees to reach a total headcount of 30.

Investment Partnerships (n=8)	Turnover	The aggregated turnover for organisations involved in IP amounted to £11 million with an increase of £4.9 million since application. Within this sample, some of the newer companies managed modest increases in revenue while more established organisations, such as an AI-enabled therapeutic exercise and rehab company with a commercially viable innovation, managed to double their revenue to just under £1 million a year.
	R&D expenditure	In total, the IP projects spent £5.9 million on R&D including £4 million specific to healthy ageing. This amounts to an increase of £3.6 million compared with the expenditure level at the point of application, around a 153% increase. Some of the main drivers of this increase were the uptick from a digital health service provider which raised its spending by over £500,000.
	Employment	The IP strand collectively created full-time employment for the equivalent of 213 FTEs, an increase of 114 jobs from the application point. Some noteworthy cases include a digital health company which added 30 employees and a healthcare provider which reached a headcount of 80 FTEs having started the Challenge with just 25. These reported increases happened over the Challenge period, but it is not possible to demonstrate that these are solely as a result of the Healthy Ageing Challenge.
SBRI (n=16)	Turnover	In total, the collective turnover of the SBRI strand came to £17 million which represents an increase of £2.2 million compared with the application baseline. With an average increase of around 20%, some participants, such as a personalised therapy and wellbeing company managing to increase revenue by as much as £400,000.
	R&D expenditure	In total, the SBRI projects spent £3.3 million on R&D including £3.2 million specific to healthy ageing. For a large number of projects, the allocation of grant funding meant they could begin to spend resources on R&D which would not have been otherwise possible given the small size of many of the social ventures. Other organisations increased an already sizeable R&D budget including a dance-focussed social venture which increased its healthy ageing related R&D budget by over £500,000 and a non-profit architectural firm which quadrupled its overall R&D spend.
	Employment	As of 2023, the companies involved in SBRI projects had a collective headcount of 457 employees, an increase of over 60 full-time jobs from the application point. Most organisations managed to add 1-3 FTEs, with an average growth of around 8%, although in a few cases, some social ventures added 6 FTEs.
Trailblazers (n=3)	Turnover	In total, the collective turnover of the Trailblazers strand came to £9.2 million which represents an increase of £5.8 million compared with the application baseline. A software developer who participated in the project reported an increase in turnover from just under £250,000 to nearly £2 million over the course of the project.
	R&D expenditure	In total, the Trailblazers projects had spent £8.9 million on research and development including £2 million specific to healthy ageing. Each of the three respondents indicated that they had at least doubled their expenditure on R&D as of 2023 amounting to an increase of £5.7 million compared with the level at application (£1.4 million specific to Healthy Ageing)
	Employment	As per the survey responses, in the latest financial year, the Trailblazers strand had a collective headcount of 76 employees an increase of 34 full-time jobs from the application point. These increases ranged from three onboarded staff in the case of a non-profit participant to 19 new members of staff for a local sports authority.

Source: Survey of successful projects

4.2.7 *Capacity and ecosystem building/strengthening*

Project teams across all funding strands agree that the Challenge has filled a gap by providing funding that allows for innovation in healthy ageing as an emerging sector. Grants and funding are available at a stage of development and scale that did not previously exist. This has focused attention on the older population as a target group for activities from organisations across different sectors, in some cases as a new activity, in others as an expansion of existing activities. Teams recognise several valuable factors that have arisen through the Challenge. For instance, it has enabled:

- New spaces for healthy ageing researchers and innovators to gather, work through issues and network with appropriate people. This also helped companies and individuals to build their networks and promote their work. The annual Healthy Ageing conference was well-received among project teams and wider stakeholders. The CoP effort received mixed feedback from interviewees, many found it a useful space for sharing experience while a few others felt it was "*pitched at a level which was not right for everyone*". One interviewee stated that the Centre for Ageing Better was not the right convener for the Community of Practice but had not engaged with the CoP once it was taken over by the Knowledge Transfer Network.
- Strengthening of multidisciplinary, inclusive R&I collaborations across a range of project partners, as well as policymakers, practitioners, and businesses. Evidence from the survey of successful applicants shows that almost half of the respondents had collaborated or were collaborating at the time of data collection with HAC project partners outside HAC projects, while another 40% were keen to collaborate with HAC project partners beyond their HAC projects.
- Improved absorptive capacity and buy-in from users (individuals and organisations) with regard to adopting HA innovations through collaborating on HAC projects
- New sectors and groups of organisations being brought into the HA R&I ecosystem, for instance the SBRI funding strand provided a space for funding for social ventures. One project team noted "*this is the first time that's been serious investment into the people that will transform how we live longer, happier, healthier lives*".

4.3 Future outcomes and impact

While there is early evidence of progression and growth from projects that have participated in the Challenge, and the early evidence that the Challenge is creating additional opportunity for impact, the projects are at an early stage and are mostly pre-commercial. Therefore at the time of this report, it is not possible to assess the extent to which the Challenge has led to wider health and social benefits. Across section 4.2, there is evidence that the Challenge projects are making progress with respect to product and service development, de-risking products, developing intellectual property and encouraging adoption among an initial user base.

Further evidence demonstrating that projects have been able to scale to a larger population group, and report growth and population benefits at scale, will be necessary in the future to assess on the real impact that will have emerged from the Challenge. This will require assumptions to hold true on whether the projects are able to complete the development of their products or services successfully, sustain themselves commercially (e.g. interest and

investment from private investors) and demonstrate consistent benefits for users as these emerge so that they can be taken up by consumers or the health and social care systems (provided demand plus absorptive capacity also exists).

4.4 What would have happened without HAC funding?

Survey responses from unsuccessful applicants provided an indication of the counterfactual scenario, i.e. what progress would have been achieved in the absence of HAC funding. Of the 41 unsuccessful applicants who responded to the survey, 20 were small-or medium-sized businesses (largely Designed for Ageing applicants), followed by universities (16, mostly applicants to the Catalyst Awards). A small number of responses (n=5) were received from social enterprises. Detailed analysis of the unsuccessful applicants' survey is provided in the accompanying Annex report.

The healthy ageing themes most commonly covered by unsuccessful proposals were 'Sustaining physical activity' and 'Supporting social connections'. With regard to the geographical location of their organisation, most respondents were based (or conduct their activities) in Greater London (n = 9), East of England (n = 7) and South East of England (n = 5). Other regions of England were also covered, but to a lesser extent (n = 4 or less). Scotland (n = 5), Wales (n = 2) and Northern Ireland (n = 1) were also covered.

Nearly 80% of unsuccessful applicants noted in their survey responses that they have continued working on the project idea (n = 24) or on some aspects of the project idea (n = 7). Most survey respondents did not apply for funding elsewhere (n = 24). Of the 16 survey respondents who submitted an application to another funding programme, 11 were successful. Of the latter pool of survey respondents who were successful in finding alternative funding for their project idea, some projects were ongoing and had not yet produced all their results. Of the ones that reported results, these included capacity building (n=8, 72%; e.g. improvement of skills related to commercialisation and healthy ageing research); receipt of follow-on funding (n=6, 55%) in the form of loans, equity investments and other grants from public funders; and social or healthy ageing benefits for project participants (n=6, 55%), including benefits achieved through use of the digital platforms and mobility solutions that are being tested or scaled-up. The majority of those who received alternative funding (n = 7, 64%) also had produced new intellectual property, including trademarks (n = 5), R&D tools or methodologies (n = 4), designs (n = 2) and patents or trade secrets (n = 2).

The nature and extent of outputs and outcomes achieved are fairly comparable to those achieved by HAC projects with the exception of follow-on funding where a lower proportion of HAC projects (13%) had obtained follow-on funding. However, it should be noted that many of the HAC projects were ongoing at the time of data collection and hence efforts to obtain follow-on funding had not been made. Moreover, the project timelines for the two sets of projects are not uniform.

It should also be noted that many successful applicants in interviews indicated that they may not have been able to develop or progress their innovations at all or to the extent that they were able to without HAC funding.

5 Conclusions

5.1 Key conclusions

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 largely produced its planned outputs in terms of new publications (mainly through the university-led projects), establishing proof of concept for new innovations (e.g. in Catalyst Awards), new knowledge and transformative ideas, accessible and inclusive HA innovations, multidisciplinary cross-sectoral collaborations and increased skills. Similarly, many of the short-term outcomes such as health and social benefits for users involved in testing, follow-on funding and new investment, and increased R&I and absorptive capacity have been achieved in specific projects as shown in the preceding chapter. £40.6M of co-investment (in cash and kind) was pledged largely by the industry/business sector participating in HAC projects, thus HAC has also succeeded in leveraging investment for the project activities.

HAC has supported R&I across the entire innovation pipeline from early-stage and feasibility research to adoption and scaling research and commercialisation. It has helped develop innovations across the full range of TRLs and helped bring several innovations closer to market, including existing lower TRL innovations. New products and services have been designed often with input from users, proof-of-concept has been established in several cases, and existing innovations have been further developed with new markets and business models in mind and user testing has been conducted. Thus, there is a whole pipeline of innovations spanning all seven of the Centre for Ageing Better's healthy ageing themes at different levels of maturity.

Social benefits, particularly health and wellbeing benefits, have been achieved in some projects largely for users participating in the project's R&I activities. This includes benefits for older people, people with cognitive and physical disabilities and people from low-income or minority ethnic backgrounds. At the time of data collection, limited quantitative data on benefits achieved and/or number and type of people benefitting were available and that too on a project-by-project basis. Nonetheless, long-term benefits such as savings for health and social care providers and population-level health impacts are expected to emerge on the Long-term benefits such as savings for health and social care providers and population-level health impacts are expected to emerge based on the social benefits already demonstrated provided there is large-scale adoption of HAC innovations.

It should also be noted that since most solutions undergoing development in HAC cover a broad range of income-groups including lower income groups, HAC has the potential to tackle healthy ageing **inequalities** in the UK depending on adoption by relevant populations. Of all the innovations developed or being developed with HAC funding support, 80% are targeted at a broad range of income-groups including lower income groups and a further 10% of innovations are specifically for the lowest income groups. Inclusive and user-centred design with input from under-represented groups and benefits demonstrated for these groups in user testing strongly suggests that inequalities could be addressed in specific contexts (e.g. specific health conditions, communities, HA thematic areas) through adoption and scaling of some HAC innovations. Communities and citizens, particularly older people from diverse backgrounds including ethnic minorities and low-income groups as well as those with cognitive and physical disabilities have been embedded into the HA R&I activities supported by the Challenge, which is likely to generate absorptive capacity and buy-in for adoption of HA solutions, and could thereby contribute to reducing inequalities.

HAC has contributed to firm-level growth. There is an indication from project survey responses that some project lead organisations' turnover, research and development expenditure and

staff headcount increased compared to the baseline. In total, the committed expenditure on the funding strands and activities is £81.3 million, split across each funding strand with £23 million (29% of this funding) allocated to Trailblazers Stage 2. There is early evidence that HAC funding has enabled progression in companies' development however in many cases projects are not yet in a position to commercialise their product or service through a completed business model. These increases have happened over the Challenge period; however it has not been possible to robustly assess the extent to which Challenge funding has led to these increases.

Aggregating the responses of 35 individual organisations from the survey which have shared their commercial data at the point of application and the most recent financial year, there is some evidence of sound economic progress at the programme-wide level. Turnover, estimated at £41 million in 2023 grew by £14.9 million compared with the baseline value at the application time point (£26.1 million). Challenge-wide research and development expenditure, when accounting specifically for HA related activity, increased by £7.4 million from £2.8 million to £10.2 million as of 2023. Finally, the headcount from firms and social enterprises reached 859 among the respondents, an increase of over 260 full-time employees over the same period (599 at the baseline).

In terms of programme-wide investment since the beginning of the challenge, beyond the pledged co-investment (£40.6 million), PitchBook data revealed a total of £16.8 million investment leveraged by HAC participant firms over the course of 24 deals. Moreover, in individual projects across most HAC strands, we found examples of business growth and new inward investments or follow-on funding. Due to challenges in gathering secondary evidence on the economic growth of organisations, this evidence draws on survey findings, which are subject to the rate of response from project teams, as well as discussions with a subsection of projects sampled for interview. Changes in turnover, research and development expenditure and staff headcount from some firms which did not respond to the survey may therefore not be covered in the above growth figures, however this will depend on if there are any underlying reasons for why some firms did not respond to the survey.

The medium- to long-term outcomes are likely to be achieved to some extent in the expected timeline of 3 to 5 years from the end of the Challenge. There are likely to be social and health benefits for users of the HA innovations, savings for health and social care providers, and economic growth of companies involved in developing these innovations. These will be dependent on large-scale adoption of said innovations. *However, population-level health benefits and impacts on the UK economy and markets are much further away and currently available evidence is not sufficient to indicate the likelihood of the wider impacts being achieved in the long-term.* Current progress in outcomes such as the technical progression and de-risking of products, and early user adoption indicate that Challenge projects will be able to continue to develop. Follow-on investment for some companies, including projections from the Investment Partnerships projects, indicate that there is confidence in some of the projects to continue to generate revenue. However, evidence in the ability of projects to sustain themselves commercially, scale and achieve their intended aims will be necessary in order for this progress to continue.

HAC has helped galvanise the nascent HA sector. HAC has made considerable inroads into developing a HA R&I ecosystem in the UK. It has fostered a community of practice, bringing together stakeholders from different sectors (e.g. academia, business, non-profit and government) to develop HA solutions with the potential to promote HA in the UK and beyond. It has encouraged new entrants, ranging from micro and small enterprises to large multinational companies as well as social ventures and universities, to participate in HA R&I. The focus on inclusive and user-centred design of HA solutions has leveraged the R&I and design expertise in the UK, thereby further stimulating investment in the HA sector.

HAC-funded projects took almost all independent jury prizes at AgeingFit 2023,[10] demonstrating HAC's and the UK's leadership in HA R&I.

5.2 Lessons learned

Our stakeholder consultations revealed a number of learnings that could inform areas for future improvement for future iterations of HAC or a similar programme.

5.2.1 HAC processes and design

HAC is seen as filling a key gap in the R&I landscape, providing a focus for developing solutions to the societal challenge presented by an ageing population. Overall, the vital contribution of HAC activities and funding has been acknowledged in terms of

- Providing a focus and supportive environment for R&I related to HA
- Encouraging new entrants including social ventures into HA R&I. For example, VRGo, a company that sold gaming products focused their technology on something that can benefit a sedentary working population
- Building on the UK's research strengths through supporting early-stage research (e.g. in SBDRP) and entrepreneurial innovation in universities (in the Catalyst Awards)
- Supporting inclusive design and development of new HA solutions
- De-risking early-stage ideas for further investment
- Facilitating capacity and community building for HA R&I through knowledge exchange activities such as the Community of Practice and Healthy Ageing Conference

The **delivery model** has evolved over the course of the Challenge as the streamlined approach set out in the beginning was based on a number of assumptions (e.g. maturity of the market, investors and companies are ready to contribute to a large extent, R&D community is integrated) which ultimately were only partially true. As a result, the delivery model evolved to a more 'spread out' and seemingly complex one to promote interdisciplinary and intersectoral collaboration and innovation at different stages of the innovation pathway from early-stage research to adoption and scaling R&D. This had two effects in the opinion of the evaluators: (i) focus shifted to build HA R&D capacity and the ecosystem; and (ii) impacts could not be achieved to the extent planned partly due to change of focus and partly shorter time available for projects. These two objectives are in tension: building capacity may require focusing more on new entrants and hence the need to be more 'permissive' on business plans, while a more mature R&D base and market would have allowed the Challenge to respond to a small set of key market failures, thereby consolidating impact and adding value in key areas. Nevertheless, the portfolio approach with different strands and covering different innovation stages was useful and helped bring in new players and ideas for testing.

Some project leads and wider stakeholders felt that **HAC grant application processes for Investment Partnership grants were complex and time-consuming which could potentially deter some types of organisations from applying**, especially start-ups and SMEs with limited resources and experience in developing proposals. Wider stakeholders commented this could result in a limited pool of businesses applying and a broader risk that many companies may go abroad to develop and scale their projects. Some DfA project leads commented that HAC

[10] https://iuk.ktn-uk.org/news/triple-win-for-uk-companies-at-european-healthy-ageing-innovation-event/

grant application requirements can sometimes pose challenges for charities seeking to participate in projects. For example, one interviewee reported that a charity leading the development of a product could not be the project lead due to specific commercialisation requirements for lead applicants. Related to this, investment partnership project leads mentioned the timing for securing co-investment was a challenge, as organisations sometimes require grant confirmation before committing funds.

Furthermore, it was noted by some Trailblazer project leads that the **high co-investment targets** (50% of the project level) **may have prevented smaller businesses taking advantage of HAC funding opportunities**. This may have been reflected in the low numbers of high-quality applications received for Trailblazers Stage 1 resulting in only seven being funded rather than the anticipated 15-20. The requirement for 50% co-investment was relaxed in the DfA projects which might have led to a greater number of high-quality proposals put forward. However, it should be noted that in real terms, the co-investment amounts in Trailblazer Stage 1 projects averaged around 42K as opposed to 297K for DfA (39% co-investment).

Project leads noted that **HAC onboarding processes can be time-consuming**, leading to delays in starting some projects. For example, one SBDRP interviewee commented that having the award start date close to the project start date can lead to delays in starting projects if new staff need to be recruited. It was also noted that **processes for claiming grants can cause bottlenecks and funding flow issues that create barriers for collaboration**. For example, in one project, co-investment from the partner could not be raised to claim the grant funding, resulting in the partner delivering the work in-kind and with reduced staff capacity. Several investment partnership project leads felt that the "**payment in arrears" HAC funding model can pose challenges for businesses**, especially for start-ups and SMEs, as it requires them to have sufficient funds to cover expenses before claiming reimbursement.

Monitoring requirements differed across the strands, especially between Innovate UK- and ESRC-run strands. However, monitoring data collection and activities like impact workshops for SBDRP projects and Trailblazer evaluations appear to be facilitating the building of an evaluation and learning culture among projects. Several project leads appreciated the monitoring team's support and understanding, particularly when projects were delayed. A minority of DfA project leads would have appreciated more support from the HAC monitoring team in terms of helping them to navigate challenges and explore other avenues to overcome problems. A particular issue raised by a few Trailblazer project leads was the time required to get approval for project change requests and less flexibility in use of funding. For example, it was suggested that easy processes for no-cost extensions could support project teams to deliver on the project objectives in instances where delays were experienced e.g. in recruiting the right expertise or engaging with users. A bit more stringent milestone or stage-gate based system would have been useful, especially for larger single investments.

Many HAC innovations progressed along the TRLs, which suggests that the ToC assumption that award-holders have sufficient time to progress innovative ideas closer to market launch is valid. However, some project leads (e.g. DfA, catalyst awards, SBDRP) highlighted that the **time-period of HAC awards** is not always sufficient to complete projects and produce market-ready innovations. Based on the evidence collected for the evaluation, it is clear that many HAC projects will require more time and follow-on funding to allow for full development and evaluation of their innovations, as well as commercialisation and development of new, sustainable business models that are less dependent on healthcare and social care system commissioning.

In terms of the design of HAC funding opportunities, wider stakeholders praised HAC for its **inclusive approach in providing support for a wide range of activities** but had mixed views on

the risk appetite of the programme. A couple of these wider stakeholders viewed HAC as taking healthy risks with ambitious projects such as Tribe, but also felt some of the other projects were low-risk or unoriginal in nature, focussing on short-term service needs or adapting existing solutions. It was suggested that funding should be prioritised in areas or technologies that seek to achieve a step change in healthy ageing.

5.2.2 Enablers and barriers

Project leads and partners reported several benefits of participating in HAC projects. In particular, partnerships established through the funding helped project teams to establish **new ways of working** and be more innovative. For example, introducing the project teams to different **user-centred design** approaches created new ways of working and enabled these teams to develop solutions that will be more likely to be adopted by users and more commercially viable.

HAC has enabled inclusive innovation, for example improving inclusivity in terms of gender, different religious and ethnic or socioeconomic backgrounds and well as different cognitive abilities. There are some signals of a culture change (based on interviews) that academic researchers are more attentive to and aware of business needs (e.g. SBDRP) and businesses are considering the inclusive design principles.

Partnerships were also valuable for small companies, as working with community networks, charities and housing associations has enabled them to access a diverse and geographically spread groups for end-user testing, which would have been challenging otherwise. This has helped to enhance the quality of user testing, which has led to improvements in products for older adults and their future commercial potential. Furthermore, the user-centred design focus of projects has also allowed organisations to gain a better understanding of the different needs of older adults and test assumptions. As a result of this learning, some companies plan to bring user-centred design expertise in-house. The knowledge thus gained also led to strategic shifts for some projects, for example, in terms of targeting alternative or new markets and tailoring of the HA innovation to meet the needs of these markets. Working with users and communities has also created **absorptive capacity and buy-in for HA solutions** in general, not only for the ones they have tested or helped develop.

Several projects acknowledged that scaling was enabled and expedited by the HAC award, since follow-on investment, partnerships and other funding often built on the R&I, networks and knowledge developed during the Challenge. Conversely, **lack of follow-on funding and sustainable business models** was raised as a key barrier to further progression of HA innovations towards wider adoption and scaling, and thus to impact. Many project leads across the HAC funding strands reported encountering challenges in securing further funding and investment for further development and commercialisation of their innovations or with adoption in the public sector.

5.2.3 Additional activities to support HA R&I

In terms of **additional activities UKRI / government could support** to promote healthy ageing R&I, wider stakeholders suggested **supporting brokering activities** such as incubators to facilitate match-making between developers of HA innovations and potential investors; **supporting public and private partnerships** that embed academics in businesses to collaboratively develop healthy ageing innovations; and **advocacy efforts** to urge the government to prioritise healthy ageing and set a national strategy to sustain progress in the field. It should be noted that Innovate UK's Knowledge Transfer Partnerships (KTPs) facilitate public and private partnerships and this knowledge has been leveraged for the Challenge's CoP strand. Moreover, the COVID-19 pandemic and shift away from Industrial Strategy

Challenges has to an extent hindered efforts to continue the Challenge activities in their current form.

Additionally, some stakeholders suggested a more systematic approach should be adopted to **identify the factors contributing to the success or failure of HAC projects**. This would help strengthen future funding decisions and identify priority areas where targeted support is needed to further develop the R&I ecosystem. Some stakeholders suggested that if a similar HA R&I programme were to be implemented in the future, more efforts could be made to raise awareness of the funding opportunities to encourage a wider range of businesses applying. Suggestions for activities to support this included networking events to promote knowledge and expertise sharing among potential innovators and to connect innovators with potential end-users such as health and care organisations and professionals to support buy-in, facilitate adoption and find sources for further funding. The Challenge team have made some efforts in this direction already. Significant efforts were made to engage larger businesses in 2018 which were unsuccessful. Furthermore, the broad UK-wide spread of projects was supported by an active pre-competition engagement effort, including in one case establishing co-funding memoranda of understanding (MoUs) with two of the three devolved nations.

Many project leads and partners across HAC funding streams mentioned the need for sustainable funding for R&I in healthy ageing. Activities or funding that will help support innovations getting to a stage of development where venture capitalists, angel investors or other funders will support further commercialisation or where the HA product/service can be commissioned in the public sector will be very beneficial and help lower the barrier to impact presented by a lack of follow-on funding (as discussed above). The Catalyst Accelerator and SBRI Scaling Social Ventures strands offer such support to some extent.

5.3 Considerations for the future

Wider stakeholders and project participants agree that HAC has started to build an ecosystem for HA R&I in the UK through the HAC projects, Healthy Ageing Conference and CoP. However, it is early stages yet and the ecosystem is not mature and self-sustaining at the moment. As such, the **future sustainability of the HA R&I community** galvanised through HAC efforts is at risk. This includes the networks built between micro and small businesses, social ventures, universities, government and local communities. Without continued efforts, there is a risk that this community could disperse. We understand the British Society of Gerontology has a Special Interest Group (Ageing Business Society) that may take over the organisation of future community events, which may help sustain some of the networks.

Many of the HA innovations supported in HAC are at a stage where further development or support is required to get them to market. As such, several wider stakeholders highlighted the need for **continued funding for HA R&I in the medium to long term** through another HAC or similar programme to achieve maximum impact (and minimise risk of low impact) from the investments and progress already made. It is **important to sustain the momentum built so far as the problem of UK's ageing population is not going away** and needs to be addressed. As such, the pipeline of new HA innovations needs to be continued with support to progress these to adoption to help generate benefits for the UK population and economy.

Another key consideration for future funding and initiatives for HA R&I is how to **ensure the useful HA innovations supported by UKRI / government funding are available to those who need them** regardless of their socioeconomic background or location. This is particularly challenging in the context of the UK's health and social care system. Many of the innovations developed in HAC address issues in the publicly funded NHS and social care systems, meaning innovations have to meet specific requirements and present specific types of evidence to get commissioned.

This is a big gap/barrier for HAC participants currently – products and services with a lot of potential for savings for the health and/or social care systems and population benefits are not getting to those who need them in the UK. Some mature HAC innovations are more likely to be adopted outside the UK before they are in the UK. Individuals involved in governance and management of HAC e.g. Innovate UK, Zinc, members of the advisory board, etc. are well-placed and have the networks to showcase the accomplishments of the Challenge and to raise awareness of the value of HA innovations (e.g. those emerging from HAC) in the public sector.

Appendix A Supplementary data

A.1. Survey analysis

A.1.1. About successful applicant survey respondents

From a total of 94 survey responses from successful applicants, approximately 91% responses originated from project leads (n = 86) and 9% (n = 8) from project partners, as outlined in Table 11. Most respondents received grants from the HAC strand 'Catalyst Award', followed by 'Designed for Ageing' and the 'Small Business Research Initiative' (SBRI). No responses were received from the HAC strand 'Business-led innovation in response to global disruption'.

Table 11 Number of survey responses of successful applicants by HAC strand and project role

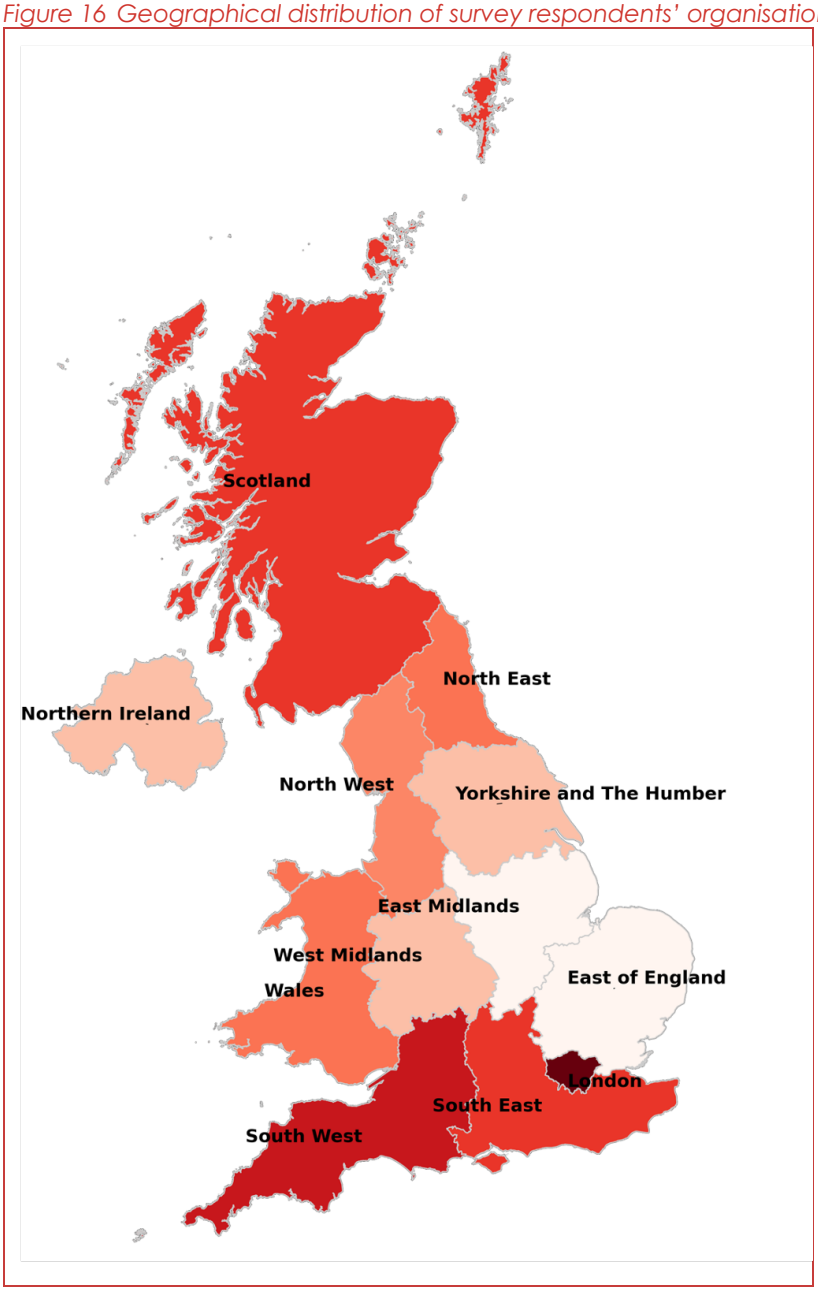
HAC strand	Number of responses from project leads	Number of responses from project partners	Total responses (% of total)
Catalyst Awards	28	1	29 (31%)
Design Age Institute Pathfinder Awards	2		2 (2%)
Designed for Ageing	17	1	18 (19%)
Investment partnerships	6		6 (6%)
Small Business Research Initiative	14	1	15 (16%)
Social, Behavioural and Design Research programme	12		12 (13%)
Trailblazer	7	5	12 (13%)
Total responses	**86**	**8**	**94**

Most survey responses originated from universities (47%, n = 44), followed by small- or medium-sized businesses (SMEs) (30%, n = 28) and charities or voluntary organisations (14%, n = 13). Remaining responses originated from social enterprises (6%, n = 6), local governments (2%, n = 2) and a large business (1%, n = 1).

Figure 16 illustrates the geographic distribution of survey respondents' organisations, with some organisations covering more than one UK region.

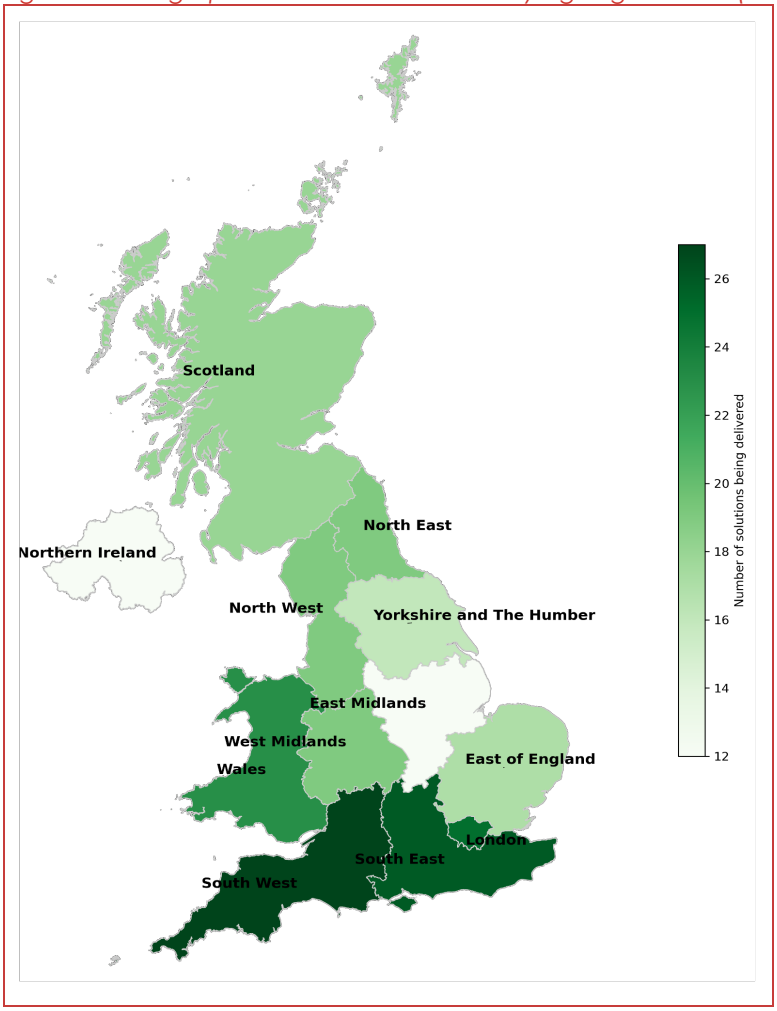
The geographic distribution below shows that Greater London (n = 19), South West (n = 15) and South East (n = 13) are the regions in England in which most organisations are based and/or conduct their activities. Within England, the least covered regions are East Midlands and East of England (n = 2). Scotland (n = 13), Wales (n = 10), and Northern Ireland (n = 6) were also covered.

Figure 16 Geographical distribution of survey respondents' organisations in the UK (n = 94)



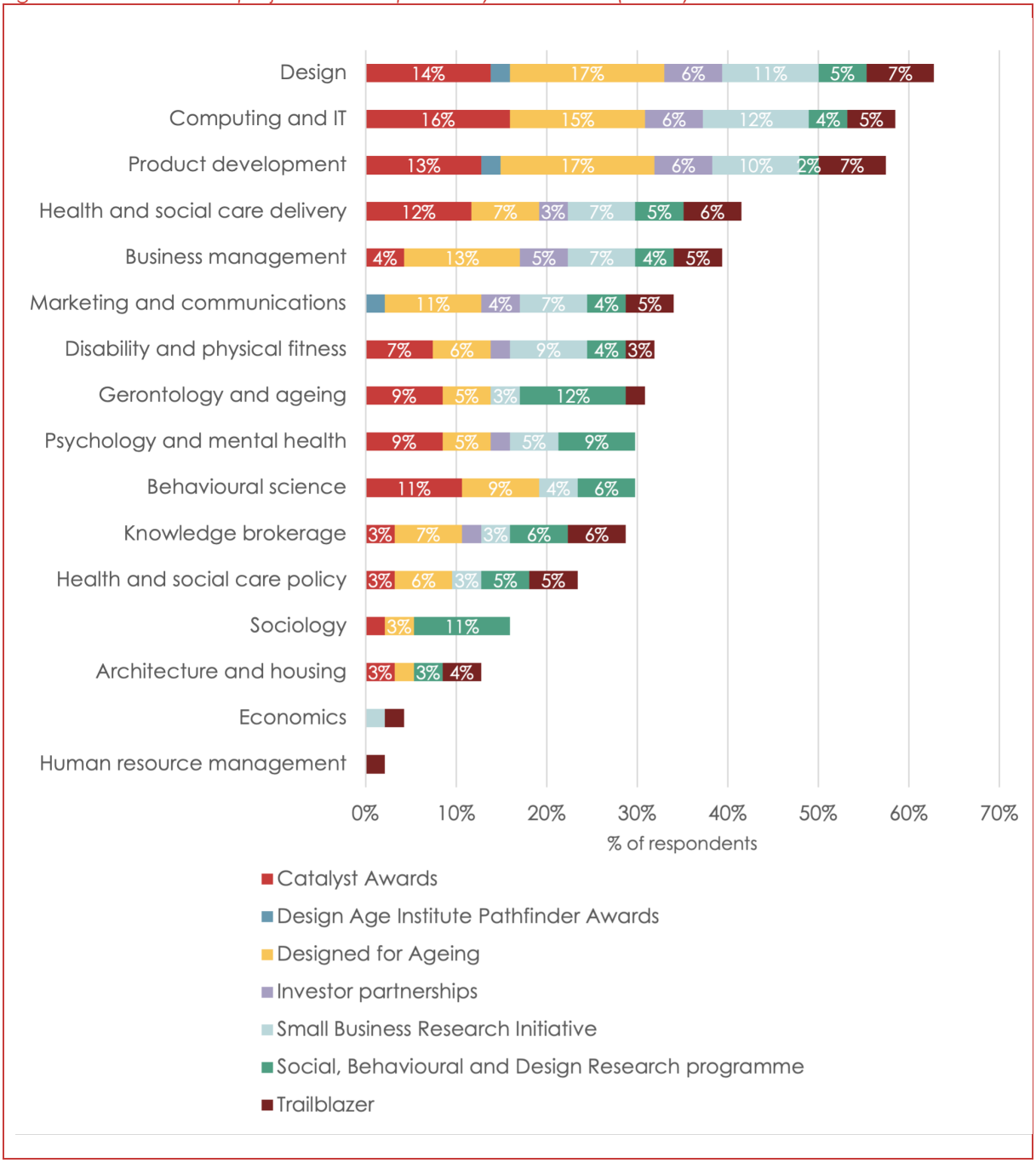
A.1.2. UK regions where healthy ageing solutions are being delivered

Figure 17 Geographical distribution of healthy ageing solutions (n = 94)



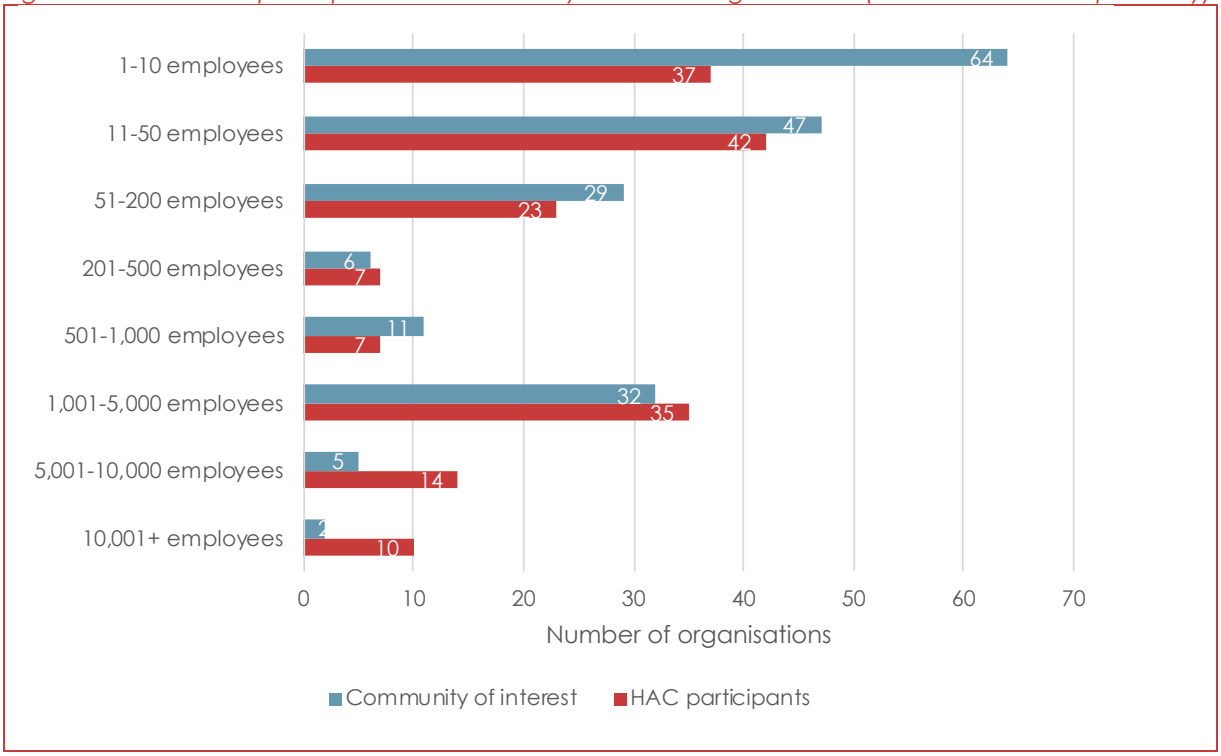
A.1.3. Project team expertise

Figure 18 Distribution of project team expertise by HAC strand (n = 94)



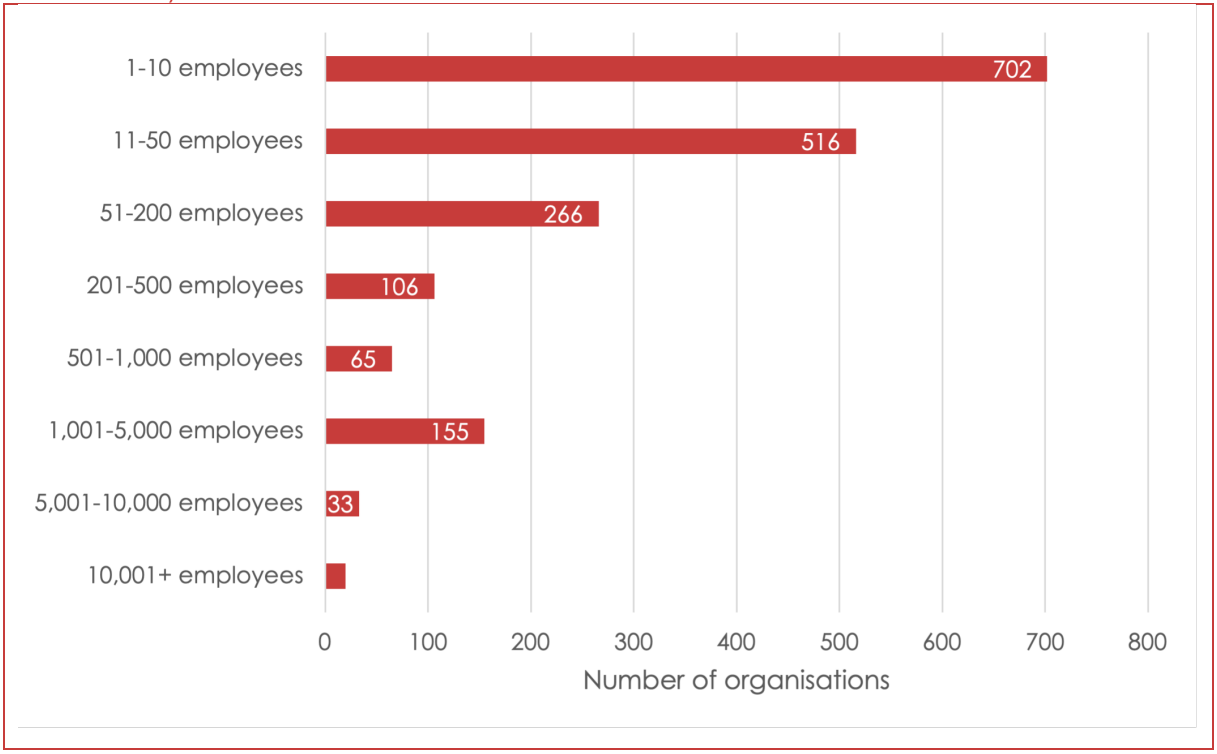
A.2. Healthy Ageing sector analysis

Figure 19 Size of HAC participant and community of interest organisations (n = 175 and 196 respectively)



Source: Technopolis analysis of web crawled data.

Figure 20 Overview of organisations' size for all organisations involved in healthy ageing sector (n = 1863)



Source: Technopolis analysis of web crawled data

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