

UNIVERSITY OF LIVERPOOL - HESELTINE INSTITUTE
A Northern Powerhouse Higher Education Mini-Conference
Humans Need Not Apply? On Artificial Intelligence And Inclusive Growth
DRAFT PROGRAMME

9.30-10am	Arrive Tea/Coffee
WELCOME AND INTRODUCTION : CAN ARTIFICIAL INTELLIGENCE PROMOTE INCLUSIVE GROWTH?	
10-10.05am	Professor Dinah Birch (PVC Cultural Engagement, University of Liverpool) Welcome and Opening Remarks
10.05-10.15am	Professor Mark Boyle (Director Heseltine Institute for Public Policy, Practice and Place, University of Liverpool) and Jacqueline Davies (PhD student, ULMS, University of Liverpool) Our Question: Can Artificial Intelligence promote Inclusive Growth?
THE AGE OF THE 'LEFT BEHINDS': SOCIAL AND SPATIAL INEQUALITIES IN A DIVIDED NATION	
10-15-10.45am	Chair Professor Cecilia Wong (Professor of Spatial Planning, University of Manchester and Member of the UK2070 Commission) <ul style="list-style-type: none"> Lord Robert Kerslake (Chair of UK 2070 Commission) UK2070 Commission's 'Independent inquiry into city and regional inequalities in the UK' Dr Aileen Jones (Liverpool City Region Combined Authority as Head of Research and Intelligence) Launch UK2070/Heseltine Institute Report on 'National Spatial Strategies in an age of inequality.'
INTERROGATING KEY TERMS: 'ARTIFICIAL INTELLIGENCE' AND 'INCLUSIVE GROWTH'	
10.45-11.25am	Chair Professor Mark Boyle (Director Heseltine Institute for Public Policy, Practice and Place, University of Liverpool) <ul style="list-style-type: none"> Professor Katie Atkinson (Dean of Electrical Engineering, Electronics, and Computer Science University of Liverpool) Artificial Intelligence: What it means, why it matters, and what policy challenges does it lead to? Professor Anne Green City-REDI, University of Birmingham Inclusive Growth: What it means, why it matters, and what policy challenges does it lead to?
IMPLICATIONS OF AI: FOR WORK AND CITIES	
11.25am-12.05am	Chair: tbc Female <ul style="list-style-type: none"> Mr Jon Andrews (Head of Technology and Investments, PwC) Implications of AI for the future world of work Dr Rick Robinson (ARUP Digital Property and Cities Leader) Implications of AI for future smart cities
12.05 – 12.25pm	DISCUSSION AND REFLECTION FROM MORNING SESSION
12.25-1.10pm	Lunch
IMPLICATIONS OF AI: FOR AGEING AND HEALTH CARE	
1.10 to 1.50pm	Chair Professor Christine Milligan (Co-Director of the Lancaster University Centre for Ageing Research) <ul style="list-style-type: none"> Professor Mike Catt (Director National Centre for Ageing, University of Newcastle) Implications of AI ageing societies Dr Paul Fergus and Dr Carl Chalmers (School of Computer Science, Liverpool John Moores University) Implications of AI for health and health care
POLICY CHALLENGES AND OPPORTUNITIES : THE NORTHERN POWERHOUSE : TOWARDS AN INCLUSIVE FOURTH INDUSTRIAL REVOLUTION	
1.50- 2.30pm	Chair: Dr Aileen Jones (Liverpool City Region Combined Authority as Head of Research and Intelligence) Mr Mark Basnett (Managing Director, Liverpool City Region Local Enterprise Partnership) Local Industrial Strategies and the pursuit of Inclusive Growth Dr Annette Bramley (Director of N8 Research Partnership) The Northern Powerhouse: Prospects amidst a fourth industrial revolution
2.30-3.30pm	Creating a Northern Ecosystem for Accelerating the Adoption of AI Chair: <ul style="list-style-type: none"> Mr Michael Gleaves (Deputy Director Hartree Centre) The Hartree Centre: Delivering competitive advantage to the Northern Powerhouse by accelerating the adoption of Data Centric Systems, Big Data and Cognitive technologies. Mr Steve Caughey (Director National Centre for Data, University of Newcastle) The National Centre for Data Enabling the Northern Powerhouse to compete and thrive in the new data-driven global marketplace Mr Simon Reid Sector Manager Advanced Manufacturing at LCR LEP LCR 4.0 AI and Advanced Manufacturing
3.30-3.50pm	OPEN DISCUSSION AND REFLECTION FROM AFTERNOON SESSION
3.50-4.20pm	Chair: Professor Dinah Birch (PVC Cultural Engagement, University of Liverpool) Mayor Steve Rotherham (Metro Mayor of the Liverpool City-Region Combined Authority) The Liverpool City-Region Combined Authority: Towards an Inclusive Fourth Industrial Revolution
4.20-4.30pm	- CLOSE AND NEXT STEPS -

27/02/2019

National Innovation Centre for Ageing

“Humans need not apply” On artificial intelligence and inclusive growth

Implications of AI for ageing societies

Northern Ecosystem Vision?

Heseltine Policy Institute, Liverpool
6th February 2019
1310 - 1330
Michael Catt, Graham Armitage



**The
Alan Turing
Institute**



Position
Turing Fellow

Partner
Institution
Newcastle
University



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How Is AI Revolutionizing Elderly Care? FORBES 31st October 2018

1. At home health monitoring

There is always a need for continuous supervision and quick diagnosis in the case of elderly patients. Biotricity a medical diagnostic and consumer healthcare technology company dedicated to delivering biometric remote monitoring solutions is implementing device-level AI to improve its remote patient monitoring platform. CarePredict is using AI to continuously detect changes in activity and behavior patterns for early detection of health issues.

Voice-based virtual assistants such as Amazon Echo and Orbita Health are using AI to enable medication adherence and care coordination for the elderly. Companies like Careangel are further optimizing the voice-based virtual assistants as nurses and caregivers for target patient populations.



2. Smart device assisted daily living

Companies like Apple and Fitbit have made smart wearable biometric trackers available to a large demographic, including elderly and geriatric patients. Elderly patients can use this device's built-in AI-powered functionality to check inconsistencies in their biometric data, as well as detect a significant or hard fall and sound an alarm. AiCare claims to use machine learning analytics and wearable sensor to personalizes the care for each elderly consumer.

3. Smart device assisted fall detection

Emergency situations such as a simple slip and fall can trigger a series of medical conditions in geriatric patients. Xsens, Kardian and Qventus have built AI-powered fall detectors. Starkey has integrated AI-powered fall detectors within its hearing aid Livio AI.



4. Virtual companions

The lack of skilled caregivers who can help elderly patients who live alone and require daily assistance, has given rise to need for robotic helpers. Robots like Catalia Health's Mabu, Intuition Robotics' ElliQ, CT Asia Robotics' Dinsow and Reiken's Robobear are virtual home assistants for elderly who live alone and require daily assistance as well as companionship. Mabu is a conversational robot that can not only provide tailored conversations to each patient but can obtain the hard-to-get data about treatment. Whereas ElliQ is aimed at keeping older adults active and engaged by connecting them to their families and the outside world.



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But AI is increasingly applied across products and services beyond health and social care, impacting all our lives ...

1,176 views | Jan 15, 2019, 09:00am

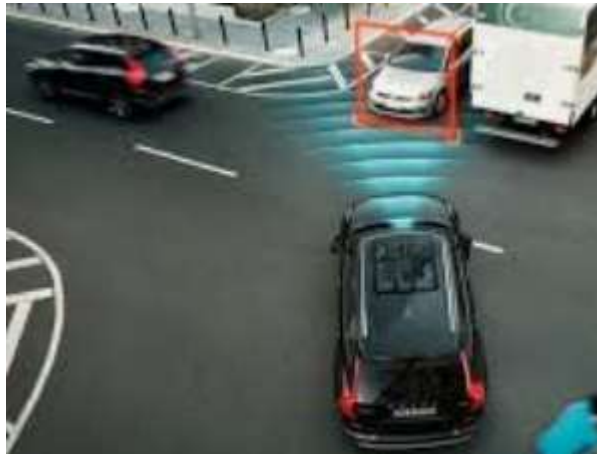
Five Predictions For AI In Marketing In 2019



Vijay Chittoor Forbes Council
Forbes Technology Council CommunityVoice

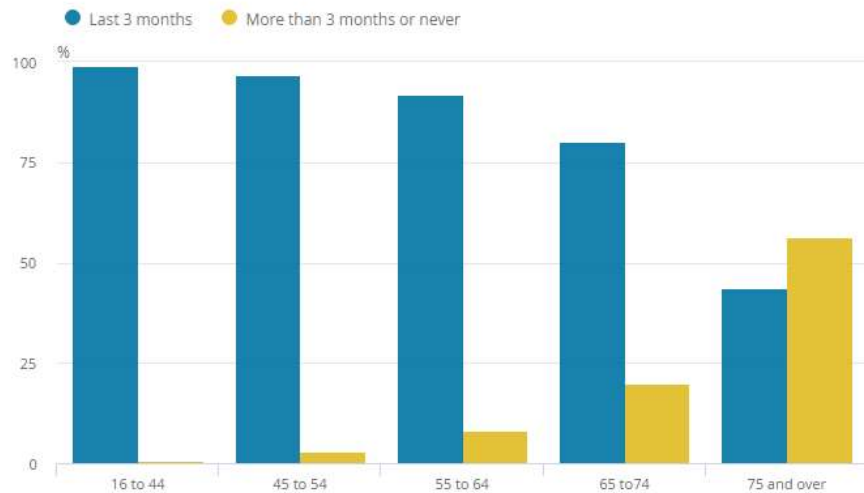


74% of insurers will dramatically increase their AI investments by 2019.



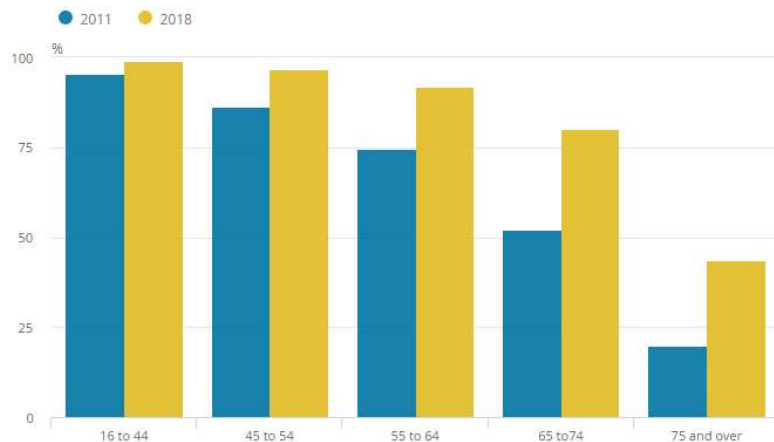
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Figure 1: Internet users by age group, 2018, UK



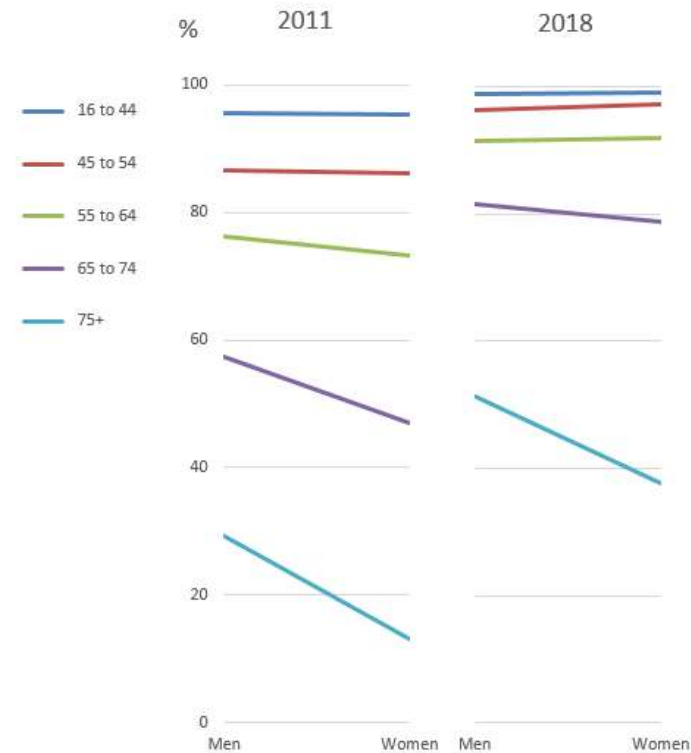
Source: Office for National Statistics

Figure 2: Recent internet use by age group, 2011 and 2018, UK



Source: Office for National Statistics

Figure 3: Recent internet use by age group and sex, 2011 and 2018, UK

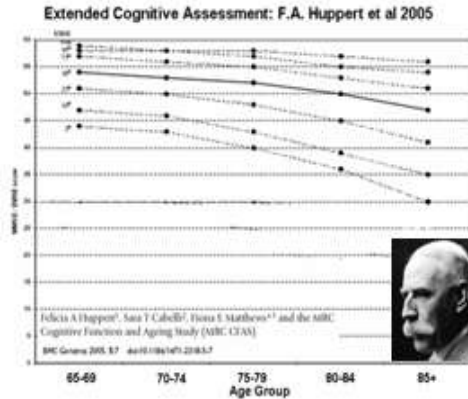


Source: Office for National Statistics

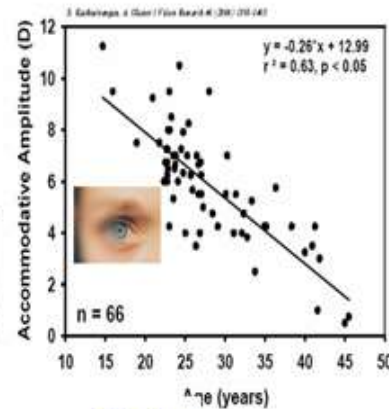
<https://www.ons.gov.uk/businessindustryandtrade/itandinternetindustry/bulletins/internetusers/2018>

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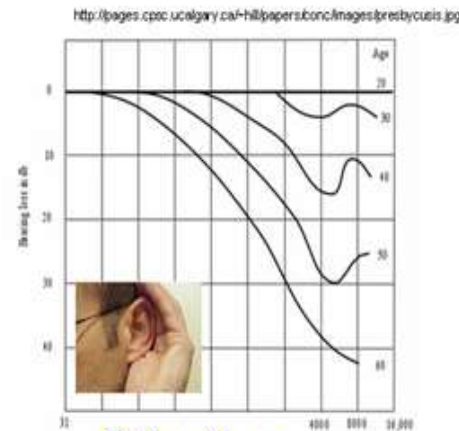
Mental Performance



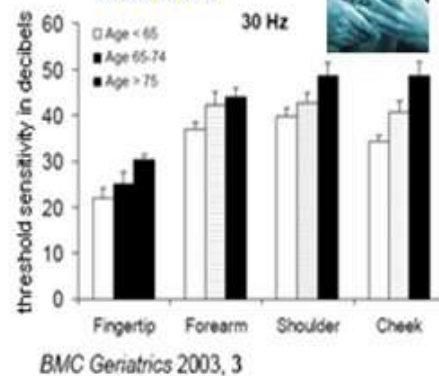
Accommodation



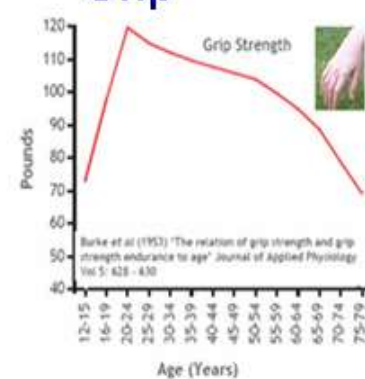
Hearing



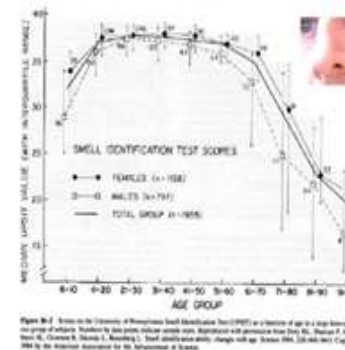
Touch



Grip



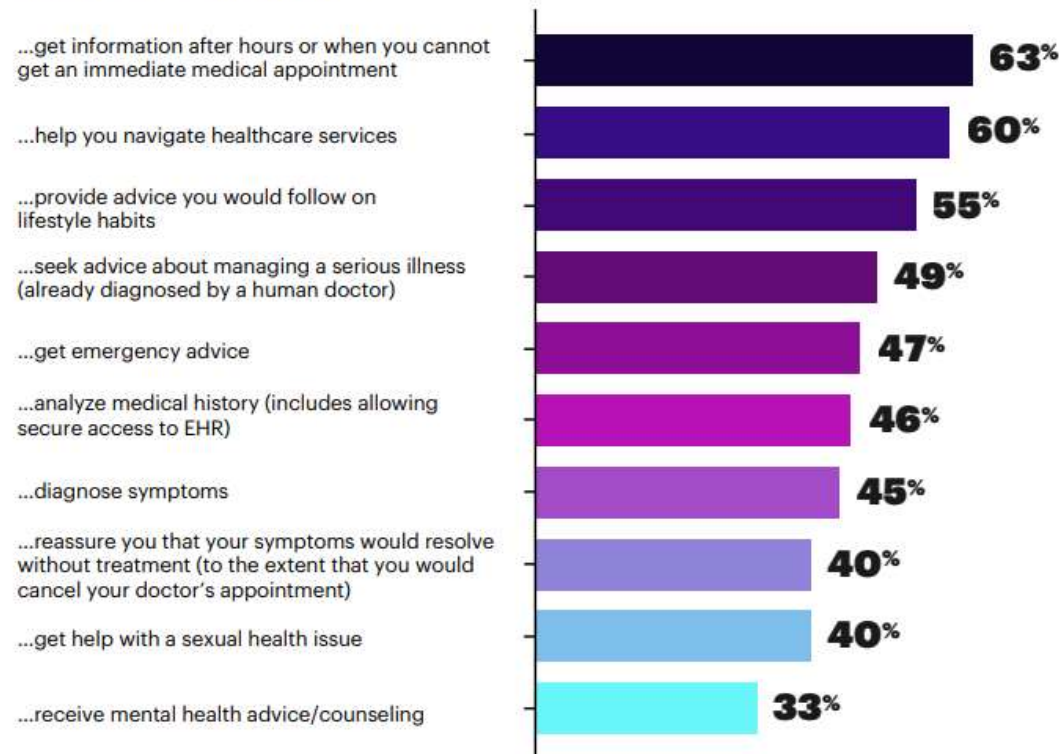
Olfaction



- Digestive
- Renal
- Endocrine
- Nervous
- Cardiovascular
- Senses**
- Musculoskeletal
- Respiratory
- Immune
- Reproductive
- Skin

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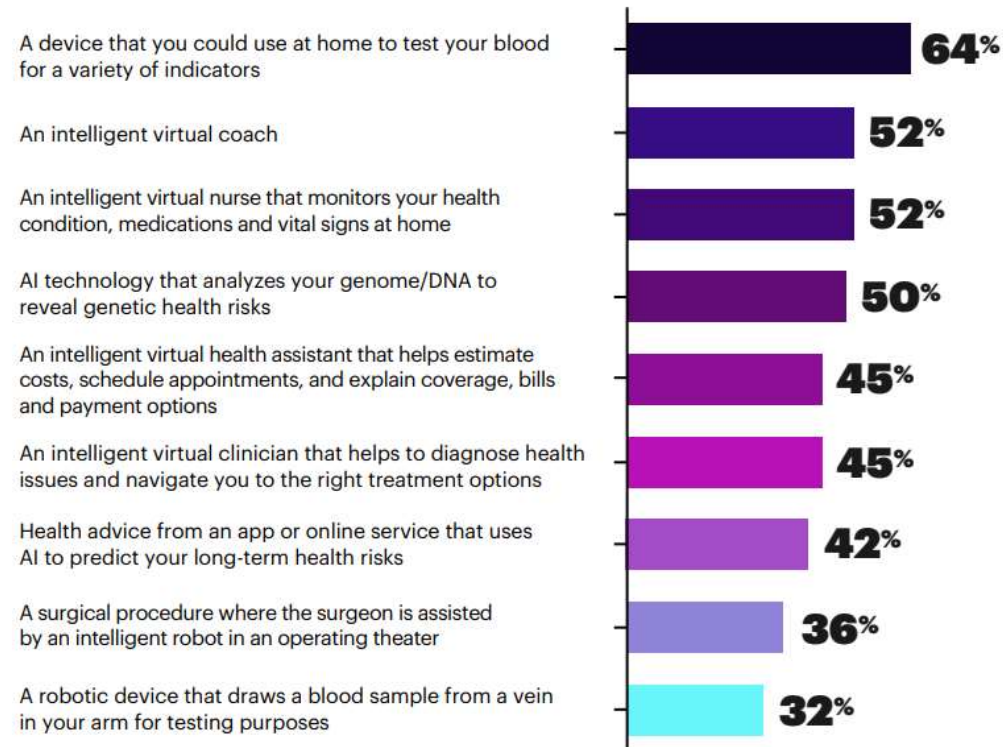
Figure 10. Consumer likelihood of using health services powered by intelligent technology to...



Accenture commissioned a **seven-country survey of 7,905 consumers aged 18+** to assess their attitudes toward healthcare technology, modernization and service innovation. It is the latest in a series of annual health technology surveys tracking the perspectives of consumers across themes ranging from electronic health records and health management to virtual health and cybersecurity. The online survey included consumers across seven countries: **Australia (1,031), England (1,043), Finland (848), Norway (768), Singapore (957), Spain (957), and the United States (2,301)**. The survey was conducted by Longitude on behalf of Accenture between October 2017 and January 2018.

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Figure 8. Intelligent health technologies consumers are most likely to use



Accenture commissioned a seven-country **survey of 7,905 consumers aged 18+** to assess their attitudes toward healthcare technology, modernization and service innovation. It is the latest in a series of annual health technology surveys tracking the perspectives of consumers across themes ranging from electronic health records and health management to virtual health and cybersecurity. The online survey included consumers across seven countries: **Australia (1,031), England (1,043), Finland (848), Norway (768), Singapore (957), Spain (957), and the United States (2,301)**. The survey was conducted by Longitude on behalf of Accenture between October 2017 and January 2018.

Perceived age and survival

It is better to be a year older than look a year older

- Risk of death increases by 11% every year you are older.
- Risk of death increases by 15% for every year you **look** older.

Mortality is written on the face

- Twin with older face more likely to die first.
- No link with surrounding.

12 years of
survival data &
face swap
study

Christensen K, *et al.* (2009) BMJ.
Gunn D.A., *et al* (2016) J. Ger A Biol Sci Med Sci

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OPEN ACCESS Freely available online



Why Some Women Look Young for Their Age

David A. Gunn^{1*}, Helle Rexbye², Christopher E. M. Griffiths³, Peter G. Murray¹, Amelia Fereday¹, Sharon D. Catt¹, Cyrena C. Tomlin¹, Barbara H. Strongitharm¹, Dave I. Perrett⁴, Michael Catt⁵, Andrew E. Mayes¹, Andrew G. Messenger⁶, Martin R. Green¹, Frans van der Ouderaa⁷, James W. Vaupel⁸, Kaare Christensen²

¹Unilever Discover, Sharnbrook, Bedfordshire, United Kingdom, ²The Danish Twin Registry and Danish Aging Research Center, Institute of Public Health, University of Southern Denmark, Odense, Denmark, ³Dermatological Sciences, University of Manchester, Salford Royal Hospital, Manchester, United Kingdom, ⁴Perception Lab, School of Psychology, University of St Andrews, St Andrews, United Kingdom, ⁵Institute for Ageing and Health, Newcastle University, Newcastle Upon Tyne, United Kingdom, ⁶Department of Dermatology, Royal Hallamshire Hospital, Sheffield, United Kingdom, ⁷Netherlands Consortium for Healthy Ageing, Leiden University Medical Centre, Leiden, Netherlands, ⁸Max Planck Institute for Demographic Research, Rostock, Germany

monozygotic twin sister composites

- A) Younger looking: mean perceived age 64 [57–70]
- B) Older looking: mean perceived age 70 [60–85]

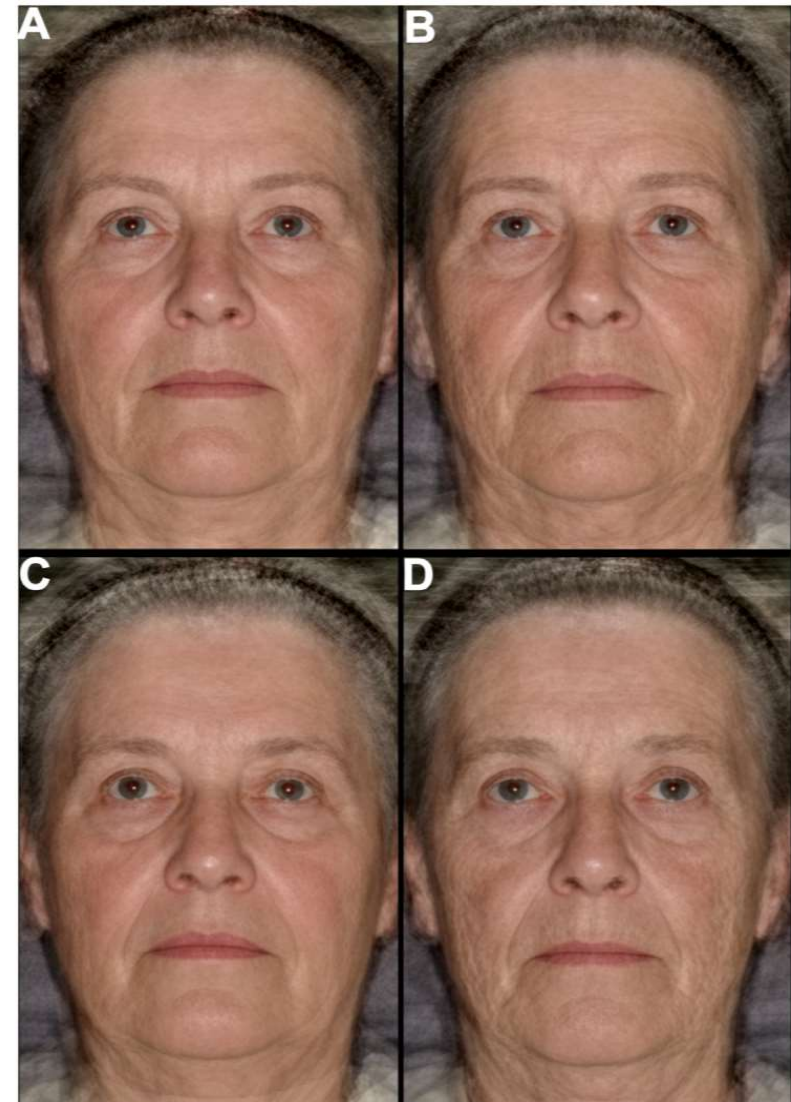
dizygotic twin sister composites

- C) Younger looking: mean perceived age 64 [59–74]
- D) Older looking: mean perceived age 76 [69–84]).

Older looking composites show:

- increased skin wrinkling
- increased nasolabial fold
- grayer skin color
- thinner face
- reduced lip fullness. S

Figure 1. Composite images representing the effects of environmental factors on variation in perceived age between monozygotic twin sisters (upper images) and the effects of environmental and genetic factors on variation in perceived age between dizygotic twin sisters (lower images). a, Younger looking and **b,** older looking monozygotic twin sister composites (mean perceived age 64 [57–70] and 70 [60–85] respectively). **c,** Younger looking and **d,** older looking dizygotic twin sister composites (mean perceived age 64 [59–74] and 76 [69–84]). The older looking twin sister composites demonstrate signs of increased skin wrinkling, increased nasolabial fold shadowing (running from the lateral edge of the nose to the outer edge of the mouth) and, particularly for the non-identical twin comparison, a grayer skin color, a thinner face and reduced lip fullness. Each composite image was derived from 14 twin images and the chronological age was 67 [60–76] and 69 [61–79] for the monozygotic and dizygotic composites respectively; square brackets denote age ranges.
doi:10.1371/journal.pone.0008021.g001



www.ncl.ac.uk/nica

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2779449/pdf/pone.0008021.pdf>



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IMDB-WIKI – 500k+ face images with age and gender labels

Rasmus Rothe, Radu Timofte, Luc Van Gool

DEX: Deep EXpectation of apparent age from a single image

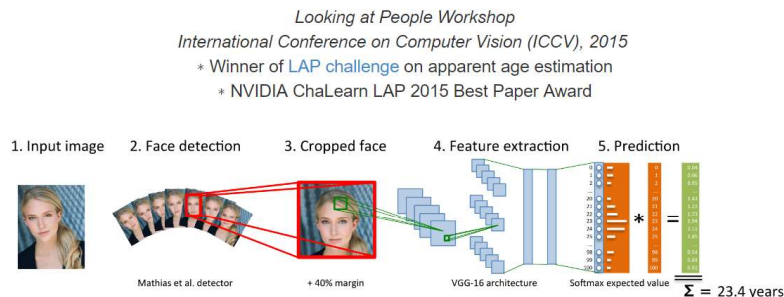


Table 3. ChaLearn LAP 2015 final ranking on the test set. 115 registered participants. AgeSeer did not provide codes. The human reference result is the one reported by the organizers.

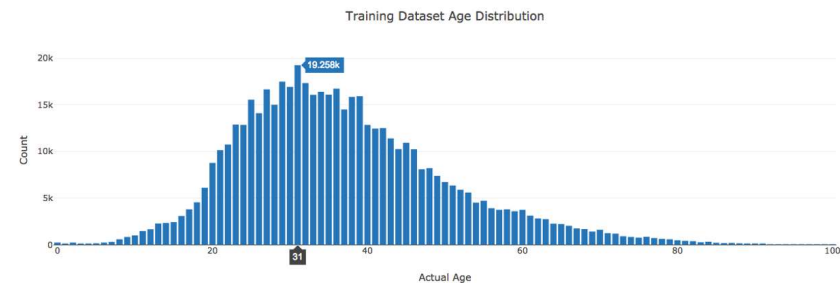
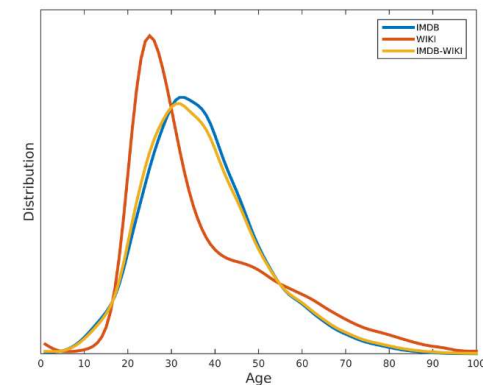
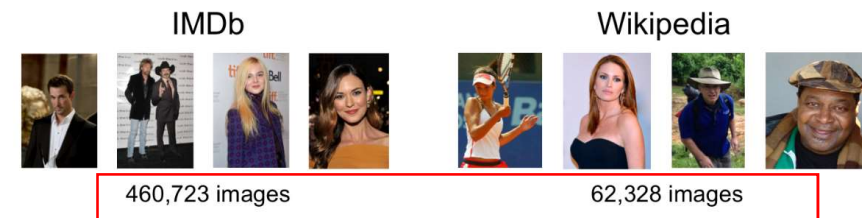
Rank	Team	ϵ error
1	CVL-ETHZ (ours)	0.264975
2	ICT-VIPL	0.270685
3	AgeSeer	0.287266
3	WVU-CVL	0.294835
4	SEU-NJU	0.305763
	human reference	0.34
5	UMD	0.373352
6	Enjuto	0.374390
7	Sungbin Choi	0.420554
8	Lab219A	0.499181
9	Bogazici	0.524055
10	Notts CVLab	0.594248

methods drop below 0.34 ϵ -error, the human reference performance as reported by the organizers during the development phase.

<https://data.vision.ee.ethz.ch/cvl/rrothe/imdb-wiki/>
Vision Lab Zurich: <http://www.vision.ee.ethz.ch/en/>

The IMDB-WIKI dataset

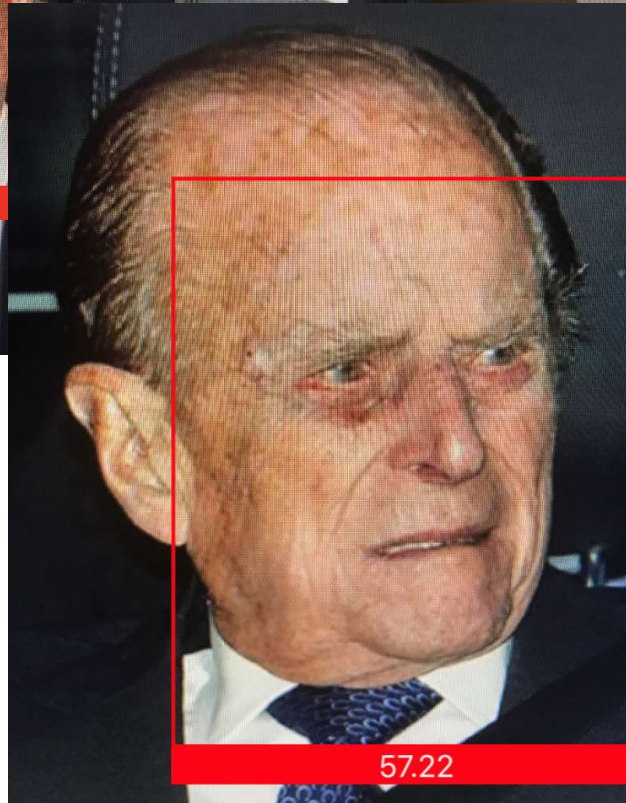
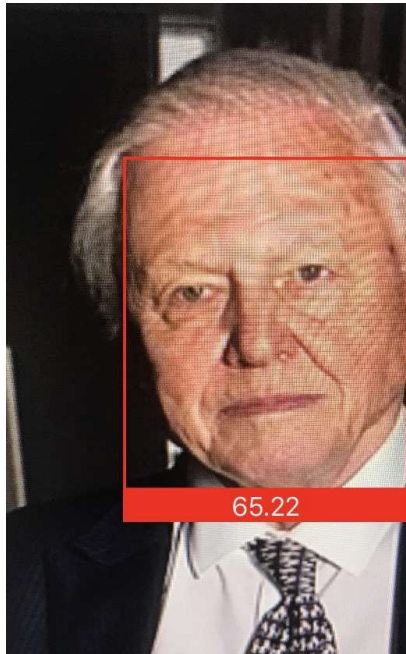
To the best of our knowledge this is the largest publicly available dataset of face images with gender and age labels for training. We provide pretrained models for both age and gender prediction.



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Grace Jones of Worcestershire
b. 1906 on 112 birthday 16 September 2018



Grand Challenges

- Harness the power of innovation to help meet the needs of an ageing society.
- Put the UK at the forefront of the artificial intelligence and data revolution;
- Maximise the advantages for UK industry from the global shift to clean growth;
- Become a world leader in shaping the future of mobility



John Bell GBE, FRS, FMedSci Regius Professor of Medicine, University of Oxford
Chairman, Office for the Strategic Coordination of Health Research

*The Industrial Strategy recognises the opportunity arising from our ageing societies to engender **Healthy Ageing** against a recent historical context of growing social and spatial inequalities and recognises the rise of big data and artificial intelligence. The first has already birthed a cri-de-coeur on behalf of the 'left behinds' and a demand that future growth be inclusive and the second energises a Fourth Industrial Revolution.*

Productivity and social justice have always made for awkward bedfellows, but it is a particular concern that these two forces might act in contradictory ways. Is confrontation inevitable? Can public policy do anything to effect their reconciliation?

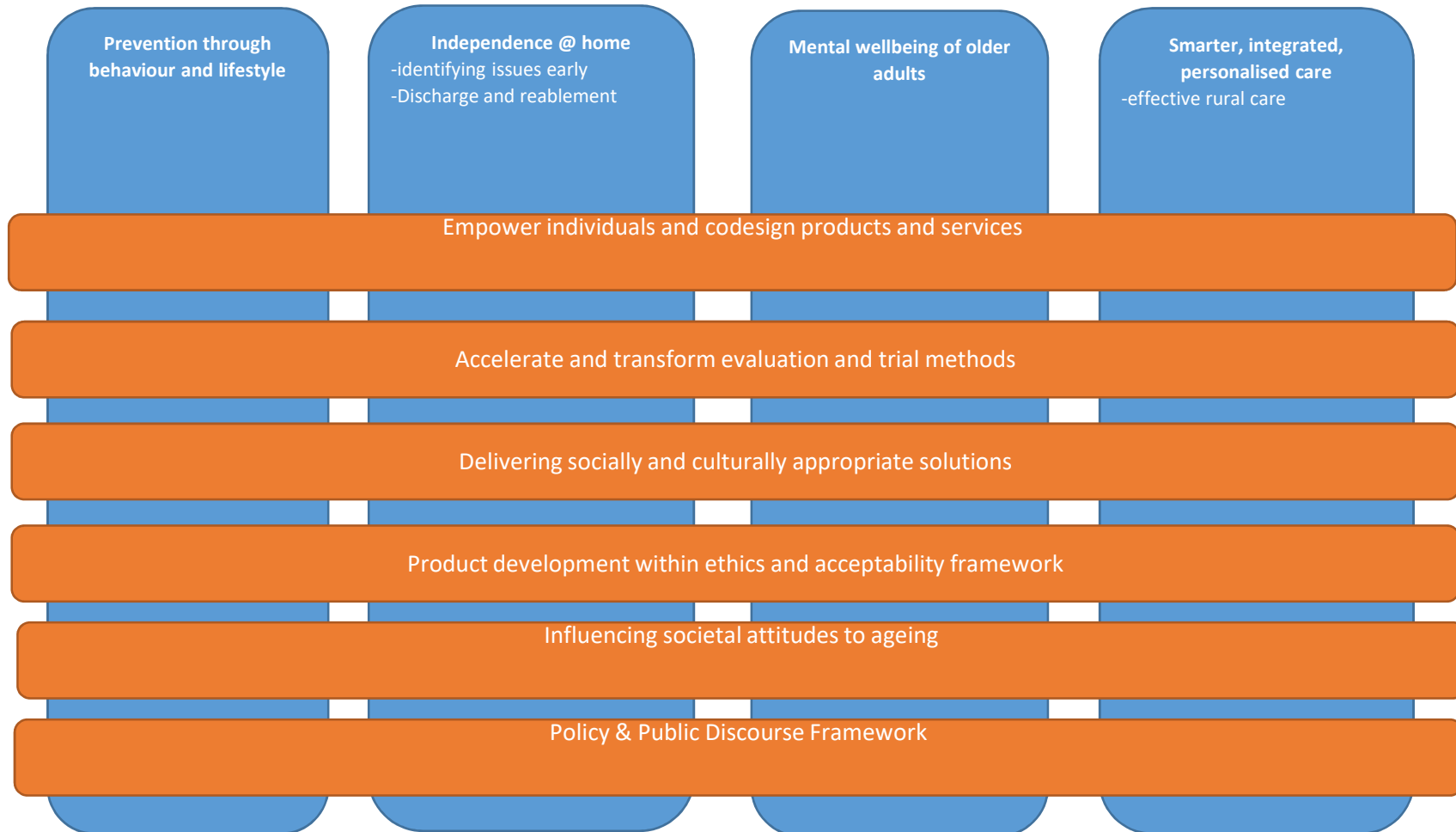
Mark Boyle

Wave 2 Healthy Ageing ISCF Themes

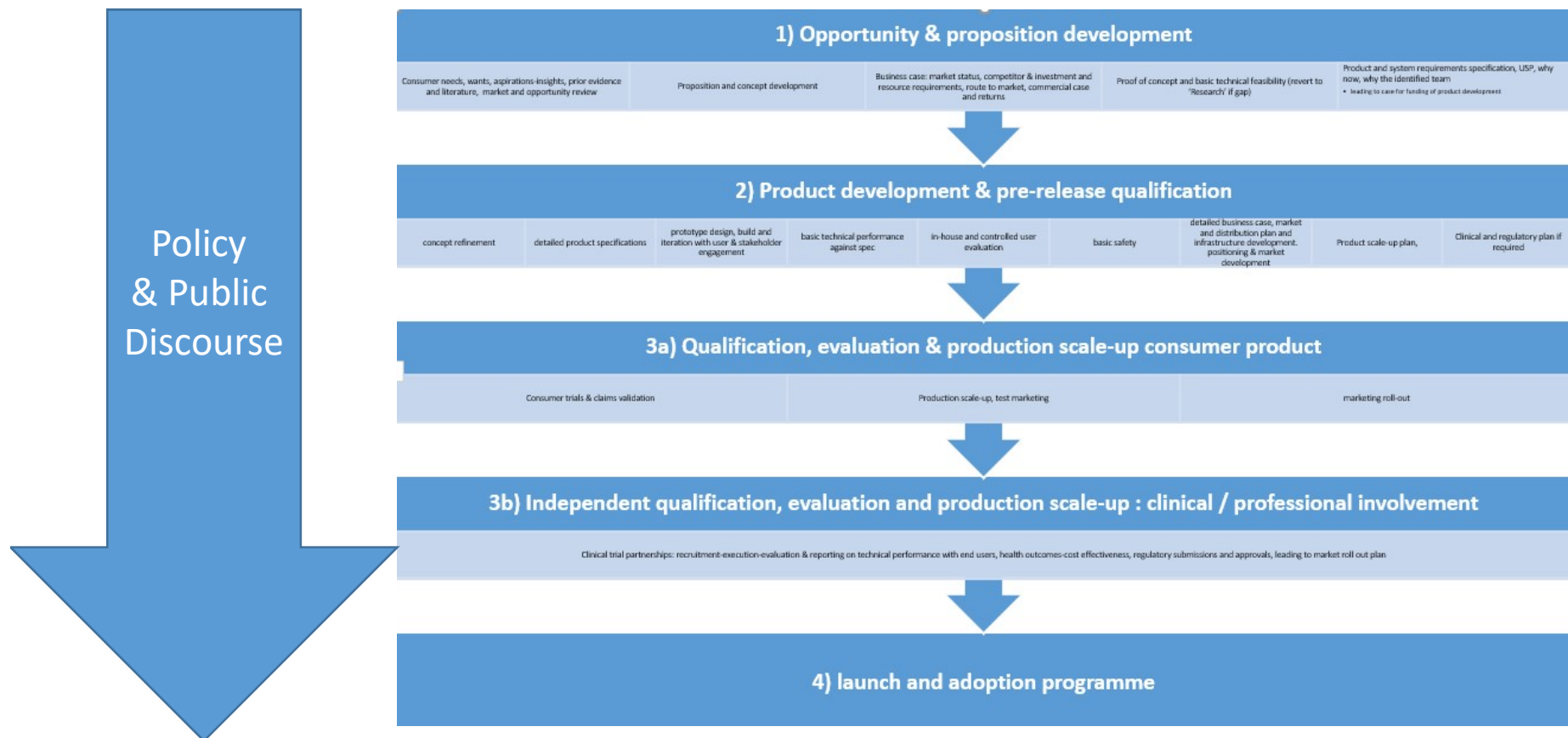
- 1) **Sustaining Physical Activity** – Stimulate new products, services and social innovations to help people in mid-life to increase and sustain their levels of physical activity
- 2) **Designing for age-friendly homes** – Stimulate inclusive design of mainstream home products and innovative services and products to enable people to live independently and safely at home for longer.
- 3) **Maintaining health at work** – Stimulate new products and services and social innovations to promote and maintain older workers health and wellbeing.
- 4) **Managing common complaints of ageing** – Stimulate new products, services and business models including social innovations to improve the quality of life of people in later life with a range of common age related conditions.
- 5) **Creating healthy and active places** – Stimulate the development of places that encourage people in later life to sustain physical activity and social engagement.
- 6) **Care support for people with cognitive impairment** – Stimulate new products and services to improve the quality of life of people with cognitive impairment.
- 7) **Reducing social isolation** – Stimulate new products, services and innovations to tackle barriers to people remaining socially connected as they age.

Northern Ecosystem: Vision

“to overcome market failure by creating a coordinated Northern Ecosystem to accelerate the development, evaluation and evidence-based adoption of lifestyle products and services to help us age well and function independently”.



Northern Ecosystem?



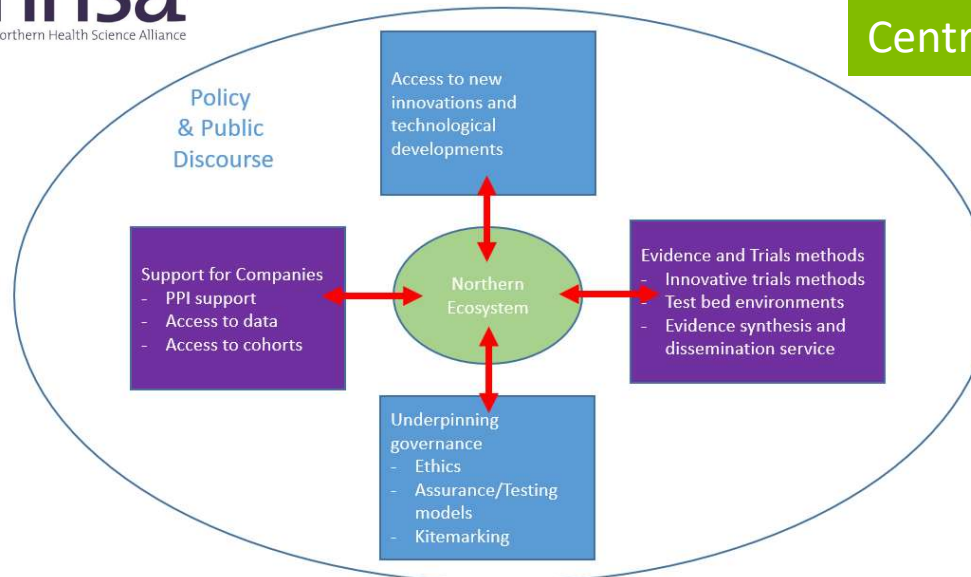
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Northern Ecosystem

*Multiple Proposals Across N8
Linked to Common Aspiration
For a Northern Ecosystem*



National Innovation
Centre For Ageing



Northern Ecosystem: Vision

"to overcome market failure by creating a coordinated Northern Ecosystem to accelerate the development, evaluation and evidence-based adoption of lifestyle products and services to help us age well and function independently".

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