

NEIGHBOURHOODS OF THE FUTURE

20
19

The text is rendered in a playful, rounded font where each letter is composed of multiple overlapping, semi-transparent colored segments. The colors used include red, yellow, green, blue, purple, orange, and black. The letters are arranged in five rows: 'NEIGH', 'BOUR', 'HOODS', 'OF THE', and 'FUTURE'. The 'O' in 'BOURHOODS' is a ring shape with the year '2019' centered inside it.

CREATING A BRIGHTER FUTURE FOR OUR OLDER SELVES

AN AGILE AGEING ALLIANCE PRODUCTION MADE POSSIBLE BY TATA STEEL

NEIGH BOUR HOODS OF THE FUTURE

20
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BETTER HOMES FOR AN AGEING POPULATION

IMPROVING CONSTRUCTION, HEALTH,
CARE, DESIGN, TECHNOLOGY & FINANCE



AgileAgeingAlliance

TATA STEEL

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THE CHALLENGE

In an ideal world, what could our homes and neighbourhoods look like in ten to twenty years' time?
What should we be doing now to disrupt the status quo and make this vision a reality?



Neighbourhoods in the sky

Dear Ian,

You persuaded me to take an interest in urban living in the future, and I began to think about it. I commissioned a number of slides, amending them as further ideas were generated. The whole subject of regular or irregular arrays of moderately high-rise buildings, connected by "Garden Bridges" (I do not claim total originality for these thoughts, small experiments have been built).

Buildings of 15-20 storeys high, with 120 dwellings (average 3 1/2 people in each, connected by bridges, long enough and wide enough to save a good deal of open space on the ground), in a regular array of 12 (boring, but makes the sums easier) would accommodate about 5000 people. This would make it worthwhile for some services like small convenience shops, dry cleaners etc. to be included, would cut down the need for commuting, as well as a work place. The case for having highish rise buildings connected at several levels and sides of the building, also has the very topical advantage of providing a multitude of escape routes, firefighting points, and relief if the lift system in one block failed. In my assumptions, using a 3 x 4 array of 12 buildings, there would be 17 bridges each 50m long and 6m wide, adding an open space of 5000m², with a little more at ground level. If anybody had the courage to build the whole array, as a single steel framed building, with the bridge spaces left uncovered, except for a floor, this could be cost saving. I have worked out the need for shallow rooting plants, thin soil layer, fed possibly by a simple hydroponic system, light weight garden walls etc. It would be a commercial decision, whether all flats had a little garden or allotment (actually, not enough space), higher rents, except rite of passage, for those who do have gardens, or public space.

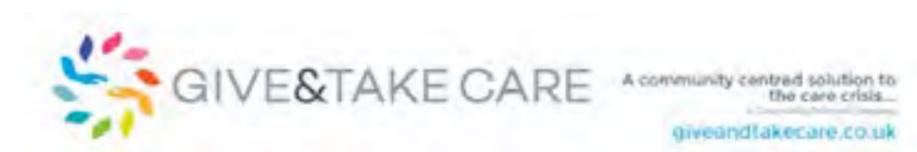
Transport services could operate at ground or basement level. If society allowed some direction where you had to live, care of the elderly could be built in, by giving some advantage to relations.

Am I completely unrealistic, or could society move in this direction?

Best wishes,

Professor Heinz Wolff
CEO of Give & Take Care

Photo credit: Photo by REX (1302935g) Professor Heinz Wolff



City in the Sky – From the imagination of Heinz Wolff



You say you want a revolution



We all want to change the world // Integrated action //
Ageing Society Grand Challenge // Challenging the status quo //
Reimagining our Neighbourhoods of the Future



Ian Spero
Founder, Agile Ageing Alliance (AAA)

The Industrial Strategy Challenge Fund (ISCF) may not have the snappiest title but it is core to the government’s commitment to increase funding in research and development by £4.7 billion over four years. The aim – to strengthen UK science and business.

As an Innovate UK Monitoring Officer, I am beginning to see the juicy fruits of this investment fuelling the growth of a new breed of entrepreneur, propagating potentially game changing innovations that encompass quantum science, leading-edge healthcare, robotics, clean energy and more.

The ISCF Challenges that are most relevant to the more than 1,000 private, public and third sector members of the Agile Ageing Alliance (AAA) are ‘Transforming Construction’ and the forthcoming ‘Ageing Society Grand Challenge’. This particular challenge has been granted over £300 million to facilitate the development of “new technologies that will revolutionise the way we age and provide everyone with the best possible chance to grow old with dignity in their own home”.

On the face of it, this is great news but how many of us will get to enjoy the luxury of growing old in the comfort of our own home, when the majority of UK housing stock is not fit for purpose?

Writing in Neighbourhoods of the Future 2017, Judith Torrington, author of ‘Future of Ageing: adapting homes and neighbourhoods’ (Government Office for Science), summarised the challenge:

“People age differently but physical decline is inevitable: 45% of the UK population over state pension age is disabled in some way. With age, nearly everyone experiences some loss of mobility and increasing difficulty in bending, stretching and weight bearing.

The key features of accessibility – level access, flush thresholds, wide doors and circulation space and entrance level toilets-are found in only 5% of homes in England.

Older people may have difficulty getting in and out of baths, walking upstairs, bending down and reaching up. Some of these needs can be met by adapting existing homes (See Sue Adams page 36). But studies indicate that 16% of homes would need major structural alterations to become fully accessible, and in 28% of homes alteration would not be feasible.”

Unfortunately, we have not seen much in the way of progress.

Then, there is the economic argument. According to a recent report for the European Commission by Technopolis Group and Oxford Economics, home adaptation can delay a move to residential care by four years, limiting pressure on the care system. Relatively low cost, simple home modifications can also help reduce the falls that need medical treatment by 26%. This is estimated to lead to annual savings of £500m to the NHS and social care services.

How many of us will get to enjoy the luxury of growing old in the comfort of our own home, when the majority of UK housing stock is not fit for purpose?

Looking to the future, if we really want to challenge the status quo, we need to adopt a more holistic, cooperative and integrated approach to trialling, evaluating and mainstreaming innovative solutions at scale.

Challenging the status quo

But, what does good look like? Inspired by a conversation with the amazing Professor Heinz Wolff (RIP) we asked expert stakeholders what, in an ideal world, our homes and neighbourhoods could look like in 10 to 20 years, and what steps must be taken now to disrupt the status quo and make their vision a reality?

Heinz took my challenge very seriously indeed. In his email on the previous pages he laid out his vision for a neighbourhood in the sky for which he even commissioned images, which can be found on page 8 and below.

As can be seen from the breadth of thought provoking articles curated herewith, all of our contributors have risen to the occasion; laying out their vision with creative flair, without losing sight of the real world challenges specific to their respective disciplines.

Even with the best will in the world, this project would not have been possible without the support of Tata Steel, the UK’s largest steel company and manufacturer of high-quality construction materials. Tata’s industry expertise, influence and product base adds real weight to our mission, while providing

greater flexibility to architects in construction and supporting designers with any future adaptability needed in a dwelling.

Collective responsibility

Neighbourhoods of the Future 2019 captures the thoughts and predictions of a veritable ‘who’s who’ of distinguished experts and emerging thought leaders. In these pages, you will discover novel concepts for disrupting construction, finance, social and business models.

Read between the lines and you will see a future where ‘cognitive homes’ are grouped into ‘smart’, intergenerational neighbourhoods, seamlessly incorporating interoperable technical and social infrastructure, located within age-friendly public spaces.

We have grouped the articles under five headings. Here follows a taster of what’s in store:



Neighbourhoods in the Sky - Image by Heinz Wolff

Design

Royal College of Art (RCA) Director, and Helen Hamlyn Chair of Design, Jeremy Myerson, says it's time for designers to flex their creative muscles (see page 172). Kieran Singleton of Forge Design agrees, having seen that platform design has transformed the automotive industry and wondering could the same happen for housing? (see page 176)

You can also read about a fascinating project involving RCA students who collaborated with contemporaries in Singapore - designing for their future selves (see page 188). While Marta Hernandez, Director of RMIT Europe, reminds us that we should pay equal attention to design in the urban environment as in the home (see page 194).

One of the design world's leading statesmen, Paul Priestman, points out that mobility is at the heart of extending our healthy lives. In his article on page 198, Paul explores ways we can rethink transport to improve individual experience. To complement this, design guru, Sebastian Conran, believes that soon it will be social/companion robots that will share our personal space, interact with us and with each other, to provide emotional engagement and entertainment (see page 222).

Health & Care

Martin Green, CEO of Care England, predicts the next few years will be remembered as a period of seismic change, akin to that of the Industrial Revolution, and will redefine what it means to be human in the 21st century (see page 228).

Shirley Cramer, CEO of The Royal Society for Public Health, envisages a radical shake up for sector, involving a much broader group of professionals and volunteers sharing responsibility for improving and protecting the public's health (see page 234).

The digital revolution has created a growing expectation that technology and information services should be integrated throughout the delivery of health and care services. The key to success, according to DHI Director, George Crooks, is a simplified but robust consent model, owned by us as individuals (see page 240).

The influence of SMEs in healthcare is escalating. Oviva, one of the fastest growing digital health companies in the UK, represents a new breed of practitioner who are transforming the health and care landscape (see page 250).

If you are wondering what role pharmacies will play in our neighbourhoods of the future, find Sarah Heywood, CEO of MedCity, and read her fascinating predictions on page 244.

Technology

Wired, the world's foremost media authority focusing on how emerging technologies affect culture, the economy, and politics believes that:

"The connected home market has a trillion-dollar potential but it's currently broken and dysfunctional, with bad user experience, poor technology integration and lack of business cohesion." And that "there is a huge opportunity to reframe the business models currently held by more traditional services."

PricewaterhouseCoopers predict the global connected home market to be worth \$150bn by 2020. The market is expected to grow strongly from 2020 onward, based on the assumption that a 'new' generation of older people, who are more tech-savvy than the previous generation, will be inclined to invest in smart home solutions.

In parallel, BCC Research predict the global market for ICT solutions for healthcare monitoring in private homes to grow from nearly \$11.3bn in 2016 to roughly \$33.1bn by 2021. These services also change the focus from treatment to prevention.

According to Wendy Tindale, CEO of NHS England Test Bed, Devices for Dignity, technology has the capacity to create efficiencies in the delivery of care, early diagnosis and personalisation of treatments, and transform the ability of individuals to participate actively in their own care and management of long-term conditions. Wendy looks to the future of tech and the NHS on page 278.

In our Home Smart Home feature (see page 270) you will find some of the more innovative products and services coming to a neighbourhood near you, from security droids to robotic kitchen arms.

There is no doubt that technology can serve as a force for good, but we cannot afford to ignore the potential dangers. With that in mind, do read the insightful articles we have commissioned focusing ethics (page 294), security (page 290) and interoperability (page 298).

This report captures the thoughts and predictions of a veritable 'who's who' of distinguished experts and emerging thought leaders.

Finance

According to a recent report for the European Commission by Technopolis Group and Oxford Economics, the size of the economic opportunity is significant. Total consumption by or on behalf of the 24m people over 50 years old was close to £400bn in 2015 and is expected to grow by 40% until 2025. This expenditure drives a large amount of economic activity via direct, indirect and induced impact channels.

The overall economic impact on the UK's GDP was £422bn in 2015, or one fifth of the total GDP of the national economy. Through this economic activity, over 9m jobs were supported in 2015, or 28% of employment in the UK. The higher share of employment relative to contributions to GDP illustrates that activity is sustained, in general, in comparatively labour-intensive industries, where a high number of employees are required to deliver a given level of output. Over the next decade, Silver Economy GVA is forecasted to grow by 50% compared to employment growth of around 13%.

On the other hand, in nearly every developed country, ageing populations constitute a significant threat to government spending, workforce shortages, and social support structures over the next 30 years.

So, we need to be objective. Let's avoid talk of 'Silver Tsunamis' and other expressions of doom and gloom.

According to Joseph F. Coughlin, Director of the Massachusetts Institute of Technology AgeLab, "The rise of the longevity economy remains the most important yet predictable market event facing the investment community today but selling more of the same old solutions is no longer a safe bet. How can you be sure a company is serving up what older people actually want? The sorts of products that tomorrow's older consumers will avoid at all costs have one thing in common: They treat older people as a problem to be solved—often at the expense of their choice of home, community, accessories, fashion, activities, and, yes, fun."

We are living in extraordinary times which warrant unorthodox thinking and strategies. It is time for farsighted corporations to follow the lead of Tata Steel and become advocates and drivers for change.

Steven Ellis, CEO of Legal & General Home Finance, makes some particularly interesting points on the 'Silver Spenders' in his article, 'The final chimes of carriage clock retirement on page 318. I would also encourage you to consider Martin Clark's novel ideas for social funding solutions to support the development of new types of communities on page 324.

Integrated action

Our contributors have made their ambition clear. They are determined to join forces in a spirit of open innovation to construct a prototype Neighbourhood of the Future. Rather than fearing the future, they, and we, believe in being pro-active in preparing for the population shifts to come. Crucially, we demand that these provisions for a healthier, happier later life are accessible to everyone.

Now is the right time for those committed to shaping a healthy, secure and purposeful future for our older selves to unite and elevate agile ageing and longevity to a central position in the cultural/political landscape.

Neighbourhoods of the Future is our way of involving a wide group of cross sector stakeholders in creating the best possible vision for the next 10 to 20 years, as well as co-creating the steps required to achieve it. Through collaboration, integrated action and combined accountability, the future our contributors paint is achievable.

Enjoy the passionate calls-to-action ahead. They have been written from the heart. Then, turn to page 342 to see how you and/or your organisation, can join the revolution.



AgileAgeingAlliance



Why is a steel company interested in housing?



Housing is a current and pressing problem // A paradigm shift // Steel gives architects and designers creative license // A blueprint for our future



In a free enterprise the community is not just another stakeholder in business, but is, in fact, the very purpose of its existence.

Bimendra Jha
Chief Executive Officer, Tata Steel UK

At the same time that Tata Steel was created in 1907, a town grew up around the new steelworks at Jamshedpur. In a letter to his son Dorab, the founder of the Tata Group, Jamshedji Tata, outlined the following guiding principles for its layout and design:

“Be sure to lay wide streets planted with shady trees, every other of a quick growing variety. Be sure that there is plenty of space for lawns and gardens. Reserve large areas for football, hockey and parks. Earmark areas for Hindu temples, Mohammedan mosques and Christian churches.”

Such a statement would not have been out of place coming from the pen of Ebenezer Howard, the father of the Garden Cities movement in Britain. It demonstrates Tata’s appreciation that, even at a time of rapid industrialization and population migration from the countryside into the cities and towns, the art of place making was key to the success of the enterprise. This means providing a decent, sustainable and, above all, pleasant place for people to live and work.

Tata Steel in India and its Tata Steel Europe operation still hold these founding values dear. They help to define us in a sector where shareholder value and return on investment can sometimes overshadow the fact that the inception of almost every enterprise was brought about because, at some point, someone wanted to make or do something better.

In construction, housing is the single most important problem we currently face. At Tata, we regard this not only as a business opportunity, but also as part of our duty to try and do something better in the communities we serve.



The Three Magnets – Ebenezer Howard’s diagram illustrating the advantages of the garden city

Our ambition, as a collective, is to build a prototype Neighbourhood of the Future.

Housing is a current and pressing problem

In 2018, recognizing that we face many of the same problems and challenges today, we can still take inspiration from our founder's words.

In the western industrialised nations, the potential negative impact of an ageing society and the so-called 'demographic timebomb' are becoming increasingly apparent.

By 2050 in the UK 30% of the population will be over 60 years old. This group will consist of a much more active and participatory cohort than has traditionally been associated with later life. It also constitutes a significant business opportunity.

Current UK Government spending on ageing and age-related issues is projected to be 2.3% of GDP. This amounts to more than £40 billion.

Right now, the UK provision for an ageing population is piecemeal. It is provided in the private sector to those who can afford it in the shape of 'retirement homes' and health insurance, and in the public to those in most need. Quality provision provided by the state and local authorities is increasingly hard to fund. Which means that the assets of those requiring care often have to be sold in order to be able to afford it.

Part of this problem relates to the design and provision of housing, be it privately owned, privately rented or (to a lesser extent) through a Housing Association or Local Authority. One element of this is the – literally – inbuilt problems associated with an ageing housing stock. But mostly, it's the result of a disassociation – the end user is not the prime consideration of the housebuilder. Instead, the focus is on land value uplift (housing as a method of increasing the value of land) and a constrained supply (to keep demand high).

If we really want to challenge the status quo there needs to be a paradigm shift in the way housing is considered – not as a series of rungs which the consumer must climb,

from starter home upwards, and then back down again in later life, but to a building type capable of adaptation, of morphing to support a growing family, and then accommodating an ageing one. This can only be achieved by looking at the needs of the occupant and how they change over time.

A paradigm shift

The current market, it could be argued, is not interested in creating long-term solutions, because it is not invested in the long term. Changing this view involves the creation of innovative financing models and patient investment into developments which, in turn, would reduce the need to realise investment as soon as the building is completed. More importantly, this could allow the occupants of a dwelling to have a stake in the community. Imagine a housing model where you were encouraged to stay, rather than move as soon as your needs changed.

Our approach is based on work carried out between 2015-17 by the Agile Ageing Alliance on Neighbourhoods of the Future. The white paper produced contained a strategy to provide adaptable, digitally enabled dwellings which provide access to services such as healthcare and work across a broad demographic. This enables the creation of 'cognitive homes' for life, rather than the current stratified model of provision where it is often necessary to 'move or improve'.

Our proposal is to facilitate the building of a Neighbourhood (or Neighbourhoods) of the Future at scale in the UK. As a consortia of like-minded designers, suppliers and manufacturers. The first step towards making this happen is this white paper, which we see as a blueprint for our homes and neighbourhoods of the future.

Steel gives architects and designers creative license

Steel can offer real advantages in housing. By adopting a platform approach, not unlike that used in the car industry (see page 176),

If we really want to challenge the status quo, there needs to be a paradigm shift in the way housing is considered.

we can redeploy a scaled-down version of a structural steel frame which is generally used to build high rise apartments and offices.

The basis of our approach is to employ a state-of-the-art agile steel frame to support fully spanning elements such as wall infill panels and floors. This in turn will afford a great deal of flexibility to the designer. The improved load bearing capacity of the frame, and the positioning of the load bearing elements out to the external faces, significantly frees up the internal space, and aids the future adaptability of the dwelling.

Keeping the frame connection design simple reduces costs and can allow us to build more quickly; typically up to twice as fast as traditional methods. Simplification of the construction process is also important in helping to address the skills shortage in the sector.

We are also committed to enabling dwellings to incorporate technical innovations as and when they become available. This needs consideration at the design phase, but is understandably difficult to predict. Flexibility is key.

There is an urgent need for a new approach to ageing; one where the knowledge, experience and capabilities of this significant part of the population can be employed (literally and metaphorically) to the advantage and wellbeing of both the individual and wider society.

The basis of this approach starts in the home – a place where a person so enabled can live, work and play without impediments imposed on them by their environment. Well-designed spaces coupled with augmented systems and 'cognitive' services which have been tailored to the needs of the recipient, are the starting point of a cradle-to-grave approach to housing design where, as the needs of the occupant change over time, the space can adapt with minimal disruption, thus reducing the need for a person to move and in turn strengthening the building of and continuity of the 'neighbourhood'.

A blueprint for our future

The first Neighbourhoods of the Future white paper set out a manifesto for change and described some of the products, services and notably a housing design which could bring about the required paradigm shift in our attitudes and approach to ageing. It seemed like a natural progression to suggest that Neighbourhoods of the Future 2019 will be a blueprint for realizing the built expression of that change – a Home for Life.

Such a blueprint will describe how such a dwelling could be built, and how its design is based on basic, proven space and activity standards, the technologies embedded in the house and the services they provide, and how these might be applied in real situations.

Key to this idea is the necessity of demonstrating, at scale, how such a community will work – our ambition, as a collective, is to build a prototype Neighbourhood of the Future, the first of many, to prove the concept.

Tata Steel has been developing residential systems using steel which are predicated on these principles:

- Everyone has a right to decent housing.
- No-one should be forced to move because their dwelling has become unsuitable.
- Housing should be affordable.
- Housing should be sustainable.

In the words of our founder:

"In a free enterprise the community is not just another stakeholder in business, but is, in fact, the very purpose of its existence."

We believe it is our duty to be a part of the society we operate in. The provision of decent, affordable homes is an expression of that belief.

Photo credit: Images courtesy Tata Steel UK and Chronicle / Alamy Stock Photo. Adaptable Steel frame building CGI image by Jakub Rozanski for WE.MAPOUT Architectural & Design Visualisation Studio

TATA STEEL



Catalysing innovation



Transformative vision // Five extra healthy, independent years of life // Collective responsibility



Professor Michael Catt
Director, National Innovation Centre for Ageing

This white paper, stimulated and compiled by the passion and commitment of Ian Spero, founder of the Agile Ageing Alliance, articulates the aspiration of a broad coalition of business, academia, third sector and other associated organisations to create aspirational neighbourhoods of the future, delivering affordable and flexible homes for life.

The outcomes of the proposed activities will catalyse innovation, not only in new builds but in existing stock and communities. The aspiration is grounded in practical, pragmatic approaches that can be consistent with best evidence and practice, but which are unlikely to be fully realised if left to the dynamics of the existing environment for home and neighbourhood creation. It provides an opportunity for government, both national and local, to show vision and commitment to facilitate and enable.

The greatest challenges we face as a society are:

- Overcoming the inequality in health and wellbeing as we age, and
- Ensuring the development of sustainable and clean environments, without affecting economic and social prosperity.

The challenge of producing homes for life lies at the intersection of the current Industrial Strategy themes of Healthy Ageing, Clean Energy, Big Data/AI, Future Construction and Mobility.

Improvements in our homes, neighbourhoods and built environments have contributed significantly to life expectancy, health and wellbeing. Since the 1840s, female life expectancy has risen linearly in the best performing countries, rising from around 45 years to over 85 in the present day¹.

This cannot be ‘business as usual’. It must be driven by the application of scientific, technical, clinical, health and wellbeing knowledge, combined with the best social, cultural, industrial, commercial, marketing, design and policy practice.

Transformative vision

This increase is one of the exceptional human achievements, coming despite major social and economic upheaval, and it is far from automatic. It is the product of transformative vision, robust research, improved practice and consistent application across many fields of human endeavour. It has arisen not merely from improvements in healthcare but also in our social, economic and utility infrastructure, improved working practices and conditions, reduced environmental exposure and changes in the everyday products and services that influence our lifestyles.

Despite these gains, there is considerable inequality in life expectancy between and within nations². It is estimated that people living in the poorest neighbourhoods in England will on average die seven years earlier than those in the richest neighbourhoods³. Moreover, there is evidence of stalling improvements in life expectancy in the UK since 2011⁴, with some areas of the UK showing a decline.

Healthy life expectancy has not increased at the same rate, leading to more years spent in poor health. Life expectancy for an English male was 79.5 years in 2014-16, with an average healthy life expectancy of 63.3 years, a period of 16.2 years in ‘poor health’. For an English female, life expectancy was 83.1 years but with 19.2 years in ‘poor health’⁵.

Living our lives with sustained health and wellbeing is a near universal aspiration.

Five extra healthy, independent years of life

In this context, the Prime Minister announced an ambitious Industrial Strategy Healthy Ageing Mission that “through our healthy ageing challenge, we will ensure that people can enjoy five extra healthy, independent years of life by 2035, whilst narrowing the gap between the experience of the richest and poorest”⁶.

My organisation, the National Innovation Centre for Ageing, is fully committed to the realisation of this ambitious mission, and will engage with citizens, businesses, finance,

“Increased longevity without quality of life is an empty prize. Health expectancy is more important than life expectancy.”

Dr Hiroshi Nakajima, Director-General WHO 1997

Improvements in our homes, neighbourhoods and built environments have contributed significantly to life expectancy, health and wellbeing.

academia, clinical, third sector, governmental organisations and, of course, the Agile Ageing Alliance in the UK and internationally to achieve them.

The realisation of these missions will require a clear focus on the needs and aspirations of citizens, and rigorous academic and clinical research. It requires financial, commercial, third sector and governmental agencies to be committed and work together to catalyse the market forces, investment, sector skills and environment for them to flourish.

In this white paper, Bimlendra Jha, Chief Executive Officer of Tata Steel UK, clearly articulates how practical innovation in construction techniques can contribute to better lives and align with business opportunity and growth. This applies to the wider economy, domestically and internationally.

Collective responsibility

While the construction industry has made tremendous strides in health and safety, there remain challenges to long term health and continued participation in the workforce, particularly within certain construction trades and roles. Innovations in construction processes, such as those proposed by Bimlendra Jha, provide an opportunity to transform the expectations of workers health and wellbeing. These innovations can also contribute directly to sustainability and the environmental legacy, alongside the primary objective of providing homes for life and neighbourhoods of the future.

Our homes and the environments where we live and work shape our life expectancy, and the number of years we spend in good health. They affect our quality of life and our social and economic contribution to society in later years. We have an opportunity to continue the progress achieved by earlier generations, by addressing the challenges that face our society, something that can only be done collectively. The common objective should be to reduce inequalities, ensuring health and wellbeing as we age, and transforming our society to establish sustainable and clean environments while generating economic and social prosperity.

Photo credit: Images courtesy of the National Innovation Centre for Ageing

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Couple enjoying new development at Gifford Lea in Hertfordshire



Homes for later life



Why are we missing this huge opportunity? // Money is not the biggest problem // Action must come from three main sources

Why is it so much more lucrative for all the volume house-builders to focus on younger buyers and ignore the older age groups?

Lord Richard Best
Chair, All Party Parliamentary Committee on Housing and Care for Older People

Two recent reports from think-tank DEMOS tell us there are 3.8 million people over pension age who are interested in downsizing; and there is an annual demand for over 30,000 new, purpose-built homes designed for older people. But the actual number achieved last year, including retirement villages and Extra Care/Assisted Living schemes, was just 7,000 homes.

Meeting the pent-up demand for tailor-made, “age-friendly” homes would mean tens of thousands of family properties, mostly with gardens, coming onto the market. So building for the older age group also generates the accommodation needed by younger families who, so often, find themselves crammed into tiny new houses and flats.

Indeed, society as a whole would benefit hugely from a programme of new homes specifically for our later lives. It is inadequate and unsuitable housing that generates the problems and magnifies the costs of health and social care for an ageing population. The work of the NHS is increasingly about caring for people with long-term conditions in their own homes. But too often, the home itself is the problem. NHS budgets are seriously affected by the ill-health caused by damp and cold properties, and by accidents from icy steps, troublesome stairs and inadequate maintenance. Frequently, it is not possible to discharge patients from hospital because their home is not suited to their recovery. This problem, known as “bed-blocking”, is wasteful and expensive. And if it is too difficult for local authorities to provide social care in the home, the huge expense of residential care – which could have been prevented or at least postponed – becomes a crippling burden for the Council, or for the individual and their family.

Health and Social Care both depend on housing as the vital “third leg of the stool”.



Innovative housing models for older people can also facilitate a social life with like-minded neighbours that protects against the scourge of loneliness.

So, with these massive gains to be achieved, why is the UK – in contrast to many other European countries – failing to build the homes that our changing demography so clearly requires?

Money is not the biggest problem

Clearly those “under-occupiers” who are tenants or homeowners in low value property need a subsidised solution – most probably provided by a housing association. But 75% of those over 60 own their homes with no, or only minimal, debt. Most can cover the cost of a new apartment or bungalow from sales proceeds. And for others an equity loan, not repayable until the new home is sold, could meet the balance.

The “silver surfers” may be cautious about spending their money, but if their next bricks-and-mortar asset is more appropriate to their needs, they should be less reluctant to reinvest. And pensions will go further when fuel bills and running costs are much reduced in their new home.

The real reason why so few people are moving to age-friendly new homes is that the UK house-building industry has let us down. The house-builders have failed – and continue to fail – to create the places that we older people would like to move to. Where are the attractive, well-designed, high quality homes to meet the aspirations of would-be “right-sizers”? So long as there is nowhere sufficiently enticing to go to, we will all simply stay where we are.

UK house-building is dominated by a handful of very large companies, with an oligopoly of eight firms commanding 70% of the market. These concentrate on the mass production of houses and flats for younger households. They outbid and crowd out any developers who seek to serve a different market.

First, because younger purchasers are heavily subsidised through the government’s Help to Buy scheme. At a cost to the Exchequer that will exceed £20 billion, this can cover 20% (or 40% in London) of the purchase price, with

no interest to pay for 5 years. Last year, Help to Buy recipients accounted for nearly half the buyers of, for example, Persimmon, the biggest house-builder. And, uniquely, first-time buyers can also get exemption from Stamp Duty.

Second, the prospective young buyer will probably be in urgent need of a new home, in order to leave the parental home or privately rented property, or to accommodate new offspring. By contrast, the older buyer often has no necessity to buy at all. The older customer will be more discerning when confronted by poor workmanship, an absence of storage space, low standards of design, and the other deficiencies so commonly encountered in new housing. Whereas the younger buyer may be persuaded to purchase after simply visiting the show house, without a proper inspection of their new property, the older buyer will be harder to please. They may require several visits before committing themselves. After all, the older owner is going to spend most of their time in the home, while the young will be out at work and commuting there and back.

Third, younger households can be accommodated outside the urban core on the large greenfield sites that are easier to develop, and where values multiply when planning consent is granted. Repetitive, pattern-book houses and flats can be churned out here with no regard to the local vernacular, local materials, design quality or place-making. Housing for older people, on the other hand, usually needs to be on more central, brownfield land, within walking distance or easy public transport for shops, GP surgeries, etc. These smaller urban sites each need careful attention – even the services of an architect – and acquiring them may well mean bidding against the likes of Aldi or Lidl or a car showroom.

Fourth, there is the problem that when building for the older buyer, the customer must sell their own home before completing the deal. The first-time buyer comes, mortgage offer in hand, without the hazards of a sales chain that can go awry.

So it is much more profitable for the volume house-builders to stick to their production line of bog-standard houses for younger buyers, which are built only at a rate the market can absorb without bringing down the price. While overall shortages continue to exist, these builders can choose to stay away from older customers who demand the kind of high quality design spelt out in the “HAPPI” standards from the Housing our Ageing Population Panel for Innovation, which have gained traction across the country.

In an industry dominated by companies that can clearly disregard the potential market for an extra 30,000 homes a year, and have no interest in the social and economic benefits that meeting these needs would fulfil, what can be done?

Action must come from three main sources

First, government has a central part to play. It has created the incentives for building for first-time buyers. But similar help for “last-time buyers” would achieve a “two for one” benefit, stimulating a second-hand market currently in the doldrums. Levelling the playing

field to support companies catering to older “right-sizers” could be achieved by a Stamp Duty exemption for buyers over pension age. Treasury stands to gain from such a concession because, on average, nearly three properties get sold when one older owner decides to move. And government can enlarge the market of those potential movers by allowing access to Help to Buy equity loans (repayable when the home is sold) to bridge any affordability gaps.

Second, the housing associations and Councils need to recognise the ageing profile of their own tenants (and Right to Buy purchasers) as well as the growing numbers of older adults with unsuitable accommodation in their communities. A bigger proportion of the new homes these social landlords are building need to be for this age group. Meanwhile, Local Planning Authorities need to take forward their recently extended duties, and use their planning powers more strenuously to secure homes for older people through their Local Plan and their planning agreements.

And third, the entrepreneurial private sector could offer so much. The smaller, niche developers, the SMEs, could make this fledgling sector their own, working alongside the new custom house-building movement wherein individuals or groups commission

their own new homes. Smaller building firms often have a strong local connection and a local reputation to maintain; they have every reason to go for a quality product. And when seeking sites and planning consents, they can draw upon local trust and local knowledge to offset the disadvantages of competing with the volume housebuilders’ economies of scale.

New companies could bring the imaginative thinking this emerging market needs. For example, there are opportunities for introducing new online applications. No-one stands to gain more from greater connectivity than older people who spend so much time at home. New entrants to the world of housing development will bring new ideas for IT to make life easier for older users and help achieve the connectedness that counteracts the scourge of isolation.

Another big opportunity is to take hold of the innovations in building techniques – the Modern Methods of Construction – that the volume house-builders are shunning. While the inflexible oligopoly of major builders fails to invest in innovation – just as they fail to invest in skills/training – entrepreneurs newly entering the field will bring a different mindset. Off-site manufacture, in a variety

of formats, can outperform the flawed products of the big players. You can learn more about these innovations in this white paper. Hopefully newcomers will use these advances to steal a march.

Joining the fray

With a large, ready-made market that the unimaginative house building industry is failing to address, there are massive opportunities for creating homes for later life. Government, local and central, stands to gain from incentivising and supporting a major growth in this fledgling sector, not least in collaboration with housing associations. But the tipping point – when “right-sizing” becomes the norm for those in their 60s and 70s – will arrive when a new generation of entrepreneurs take up the challenge. A market that is worth over £6 billion p.a. beckons. And with it comes the great prize that both older and younger generations can live in homes that make their lives better.

Photo credit: Images courtesy of Lord Richard Best and Inspired Villages Group

Future homes? They're out there now

With 80% of the homes that we will be living in by 2050 already built, retrofit for ageing is the big housing story.

Sue Adams OBE
CEO, Care & Repair England

So far, 'Neighbourhoods of the Future' has, for good reasons, focused on the building of new homes which are well designed for active ageing. This is undoubtedly important given the lack of innovation and poor design of so many new properties, but it is far from the whole story.

This is because the neighbourhoods of the future are already out there – 80% of the homes people will be living in by 2050 are already built. Consequently, there is a massive opportunity in the field of retrofit to make this general housing stock fit for a rapidly ageing population.

In England today, there are 26 million households of which 9.5 million (43%) are lived in by older adults (55yrs+). Virtually all (96%) are ordinary homes which anyone of any age might occupy, with only 4% of older households living in homes specially built for retirement.

This housing and ageing profile and scale of market potential is of great relevance to the building, product design and service industries, particularly as the vast majority of older people (76%) are owner-occupiers, with an estimated £1.4 trillion of housing equity. (Over half of this is concentrated in the south of England, i.e. London/South East and South West.)

Happy at home

I like my home. You probably do too, especially if you are over 50, in which case you are likely to be a homeowner with a fair amount of space to do what you like, be that dancing around the living room during Strictly, having your friends or grandchildren to stay for the weekend, or web surfing in your back bedroom (a.k.a. home office.)

With evidence emerging of the value to health of maintaining social networks and avoiding loneliness in later life, living with good friends and neighbours in a well-established, mixed community seems like a good idea. Even if I wanted to move (and I currently don't) there aren't many homes in my area that would be much better for ageing than where I live now. So what better solution than to retrofit my current home to make it a better place to age?

In fact, 94% of older people say that they are satisfied or very satisfied with their current home and neighbourhood. When older people have been asked about where they wish to live in the future, three impartial studies have found that around 80% want to continue to live in their current homes for as long as they possibly can. And the inclination to move home decreases with age.



There is undoubtedly a market for innovative new homes (I like Grand Designs as much as the next person), and a minority of older people are chafing at the bit to move to on to pastures new. However, in addition to the matter of personal housing choice, the reality is that there is a very limited supply of well-designed (let alone accessible and adaptable) new homes out there. For many older people, especially those with more limited equity and income, there are few or no realistic alternatives to living in their current home.

This retrofit of current homes to make them age friendly is a potentially massive market, as hardly any homes in England (just 7%) have the four accessibility features that provide visitability to most people, including many wheelchair users.

The four accessibility features that provide 'visability' are level access to the entrance, a flush threshold, sufficiently wide doorsets and circulation space, and a toilet at entrance level. In 2014, around two thirds (64%) of homes had a toilet at entrance level, but the presence of the other three visitable features was less common, especially level access (18%).

The majority of current homes could, however, be adapted to a degree that will suit the needs of retired people for most, and often all, of their remaining lives. Almost three quarters (72%, around 15.7 million properties) of all the homes that lacked full visitability could be adapted to provide all these four features.

A national network of Older People's Housing Champions identified a range of influential factors including:

- Access to impartial/ independent information and advice about possible options
- Clear, reasonable pricing
- Good communication with customers
- Simple process to get help if and when needed
- Speedy delivery
- Fast and efficient installation of well designed, quality products
- Good value job done well by a trustworthy contractor

On the whole, older people will be more likely to adapt their homes for ageing if they:

- Know what is possible
- Have access to trusted, impartial information about what would work best for them
- Appreciate how this might benefit them individually
- Are able to identify affordable, attractive products
- Trust the building sector to make changes to their homes with minimal disruption

15.7 million

the number of adaptable homes

7%

the total number of homes in England that are built to accessible standards

26 million

homes in England

9 million

older households (HoHH 50+)

76%

owner-occupied older households



Do I really want to die before I get old?

So why don't more of us think about future proofing our home for later life in the same way we are supposed to make financial plans for our retirement?

The Who [note for any younger readers – this is a reference to a song by a band from the 1960s who said they wanted to die before they grew old] have a lot to answer for when it comes to acceptance of older age as a desirable stage of life. (The death alternative really is much worse). There can be an ostrich-like attitude to ageing, with so many people hoping 'it' will never happen, whatever 'it' is. Even for those with the means, there is often a reluctance to plan ahead, even as far as retirement income. So to anticipate being less mobile, let alone disabled, is way off most people's radar.

We are living longer (good news) and live independently at home for longer (more good news.) Yet healthy life expectancy has not kept up with the past increases in life expectancy, and there is also a growing divide between rich and poor (both trends are not so good news.) Nearly half of all people over 65yrs have difficulty walking even a moderate distance whilst just over 2 million people aged 65yrs+ have some degree of sight loss which impacts on their day-to-day living.

Whilst medical advances can help to address these physiological changes, they will not eliminate this functional decline in the foreseeable future. One way to reduce the impact of such physical and sensory changes on day-to-day living is to alter the built environment, particularly the home, to accommodate such change. For example, improved lighting can go a long way to addressing eyesight decline, whilst alterations to the design and layout of key areas of our homes can make moving around them easier and safer.

Time to put the fit into retrofit

In terms of the retrofit market, there is an interesting convergence of spending priorities for home improvement and later life independence. Upgrading kitchens and bathrooms is the biggest market when it comes to money spent on existing homes. As we age, the design of these two critical areas of the home have the greatest impact on our ability to live independently.

Half of all government grant-funded home adaptations are related to use of the bathroom. Getting safely in and out of the bath is one of the first problems that people

encounter in advance years. In the kitchen, the quality of lighting, positioning and design of storage and appliances can make all the difference to being able to continue to cook and look after yourself.

And yet all too often the 'improved' kitchens and bathrooms that people put into their homes are poorly designed for ageing and can even make matters worse. Let's take lighting. There is a research-based guide published by the Thomas Pocklington Trust which sets out what works best in terms of lighting for people with sight loss. Unfortunately, what is often installed as part of modernisation is lighting that can make matters worse if your eyesight is less than perfect, e.g. spotlights that create pools of dark and shade and/or inadequate task lighting.

In the case of kitchens, there is solid research that has identified the key inclusive design features that can make kitchens good places for people to live independently in later life. Yet this has not been taken on board by mainstream manufacturers – despite the best efforts of the researcher.

If not now, then when?

If we understand what works to make our homes more suitable for ageing, why isn't everyone applying this knowledge and proactively adapting ahead of a later-life crisis? Why are manufacturers not chasing this market?

Given the negative connotations of old age, it is understandable that not only are people reluctant to view themselves as 'old', but also disinclined to purchase generic products

that are identified as being for older people. Anecdotally, we hear from the retail sector that anything perceived as being designed for ageing is toxic in terms of wider marketing.

Consequently, we have a situation where there is a niche market for specialist disabled home adaptations and equipment, much of which is only purchased and installed at the point when the individual is pretty desperate. The classic example would be an urgent need for rapid installation of a level access shower and/or stairlift, because an older person can no longer get in and out of the bath or negotiate the stairs as a consequence of falls-related injury. This crisis point decision-making is not conducive to driving market innovation or more widespread application of inclusive design.

If we are to drive significant market change, we somehow have to overcome our reluctance to think and plan ahead when it comes to making homes better places to age, as well as finding ways to remove the barriers to advance retrofit.

Understanding the obstacles and nudges

We can speculate about the 'ageing denial' phenomenon based on personal experience and professional observations. But it is also useful to consider some of the hard evidence about obstacles to altering homes in order to accommodate the mental and physical changes that ageing so often brings.

A survey by market research company BMG asked people over 55yrs about their housing situations and aspirations, including home adaptations. Just under a quarter had already

For many older people, especially those with more limited equity and income, there are few or no realistic alternatives to living in their current home.

The potential technological advances by 2050 are hard to imagine. Who could have predicted innovations such as Alexa 30 years ago?

had adaptations made to their homes. A similar number expected to have to carry out adaptations at some stage.

Looking into the barriers which may stop people from adapting their home, 43% of over 55s said that they could not afford home adaptations. 23% said they didn't know what adaptations might be possible or best for them, whilst 16% couldn't face the disruption of building work.

These issues of knowing what is possible alongside affordability and worry about installation come up in other housing adaptation studies and surveys. Care & Repair England works with a national network of Older People's Housing Champions who have discussed the issue of adapting existing homes.

As a step to improving the information available about retrofit, the Older People's Housing Champions have worked with Care & Repair England to produce a series of self help guides to modifying your home if you have particular long term health conditions, covering respiratory, macular, and heart disease, dementia, stroke and arthritis. There is also one general guide for people with long term conditions.

More extensive adaptations

The future age profile of neighbourhoods will change significantly in terms of the rising numbers of 'older old' people. According to the latest figures from the ONS, in mid-2016 there were 1.6 million people aged 85 and over; by mid-2041 this is projected to double to 3.2 million. Using current data about functional decline, we know that this age group will have an even greater need for more extensive home modifications to enable them to live safely and well at home.

The most common home modification after bathroom adaptations is the installation of a stairlift. Henry VIII is credited with using the first contraption to enable a person who can't walk to go up and down stairs, but what we would now recognise as a stairlift was invented by C.C. Crispen in the 1920s. The basic design has seen limited change over nearly a century, and even though they are life-transforming for individuals, stairlifts continue to be the butt of ageist jokes. We are just starting to see innovation in through-floor lifts that are now much simpler to install as an alternative to this common adaptation. It will also be interesting to see how robotics developments tackle this issue, particularly in the light of innovations in the field of exoskeletons to enhance muscle function.

In this later stage of life, given the high incidence of long-term health conditions such as respiratory problems and heart disease, being able to keep warm in the winter and cool in hot summers becomes even more crucial. Efficient, affordable heating, insulation from excess cold and heat, plus good internal climate/ventilation controls are critical modifications to ensure healthier ageing. With the onset of dementia, this management of the thermal performance of the home becomes even more of an issue.

Enabling carers to have virtual control of the home environment, able to monitor and control room temperatures even if they are hundreds of miles away, could be of great benefit to older people. Alongside other monitoring measures (e.g. tracking liquid intake) it could help to prevent dehydration, which is a significant cause of health decline amongst older people, as well as reducing cold-related health problems such as increased risk of stroke.

Amongst the ageing population, and for women over 75yrs in particular, we see an increasing proportion of people living alone. Alarm systems which can trigger a response to accidents in the home, particularly falls, are seen as key to safe, independent living at home for more at-risk groups, including the rising number of those living with dementia. Smart technology will ultimately replace the current generation of pendant or similar alarms. The interconnection of retrofit of existing homes with wider adoption of smart technology has yet to be fully explored.

The potential technological advances by 2050 are hard to imagine. Who could have predicted innovations such as Alexa 30 years ago? But whatever this tech future looks like, we will still have to get the basic bricks and mortar of mainstream buildings right for ageing. If my home is cold, if I can't go safely upstairs to bed or to use the bathroom, if I'm unable to get in and out of my home because of steps, stairs or broken lifts, the best falls alarm system around will be cold comfort.

Avoiding the stigma of a medicalised home

Another factor which contributes to reluctance to adapt the home is stigmatisation and 'medicalisation'. Recent research by Northumbria University found that older people with health conditions and mobility issues are delaying making vital changes to their homes due to the off-putting and stigmatising appearance of products. It found that older people often made the decision to install equipment and adapt their homes too late; usually once they were in crisis such as after an injurious fall or a long period of struggling with basic activities such as daily washing.

'Many people said that the clinical appearance of equipment and adaptations – including handrails, ramps and accessible bathing equipment – were off-putting. They associated them with ageing and vulnerability, with items often designed to be practical rather than attractive, and making their homes reminiscent of hospitals and clinics.'

The research calls for innovation in creating a wider range of attractively designed products, including from high street retailers, and for kitchens and bathrooms to be designed inclusively, so they're suitable for all ages.

There clearly is a need for more innovative thinking by industry in terms of the diversity of the older population, and a shift away from a 'one size fits all' perspective. People's experience of ageing can differ greatly – there are fit and well 90yr olds, very disabled 55yr olds, some older people are very well off indeed and live in wonderful homes, others struggle on low incomes and are badly housed. There is as wide variation in personal taste and life experience in older age as there is at other times of life. Retrofit innovation is needed to cater for this diverse market.

A word of warning

When looking for ways to stimulate increased housing retrofit in the context of significant later life diversity, we must not forget the million or so lower income older homeowners living in non-decent homes. They face day-to-day worry about repairing, maintaining, and even insuring or heating their homes.

Whilst many people can and will pay for preventative retrofit and home adaptations, there is still an important role for society to support those who are disadvantaged.

There is a narrative that says everyone is individually responsible for preparing their homes for ageing, and if they fail to do so they are to blame for resulting problems. (In the case of homes this might be the ensuing accident/fall/health decline.) This is over-simplistic in the context of widespread inequality.

The estimated cost of poor housing to the NHS is £1.4 billion per annum, and over half a million long-term sick and disabled people over 65yrs live in a non-decent home, most of them in the owner-occupied sector.

Even if these lower-income older homeowners have some savings (so often put by for a funeral), many will understandably be reluctant to use what little money they may have to adapt their home in advance of a need. This is especially true if they think that a more pressing crisis might occur first (e.g. urgent roof repair). Most older people don't want to be a 'burden' to their children and/or grandchildren, often preferring to use their limited resources to help these younger generations, passing on even low levels of home equity or savings.

Whilst many people can and will pay for preventative retrofit and home adaptations, there is still an important role for society to support those who are disadvantaged. The current modest, means tested grants for home adaptations have a high cost benefit profile, e.g. NHS savings. Similarly, home improvement agencies and linked handyperson services (which carry out small, essential works in older people's homes at minimal cost) also offer invaluable practical housing help and need to be more widely available.

Kick-starting the retrofit revolution

In the face of deep-seated ageism, a climate of economic and social uncertainty alongside commercial conservatism, the building-related industries are unlikely to innovate in response to demographic change without some stimulus or active market disruption.

Radical change will need to be kick-started with joint action by government and the building-related, retail and technology sectors, all working alongside older people as co-producers.

This wide-ranging partnership must also include the academic research community, who can help to develop evidence about the potential gains of retrofit, both fiscal and social, quantifying the benefits for individuals, industry and wider society.

A Radical Retrofit Kick-start Programme is urgently needed, which would include:

- Raising awareness of what is possible in terms of inclusive design and home modifications that enable active ageing.
- Highlighting the benefits that can result from retrofit. This includes gains for individuals, both fiscal (e.g. reduced high residential care costs) and social (maintaining independence and quality of life.)
- Quantifying increased risks of failing to retrofit mainstream homes for ageing, e.g. to individuals' health and demands on the NHS.
- Making it easier for individuals to make changes to their homes – spreading knowledge about 'what works' with truly impartial, independent information and advice, as well as support to implement home changes where necessary.

- Market disruption through co-production with older people; frugal innovation and cost-cutting through better design and increased volumes.
- Mainstreaming of inclusive product design, setting new standards and creating higher expectations.

Win, win, win

The retrofit revolution will be great for individuals who want to age well in the homes they love, without making them feel like hospital wards. It will be a great opportunity for the building and tech sectors, as more money is spent by older householders to future proof their homes in ways that add value, rather than devaluing. And it will benefit the public purse, reducing calls on the NHS, as the 9.5m older people living in ordinary homes are less at risk of housing related injury or health decline.

In the words of Joan, a woman who spent a year in hospital waiting for home adaptations to be installed, "You don't value normal until it's gone". For her, it was about the thrill of being able to return home; to use her own bathroom, sleep in her own bed, and make a piece of toast in her kitchen

It's time to make retrofit of current homes the new normal.

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Our mission is to help fund the future

Nigel Wilson
Chief Executive, Legal & General

The weekly “Tomorrow’s World” programme was a staple BBC product and compulsive viewing for almost forty years. Futurology is fascinating, even if some of the inventions – like the fold-up car that fitted into a suitcase – never made it off the drawing board.

Today, science and technology is the most exciting it has been in my lifetime. From AI, to genomics, to nuclear fusion, we are experiencing exponential change. As the articles in this publication illustrate, the neighbourhoods, towns and cities of tomorrow will be radically different from those of today, partly because of technological and scientific advances, but equally because of complex changes in how we live our lives.

Education, work and retirement are no longer part of a linear process. There will be multiple stages and transitions. Work will be very different. There are already multiple different types of family structure, from “blended” families with stepchildren, to single parents and households headed by grandparents – an almost infinite variety. Some (mainly well-off) people will live much longer and will see the hundred-year life as the “new normal” Others (mainly poor people) will not see life expectancy rise at the same pace, if at all. So, inequality becomes, quite literally, a life and death issue.

We all talk about disruption as a “given”, but we don’t think enough about in whose interests we are disrupting, or which societal issues we are trying to address. As sci-fi writer William Gibson said: “The Future is already here: it’s just not evenly distributed.” Alongside new technology, we need people with the skills to use it. Alongside longer lives, we need better social care for older adults and more savings for later life. Today’s and tomorrow’s older adults received a huge windfall in housing equity, and they will have to use it. This requires innovative approaches which change both the demand and supply sides across the financial services and care industries.



The role of investors

Legal & General's mission, as the UK's largest investor, is to help fund the future: directly, by investing in new technologies, cities and neighbourhoods, and indirectly by helping individuals to plan financially. There has never been as much global money available for investment as there is today, but it has never been so badly invested, with data from the US Fed and others showing around \$10 trillion globally earning negative returns.

Meanwhile, some of our cities are regenerating themselves and becoming fit for the future, while others remain not overbuilt, but under-demolished. Legal & General's estimates, based on the UK National Infrastructure Plan estimate the UK has funding gaps or shortfalls of: £150bn for housing, £100bn for urban regeneration, £40bn for clean energy, £90bn for transport and £125bn for SME financing.

The money exists to meet these challenges, but we have policy gaps and need a series of "nudges" to make it happen. For example, a housing policy framework disproportionately focused on home ownership and capital gains for consumers and providers alike needs to morph into a balanced, multi-tenure approach, where long-term rentals also provide steady long-term yields to pay pensions.

De-carbonisation, battery technology and AI will revolutionise transport and the built environment. Smart cities need to regenerate to reflect modern living, working, shopping and leisure trends. We will have to build homes differently to meet rising demand – precision-built, energy-efficient modular homes will supplement, and possibly replace, building techniques which have barely changed since Ancient Egypt. High streets will look very different. We need to anticipate those shifts.

The neighbourhoods, towns and cities of tomorrow will be radically different from those of today, partly because of technological and scientific advances, but equally because of complex changes in how we live our lives.



Grasping opportunity

British universities are world leaders and have produced huge amounts of high-quality core research, with many potential applications. Company formation has never been as easy as it is in the era of "capitalism without capital" – modern start-ups typically don't need "plant and machinery", just ideas, technology and skills. But they do need capital to expand – unfortunately for the UK and Europe, the twenty largest global tech firms are all either American or Chinese. The internet was a British invention, but we gave it away. We failed to capitalise on 4G. To catch up and compete, we have to fund university spin-outs and grow our scale-ups.

The neighbourhood and the society of tomorrow has to work more fairly across all generations. Baby boomers like me had it good, with free education, free housing (price appreciation outweighing mortgage interest), and relatively plentiful, steady employment often with good pensions. It is time for us, as dedicated viewers of Tomorrow's World, to deliver the real thing.

Photo credit: Images courtesy of Legal & General Group PLC

Unfortunately for the UK and Europe, the twenty largest global tech firms are all either American or Chinese.





Multigenerational housing is the future

Stephanie K. Firestone,
Senior Strategic Policy Advisor, Health & Age-friendly Communities
AARP (American Association of Retired Persons) International

Urban aging

It is estimated that by 2020 over 70% of the world's population will live in urban environments. Due to rapid population aging, an increasing proportion of these urban residents will be older adults. By 2050, approximately one in four people around the globe will be 60 years or older—up from one in ten today.

Yet, most of the housing stock in cities on both sides of the Atlantic doesn't match the needs or desires of existing populations. The housing that exists in many metropolitan areas was designed for able-bodied residents and often becomes inappropriate as individuals live longer. Many older adults live alone in large houses that they can no longer maintain or navigate due to a disability or frailty. Once retired from driving, they will also experience social isolation, thanks to inadequate public transportation making it difficult to access markets and other essential services and amenities.

The explosion of urban dwellers in metropolitan areas means municipalities are struggling to meet affordable housing needs. In many cities, tight housing markets trigger expensive new developments that are beyond the reach of many. In the US, young adults have difficulty purchasing or even renting a home. At the same time, older adults are the fastest growing demographic among the US homeless population. Similarly, in a number of European countries, such as the UK, "little progress seems to have been made in creating wider housing choices and improving housing affordability for older people" (Pannell, Aldridge & Kenway).

One solution to the affordable housing crisis is to focus on how existing and housing stock in established communities can be adapted with new housing models. In June 2018, the German Marshall Fund of the United States and AARP assembled a group of 13 transatlantic experts, including AAA founder Ian Spero, to explore this challenge. The emphasis was on housing models that

offer the opportunity to connect multiple generations and reduce isolation.

Despite differing contexts between the US and Europe, there are many shared similarities in terms of how cities are embracing policy frameworks that enable multigenerational housing as a key component to sustainable and livable cities. Over two days, participants at the GMF/AARP workshop discussed new housing models (such as shared housing, co-housing and accessory dwelling units) and technological innovations (such as smart home systems and wearable devices) that offer the opportunity to connect multiple generations, reduce isolation, and improve integration. The group worked to identify specific policies, practices and regulations that would enable implementation, as well as the principles for transferability to both the US and European contexts. The forthcoming policy paper will highlight alternative housing models and a road map to navigating the opportunities and challenges of their implementation in transatlantic cities.

Generations living together

A multigenerational approach to housing provides an important perspective. Millennials and Boomers prioritize similar living environments—namely, mixed-use communities that are walkable, livable and facilitate social engagement. We are also witnessing the increasing value of intergenerational engagement—in the form of mentor/mentee relationships, mutual learning, and companionship.

Closer and more regular intergenerational interactions can also lead to a change in the perception of older people—from largely a burden, to a renewed appreciation. Thus, multigenerational housing can help to catalyze a cultural shift in the narrative around aging. This can uncover opportunities to create alternative housing options that meet a greater diversity of community members' needs and desires.

Sector experts meet to discuss intergenerational living in Washington DC

In the US, multigenerational living is on the rise. Homes that include at least two adult generations, or grandparents with grandchildren younger than 25, increased from 12% in 1980 to 20% in 2016. The growing racial and ethnic diversity in the US—particularly among Asian and Hispanic populations—explains some of this increase, as foreign-born Americans are more likely than those born in the US to live in multigenerational family households. Cities on both sides of the Atlantic would do well to prioritize housing options that are varied and flexible, in order to accommodate these changes in household composition.

Zoning for housing options

Communities must offer housing options that serve residents across longer lifespans, and that encourage generational co-living. An Accessory Dwelling Unit (ADU), for example, is a small dwelling attached to or on the grounds of a single-family house (i.e. an apartment above a garage, a basement apartment, or a tiny house in the backyard). These second homes are often used for grandparents, a paid caregiver, or rented to a younger person who can help with household maintenance.

While ADUs have existed for a long time, rigid residential zoning rules enacted in the US after WWII have erected numerous barriers. Local rules that were established to separate different types of land hindered the emergence of alternative housing options. Across the US, single-family housing is still the preferred development type, often allowed by-right. On the other hand, multi-family housing often requires a special permit, variance, or other action. Yet, the demand for ADUs is great. In January 2017, a new California law took effect allowing ADUs across the state, leading to some 5,000 ADU building permits in just the first year—an increase of 400% on some cities.

The UK doesn't face the same zoning-related barriers, since ADUs are not recognized in the planning system as separate units. However,

as people can easily create “granny annexes” without conflicting with zoning code, there is no ability to count or monitor them, thus creating a different type of hurdle for city planners.

Another housing option—coined “missing middle housing” (missingmiddlehousing.com)—is comprised of multi-unit or clustered housing types, such as duplexes or courtyard apartments. This housing type is typically the size of a large house and, in the US, was integrated throughout pre-1940s neighborhoods that were close to transit and other amenities. Despite this, only one in ten cities has zoning that enables missing middle housing.

ADUs and missing middle housing enable a gentle increase in density in tight housing markets. In both the US and the UK, zoning for single-family dwellings has led to a mismatch between existing housing and a greater variety of housing options. Creating alternative housing options will require a more flexible approach to land use.

Effectively using existing structures

Two alternative housing models center around effectively utilizing existing building stock—home sharing and adaptive reuse housing.

For over twenty years, AARP has advocated for home sharing, where two or more unrelated persons share a home for mutual benefit. Often the homeowner is an older adult with one or more spare rooms, which they share in exchange for an affordable rent, or a combination of rent and support, such as household tasks, or simply companionship.

Such arrangements are either professionally engineered via nonprofit service organizations, or increasingly coordinated through online websites and apps. These tools match homeowners with home seekers—the latter often being young people, particularly in university cities where students are financially strapped.

According to a recent AARP survey, adults aged 50 and older today are much more willing to consider home sharing for extra income, or if they need help with daily activities, than they were in 2014 (www.aarp.org/livablesurvey2018). Despite this increasing interest, rules in some cities can undermine home sharing as an alternative housing option. Such rules prevent a certain number of people from living under one roof if they are not related by blood or marriage.

Additionally, some novel ways are emerging to use types of existing structures to create affordable multigenerational housing options. Younger people are finding living arrangements in adult care centers, such as nursing homes, paying nominal or no rent in exchange for services like teaching art/music, or otherwise engaging with the older residents.

Budget residential hotels are also being explored as places for older adults to reside and manage their health. Typically, they will provide kitchenettes and cleaning services. Recent research has shown that older adult residents relish the independence and privacy, as well as connecting to a diverse array of people in a community context.

Conditions for innovation

How can existing structures and building footprints be adapted and marketed to encourage housing types that accommodate multiple generations, and that meet

the increasing need for affordable and appropriate housing?

Some of the transatlantic conversation has focused on easing the administrative burdens that accompany these developments. Collectively, we agreed that the lender community must be engaged, to offer more financing options and re-examine policies that hamper them. These include barriers that limit access to grants or loans, and per-unit impact fees disincentivize the development of smaller housing units. In short, we must encourage cross-sector partnerships and collaboration among the public, private and third sectors, to create conditions that are favorable for innovation.

Finally, is addressing the ageist attitudes that prevail on both sides of the Atlantic. Ageist biases are often the cause of housing marginalization and isolation; many “retiree communities” in the US are located at the physical margins of the community. Yet it is not only older adults who are feeling isolated. Recent research, including an AARP survey, shows that Generation Z (those surveyed were aged 18-22) are more likely to report feelings of a lack of companionship, feeling left out, and feeling isolated from others than any other generation (www.aarp.org/livablesurvey2018). There can be no better reason to advance a transatlantic conversation around a multigenerational housing agenda.

Photo credit: Images courtesy of AARP International and GMF Alexander Nasserjah

Adults age 50 and older today are much more willing to consider home sharing for extra income or if they need help with daily activities, than they were in 2014.

A perfect storm in construction?

With a rapidly and inexorably ageing population needing more flexible options, we must act now.

Jon Johnson
Founder, The National Federation for Affordable Building (NFAB)

We have reached a fork in the road of construction. Along one path lies the perpetuation of overpriced traditional housing, built to suit the industry and its cartel of big business interests. It is the path of inflated pricing, where unnecessary strata of risk are sold down the chain, inflating the economy, all whilst using outdated materials and techniques.

Along the other path, a little further off but shining with promise, is the land of MMC.

Modern Methods of Construction. Call it what you will, offsite, volumetric, pre-engineered (just not prefab, thanks!), there is no doubt that this is the route to the future. But the road is not without its potholes. Opposition is mounting from traditional builders who see a growing threat. It's time for MMC stakeholders to pull together and learn to collaborate to meet the challenges ahead. This is the raison d'être behind a new organisation: The National Federation for Affordable Building (NFAB).

My own efforts with REACH Homes to bring a low-cost eco container-based solution to market have shown how difficult it is to gain acceptance from commissioners, investors, councils and housing associations, even while they are being whipped to find the 'missing' 140,000 homes per year that the traditional market is consistently failing to build.

Of the 214,000 new homes (including 85,000 conversions of existing buildings) built in 2017, only 40,000 met the Government's £250,000 definition of 'affordable'. Over 120,000 social rent homes have been lost in the last six years through Right to Buy, with a further 130,000 under threat by 2020. Housing associations only built 13% social rent properties in Q1 2018 – less than they built for sale.



Caledonian Modular home



The government's English Housing Survey 2014/5 reveals that 51% of owner-occupied homes in England (7.3 million households) are under-occupied. These are homes that have at least two bedrooms that are not regularly occupied. In 1995/6, the equivalent figure was 39% (5.3 million households). This indicates that our existing private sector housing stock is being utilised less and less efficiently.

With a rapidly and inexorably ageing population (many with inadequate provision for a longer old age) needing more flexible options, we need to act now. The benefits of freeing up larger homes – worth up to £356bn – have been examined elsewhere in this whitepaper, but where should older adults – still independent but not yet ready for supported living – go? NFAB are keen to examine new tenures, new tailored designs, new ways of building and the ability for people to make their own choices about communities that they can stay active in.

At the moment, just a few companies are in control of building new homes. That means they can control what gets built and when – and they aren't delivering what's needed. The market needs a shake-up, and we need to make sure local authorities can also start building homes again on a bigger scale.

Polly Neate, Shelter

The pioneers of 'Offsite v2018' – latest in a series of efforts going back to the 1920s to build decent volume affordable homes – have a huge advantage this time. As the title states, we have a perfect storm which demands change, for the following reasons:

Tech has caught up so that digital solutions such as integrated supply chain and BIM are ready to further streamline the time and labour-saving aspects of MMC. It will also attract more IT-savvy young people to a construction industry struggling with image, low wages, retention and diversity issues. Offsite working environments are far better for workers, cutting risks and reducing illness. Quality homes, built efficiently and designed to perform specifically for the 'last time' buyer, are the achievable goal.

Land supply is a huge discussion point, with some brave decisions needed from MCHLG, Treasury, the Local Government Association and a newly-revamped Homes England. This latter body is still struggling to get its collective head round how to deal with smaller firms, smaller sites and moving away from the DPP3 (approved companies) list. By ring-fencing public land for affordable and co-housing projects and encouraging more specialist SME manufacturers, Homes England & LGA can be the ones who "Modernise rather than Dying" and help NFAB members to provide the accommodation that all communities need.

Goodwin Development Trust, Hull/Premier Modular



Buildings should be designed once.
It's another reason why we need a
more joined-up industry.

Sustainability: With the growing urgency to tackle climate change, offsite buildings offer low-carbon, low-energy homes in line with the UN Sustainable Development Goals.

Skills gap & training: With a declining age profile in construction, fewer starters, Brexit promising to shrink the EU workforce (by 30% in London) and poor standards in existing training, you'd think something urgent would be happening to address the skills gap. Now is the time to start a new delivery framework for sustainable building techniques, from design to completion, and begin building the target of 300,000+ new homes to energy standards, which will end fuel poverty and tackle climate change.

Funding: With billions of pounds promised, investment waiting and savings to be made from the £28bn bill for Housing Benefit, there is no shortage of cash. What is missing is leadership; a committed Housing Minister who stays in post for more than a few months and coherent policies which deliver the homes people need, not what Bovis, Persimmon etc. dictate we should have.

Public opinion: The clamour for change is becoming deafening, but still there is no joined-up voice for anything different. That's why NFAB was set up. Most of the business world wants change' – 'The environment demands it.'

The opportunities above form the basis for NFAB's business plan. We aim to build for people and planet, with profit as a far less significant factor. Indeed, with concerted backing we will change the shape of construction.

The long-term vision for our industry has to be one where businesses of all sizes are working in more distributed manufacturing supply chains, spanning centralised large factories through to local, small scale 'flying factories' using accessible digital technologies and equipment and with SME builders using more open source pre-manufactured components and assemblies rather than just traditional building materials. I wish the NFAB well on its mission to open up the MMC market at all levels of the supply chain.

Mark Farmer, Author of "Modernise or Die".

Photo credit: Images courtesy of REACH Homes

The Hundred House – Sunday Times British Homes Awards
2018 winning submission



Creating an opportunity out of a crisis

Simon Bayliss
CEO, HTA

If there is an urgent need to reconsider how we best respond to the changing housing needs of our population, then it is perhaps no coincidence that this is against the backdrop of a more general housing crisis in the UK. The chronic housing shortage, caused by a long period of undersupply, has been exacerbated by the building of the wrong sort of houses to suit the way we live. But we are hopeful that a growing understanding of how we best respond to the changing physical needs of an ageing population will create the political drive and economic means to deliver the right housing in the neighbourhoods of the future. It is this that will transform our way of life for generations to come.

Whilst acknowledging the challenges we face, it is surely a fact to celebrate that we are all living much longer. Sustained improvements in our standards of living, advancements in medicine and nutrition, and the mechanisation of many of the more physically damaging jobs of the past should be hailed as major progress that is all to the benefit of our society.

The opportunities created by these additional years of life are threatened by new health issues arising through increasingly sedentary lifestyles, and perhaps the more pernicious threat, the impact of loneliness on health. The increased isolation experienced by people living longer and more alone is in contrast to the trend of urbanisation, where we choose to live ever closer together. By 2030, it is expected that over 90% of the UK population will be living in cities, providing the opportunity to radically rethink the types of homes we need and the quality of neighbourhood we deserve.¹

The lamentable quality of much of the housing currently being delivered in the UK would seem to offer few solutions. Over a period of 40 years, successive UK Governments have put their faith in the private market to deliver the population's housing needs. There is now widespread acknowledgement that this faith was misplaced and that the market needs fixing².

The market is in need of a fix

Although this market failure was ostensibly focused around the shortfall in numbers of homes completed, it is also now acknowledged that the building of more homes will only be a success, indeed might only be possible, if coupled with significant improvements in quality. Better quality homes, both in terms of design and construction, within more successful and sustainable places. Homes that support mixed communities and neighbourhoods and which enable a higher standard of health and wellbeing for all residents.

We must strive to create walkable neighbourhoods, with local facilities that promote cycling and reduce the impact of the car on the public realm and environment. Successful places need networks of green spaces, trees and outdoor amenities that encourage physical activity and benefit mental health. They can also include advances in technology to enable self-driving, shared access and the rental of travelling time rather than the ownership of individual transportation. This will fundamentally influence and shape the places we create.

Mixed communities need a wide choice of housing types, with homes for sale and rent, a mix of houses and flats, of different sizes and internal layouts. Some homes need to be designed to meet very particular requirements, while others can be designed to be more generally flexible and adaptable over time to respond to changing needs. Although the building of more smaller homes would seem a natural response to a housing crisis that sees more people living alone, creating larger homes that enable more of us to live together whilst retaining independence could enrich lives and respond more effectively to people's changing circumstances as they grow older.

The need for better designed housing in places where people will choose to live, requires greater collaboration between planners, urbanists, landscape architects, architects, interior designers, and environmental specialists. These stakeholders will need to work alongside the new breed of developers and manufacturers emerging in the housing market, with a greater focus on better homes through improved methods of delivery.

An iconography of home

Buildings combine with streets and spaces to create places. A careful balance of standardisation and variety creates a unified vernacular, a distinct and recognisable whole within which varied individual elements personalise each home and reflects the essence of local materials, craftsmanship and quality.

Within the homes, we must design, model, visualise and assess our proposals to create healthier and more comfortable internal climatic conditions. We need generous levels of daylight and supplies of fresh air, both avoiding overheating and minimising heating costs. Advancement in virtual modelling enables not only the testing of performance of homes to deliver sustainable living, but modelling of the qualities and character of buildings and spaces through virtual or augmented reality. Using this technology, future residents can experience and contribute to the design of their neighbourhood.

The precision manufactured home

We are experiencing the power of offsite manufacture to craft buildings. They are better designed and higher quality than traditionally built homes, are delivered more quickly with greater certainty of outcome and potentially far more cost effective. Factory manufactured housing significantly reduces waste, energy use and carbon, both in construction and in use over the life of the building, by reducing vehicular movements, pollution and disruption to neighbours of construction sites. In addition, factories create safer and healthier working conditions than a traditional building site, and so appeal to a more diverse and older workforce who can live nearby and cycle to work.

We must strive to create walkable neighbourhoods, with local facilities that promote cycling and reduce the impact of the car on the public realm and environment.

HTA Design's winning submission to the 2016 Architects' Journal Home of the Future Competition was based on the potential for a range of housing types that would enable far more flexible modes of living. These housing types would meet demanding environmental standards and could be delivered effectively using offsite construction in a variety of contexts. The plans considered the changing needs of families and sharers, bringing together old and young members of the family unit to mutually benefit from greater interaction. These ideas have been explored further in our Terrace of the Future, winner of this year's Sunday Times British Homes Awards and through our work in developing a manufactured platform for future housing delivery in collaboration with Tata Steel.

Tata are developing a housing system which will be flexible but quick to construct. Working with HTA and others, they have developed a proof-of-concept structural design which we are confident will be welcomed by the housing market and meet the needs of modern consumers.

We are focusing on the flexibility that steel structures can provide, which makes it an ideal material for housing construction. The design is a simple structural steel frame which will allow homes to be constructed very quickly using pre-manufactured components. The structure is flexible and will create the potential for open-plan spaces. Designed to be integrated with any number of materials the new system allows the walls to be lightweight and easily adaptable during the building's life.

There is no comparable home construction system available in the UK market. It enables the home to be future-proofed much more than traditional homes. When they reach the end of their life, they can be easily dismantled and recycled. Future home owners, particularly older buyers, will be more demanding of housing quality. We expect them to integrate new technologies into their homes from the very beginning and to want flexible, spacious houses that allow them to expand and contract as their family life changes over time.

Ergonomic and sustainable

Fortunately, among the generic baseline of so much of our housing, there are plenty of exemplars to show the way to build our Neighbourhoods of the Future, and the homes that form it.

Hanham Hall, on the outskirts of Bristol, is a development designed and built in response to the Carbon Challenge – a UK Government competition to identify housing fit for the future. The dwellings meet very high standards of energy performance. They generate a proportion of their energy, harvest and recycle rainwater and are designed to be resilient to overheating.

The homes are spacious with minimal circulation and have varied, flexible layouts. Some living rooms are on upper floors, benefiting from additional ceiling height into the roof space, and exploiting views to the street and landscape. Some ground level bedrooms provide more accessible and flexible spaces.



Hanham Hall, on the outskirts of Bristol, is a development designed and built in response to the Carbon Challenge

Successful places need networks of green spaces, trees and outdoor amenities that encourage physical activity and benefit mental health.

The homes are flooded with natural light through unusually large windows, with shutters that prevent over-heating and offer privacy. The addition of balconies and verandas enhance the contact from inside to the public landscape beyond, increasing neighbourly interaction and promoting a greater sense of community.

The project includes a large area of local parkland, with a trim trail and permanent exercise stations. Allotments and greenhouses are available for rent, and there is a crèche, café and a general multi-purpose room for use by residents. The allotments and greenhouses are generally oversubscribed, and the resident community are very active in organizing events on the village green, particularly with nature-focused events for children. Neighbours compete for the lowest bills over coffee in the greenhouses, and swap their home grown produce. Recently, the first batch of Hanham Honey was produced.

Delivered using factory manufactured systems, the homes were built rapidly to the highest quality with unusually few defects. The homes were particularly popular with older buyers who were looking to downsize to more flexible and sustainable homes. They needed houses that would suit them for life, whilst guarding against long term increases in energy bills. A process of post occupancy evaluation with local residents has provided valuable feedback, with lessons to influence future projects and ensure a process of continuous improvement.

Re-imagining past neighbourhoods (Supurbia)

Some neighbourhoods of the future will form from neighbourhoods of the past. The badly designed and poorly built housing stock often built at very low suburban densities will suffer from increasing costs in use, with the inability to sustain local amenities. From such areas, community development groups will form and focus on redeveloping better, more sustainable homes in more attractive neighbourhoods. These areas will rely less on private cars and enjoy improved amenities.

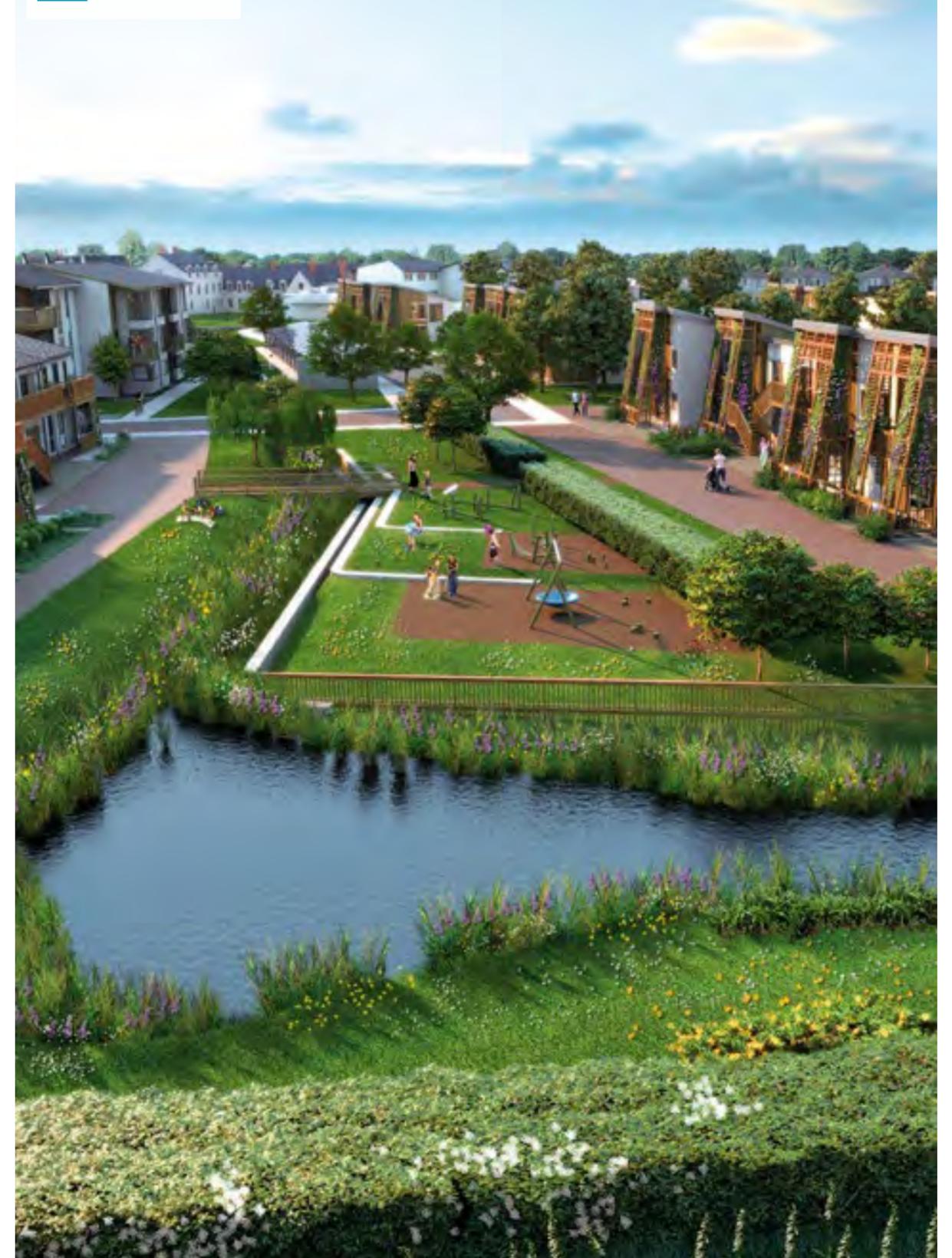
To achieve improvements across our communities, both new and old, we must bring together organisations across many sectors. This creative collaboration will be required to rethink and deliver neighbourhoods that transform the health and happiness of the population – to enable us to grow old actively, independently and healthily in the comfort of our own home by 2035.

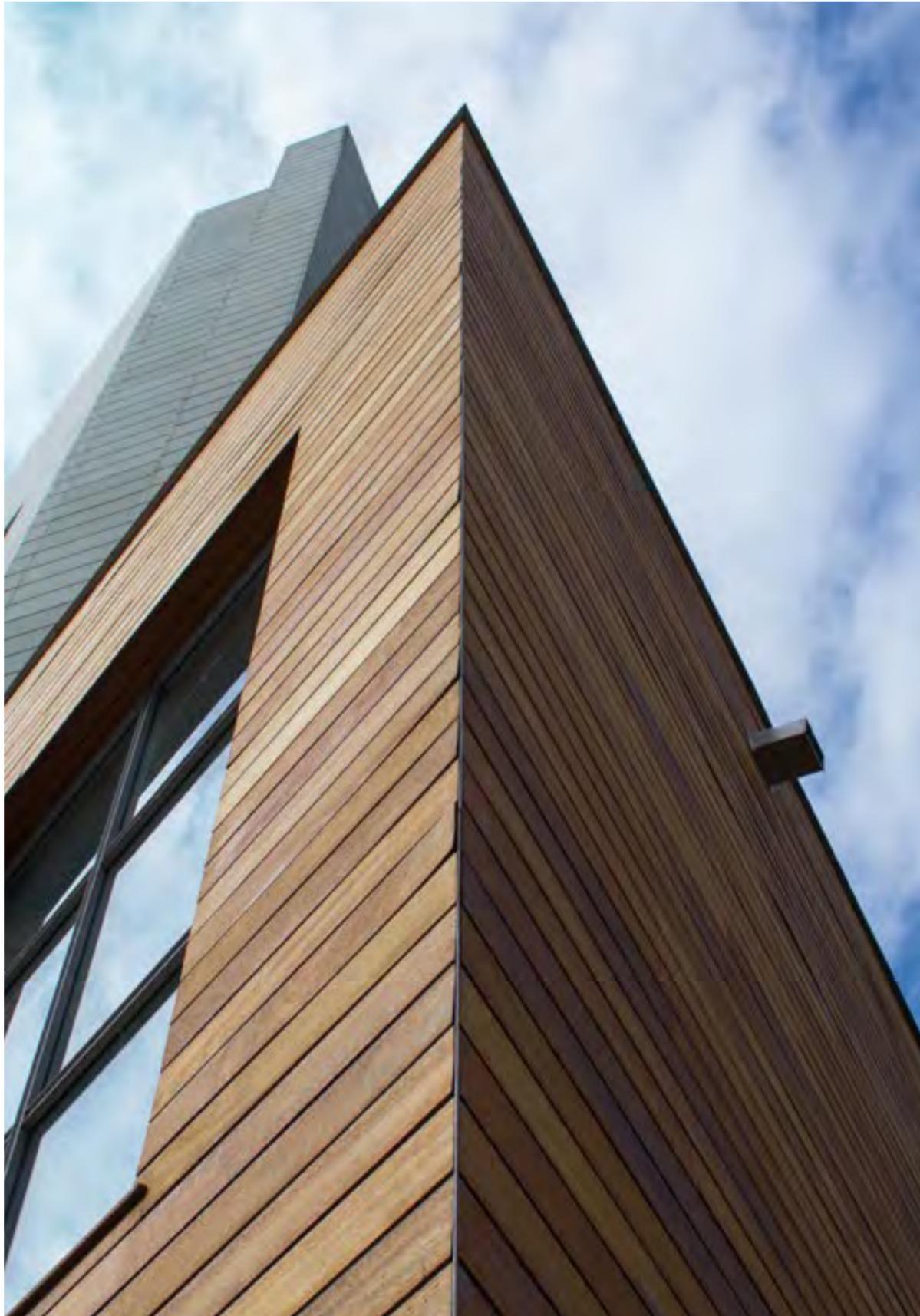
In doing so, we believe we can create an opportunity out of a crisis!

1. <https://www.theguardian.com/news/datablog/2009/aug/18/percentage-population-living-cities>
2. <https://www.gov.uk/government/publications/fixing-our-broken-housing-market>

Photo credit: Images courtesy of HTA Design LLP

Hanham Hall in Bristol





Laying the groundwork for modern methods of construction

Mike Basquill
UK Residential Associate Director,
Royal Institution of Chartered Surveyors (RICS)

The UK construction sector is a strategically significant part of the UK economy, representing 8% of GDP and 9% of employment. Every year £150 billion is invested through the public and private sectors. It is not only important in terms of its contribution to the economy but has a multiplier effect; creating wider economic growth, and directly contributing to new infrastructure, making better places, and improving the environment.

The sector has been struggling to meet the growing demand for residential accommodation driven by the rising population. This manifests in skewed price points which exclude even reasonably well-paid households from home ownership in many parts of the country. This has seen the huge growth of the Private Rent Sector (PRS) from 10% to over 20% of households since 1998, with home ownership falling from 69% to 61% of households. Strikingly, the number of households with dependent children in the PRS increased by nearly 1m, with a significant increase also in the number of older adults renting.¹

Those on the lowest incomes are almost completely excluded from home ownership, and increasingly excluded from social housing due to the reduction particularly in council stock and the switch of Housing Associations to the so-called 'affordable rent' product. The affordability issue manifests in 9% of PRS tenants being in rent arrears, and 31% reporting difficulty in paying their rent.

There are, therefore, large supply and demand imbalances, seen in extremis as homelessness, which has rapidly increased. Market-led policy interventions such as Help-to-Buy, shared ownership, and 'affordable rent', driven largely by a disproportionate commitment to home ownership, have not met the housing needs of large segments of the population.

The stage is set for MMC homes to achieve scale. A smart way of getting over this line would be to ‘democratise’ the consumer experience by utilising the principles of custom build.

Current trends in the construction industry

The construction sector offer to the residential market is characterised by low productivity, variable quality, output lagging behind target, and slim margins for builders. These margins are sometimes unsustainable, as evidenced by the decline in the numbers of SMEs working in the sector, and the concentration of production in the top few developers/constructors. This is partly due to the cyclical nature of the residential sales-led trader model, which has created unstable foundations for the finance sector to invest. Hence, planning consents outstanding are running about 30% in advance of those implemented. There are many reasons for this, including delays incumbent on negotiating a s106 agreement, awaiting the expiry or outcome of the judicial review process, and the need to leverage construction finance through expensive short-term lending. The Letwin Report (2018) also identified the trader model as being incentivised to control market ‘absorption’ tightly, to maintain price points.

The demands on the residential construction sector are substantial. At a time when we are facing a skills shortage, we have increasing workloads and aspirations to deliver ambitious infrastructure projects and targets alongside other national strategic goals such as improving productivity.

Another key issue at play, beyond planning and developers’ business planning and marketing strategies, is industry capacity. In his 2016 report about the construction industry, *Modernise or Die*, Mark Farmer identified a skills crisis in mainstream construction, likely to result in a decrease

of 20-25% in the workforce over the next decade. The workforce is ageing, and the rate of new entrants is lagging those leaving. This is likely to be exacerbated by Brexit, as one in eight UK construction workers are foreign, rising to around one in four in London. In addition, the weakening pound has increased the cost of imported materials, with some 20% of bricks and brickmaking components imported, mostly from the EU.

The construction sector deal: Government support

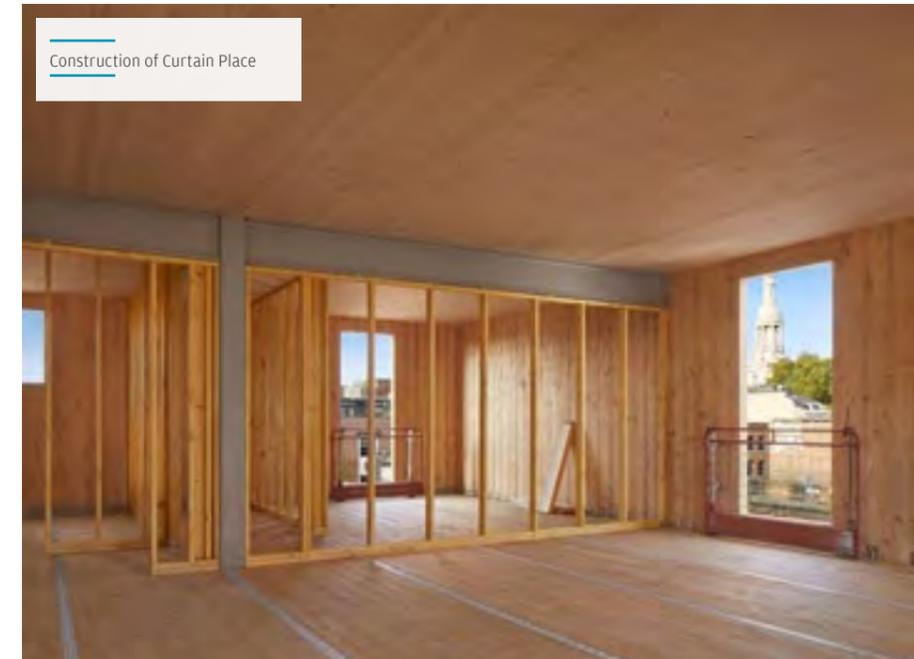
Recognising some of these problems, on 5th July 2018 the Government and the Construction Leadership Council published the Construction Sector Deal, allocating £420m to industry transformation.

The Sector Deal is based on three simple principles:

1. Digitising – Delivering better, more certain outcomes using digital technologies.
2. Manufacturing – Improving productivity, quality and safety by increasing the use of manufacturing.
3. Performance – Optimising whole life performance through the development of energy efficient, smart assets.

These are applied to five key themes:

1. Ideas – Investment in the development of digital and manufacturing-based approaches to construction.
2. People – Reforming industry recruitment and training to attract, retain and develop the skills that the industry needs.



3. Infrastructure – Taking forward the investment set out in the National Infrastructure and Construction Pipeline.
4. Business environment – Developing a sustainable business model for construction and establishing the UK as a global leader in infrastructure delivery.
5. Places – Working across the sector to strengthen the supply chain and skills base across the UK.

The residential construction industry has stepped up to the Government challenge to build 300,000 new homes per year. Achievement in the last 12 months was 195,000 newbuild completions, a 50% increase on 2012. This splendid achievement is still far short of target, which suggests that radical disrupter input is required.

Modern Methods of Construction (MMC) resonates with all the above principles and themes and can ‘fill the gap’ as a significant disrupter. There are also radical moves by Homes England to increase funding and guarantee lending to the construction sector. In addition, the local authorities’ borrowing cap incumbent on their Housing Revenue Account (HRA), has been lifted.

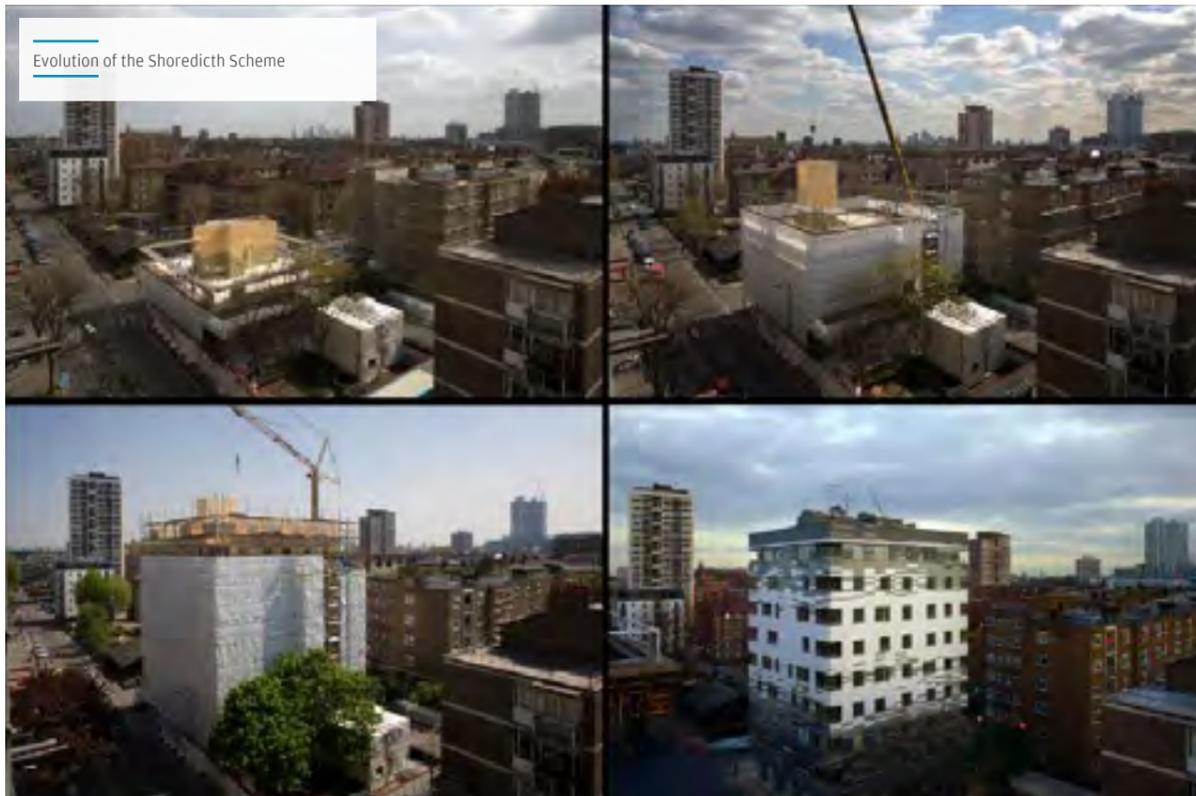
The disruptive power of MMC

Manufacturing production methods produce a workflow which is significantly different from the traditional model. Nowadays, much more of the production value comes at the better

production-managed design and assembly phase. Therefore, quality, digitisation and efficiency gains are more easily achievable.

The utilisation of pre-manufacturing technologies brings construction into the modern age by transferring a substantial proportion (up to 70%) of value from the site to the factory through greater quality control and more efficient use of materials and labour, for example by achieving 24-hour working. Employing manufacturing techniques will boost productivity, enabling faster scheme delivery with less risk of on-site programme disruption. With scale, increased productivity can be achieved through greater efficiency in a safer, controlled environment for workers.

Digitisation may be deployed both in the production process to achieve precision assembly, and through BIM and its successor models to create a dynamic database which can track the unit through design, specification, procurement, construction/assembly, quality control, finishes and sign-off, handover, letting/selling, residential occupation and management, depreciation and planned replacement to end-state recycling and renewal. Digitisation has the potential to transform stakeholder confidence in the product including investors, manufacturers, builders, surveyors, lenders, insurers, managers, and, of course, consumers.



Evolution of the Shoreditch Scheme

Performance will be much more closely monitored and scrutinised through digitisation and manufacturing. Through BIM, PropTech, Big Data, AI and the Internet of Things, performance can be tracked throughout the building's life, meaning there is a continuous cycle from design, manufacture, build, and management, feeding back into design. Moreover, for industry, MMC provides constructors and developers with wider options.

By having a different profile and properties, MMC supplements existing capabilities. Developers will have more options to choose from when considering pricing options for a development. This introduces a new dynamic into a traditionally rigid operating environment, particularly around labour and resource factors, planning and engineering constraints, and sustainability and environmental performance.

As part of the National Industrial Strategy, wider goals can be targeted:

- Skills – Modern technology needs modern skills.
- MMC-specific training offer – Government and industry must work together on the creation of apprenticeships and training products that support the rollout of MMC and encourage new entrants into construction.

- Upskilling existing workforce and organisations – This must be funded and otherwise enabled strategically, including the encouragement of SMEs.

This requires resourcing and incentivising new delivery agencies such as local authorities, local housing companies, SPVs and joint ventures to recognise and utilise emerging technologies.

Benefits of MMC for the consumer

RICS' 2018 MMC Case Studies paper subtitled 'a Forward-Thinking Solution to the Housing Crisis' looks at several different technologies as constructed on site. These include Timber-Frame, Cross-Laminated Timber, Steel-Frame, and the Design for Manufacturing and Assembly process.

The locations and design standards of the projects are impressive, and mortgageability demonstrated by sale into the owner-occupation market. The projects have in common the BOPAS (Build-Offsite Property Assurance Scheme) technological accreditation, as well as conventional insurances and assurance e.g. NHBC.

The stage is set for MMC homes to achieve scale. A smart way of getting over this line would be to 'democratise' the consumer experience by utilising the principles of

custom build; within a limited range of options, on show in the factory, where the consumer, off-plan, is enabled to make a layout, fit-out, and finishes selection to the volumetric unit.

This concept has potency in the generation of a new model of home design, selection, and consumption, broken down here into sub-markets:

- Older households – priorities are achieving highest levels of thermal performance and minimising fuel poverty; fit-out to be appropriate to need e.g. mobility, personal hygiene, and operational ease.
- Council development for lower income households: amenity, especially for families, demountability, so that temporary sites can easily be utilised, and consumer choice through factory viewing, in a sector where choice is strictly limited by availability.
- Build-for-rent: standardisation, increasing yield and reducing voids and costs to users, variety, subject to range of offer, and specification/fit-out, for frequent tenancy turnover e.g. wider door sets, and cassette replacements.

The RICS case studies show the contribution MMC has made to alleviating the housing crisis, accommodating thousands of households in high quality homes, with added social and infrastructural value as well as supporting non-residential uses.

Barriers to change for MMC

Given the stated advantages, MMC can become much more prominent in the sector. However, there are obstacles to overcome before MMC becomes mainstream.

Supply chain

The supply chains for many MMC technologies have yet to develop to a point which can meet the ambitions for the sector. Demand fluctuations, unstable investment and construction cycles, and a fragmented housing market procurement model is not obviously a good fit with factory production. Nevertheless, some offsite products and processes have had greater longevity, and have achieved significant penetration in the conventional housebuilder supply chain,

albeit as augmentation of the traditional approach rather than a replacement. Roof trusses and floor cassettes are now fully mainstreamed, for example.

Skills

The skills issue in the sector can also impact on the development of offsite construction. If there are no skills or labour supply problems at the factory end, there will still be the requirement for sub-structure, superstructure and finishing trades on site, as well as issues around utilities. Moreover, as MMC strategies are tied into digitisation, IT literacy amongst construction workers will be a concern. Given the recent pattern of concentration and fragmentation in the sector, elevated levels of investment in training and education will be required, not least around encouraging SMEs and new entrants into the evolving market.

Cost and data

From a cost, value and performance perspective, modern offsite construction is relatively untested and is still in an evolutionary phase. The data on cost of construction, value and performance using offsite is not yet robust, and as techniques evolve, cost information and performance changes, and previous data becomes obsolete. This makes it hard for the industry to estimate costs, assess benefits and plan appropriately, which is a challenge for surveyors. This is an issue for investors, lenders, values and insurance/warranty providers naturally concerned about product durability, value and ongoing maintenance cost. The Build Offsite Property Assurance Scheme constitutes a significant provider of confidence and assurance in this sector.

Changing work profile and inflexibility

As the objective is for up to 70% of cost to be incurred offsite in factories and at the design phase, the points at which labour is most intensively used throughout a project differs from traditional build, with the cost curve far more front-loaded. This cost profile demands a 'right first time' ethos from initiation. This also means less flexibility to change elements of the projects later. As a substantial portion of labour and other cost is generated early, there is greater project risk earlier on in the programme, which is exacerbated by uncertainty around land and planning, and expensive development period funding.

Industry familiarity

Lack of familiarity with different offsite construction techniques can lead to risk averse decisions against its use. This is reinforced by the subcontracting model and informal networks.

Consumer perception

There is still consumer resistance, with an abiding image of post-war emergency housing rather than 21st Century technology delivering better quality, safer, and far more cost-effective homes at the same or, with upscaling, at lower cost.

Standardisation and scalability

Standardisation of different technologies is also critical to reducing complexity and achieving scalability. There needs to be a sense that consumers have a choice between contractors when choosing a technology, although conventionally there will be a natural selection of technologies, leaving a handful in the mainstream.

Actions required for MMC to succeed**Public procurement**

MMC can be supported through public procurement. Government must support MMC through its influencing power, directly through investment and indirectly through planning, education and construction and design quality standards and programmes, including encouraging and incentivising construction of MMC factories in areas of high unemployment.

Private investment

Private sector investment in MMC is already widespread; however, more can be done to create an environment of cooperation and joint ventures, particularly to allow SMEs to access and invest in larger production plants.

Government risk mitigation

Government should consider how it can give some risk mitigation to potential new entrants and suppliers.

Guarantees

Investors and consumers need confidence in MMC products through the availability of mortgages, assurance and warranties. Accreditation for MMC such as BOPAS needs to be championed and strengthened. Stakeholders need to be satisfied that there is an industry seal of approval which gives equal or greater assurance compared with conventional home insurers and warranty

providers. Partnerships with lenders and investors, are critical in this regard. Accreditation models like BOPAS can catalyse MMC into the mainstream.

Investor and lender engagement

Investors and lenders must engage with the sector to recognise and calculate the long-term value of products. We need improved integration and collaboration between lenders and builders through schemes like BOPAS, so that lenders better understand products and build confidence in the quality, durability and marketability of the product. Regardless of tenure, investment approvals must become systematised, like mortgage approvals for second-hand property, despite, arguably, resales having a greater risk profile regarding the three criteria. Now, the second-hand home sales process is clear – lenders have tolerances for bulk retail lending. Surveyors and valuers also have a key role to play, and must add knowledge of MMC technologies to their reporting skillset, especially regarding their durability and cost in use.

Standards

Regulation, standards and professionalism need to be adapted to support MMC.

Regulator familiarity

Regulators need to familiarise themselves with MMC. Regulators and warranty providers like NHBC, LABC, BBA (BRE) must upskill in the treatment of MMC by getting better familiarised with products on offer and their properties, to enable the provision of the consumer protections to encourage confidence in the products.

There are great advantages to be gained from growing the volume of offsite-manufactured homes to significant levels. There are opportunities for all participants in the development process as it stands, and for the encouragement of new participants. The key beneficiaries, however, should be those households seeking better value for money, better quality, cheaper cost in use and higher amenity in their home.

¹ Office of National Statistics

Photo credits: Images courtesy of Mike Basquill and Will Pryce and Waugh Thistleton Architects



The next generation of housing is rolling off the line

Matt Cooper
Business and Operations Consultant, Arup Group

Digital technologies, clever design and an acceleration of Modern Methods of Construction could make it possible for us to adapt our homes throughout our lives and enable us to keep our communities together.

A new way of working

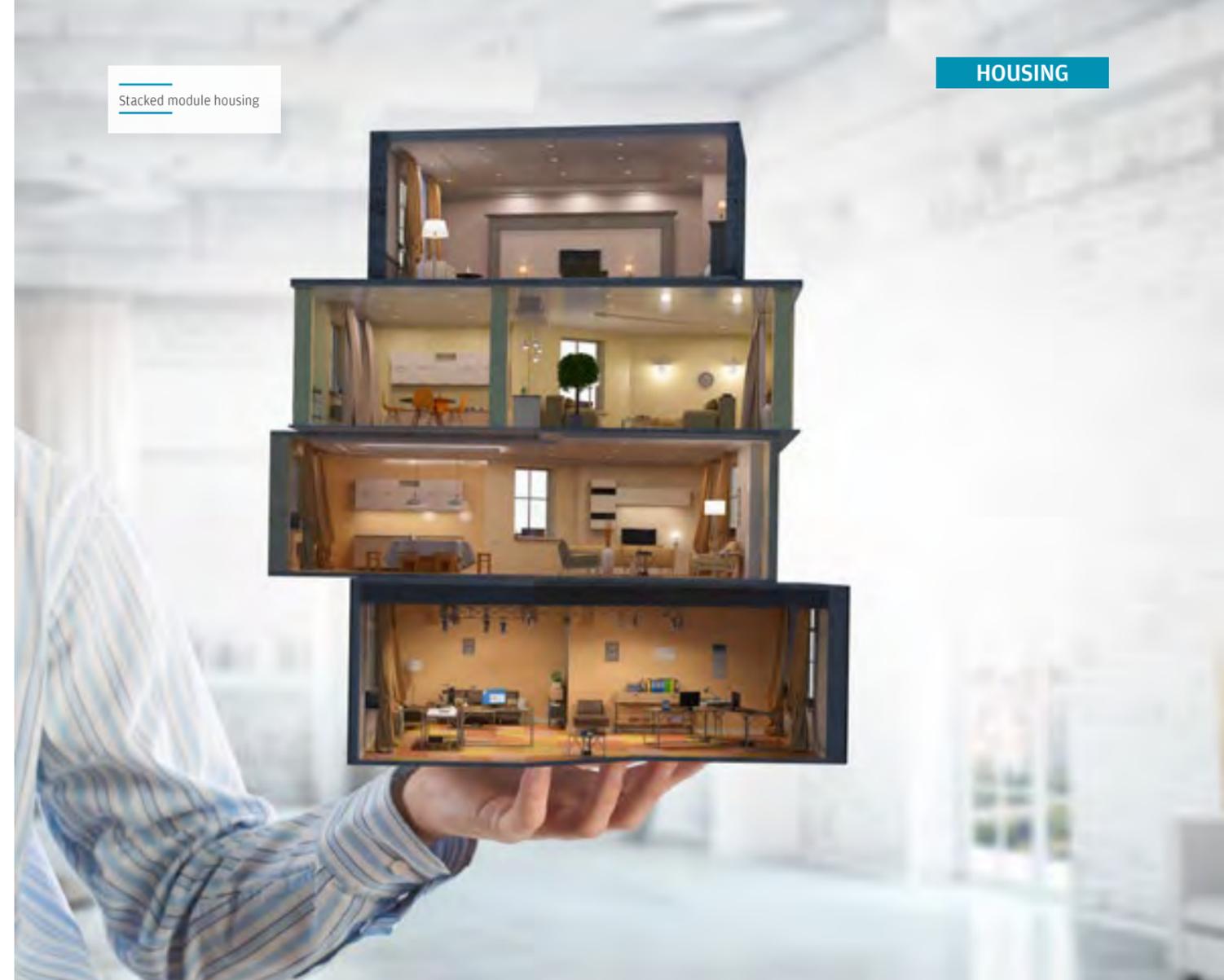
Today, the UK has around 24 million homes and a population of around 66 million people. During 2016/17, around 200,000 new homes were built, including both houses and flats. Yet there isn't a day that goes by that we are not reminded of the chronic shortage of housing, and that a significant proportion of our younger generation are finding it impossible to get onto the housing ladder. Government and many industry experts agree that a move to more high-quality, factory-produced housing could help to alleviate the problem. But could the new generation of modular housing help to change the way our housing markets work and open the door to new business models that have a much wider social impact? At Arup, we support and enable the change to a more sustainable future; not only to create more housing, but to revolutionise the way housing is provided.

A shortage of housing

The cessation of council house building in the 1980s was based on a government belief that the private builders and housing associations would take the slack and deliver the right mix of built-to-sell and built-to-rent properties for our housing market. That simply didn't happen. And, based on the rules of supply and demand, we have seen the inevitable price inflation that comes with a shortage of anything, and a crisis in the affordability of housing.

For a myriad of reasons, skills shortages being just one, the traditional house-building industry has failed to keep pace with demand. Experts agree that a new build rate of 300,000 houses per year will be required, just to start to break the housing ladder barrier to entry of affordability. With skills shortages set to become an even greater obstacle post-Brexit, we need to accelerate the development of new, high-quality manufactured housing that use Modern Methods of Construction.

Stacked module housing



Ageing housing stock

But that's not the whole story. The UK has a shortage of the right type of housing in the right places. We also have over 600,000 homes sitting empty, many of which can only be described as the wrong type of housing. Since they are empty, they must be in the wrong places, right?

Maybe not. Simple maths suggests that with 24 million homes and a current build rate of around 200,000 new homes per year, each new house or flat built today will need to last an average of 120 years – and that is without increasing the total housing stock. A recent survey stated that the UK has the oldest housing stock out of all EU member states, with 38% built before 1946. By contrast, Japan, a country with roughly twice our population, builds over a million houses each year. In Japan, homes that are no longer fit for purpose are simply replaced and the precious land is re-utilised.

Just as the back-to-back terraces and tenements built in the 1890s aren't suited to modern living, it is highly unlikely that our older houses are going to be suited to future living. With the acceleration of new digital technologies designed to make our lives easier and more connected, surely it is time for a rethink of how we finance, build and maintain relevance in our housing stock.



Homemade Heartlands by Igloo Regeneration

It's not the money

Anyone who has driven through one of our inner cities will have seen streets of houses boarded up, no longer fit for habitation. But the land that those houses sit on is, in most cases, still perfectly suitable for housing. So, why don't we just replace houses that are no longer fit for purpose?

Well, it is not just the money. Using traditional build methods, it takes a considerable amount of time and associated disruption to knock down and regenerate an area of housing. As a result, builders prefer to develop greenfield sites. Unfortunately, this leaves the more problematic areas to degenerate, allowing resultant societal problems to grow.

The UK spends around £40bn per year on housing, yet 98% of Local Authorities are unable to meet demand. They spend hundreds of millions of pounds repairing dilapidations, in an attempt to keep houses just fit for habitation. The total cost of inadequate housing in the UK was estimated in 2011 at £4.4 billion per year. That figure includes not only the maintenance costs but

also those of associated energy, crime, health and a range of other factors. In 2009, the UK Audit Commission stated that 'Every £1 spend on providing housing support for vulnerable people can save nearly £2 in reduced costs of health services, tenancy failure, crime and residential care.'



Rapid regeneration

Most of us accept that an old family car will be worth less than the equivalent new one. As they become dilapidated, we seem perfectly happy to replace our cars for something newer, more technologically enabled, more fuel efficient, and generally better. We don't factor in the cost of the land that we park our cars on when we make that decision. So why not replace our housing stock using the same logic?

What if we could replace our homes as quickly and easily as we replace our cars? Homes can and are being made in factories using the latest Modern Methods of Construction (MMC). Innovations in modular construction technologies now make it possible to produce high quality, customisable, energy efficient housing that can be adapted to meet changing societal and personal needs, and that can be delivered and installed in days rather than months. Japan delivers more homes in produced factories each year than we build in the UK in total.

The model of developers building on greenfield land is not sustainable in the long term. The advances in technologies, and the need for society to be less wasteful and polluting, present a need, or indeed an obligation, to reinvent and rejuvenate our cities.

Building in adaptability

With clever modular designs, a house can be installed in days and can be replaced, adapted or reconfigured equally efficiently. This means that our homes and neighbourhoods can be adapted to meet individual or family needs as they change throughout our lives. This could be either due to physical changes, or the changes in technology that will inevitably impact on all of us.

We are already seeing giants like Amazon investing in technology-enabled, prefabricated modular housing, and financial institutions, like Legal and General, establishing their own MMC production capabilities. Companies like Tata Steel are developing housing systems that could provide quality, adaptable modular designs. These allow us to upgrade our homes in much the same way that we upgrade our cars and technology.

The range of materials, and ability to customise products, make for some interesting places to live. Different MMC typologies allow us to create different types of places, tailored to local needs. This can readily be translated into local design guides and codes. The combination of innovative financial and technical services could see a major shift in the way housing is provided.

This doesn't mean that we are proposing a throwaway society. We are committed to promoting the principles of a circular economy. With clever design, just as cars are reused, housing can be easily upgraded, reprocessed and ultimately recycled, without reducing them to rubble. The approach will not only reduce the sprawl into precious greenbelt, but it will recycle housing land and the materials that our homes use. It will allow communities to remain together and to adapt to living in homes that fit with differing needs and means across a lifetime. Furthermore, by decoupling the land value from the house, and increasing the aftermarket value for housing components and modules, we can attract new financial models, services and industry markets. This will help offset the cost of the homes we use.

Housing is at the core of the community and can integrate society across all ages. Quality housing, which is maintained to a high-quality standard, can establish pride in a community. There is no shortage of studies that prove the benefits of communities on health and wellbeing. At Arup, we are working with central and local Government departments, housing developers, financial institutions and technology partners to develop products and collaborative models to not only address the current housing shortage, but create new markets and industries associated with urban regeneration. We want to allow individuals, families and communities to have a better chance of remaining in the places we want to live in.

A new social economy

The creative pioneers of the new generation of MMC not only have the opportunity to alleviate our housing shortage, but to change the way housing is delivered across the social spectrum. A house is just a house, but homes are part of communities. Throughout our lives, the way we use our home changes. With adaptable and agile regeneration capabilities built in by design, MMC could be the game changer. Within the next 10-20 years, it may not only halt the downward spiral in our housing market, but act as the catalyst for a new social economy.

Photo credit: Images courtesy of Arup Group and Igloo Regeneration Ltd – www.homemadeheartlands.co.uk

BIM – Disrupting construction industry practices

Terry Stocks
Director and Head of Public Sector and Education, Faithful+Gould

Homes and neighbourhoods in the UK are generally not fit for purpose to meet the needs of an ageing population. If we want to see change at an industrial scale, stakeholders need to work more collaboratively to redefine the way buildings are constructed from the ground up.

The UK Government recognises the importance of this agenda and is championing change within the construction industry under the IPA and Department for Business, Energy & Industrial Strategy (BEIS). Industry- academia- and government-led programmes such as the Cambridge Centre for Digital Built Britain and the Construction Leadership Council's Sector Deal are focusing on driving this change. The IPA Transforming Infrastructure Performance (TIP) programme is a 10-year initiative to drive efficiency and improve the outcomes of planned and delivered infrastructure assets.

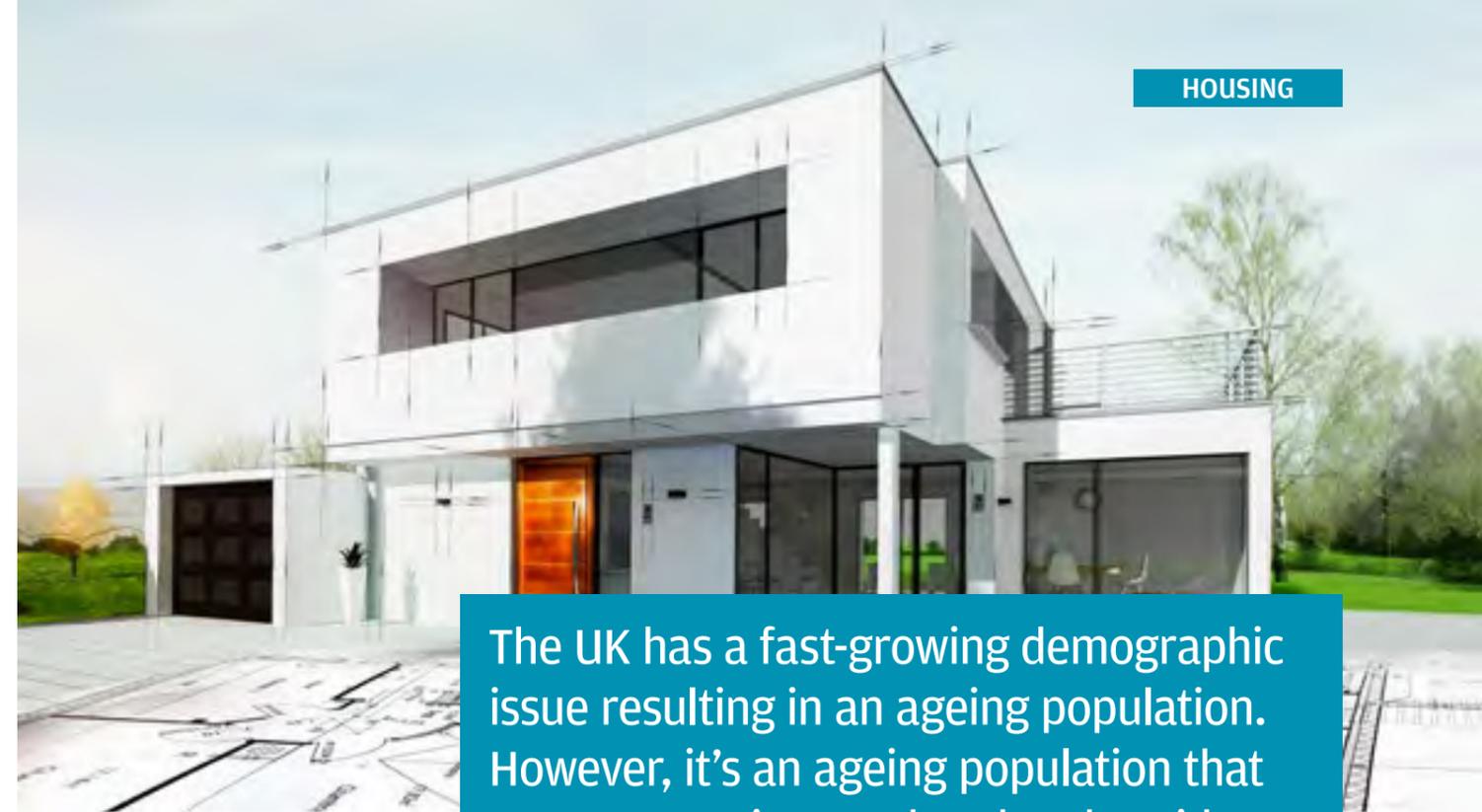
This ambitious programme relies on digital approaches to delivery, adopting a process called Building Information Modelling (BIM.) The BIM process enables designers to build a 'digital twin' of the proposed asset, which reduces on site construction waste and duplication. It provides increased certainty that the delivered asset reflects the intentions outlined at the project/programme inception.

A social infrastructure that serves its intended users

The BIM approach supports digital libraries and the open sharing of object information and designs. Combined with collaborative design practice, this supports Modern Methods of Construction (MMC) as stated in the TIP efficiency programme.

BIM also facilitates the building of 3D models of the facilities to increase stakeholder engagement and understanding. This, in turn, allows better feedback and comment, allowing a more insightful design and specification process. This collaborative approach to scheme briefing, design development, delivery, handover and operation is critical in delivering the TIP requirements, and a social infrastructure that serves its intended users and functions.

Current delivery process can be opaque. The various players (client, procurers, professional service providers, contractors, facilities managers and so on) work in silos and deal with misaligned expectations of outcomes. The tragic events of Grenfell Tower and the subsequent review of building regulations report led by Dame Judith Hackitt, 'Building a Safer Future', demonstrated the consequences of working within an opaque system. The Hackitt report identified the production and sharing of information



The UK has a fast-growing demographic issue resulting in an ageing population. However, it's an ageing population that spans a growing age band and a wide demographic need from active through impaired mobility and extra care.

as the 'Golden Thread' that should run through the whole life cycle of an asset. Collection and verification of the data must be supported by digital approaches.

The report also emphasised the importance of crystallising aspirations and expectations at the start of a project. Further, there should be a checking process in place throughout design development and delivery of the asset, to ensure those expectations have been delivered for the asset that is handed over. Finally, the asset data should be held, accessible and updated throughout the operational lifecycle.

This is where BIM comes into its own and you can read more about this process in Alex Small's article on page 282. BIM is championed by Central Government represented by the Infrastructure and Projects Authority (IPA), Business Energy and Industrial Strategy (BEIS) and the Cambridge Centre for Digital Built Britain. It enables the delivery of the asset 'soft landings' process. This includes post-occupation reviews, providing a detailed in-use occupancy report to support better operation of the delivered asset, and lessons learned for future asset briefing and specification.

The Hackitt report focuses on high rise, high risk buildings (residential buildings generally over 10 stories high). However, Dame Judith would like to see her recommendations extended to other buildings where those using or living in the facility could have mobility or other issues affecting their free and rapid movement around a facility. This is particularly pertinent to the housing of older adults.

Breaking traditional moulds

Delivering the combined benefits of BIM and the wider digital initiatives requires a joined-up collaborative approach across the whole project and asset life cycle. The client, procurement and professional service teams, contractors, designers, facilities management, and end users will be able to work together sharing clear intent and understanding of the outcomes to be delivered.

This approach will break the traditional 'iron triangle' of Time – Cost – Quality, where one aspect is delivered at the consequence of the other. The collaborative BIM approach supports a move to a Time – Cost – Quality Venn diagram approach where all three can be delivered simultaneously.

We need to start now if we want to deliver homes and neighbourhoods that meet the needs of 21st Century society.

Delivering through scale

Because of the ageing population and the general housing shortage, there is an opportunity for BIM, MMC and revised procurement approaches to have a real impact across a wider sector. This can address what may look like a diverse asset requirement, which could, in fact, be resolved through standard design approaches. (This is not to be confused with standard designs or standard aesthetics!)

The demographic need could be satisfied through development of age-friendly targeted developments. But residential houses, apartments and so on could still use the same basic structural frame approach. Such an approach would provide manufacturing facilities with the means to mass-produce assets. After all, the requirement would be across a whole sector rather than the current feast or famine situation brought about by individual orders across a diverse set of projects, all with bespoke requirements.

By adopting a collaborative cross-sector approach to asset specification and delivery and using BIM/digital approaches as the collaborative tool to support production, delivery and operation, many of the current and emerging delivery and planning risks could be mitigated. Modern Methods of Construction are enabled through BIM, and championed as a step to improve productivity and output. (MMC articles directly follow) A production type volume is required to deliver the benefits of a correctly procured and collaborative sector approach. We need to start now if we want to deliver homes and neighbourhoods that meet the needs of 21st Century society.

F+G (Member of the SNC Lavalin Group) are a construction multi-disciplinary design and integrated project and programme management organisation. They have national and global coverage with offices throughout the UK and worldwide. Their staff hold key positions in Government and Industry in developing and deploying the BIM and MMC initia.



Modern methods of construction (MMC) will transform the supply chain

Jonathan Parnes
CEO, Regents Affordable

I've been a property developer for over 30 years. I've been involved in countless developments during this period and I've had first-hand experience with most major construction companies. So, when I say that the infrastructure of the construction industry is rotten, I'm speaking from experience.

One of my most recent projects is a £80 million student accommodation in Coventry, and I am currently taking forward my next scheme in the city which will be built in time for Coventry's tenure as the UK City of Culture in 2021. I've been impressed by the city's appetite for doing things differently in building a Neighbourhood of the Future and I want to be part of it.

I want to incorporate changes envisaged within the Neighbourhoods of the Future white papers. This way, we can develop communities which work for an intergenerational demographic. Our homes will incorporate the recommended 'cognitive' systems, including health-based monitoring and environmental controls and will adapt in form as people's needs change.

Pivotaly, I want to join with others in building quality and affordable housing on a scale that will make a difference. Our society needs it: research tells us that the UK needs 250,000 new "affordable" homes annually to meet the needs of our population. And we need them quickly. Our partners exist – they are called Housing Associations, Local Authorities and, of course, likeminded developers.

My company is ambitious, we want to scale and help meet the UK's growing demand for new housing. So, what do we need? A suitable site, willing partners, investment, a plan, a set of architectural designs and then builders. If this sounds easy, it isn't!

I believe that we need to change supply-chain dynamics and the volume construction process and these need stakeholders to change their mindsets.

What currently happens is that as soon as a developer commissions a building contractor, the contractor starts to think of how they can save money and increase their profit. The contractor tries to renegotiate the design, the materials and, of course, renegotiate the agreed price. This happens all the way down the contractor's supply chain. This results in delays and litigation, which results in more delays and in the case of international construction giant Carillion, an utter collapse in January 2018 having racked up debts of £1bn (Inman, 2018).

I'm not the first to recognise the rotten infrastructure. It's been a familiar refrain for two decades¹. In June 2018, the chief executive of construction industry standards notifier, British Board of Agrément, Claire Curtis-Thomas, stated her belief that "fundamental" problems with procurement are making "good companies complicit in bad outcomes,"² leading to cuts in quality. She continues: "Once the contract has been won, [contractors] go about 'subbie bashing' – they go to subcontractors and say we haven't got a lot of margin here, how we going to make the margin up?"



A shorter, transparent supply chain

We need to transform the supply chain, which we can do by shortening it and by making it more transparent.

We can shorten it using modern methods of construction (MMC). We can make it more transparent with a shared 'open book' accounting system.

MMC enables more efficient builds, as sites can be prepared at the same time as in-factory production of build materials. 80% of the build can be produced in the factory and transported efficiently to site. This ensures that each development will be delivered to an agreed design, fully fitted and typically in 60% of the time. A large housing scheme will take 14 months from mobilisation date rather than 24-30 months for a traditional build. The method is tried and tested (see also Mike Basquill's article on MMC on page 68). It's the scale of application I am proposing that is disruptive, along with the additional infrastructure that goes with it.

My vision involves opening a factory in Coventry, ideally in collaboration with Tata Steel and other members of the Agile Ageing Alliance. The location is perfect. Coventry is a traditional engineering hub and has the skills. The city council's housing strategy outlines the need for affordable accommodation for students and older people and Coventry University is keen to engage in order to help facilitate and promote knowledge transfer. Logistically, Coventry's central location enables it to serve a wide geographical area.

With support from Coventry's local authority we will in turn reinvest in the community, providing steady employment and quality housing within dependable timescales.

This evolved method of construction still requires building contractors to complete the remaining 20% of the builds. However, I suggest that with higher profit margins, and working to open book accountancy, we can transform the supply chain into one of trust and transparency.

When I say that the infrastructure of the construction industry is rotten, I'm speaking from experience.

Contractors currently work on a 2%–3% margin, sometimes less. If we double this, we reduce the need to cut corners. This means that developers like me should also step up to the plate and significantly reduce our margins.

I say, let the challenge commence!

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- 1 See Latham Report 1994, Egan Report 1998, Government Construction Strategy 2011, Farmer Report 2016.
- 2 The Fire Protection Association, 2018

Photo credit: Images courtesy of Jonathan Parnes



Orb (Organic Refuse Biocompound) material, made from food and agricultural waste

A bio-revolution in home construction

Ehab Sayed
Founder and Director of Innovation, BIOHM

If we were to imagine the ideal neighbourhood of the future, we would subconsciously place great emphasis on truly happy and satisfied communities, as we inherently understand that a healthy and flourishing community forms the heart of any successful neighbourhood. Architecture allows us to create built environments in which we can flourish. Natural ecosystems and environments that enabled species to flourish have been developed and optimised over 3.8 billion years, making them ideal places to seek inspiration. Biomimicry, or biomimetics, is the abstraction of formations, structures, functions and processes in biological systems to synthesise man-made products and systems that solve a problem (John et al., 2005).

The science of biomimetics is driven by the realisation that our most prized inventions exist in more elegant, eco-sensitive, efficient and effective forms in nature. Bamboo stems and lily pads contain beautifully constructed structures that make man-made architectural beams and struts seem underwhelming. Our air conditioning and ventilation systems cannot compete with the way the architecture of termite mounds passively maintains precise temperatures. A deep understanding of how organisms achieve such feats of engineering can shed light on how we can work towards creating healthy and sustainable neighbourhoods of the future.

Biomimetic neighbourhoods of the future

With bio-technologies, bio-inspired design and bio-engineering becoming more popular than they have ever been and rapidly attracting the attention of academics, practitioners and governments, it seems that a bio-revolution is taking shape. This means that we may be working our way towards a biomimetic future that celebrates the ingenuity of nature, makes use of renewable resources and collaborates with natural organisms to develop healthy and sustainable products. Within this context, the ideal neighbourhood of the future would adhere

to ecological laws in nature that govern every living entity. Laws that can lead to optimal efficiency and resilience when applied to products, systems and processes.

The wellbeing of neighbourhoods is heavily affected by the physical environment in which they exist. Appropriate ecosystems need to exist in nature for species to survive, thrive and flourish. The species here could be perceived to be the inhabitants, but they could also be the buildings and infrastructure that forms the neighbourhood. An interesting thought to consider is what those species or buildings would look like in a biomimetic future.

Living buildings

Billions of years of development and evolution in biological systems have resulted in the world's most resilient and successful species. If we were to extract the driving adaptive features that result in their success, perhaps we would gain insights into how to create resilient and successful buildings. We could even take this a step further by bringing buildings to life. After all, a biomimetic future would thrive with living buildings.

Decades of studying nature have allowed ecologists to extract nine laws (Benyus, 1997; Brown, 2016) that all living organisms and ecosystems must follow:

1. Nature runs on sunlight
2. Nature uses only the energy it needs
3. Nature fits form to function
4. Nature recycles everything
5. Nature rewards cooperation
6. Nature banks on diversity
7. Nature demands local expertise
8. Nature curbs excesses from within
9. Nature taps the power of limits

If we combine these laws with the features that allow organisms to achieve optimal resilience and success in survival, we can create a vision that would inspire us to perceive buildings as living organisms.

Self-assembly and collaboration

We know that all organisms, structures and environments from the nano-scale to the macro-scale come into existence in nature through a process known as self-assembly. This is where biological building blocks multiply and combine to create living entities. Those that assemble a self that is fit for its environment, structurally appropriate, adaptive, multifaceted and flexible increase their chances of survival. The less an organism depends on another for survival and energy generation, the more likely it is to succeed through the natural selection process and avoid extinction. But if dependency is necessary, those who develop ingenious, mutually beneficial and sustainable collaborations and cooperation mechanisms can cheat natural selection. The rate at which an organism is capable of evolving and developing is limited by its self-awareness and intelligence. Humans are the best example of rapid development, albeit highly unsustainable in its current form, as a direct result of our self-awareness and our ability to collect information, process it and alter our behaviour accordingly (Zimmer, 2006).

Thus self-assembly, the self, self-sufficiency and self-awareness are the four prominent features or areas that determine a species' survival within an ecosystem. The nine ecological laws found in nature can be used to set guidelines within those four areas to create the beginnings of a truly biomimetic framework through which a building could be brought to life. A biomimetic future could be represented in every aspect of our life. From city planning, infrastructure and products to methods of governance, business models and daily processes. The true value lies in biomimicry becoming our common mode of perception. Perceiving life, tangible entities, ideas and processes as collections of systems within ecosystems offers an advanced level of analysis and understanding.

The key to a biomimetic future

Digital technologies are possibly the most critical enabler for a biomimetic future. They allow us to develop and integrate intelligence in our creations. This intelligence would mimic the wisdom that lies in biological organisms and ecosystems as they develop. Biomimicry requires an information-led approach.

The science of biomimetics is driven by the realisation that our most prized inventions exist in more elegant, eco-sensitive, efficient and effective forms in nature.

Processing such dense datasets and pieces of information can be beyond our mental capacity and comprehension.

Therefore, the use of computational power has allowed us to optimise products and systems with algorithms and analyse rich datasets to draw conclusions and instantaneously respond. It has also allowed us to achieve real-time models of phenomena that have puzzled scientists for decades. Feats that were impossible to achieve before the digital age, which is, perhaps, a logical explanation for the absence of biomimicry in mainstream thinking. With the emergence of quantum computing, one can only imagine the processing capabilities we will be able to achieve in the coming decades.

Empowerment through AI and blockchain

The use of sensors and advanced data management systems and the cost reductions achieved in renewable energy have brought artificial intelligence into our homes. Artificial Intelligence is more than welcome in our future neighbourhoods. In truly inclusive neighbourhoods that cater for the diverse needs of members of society, we would need to ensure that an intelligent infrastructure is in place to manage buildings in ways that are conducive to occupant wellbeing and optimal building performance. Technology can be truly empowering when implemented sensitively and appropriately, supporting a flourishing community.

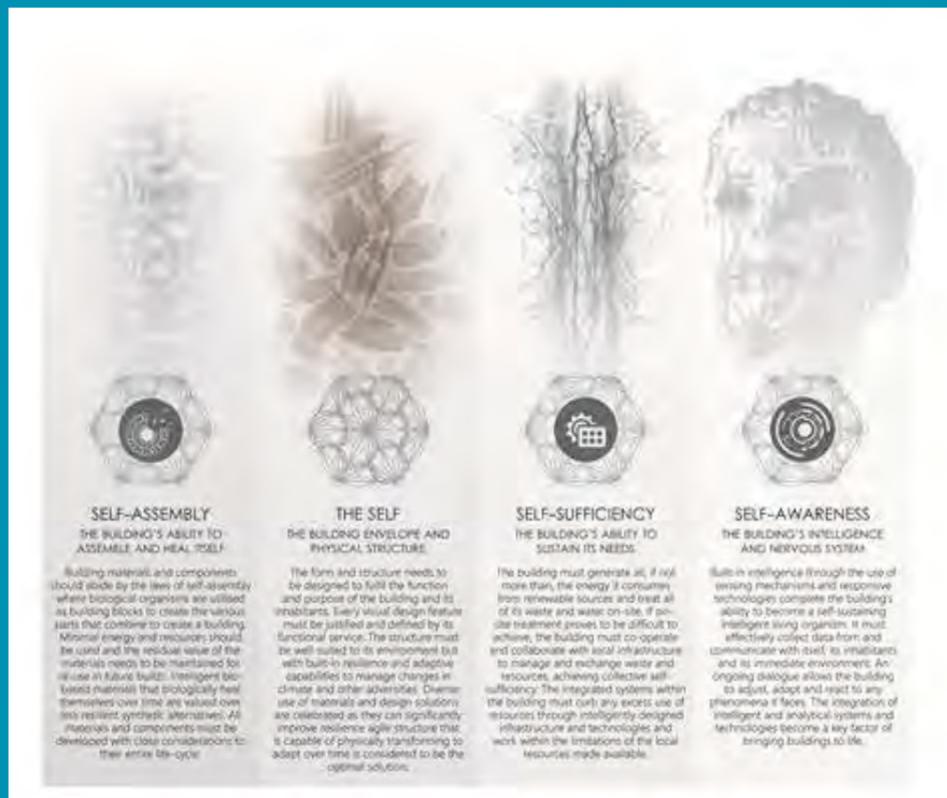
One of the most transformational innovations of our time, Blockchain, is making the implementation of decentralised micro-grids easily achievable. Blockchain can be perceived as an ever-growing records list, linked and made secure using cryptography. A by-product of the cryptocurrency, Bitcoin, Blockchain facilitates transactions between two parties efficiently and securely, enabling the trade of energy in a peer-to-

peer managed network (Kushch and Prieto Castrillo, 2017). Not only does this empower the public, allowing them to take ownership of the energy their homes generate but it creates a more resilient and efficient society and, in turn, economy as it reduces the reliance on fossil fuels or centralised energy generation.

Heliophilic planning

Such fluid movement of information, energy and people and the fast-growing and ever-changing nature of today's cities means that we need to start considering different approaches to neighbourhood planning. Ancient civilisations around the globe have taken a passive, yet ingenious, approach to planning influenced by the lay of the land and the sun-path throughout the day and the seasons. Such eco-sensitive design inspired and influenced by nature is one that can deliver some of the healthiest and most sustainable buildings. Heliophilic (attracted or adapted to sunlight) planning allows the optimal amount of solar heat and light to reach every building as well as improving overall ventilation. It is guided by the movement of the sun and determines building and street orientation, shape and size (Knowles, 2003).

The Industrial and Petrochemical Revolutions have introduced mechanical means of generating energy, heat and light, which unfortunately resulted in less emphasis on the solar envelope. Heliophilic buildings help reduce energy bills, improve heat control indoors and have a regenerative effect on inhabitants' health and wellbeing (World Green Building Council, 2014). In self-sufficient communities with decentralised micro-grids, energy efficiency is vital and, therefore, as well as designing highly energy-efficient buildings, heliophilic architecture is key (Knowles, 2003).



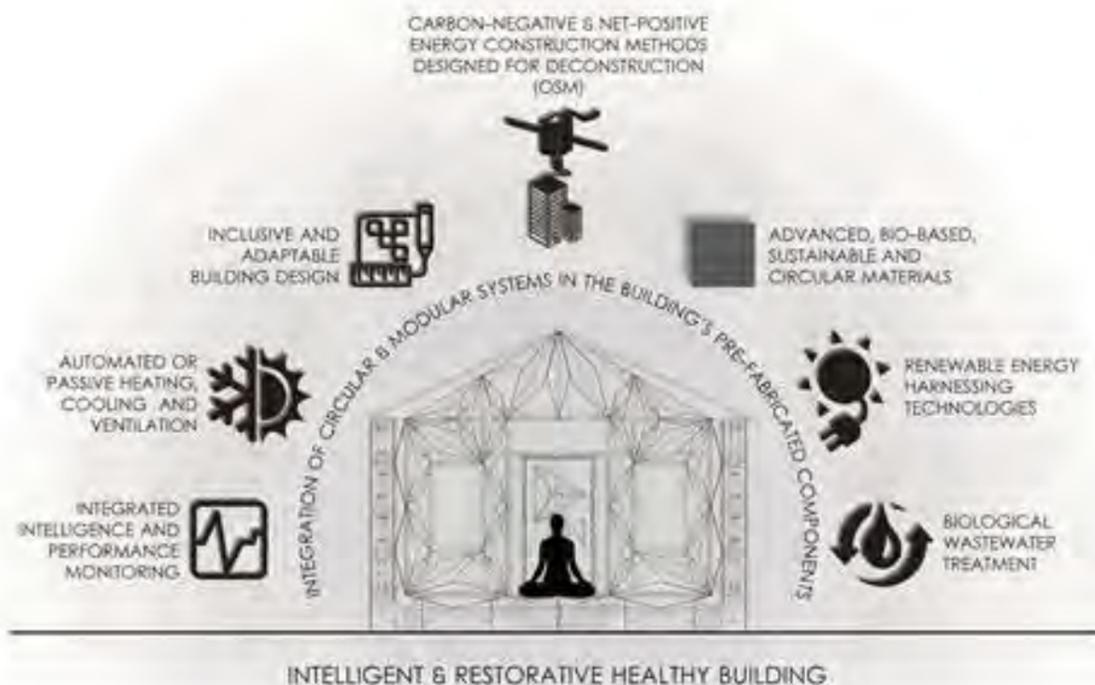
Buildings as living organisms

The way organisms, such as Mycelium (the vegetative part of a mushroom) or the unicellular slime mould, Physarum Polycephalum, grow and multiply on a two-dimensional plane to access resources can offer transformational insights into optimal efficiency in city planning. Combining learnings from natural organisms with heliophilic architecture (both of which are biomimetic concepts), can allow us to create highly efficient, healthy and resilient infrastructure in cities, whilst alleviating traffic congestion issues (Vogel et al., 2017). Off-Site Manufacturing construction methods and systems designed for deconstruction, could create agile infrastructure that can be adjusted throughout its life, allowing planners to abide by the solar envelope and taking inspiration from nature's ingenious approaches whilst ensuring the integration of future flexibility.

Agile infrastructure

Buildings, whether residential, public or commercial, need to meet a variety of needs determined by their purpose, the client, the owner and/or occupant, the architect's vision and environmental, economic and social considerations. This creates tension in the balance between time, quality and cost when it comes to the building method and design. Nature, however, would tackle this predicament by utilising the power of information, systems-thinking, mathematics and geometry in what is known as parametric, generative or computational design to achieve all three. Generative, parametric or computational design can be defined as a design method where rules and algorithms drive the generation of form using computational tools, which integrates efficiency and agility in building systems.

The integration of circular and modular systems in a building's OSM (Off-Site Manufacturing) components to create truly intelligent and restorative buildings



Agility here has two separate yet aligned definitions. One may perceive agile infrastructure as one that is resilient and dynamically responds to climate change, energy insecurities, human needs and general adversities over time. One may also perceive agility in a physical sense where buildings have the ability to transform their shape, structure, features, purpose and function over time. Sensors, Blockchain, advanced energy harnessing technologies and emerging materials combined with the modularity and customisability of Generative Design and Off-Site Manufacturing methods form viable solutions for both definitions.

The integration of circular and modular systems in a building's OSM (Off-Site Manufacturing) components to create truly intelligent and restorative buildings.

A biomimetic future of agile infrastructure can be considerably accelerated by Off-Site Manufacturing and facilitated by the integration of intelligence and modular systems, allowing a building to cater for any inhabitant at any time and in any geographical location. This intelligence must mimic the genius of nature not only through digital technologies and sensors, but also through intelligent multi-tasking, or even living materials that can react to and interact with their environment. Modularity in building design and design for deconstruction offer unprecedented flexibility to city-planning. The idea of a 'desolate neighbourhood' could become obsolete as buildings would become immortally revived and re-invented through reconfigurations, relocations and upgrades. They would age elegantly and sympathetically with their surrounding communities and inhabitants. As communities grow and change, so do their needs. Agile and restorative infrastructure can allow communities to flourish indefinitely (Russell, 2011).

The age of bio-revolution

A revolution in the construction industry is certainly overdue and we appear to be marching towards one. Developing new biomimetic products alone will not revolutionise the industry. Nor would the development of new business models or methods of procurement. A revolution in thought and value needs to occur across the industry, or, rather, across the entire economy. The 19th and 20th centuries were the ages of revolutionary advancement in physics and chemistry. Perhaps it is time for a more eco-sensitive, socially driven and economically viable revolution. One that considers every living entity and achieves balance through abiding by the laws of nature. One that is restorative by intelligence and design and led by biology. It appears that the 21st century may become the age of a Bio-Revolution.

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Photo credit: Images courtesy of BIOHM

'Active Homes' are key to a decentralised energy future

Gill Kelleher
Policy and Engagement Manager, SPECIFIC Innovation Knowledge Centre

David Attenborough's poignant message at the opening ceremony of the United Nations-sponsored climate talks, COP24 in December 2018, highlighted the need for us all to take action against the risks of climate change. The naturalist was occupying the 'people's seat' at the conference, acting as the link between the public and policy-makers. The most recent IPCC report indicated that global net human-caused emissions of carbon dioxide (CO₂) need to fall by 45 percent from 2010 levels by 2030, reaching 'net zero' around 2050.

Since buildings account for around 40% of global carbon emissions, the next 10-20 years demand rapid, far-reaching transitions in the way we heat and power our homes and neighbourhoods. (IPCC, carbon pathways).

People, governments and cities are already taking steps to reduce their carbon impact. However, more needs to be done. For example, the California Building Standards Commission approved in December 2018 a new rule that all homes built in California after 2020 require the capacity to produce and process solar energy. Through this mandate, California will attempt to become the most highly populated area on earth that uses 100 percent renewable energy. In the UK, SPECIFIC Innovation and Knowledge Centre (Swansea University) and its partners are also using a range of full-scale building projects to demonstrate why homes and buildings are key to a decentralised energy future by creating 'Active Buildings' that can generate, store and release solar energy.

What will energy provision look like in an ideal world?

An Active Building integrates solar generation and storage technologies for both electricity and heat within its construction and uses an intelligent system to optimise energy management and comfort for inhabitants. Active Homes using this design require no gas for heating, whilst being net generators of solar energy, with the potential to share or trade surplus with surrounding buildings, electric vehicles or the grid. This provides a different social economic proposition. Our future homes and neighbourhoods can be used to reduce peak energy demand, whilst meeting consumer energy needs and reducing pollution; connecting communities of homes together, sharing energy and charging electric vehicles, including e-bikes.

Modelled Energy global pathways that feature low carbon energy generation, and demand, show that the technical feasibility of solar energy and electricity storage technologies have substantially improved over the past few years. Unlocking this potential is not just a technical challenge, we also need to overcome economic, institutional and socio-cultural barriers, and inspire change in public behaviours.

What should we be doing about it now to make the vision a reality?

Climate change impacts and responses are closely linked to sustainable development, which balances social well-being, economic prosperity and environmental protection. Therefore, we need to manage and plan the use of our land and communities more effectively over the long term, making best use of innovation and technological advances. House-building and community infrastructure projects should be designed to transition away from fossil fuel power generation, to protect future generations from climate change risks. Greater investment is needed to extend decarbonised energy solutions across regions, and this requires access to finance, policy levers such as building regulations, local planning reforms and new governance models.

An independent study (Bankovskis 2017) modelled the benefits of this approach, calculating what would happen if the 'Active Homes design' used for a development in Neath, South Wales, were applied to a million homes. It revealed that the average saving per household could be as much as £600 (a cut of more than 60%), whilst also reducing carbon dioxide emissions by nearly 80 million tonnes over 40 years and peak central generation capacity by 3,000 megawatts – equivalent to a very large power station.

Delivering Active Buildings at scale requires significant electricity market reforms, and greater investment priority for the decarbonisation of heat. There is a great prospect for the UK government to seize this golden, once in a century opportunity to mandate all future energy scenarios to include Active Buildings at scale as a

key enabler to reach carbon targets and transform markets. In doing so, enabling the best trade-offs for sustainable development to be realised; protecting jobs, become world leading in 'Active Building' technologies, alleviating fuel poverty. With UK government house-building targets currently at 300,000 homes per year, 10-20 years could be enough time for millions of homes and vehicles to transition away from fossil fuels to solar-powered, Active Buildings.

An Active Building integrates solar generation and storage technologies for both electricity and heat within its construction and uses an intelligent system to optimise energy management and comfort for inhabitants.



Community Land Trusts – More power to the people

Chris Tuppen
Managing Director, Advancing Sustainability Ltd

The Neighbourhoods of the Future will require innovation in both technology and in delivery models to overcome challenges and be successful. One, relatively unused vehicle, Community Land Trusts (CLTs), offer the opportunity for communities to take ownership and directly facilitate accommodation for older adults. CLTs provide major benefits to communities, including the ability to control:

- the location of homes, through land purchase;
- their design, by focusing on people's specific needs;
- affordability over the long-term, rather than minimising build costs;
- the build itself, by letting contracts to local builders; and
- continued community engagement and support, by retaining ownership in the CLT.

However, it takes voluntary effort and some specialist expertise to get a CLT off the ground. Help is at hand though, particularly from the National Community Land Trust Network¹ and through seeking advice from existing CLTs.

East Bergholt – A view from the front line

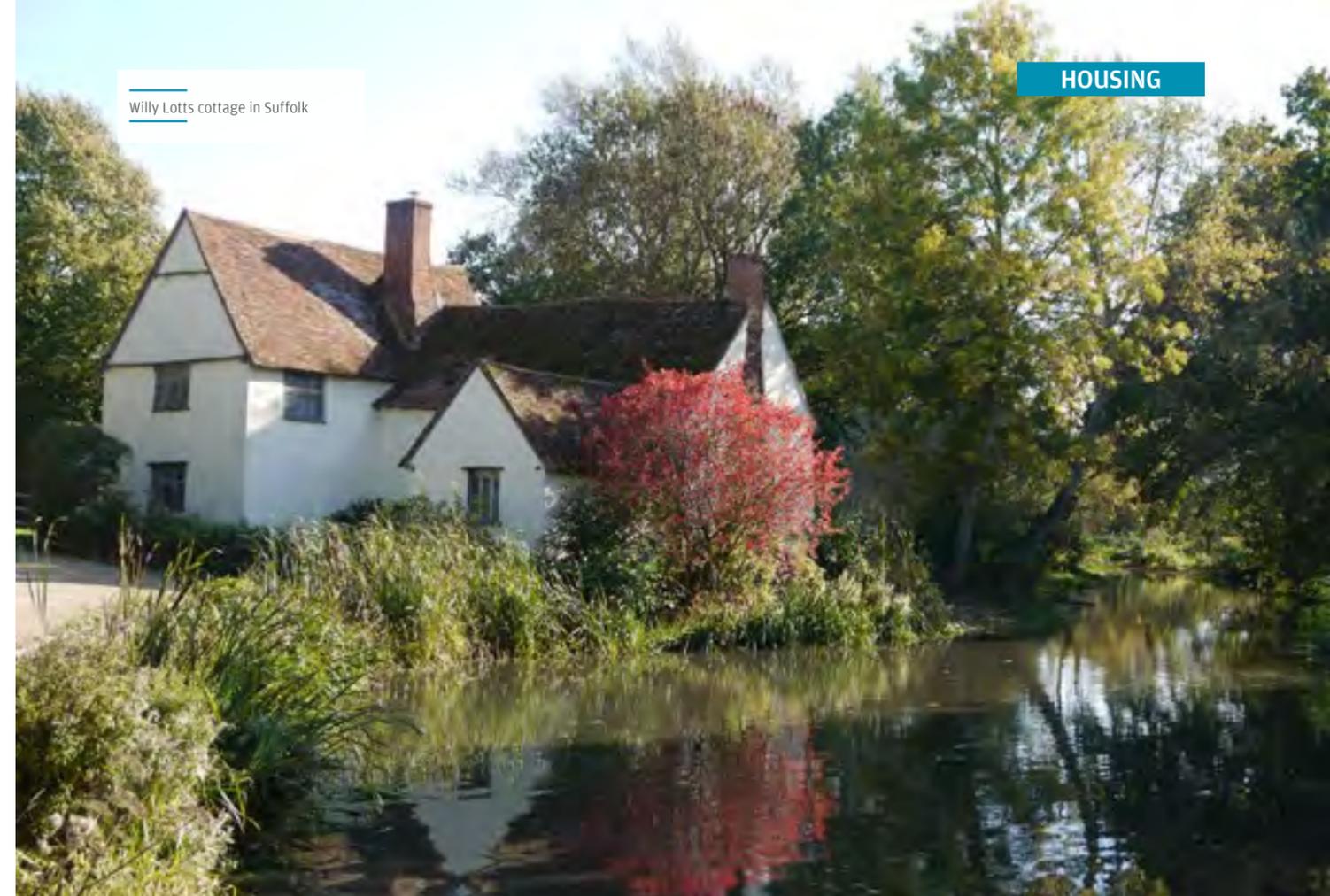
East Bergholt is a picturesque village in Suffolk, best known as the birth place of John Constable. It offers easy access to main roads and a good rail link into London. This makes it a popular place to live and commute from.

Executive style homes sell easily and developers, supported by our district council, want to build these in quantity, but the community has other views. We want to focus any new build on local needs – especially for those that struggle to find affordable housing.

In the case of our older demographic, they have often lived here for many years and in most cases want to remain integral and active members of the community. However, housing options are often restrictive.

Communities that mutually support themselves socially, and through their own asset management, may be the best way for older adults to achieve this ambition. Indeed, recognising that people who can directly control the destiny of their community are more motivated to get involved, David Cameron announced plans in 2009 to return power to local people. In a Guardian article² he wrote,

“The Conservative party wants nothing less than radical decentralisation, to reach every corner of the country”.



Willy Lotts cottage in Suffolk

Communities that mutually support themselves socially, and through their own asset management, may be the best way for older adults to achieve this ambition.

Subsequently, in 2011, the government introduced the Localism Act. This allowed provision for Neighbourhood Plans, which were designed to allow communities to come together through a parish council or neighbourhood forum and say where they thought new houses, businesses and shops should go – and what they should look like. It was actually intended to let local communities use neighbourhood planning to grant full or outline planning permission in areas where they most wanted to see new homes and businesses. The idea was to make it easier

and quicker for development to go ahead³. However, inevitably, some communities saw this as a way to stop building rather than specify it.

Taking advantage of the localism agenda, East Bergholt spent time producing a Neighbourhood Plan that received overwhelming endorsement (95% in favour) by the village's residents in a referendum poll. The Plan covers numerous aspects of village life, with multiple policies and projects covering housing, businesses, transport, architecture, landscapes and the environment.

However, at the same time as localism was meant to blossom, the shortage of new homes across the country, especially affordable ones, was reaching crisis levels. Central government responded, in part by imposing housing targets on local authorities, and through the introduction of the controversial New Homes Bonus, which only pays out if the local authority approves ‘additional housing’⁴.

In their desire to see new homes built, local authorities are desperate to ensure good relations with large house builders and are nervous of anything that might discourage the developers, such as pushing for more affordable and/or sustainable homes.

Flatford Mill in Suffolk



These competing forces leave local authorities caught between communities trying to do their own thing, central government targets and funding rules, and developers seeking to maximise their profits.

Back in East Bergholt, we felt that our district council was disregarding our Neighbourhood Plan and favouring large-scale building that ignored local needs. This led to two judicial reviews.

A community-led approach

Despite the legal proceedings, we were keen to take forward a community-led approach to development and so have progressed one of our Plan's more ambitious projects. This involves:

'the establishment of a Community Land Trust as the means of delivering homes for local people and to deliver affordable housing, to offset private sector provision, in or near to the village centre, for shared ownership or rentable properties.'

Community Land Trusts (CLTs) are non-profit, community-based organisations which are run by volunteers and that develop housing, community facilities or other assets that meet the needs of the community. The assets are owned and controlled by the community and are made available at permanently affordable levels. A growing number of communities are forming CLTs, with well over 225 groups in England and Wales.

The East Bergholt CLT was legally established in 2017 and now has over 150 members. One of the first tasks was to identify the wants and needs of the community, and to that end we held several open days. Villagers were asked their views and a rough poll was taken. The overwhelming preference has been for small (typically two bedroom), affordable, energy efficient, rented homes for either young people who can't afford to get on the housing ladder, or for retirees. The need to design for accessibility and assisted living was also highlighted. The East Bergholt CLT is now in the process of finding suitable building sites, meeting local builders, and building a register of potential future tenants.

With the right conditions, this innovative community-led approach to housing development could become a key feature of all neighbourhoods in ten to twenty years' time.

Looking to the future

Overall, CLTs offer a model that is replicable, not only in rural villages, but also in urban communities. With the right conditions, this innovative community-led approach to housing development could become a key feature of all neighbourhoods in ten to twenty years' time. However, a failure to take advantage of CLTs, and similar initiatives, means housing developments will continue to be driven by short-term imperatives, divorced from the communities who are best placed to know what they need.

- 1 <http://www.communitylandtrusts.org.uk/>
- 2 <https://www.theguardian.com/commentisfree/2009/feb/17/cameron-decentralisation-local-government>
- 3 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/5959/1896534.pdf
- 4 <https://www.insidehousing.co.uk/news/news/no-changes-to-new-homes-bonus-says-javid-53652>

Photo credit: Images courtesy of Chris Tuppen

Residents have the opportunity to meet our teams and give their views at our community events



Social housing – And now for something completely different

Jim Ripley
CEO, Phoenix Community Housing

It is astonishing to consider that by 2028 around one third of the residents who live in Phoenix homes will be 75 years old or more. Today, just 12% of our tenants and 5% of our leaseholders are aged 75 or over.

As a resident-led housing association (the first in London) we're proud of our community-based approach, and the opportunities our tenants and leaseholders have to influence and shape our services and priorities. Since tenants voted to create Phoenix in 2007 we've worked hard to get to know our residents and to understand their needs.

This demographic shift will be felt by housing associations up and down the country. In the context of the housing crisis, it will have major and far reaching implications for generations to come.

While the population in England is projected to grow by 17% between 2014 and 2039, almost two thirds (63%) of population growth in the UK will be among people over the age of 65.

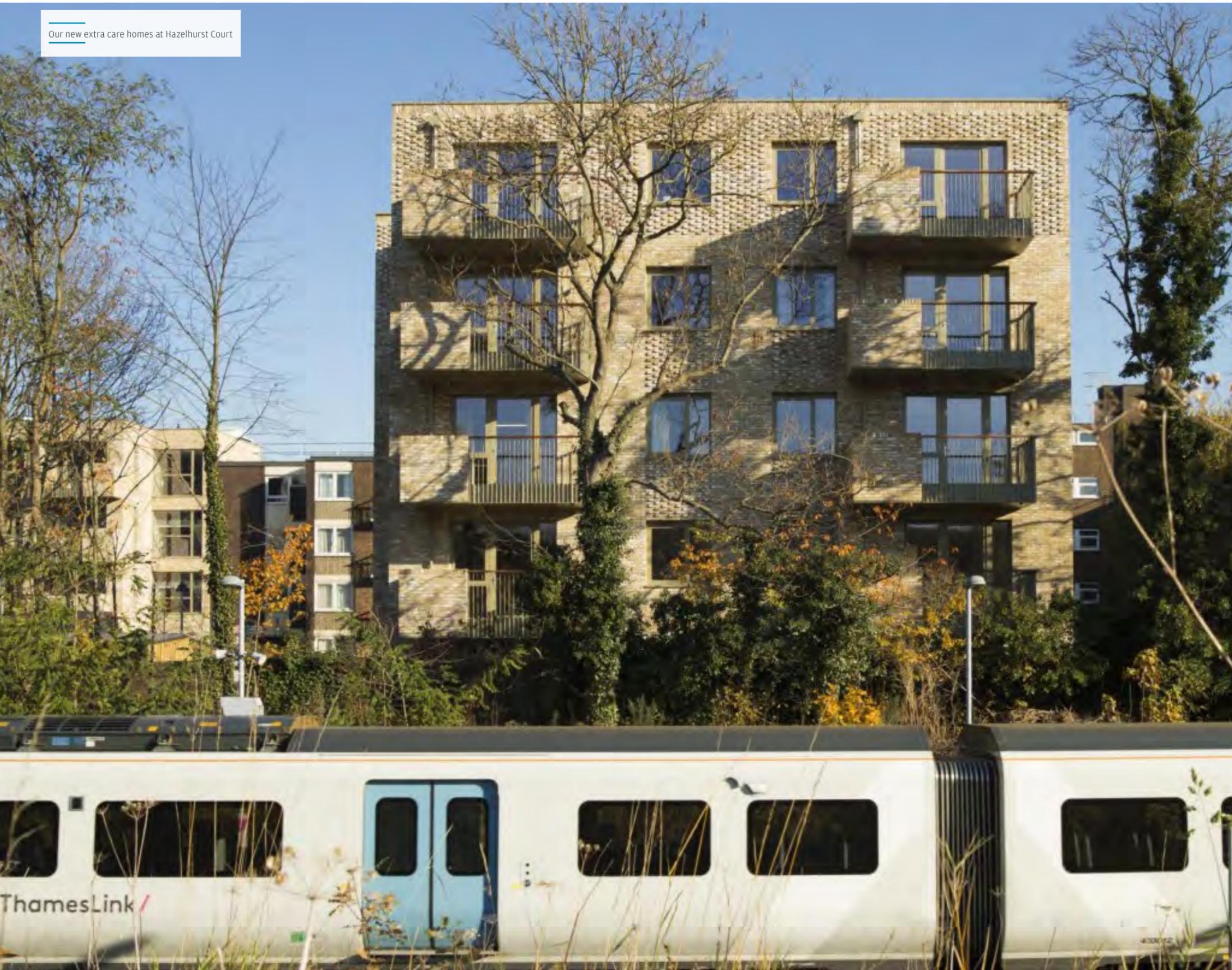
Nowhere is our ageing population so evident as in social housing. The dearth of a long-term housing vision by successive governments – both the lack of a substantial construction programme and the right to buy initiative – have deprived two generations of the benefits of low rent housing. If you wander around virtually any housing estate, anywhere in the country, you will see a high proportion of older people.

As with many housing associations, at Phoenix, we're committed to addressing the housing shortage. Our first decade was largely occupied with bringing our 6,300 homes up to Decent Homes standard. Our second will be focused on development. We've plans for up to 1,000 new homes in South Lewisham over the next 10 years.

But our key challenge may well prove to be less about erecting new buildings, and more about creating different kinds of homes. The profile of people living in our homes is steadily changing. More vulnerable people, those from diverse backgrounds, and many older people. In particular, we have to consider the support networks our residents will need, not just for independent living but so that they can get the most out of life.

This demographic shift will be felt by housing associations up and down the country. In the context of the housing crisis, it will have major and far reaching implications for generations to come.

Our new extra care homes at Hazelhurst Court



These considerations were at the forefront of our minds when we started planning our first new homes. We knew many older residents were living in large family homes in our area. One advantage of being a community-based housing association is that we become familiar with our residents. We see them regularly and we talk with them.

So, we knew that lots of older people were struggling to maintain their homes. Many struggled with heating bills, and with the garden and the cleaning. And we knew that, presented with the right offer, many would be keen to downsize to properties that better met their needs.

Understanding the needs of people

It's a relief, as much as anything, for Phyllis to be in one of the 60 new homes at Hazelhurst Court. She tells us she felt depressed when alone in her old home and didn't like going upstairs. Since her move, she says that she's sleeping better than she has in years.

Or Margaret, who'll tell you that old age suddenly hit in her late 80s. Now, she's enjoying the renewed experience of having lunch with other people and the opportunities to mix.

It's been illuminating to hear feedback from the Housing Minister's conversations with social housing tenants ahead of the new green paper. A theme that came up time and again was isolation and loneliness.

As an extra care scheme, residents at Hazelhurst Court with identified care needs can benefit from care packages delivered by our partner, Notting Hill Genesis. But it was also designed as a communal development, with a restaurant and places to socialise. Residents tell us it's this that's made the biggest difference to their lives and wellbeing.

We can all sit in our offices, focus on the bottom line, and imagine a world where Phyllis and Margaret and thousands like her interact with their landlords through a laptop. But the reality is that they want to talk to people, and that's such a basic and important human need. It's vital that none of us – housing associations, or government – lose sight of this as we plan for the future.

Technology and the Internet of Things will no doubt change our ways of living, but they will not change our life needs. For me, the ideal homes and neighbourhoods of the future are sociable places.

We will need to think about co-housing, more integration of health services, wrap-around social care provision. We will also need to think extremely carefully about the sustainability of our homes and carbon impact.

But, most importantly, we should be focused on places where people can meet each other outside the home; places where we can chat together, cry together and make each other laugh.

Photo credit: Images courtesy of Phoenix Community Housing



Homes for our future selves – A view from the front line

Sue Coles
University of the 3rd Age (U3A)

Sam Mauger
Chief Executive, The Third Age Trust

'Older people are not just beneficiaries of Neighbourhoods of the Future, we also have a key role to play in their creation. Our desire to participate does not decrease with age. Consultation is essential in identifying best practice and challenging negative planning and design. In addition, the act of consultation and engagement itself will confer greater self-esteem, satisfaction and wellbeing.'

Last year, the Agile Ageing Alliance (AAA) invited members of the University of the Third Age (U3A) to participate in the AAA's 'Neighbourhoods of the Future' conference.

Along with fellow members I took advantage of the opportunity. We had no idea what to expect, but I am delighted to say we enjoyed mixing with an inspiring group including Lords, captains of industry, politicians, professors, famous designers, doctors and nurses, entrepreneurs and technologists.

A quick introduction to the U3A. It is a network of over a thousand self-funding local organisations co-ordinated by The Third Age Trust. Formed over 35 years ago, the U3A has more than 420,000 members nationally. That's approximately 3.5 per cent of the 11.8 million people aged over 65 in the UK.

The media often paints older people as 'a problem', rarely focusing on what we can contribute. The so called 'deficit model' focuses exclusively on the negative aspects of ageing. This is a view that jars with U3A members, who engage in lifelong learning, have a thirst for knowledge and a more optimistic view of ageing.

What struck me at the Neighbourhoods of the Future conference was the speakers who painted a future where there are opportunities, not just for better housing, but for living longer, healthier, independent and more fulfilling

Older people are not just beneficiaries of Neighbourhoods of the Future, we also have a key role to play in their creation. Our desire to participate does not decrease with age.

lives. This is the future we want for ourselves, for other older adults and indeed younger people who have later years to look forward to.

Here are some of the key takeaways:

Lord Best, Chair of the All Party Parliamentary Committee on Housing and Care for Older People, and Sue Adams OBE, CEO of Care & Repair England, presented compelling arguments on the need for a re-think of house building and retrofitting, which you can read about on pages 32 and 36 respectively.

Other speakers emphasised that it's not only homes but neighbourhoods that need to be age friendly, providing easy access to key services, especially public transport. They also spoke of the need to foster a sense of community. A fair and equitable multigenerational community where young families and older adults live in harmony.

A number of speakers pointed out that older adults in a community typically help one another. This element of self-help is valuable, as it can help maintain independence and needs to be actively encouraged in the design of housing for older adults. Self-help is also a way to provide support when budgets are tight. Carefully designing housing to encourage a sense of community also has real health benefits. Indeed, we learned that social isolation has implications in terms of health equivalent to smoking a pack of cigarettes a day⁽¹⁾.

Older adults are a real market opportunity

Marketing, communication and language matter. Older adults do not want to be corralled and badged as "The Elderly". Marketeers categorize the public in different demographic groups, like 'millennials', but astonishingly they view all over 60s as one consumer group⁽³⁾. This means that something like a third of consumers are assumed to have the same needs and desires.

What's ironic is that 70% of UK wealth is held by the over 50s, so there's clearly no shortage of money for the right products. Ageing should be good business, for example

over half of 56-74-year olds have a tablet and most Apple watch owners are over 45. In the US, the nation's leading fitness program, 'Silver Sneakers', was designed for older adults and has 15.6 million members (2).

Product design needs to be inclusive

We heard from design gurus that great design can influence behaviour; it can help people stay fitter for longer and provide older adults with independence, safety and security⁽³⁾.

But there is a paradox – 'as soon as you try to design something specifically for older adults they don't want it'⁽²⁾. Unsurprisingly, older adults don't want unattractive and badly designed products that mark them out as 'old'. What they do want is 'inclusive design'; well-designed products that anyone can use but which happen to be particularly useful to older adults, for example online shopping⁽²⁾. People don't automatically stop caring about design once they reach 60. Designers need to use their creativity to be more inclusive, ensuring new products are also suitable for older adults.

Older adults want to engage in a conversation about the future

Being older doesn't mean we shouldn't have a stake in shaping the future. Society can be quick to write off older people and ignore or dismiss their views. But, as a retiree, you have invaluable life experience and/or professional expertise to call upon, contribute, and importantly, the leisure to really engage with the issues and think about solutions.

'If older adults don't engage in conversation about their future then it will be imposed on them and probably without reference to them again.'

Diversity matters. It's widely acknowledged that diversity improves organisational performance and decision making, and yet older people's views are often not sought or simply dismissed. The irony is that older people already have the lived experience of being younger, whereas younger people haven't yet experienced being old. Some societies revere the wisdom of age, but we live in a society where it's not currently fashionable to be old.





If older adults don't engage in conversation about their future then it will be imposed on them and probably without reference to them again.

Collaborating with AAA and Neighbourhoods of the Future Project

Looking to the future, U3A members inspired by the AAA event have formed a group 'Future Lives' to collaborate with this project. We are looking forward to providing insights from the perspective of older adults, who share an enthusiasm for the future and a desire to help shape it. The Future Lives group's role is not intended to be a one-off consultation exercise but an ongoing collaboration throughout the life of the project.

'The real value of the group is that it is representative of older adults, most of whom already have experience and, therefore, views on the suitability of current older persons' living arrangements and what might be useful for future arrangements.'

As a group, we have a wide range of professional and life experience. We want to provide a sounding board for Neighbourhoods of the Future and a two-way channel between those developing homes, neighbourhoods, products or services and older adults. We're enthusiastic about collaborating with the AAA and we have both the passion and the time to help build a better future for older adults.

The University of the Third Age

Sam Mauger, U3A's dynamic Chief Executive, is equally enthusiastic: "We are keen to explore new ways of engaging U3A members with big societal issues. Our members

already make a significant difference in local communities where they add significant value by engaging in support programmes as diverse as plastic recycling, reading initiatives and clearing local woodland of rubbish. "U3A members have described being part of the U3A as enabling them to "reach their potential". It is a movement where everyone is valued for themselves, and where learning and sharing experiences is exciting. Members have said that they have taken part in events and programmes they would never have dreamed of being involved in before. Whether it's Latin ballroom dancing, literature or hill walking, everyone has a chance to explore their potential and reach for more within themselves. The movement is so successful because it is shaped by the members, and the key point about the Agile Ageing Alliance project is that U3A members are the very people which our Neighbourhoods of the Future need to cater for, so who better to get involved from the outset?"

Acknowledgments:

- (1) Jennifer Rubin, Chief Executive of the Government's Economic and Social Research Council
- (2) Eric Kihlstrom Interim director of the Industrial Strategy Challenge Fund for Healthy Ageing
- (3) Paul Priestman, Chairman, Priestman Goode

Photo credit: Images courtesy of the Third Age Trust

Innovation@Home

John Feather, PhD
CEO, Grantmakers in Aging (GIA)

Alana Officer
Lead, World Health Organisation (WHO) Global Network for Age-friendly Cities and Communities

The desire to remain in our own homes and communities as we grow older, connected to the people and institutions we value, is shared around the world. In cities and villages, rich and poor neighborhoods, and more and less developed countries, people want accommodation that meets their needs and honors their preferences at all stages of the life course. This concept has come of age, but our ability to realize it is still a work in progress.

The pursuit of age-friendly housing is important because very few variables have as much power to support – or derail – healthy, productive aging and related quality of life. As the world’s population gets older (a process that is both permanent and accelerating), this pursuit needs to be on everyone’s agenda, whether we are elected officials, health care leaders, social services or aging services providers, real estate developers, technologists, philanthropists, families, or individuals.

“Age-friendly” means good for people of all ages

Calling this “age-friendly housing” is useful shorthand but requires a quick explanation. The term “age-friendly” comes from the work of the World Health Organization’s (WHO) Global Network for Age-Friendly Cities and Communities, which launched in 2007 and chose eight critical domains for communities that wanted to work toward a WHO age-friendly designation. Housing is one of the eight domains. With the age-friendly movement now encompassing 39 countries and 705 cities with more than 210 million people worldwide, its terminology is gaining traction, but this work can go by many names.

The pursuit of age-friendly housing is important because very few variables have as much power to support – or derail – healthy, productive aging and related quality of life.



Programa d'Arranjament d'Habitatges de la demarcació de Barcelona – receive their award

Sausalito, a city in Marin County, California

Improving housing is a priority. The physical and social environments in our cities and communities are powerful influences on the experience of aging, and housing plays an important role.

Age-friendly housing initiatives can take many forms: expanding the amount and variety of housing options; making housing more affordable; removing barriers to innovation, such as zoning, building codes and planning; helping with home modifications; using assistive technology to improve safety and promote inclusion; involving multiple generations in co-housing; co-locating services, such as health care; and facilitating access to transportation, shopping, and health services, just to name a few.

Building the foundation: The role for philanthropy in our neighbourhoods of the future

Philanthropy is taking a growing interest in age-friendly communities. The organization I lead, Grantmakers In Aging (GIA), a Washington, DC-based membership association for funders and foundations dedicated to improving the experience of aging, has been working in the age-friendly

sphere for several years. This has included grantmaking and technical assistance to a variety of age-friendly programs and innovators across the United States, where government funding for such work is not the norm.

A key objective for GIA is to make more foundations and other charitable organisations, particularly local and regional funders, aware of the benefits of age-friendly work, how it supports and connects to other community and foundation goals, and the need for seed money and operational support while programs are becoming established and embedded in their respective communities. This incubator-style approach is similar to what is known as “social funding” or “social investment” in Europe and elsewhere.

To do this, GIA also leads funder collaboratives and creates educational materials that help funders and others become familiar with the issues and existing programs ready to be replicated, scaled, or adapted.

Innovation@Home: Good ideas have no borders

Most recently, through a grant from the Robert Wood Johnson Foundation, GIA has been working to identify age-friendly housing innovations from around the world that might work in the United States. This included launching a global contest, Innovation@Home, in partnership with the WHO, and with the assistance of the International Federation on Aging (IFA).

Powered by a sense of excitement about the diversity of ideas being tested around the world, the project aspires to highlight both qualified success stories and promising initiatives that might not be mature enough to be classified as best practice but still have the power to inspire us.

“We believed and hoped that it would be quite a crowded field, and it was,” said Jenny Campbell, Innovation@Home project lead for GIA. “We reached out as widely as we could because we wanted to learn more about what’s out there, celebrate diversity, and make these ideas more available to the rest of the world.” For that reason, contest entries are being included in the publicly-available

WHO Global Database of Age-Friendly Practices (see <https://extranet.who.int/agefriendlyworld/afp/>)

Submissions from 15 countries were assessed by our panel of distinguished judges: Nathalie Röbbel from the World Health Organization, Stephanie Firestone from AARP International, Vivian Vasallo from Fannie Mae’s Partnerships and Innovation initiative, Ian Spero from the Agile Ageing Alliance, and Betty Lynch, a community consumer champion from Avondale, Arizona.

The judges selected three winners, but it was not an easy process. “The Innovation@Home challenge is a brilliant concept and the breadth of the entries was both stimulating and challenging, said Ian Spero, founder of the London-based Agile Ageing Alliance. “We saw projects ranging from pioneering long-term policy and planning efforts in Portland, Oregon, which was the first US city to join the WHO Age-friendly Network, to brilliantly designed government-funded accessory dwellings being built for extended and intergenerational families in the Emirate of Sharjah, which was the first Arab city to join. We also saw a lot in between, so it was extremely challenging to compare like with like”.

“There is so much good work taking place in the world today,” commented judge Betty Lynch, who plans to recommend one of the winners to her own local government. “I learned as much as I provided while working on this project.”

The results of the Innovation@Home contest make clear that counties and communities take many different paths toward the shared goal of increasing housing options. Here are the winners:

- In the university town of Porto, Portugal, Aconchego Program (Programa Aconchego) matches older people who have extra room in their homes with students who need a place to live.
- In Sausalito, California, Age Friendly Sausalito helps people obtain free or reduced-cost building permits for projects that improve the safety and accessibility of their homes.
- Across the Barcelona region of Spain, the Home Refurbishment Program (Programa d'Arranjament d'Habitatges de la demarcació de Barcelona) provides non-structural home repairs, improves home energy efficiency, together with assistive technologies.
- A fourth program, which received Honorable Mention, is the CHORE Volunteer Handyman Service in Bergen, New Jersey, which sends retired volunteers to help older people and people with disabilities with minor home repairs.

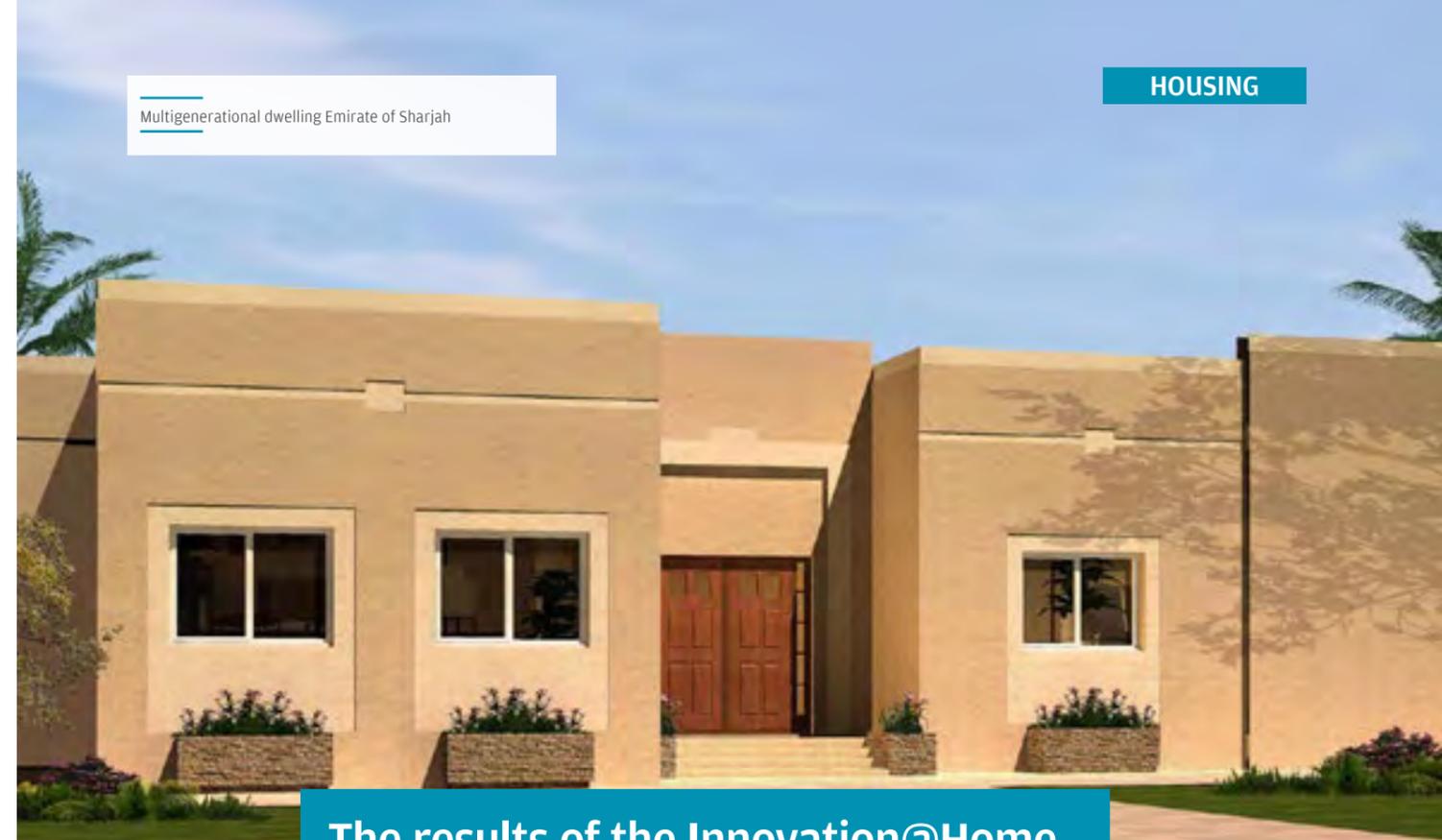
“It is striking that several of our contest winners are efforts led by local governments, and we celebrate the fact that they are testing creative and cross-sector solutions,” said judge Stephanie Firestone, AARP International’s Senior Strategic Policy Advisor for Health and Age-friendly Communities. “That said, we were also happy to see a number of very worthy grassroots initiatives, which are absolutely critical to the ecosystem of solutions.”

Lessons learned

The contest made it clear that age-friendly housing is a dynamic but decentralized field. That and other lessons will be distilled and shared in a forthcoming Grantmakers In Aging report. A few highlights:

- There is no central clearinghouse for age-friendly housing information, so finding basic facts and contacts, much less evidence, can be hard. There has been an exciting burst of new programs in the last ten years, but many are small or local, have not been well publicized or evaluated, are not researchable online, or have not been taken to scale. This was a major reason for choosing our contest format.
- Language and cultural differences, including jargon and acronyms, can make replicating programs difficult.
- Political systems matter. For instance, diverging approaches to public health and housing funding, particularly between Europe and the U.S., leave it unclear whether models with government funding behind them will travel well to places that do not offer such support.
- Costs are all over the map, raising questions about the feasibility of adapting the solutions of the rich for the poor and vice versa, and even about whether age-friendly development is a luxury primarily relevant to rich countries. The desire to age well in community does not vary by income bracket, however, and many low-cost ideas, such as simple home safety modifications (e.g. bathroom grab bars), are need-specific rather than cost-specific and are broadly applicable.
- The role of philanthropy varies geographically. Most US-based age-friendly work has required foundation backing, whereas governments provide the primary support in much of the rest of the world. This influences how some models operate and how well they may translate internationally.

Multigenerational dwelling Emirate of Sharjah



The results of the Innovation@Home contest make clear that counties and communities take many different paths toward the shared goal of increasing housing options.

While the challenges are real, we’ve found that a flexible approach can overcome many of them. Drilling deeper to find the essence of an idea, rather than getting stuck on problematic details, is worthwhile.

With early stage projects, particularly where quantifiable evidence and evaluation are not available, it’s still worth considering the participants’ own observations of how it is working and asking whether reliable data might be available in the future. Since no-one can predict where the next great idea is going to come from, it’s essential that we keep experimenting, evolving, and sharing.

A final word from Alana Officer on behalf of our partner the World Health Organization: “Most people want to age at home rather than in institutions, and an increasing number of older people will need social and health care services at home to enable them to do so. In the face of shrinking budgets – cities and communities are looking for innovative ways to respond to needs while increasing efficiency, reducing costs, and improving the quality of life for their residents.”

By shining a spotlight on fresh ideas and best practice, we hope that initiatives such as Innovate@Home will promote and foster new types of collaboration and innovation, thereby furthering the aims of WHO’s Global Network for Age-friendly Cities and Communities.”

Photo credit: Images courtesy of Grantmakers in Ageing, Ian Spero and Emirate of Sharjah

A city council's perspective

Harnessing the power of working in partnership and ensuring that improvements are for the benefit of our whole population, not just the few, are paramount.

Liz Gaulton
Director of Public Health and Wellbeing, Coventry City Council

There are plenty of reasons to look to Coventry as a model when re-imagining what our neighbourhoods might look like in 10 to 20 years' time. It provides a unique blend of a central location, strong City Council partnerships, a Marmot City with both Age Friendly and Migrant Friendly status, as well as being the City of Culture in 2021.

Coventry is taking a leading role in the movement that sees neighbourhoods as much more than simply a set of buildings. Like many cities, it is facing growing homelessness and housing scarcity, and there is an energy and drive across agencies to provide solutions that achieve better, healthier life chances for all its residents.

Harnessing the power of working in partnership and ensuring that improvements are for the benefit of our whole population, not just the few, are paramount.

In recent years, the city gained WHO Age Friendly City (AFC) status through a unique partnership between the Council, Age UK and Coventry University. Similarly, the success of our City of Culture bid was due to the creation of the Coventry City of Culture Trust, a partnership between the City Council, the city's two universities, arts organisations and the private sector.

Preparing for an ageing population

Although Coventry is a young city with a large population between the ages of 20 and 40, many residents are aged 65 years and over. By 2028 there will be an estimated 58,200 residents aged over 65 and 8,600 aged over 85. The AFC programme is an international effort to help cities prepare for two global demographic trends: the rapid ageing of populations and increasing urbanization. The AFC initiative provides a vehicle for a variety of organisations to work together to become more age friendly, to consider older people as an asset, and to ensure that people have a good quality of life as they age.

At the same time, because active ageing is a lifelong process, an age-friendly city is not just 'older adult friendly'. Barrier-free buildings and streets enhance the mobility and independence of people with disabilities, young as well as old. Secure neighbourhoods allow children, women and older adults to venture outside in confidence to participate in sports, leisure and social activities.

Council House Square, Coventry





Broadgate and open air market

Secure neighbourhoods allow children, women and older adults to venture outside in confidence to participate in sports, leisure and social activities.

The active participation of older adults in society, and the patronage of older adult consumers, has a wide range of benefits. Just recently, improvements to city parks and green spaces has helped to create much more accessible park marker routes for residents to be more active.

In the year ahead, new cricket and bowls facilities are being created, while investments in community sports, improving our parks and making our city greener, alongside the creation of a new 50m swimming pool at the Alan Higgs Centre, will all make a difference.

Looking to improve

Crucial to the realisation of this vision is the reduction of health inequalities. Guided by the principles of Professor Sir Michael Marmot's 2010 report Fair Society, Healthy Lives (The Marmot Review).

The city's involvement with Sir Michael Marmot has also helped it to channel its efforts in tackling health inequalities, where life chances can be vastly different from one part of the city to another. This support has also helped in Coventry achieving success in its Mi-Friendly cities programme, offering sustainable benefits to the city's migrant community, is helping to mitigate the effects of welfare reform through partnership working, and is helping the Council to place an even greater emphasis on tackling poverty.

The City Council's local plan includes a 10-year commitment to focus on improvements in key areas including:

- Sports and physical activity
- Provision and protection of good quality green spaces
- Better networks for walking and cycling

- Promotion of healthy eating
- Energy efficient homes
- Combatting fuel poverty
- Facilitating jobs growth
- Improving air quality.

Coventry City Council has therefore adopted the following Marmot recommendations in its Local Plan:

1. Prioritise policies and interventions that both reduce health inequalities and mitigate climate change by:
 - Improving active travel
 - Improving good quality open and green spaces
 - Improving the quality of food in local areas
 - Improving the energy efficiency of housing
2. Fully integrate the planning, transport, housing, environmental and health systems to address the social determinants of health in each part of the city.
3. Support locally developed and evidence-based community regeneration programmes that:
 - Remove barriers to community participation and action
 - Reduce social isolation.

Achieving positive change requires input from an unprecedented range of sectors, including transport, housing, employment, environment and communities. Therefore, new models of partnership will be key to developing sustainable homes and communities of the future. In the City of Coventry, we have an excellent starting point.

Photo credit: Images courtesy of Coventry City Council



Age-friendly cities – A developer's perspective



The world is ageing, particularly in advanced economies. Over the next 30 years, we will see an extra 15,000 people reach retirement age in the Organisation of Economic Cooperation and Development (OECD) member countries every single day.

By 2045 the proportion of the population aged over 65 will rise to 25%, from the current 16%. This equates to 146 million more older adults than there are today - totalling 1.4bn globally.

This demographic shift is set to have a profound impact on society and the social fabric of cities. By 2030 all major urban centres in the OECD will see a sharp increase in the number of older people. These cities will need to adapt and develop a number of short and longer-term strategies to ensure they respond adequately to both the challenges and opportunities that an ageing society presents.

For over 340 years, Grosvenor has been developing, managing and investing in properties and places. We are now active in more than 60 of the world's most dynamic cities and we recognise that our future success is inextricably linked with their success.

Our approach is to combine our international property expertise with local knowledge and to apply a farsightedness to our activity that ensures we contribute solutions to the challenges that these cities face and helps them realise the opportunities.

Whilst there is no silver bullet solutions to what is a serious challenge and a defining one for generations to come, we hope that our insights from four diverse cities: Hong Kong, London, Madrid and Vancouver, will further the aims of this white paper by encouraging discussion and debate across the wider property industry, involving and encouraging central and local authorities and other relevant stakeholders to work together in recognising the issue and prioritising its resolution. We plan to play our part.

Mark Preston
Grosvenor
Group Chief Executive



“By 2045 there will be 146 million more older adults than there are today.”



The looming impact of an ageing population



An unprecedented demographic change in the global population // Ageing is most pronounced in advanced economies // The 100-year lifespan and the changing cycle of life // Old age is still associated with increased health risks

An unprecedented demographic change in the global population is now underway

While ageing is a global occurrence, it is happening most rapidly in OECD economies. By 2045 the proportion of the population aged over 65 in the OECD will rise to 25%, up from 16% today. Ageing is particularly pronounced in continental Europe (Italy, Germany, Portugal and Spain) and North Asia (Japan and Hong Kong), where over a third of the population will be elderly by 2045 (Chart 1). In contrast, the regions that will continue to have younger demographic profiles over the next 30 years are predominantly in emerging markets, such as Africa, India and South East Asia.

There are two main reasons for this:

1. A decline in the number of births

Fertility rates have declined steadily through the post-war period, particularly in advanced economies. Almost all OECD countries now have fertility rates below the replacement rate of 2.1 children per female; a fall in the fertility rate of 3.4 in the 1950s to 1.6 today. While emerging markets tend to have higher fertility rates, even here the trend is declining due to rising education and income levels. This suggests that we are unlikely to see any reversal of this trend in the coming decades.

2. People are living longer

In the OECD, life expectancy at birth is currently 76 years for men and 82 years for women. This has increased by around 10 years for both genders since the 1960s. However, this often-quoted estimate of life expectancy understates the true lifespan of most adults, as it assumes that there will be no improvement in life expectancy throughout a person's life. This is despite the fact that data for the past 140 years shows that life expectancy has continued to improve on average by an additional 2.4 years every decade since the late 1800s. To adjust for this, statisticians also produce a 'cohort' measure of life expectancy, which adjusts for the likely improvement in life expectancy that will occur through a person's life. Based on cohort estimates, a more accurate life expectancy for most people alive today is already 90-100 years (Chart 2).

“An extra 15,000 people reach retirement age in the OECD member countries every single day.”

Chart 1
Ageing countries

Proportion of population over 65 years old (selected countries)

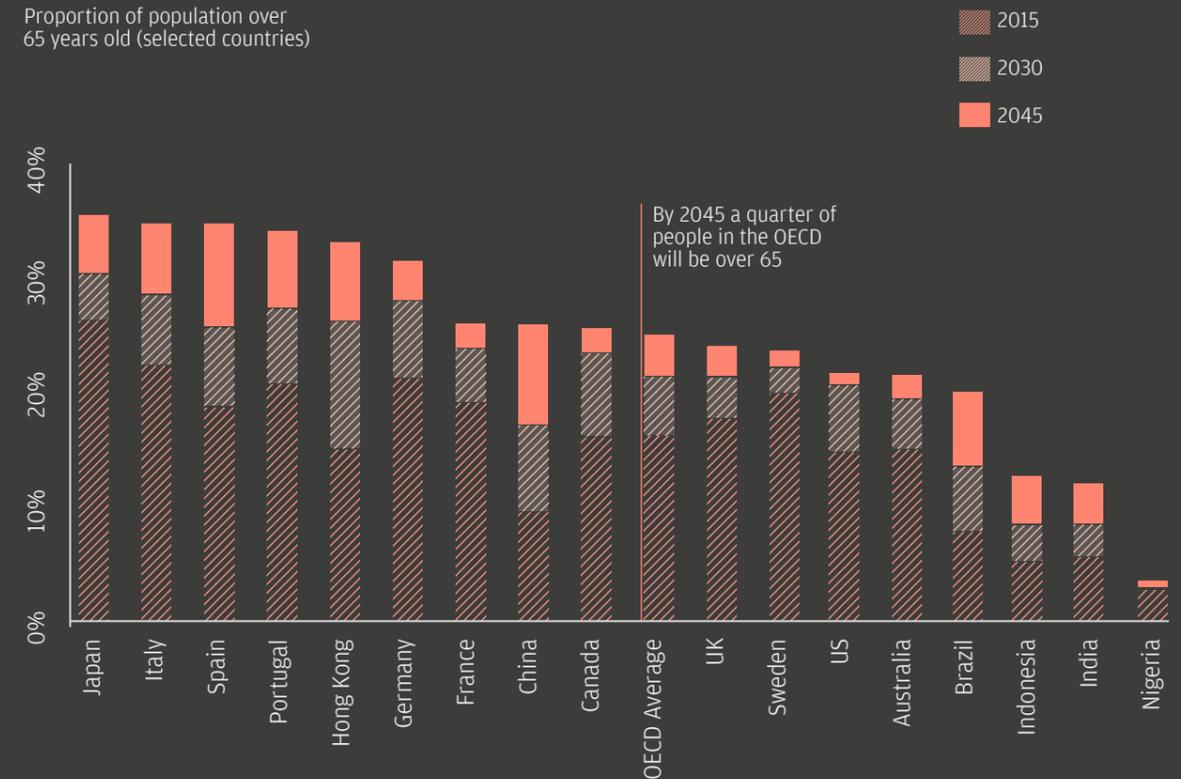
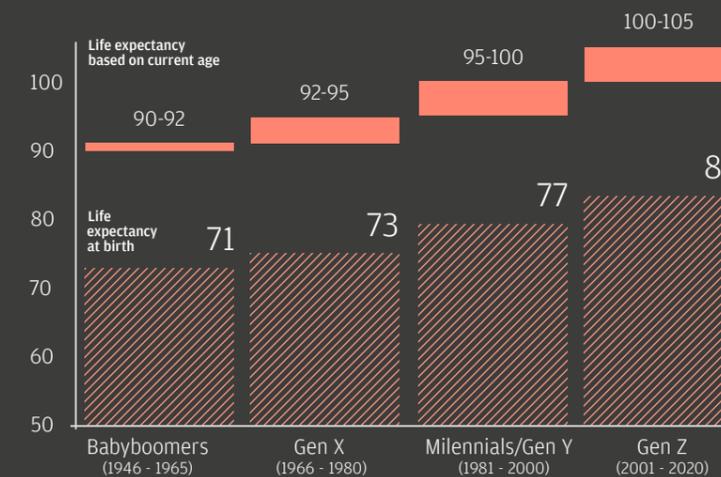


Chart 2
Life expectancy now vs life expectancy at birth



Average life expectancy

16th Century
35 yrs

19th Century
42 yrs

20th Century
80 yrs

21st Century
100+ yrs

Chart 1
Ageing Countries: UN World Population Prospects 2017

Chart 2
Life expectancy now vs life expectancy at birth: UN, Human Mortality Database Note: Data is for selected OECD countries: Australia, Canada, France, Germany, Italy, Japan, Spain, Sweden, UK, US. Figures are for period life expectancy and cohort life expectancy for both genders.

Average life expectancy. The Human Mortality Database. Average life expectancy for developed countries.

Chart 3
Proportion of OECD population over 65 years old

Male Female

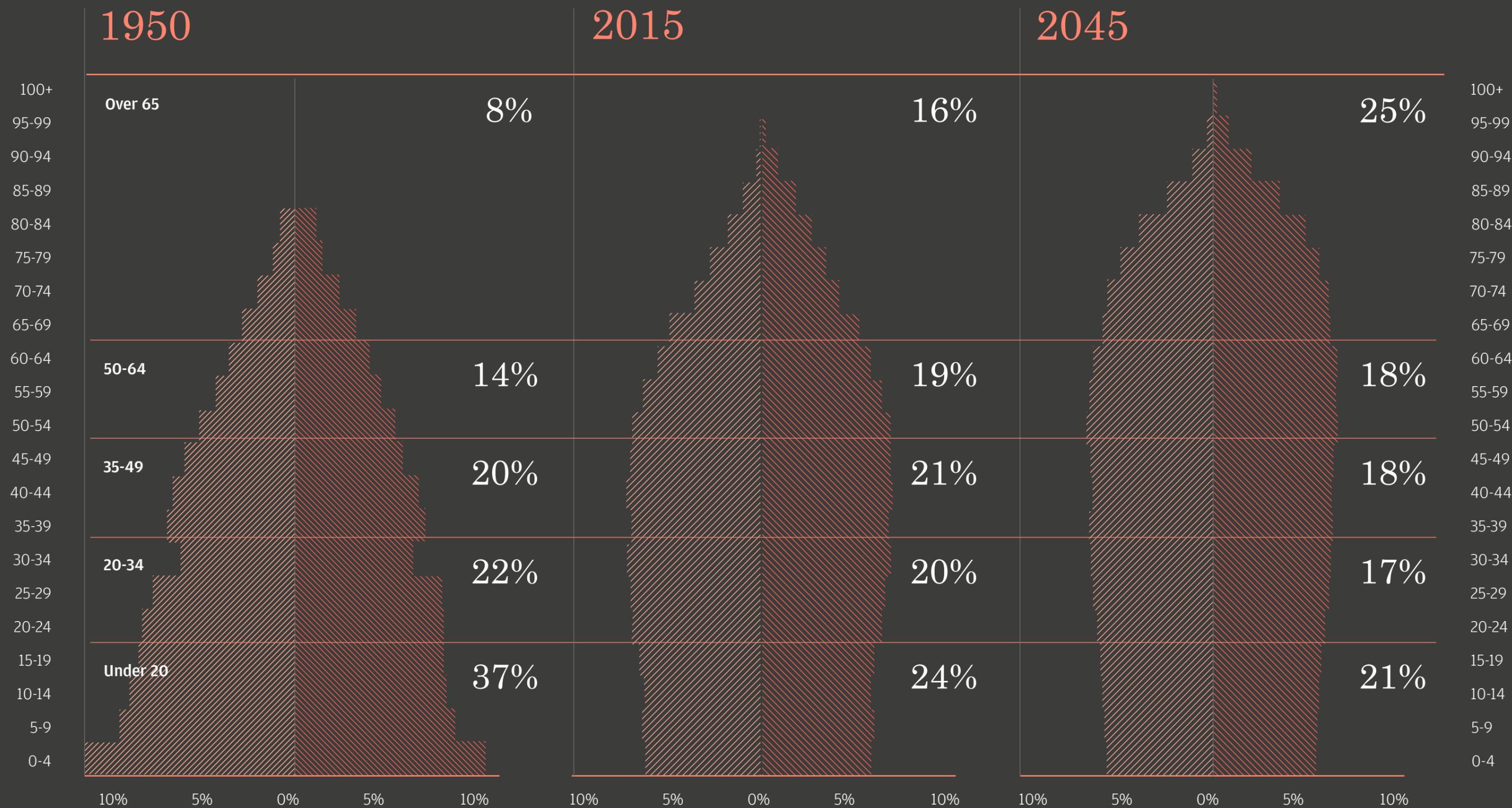
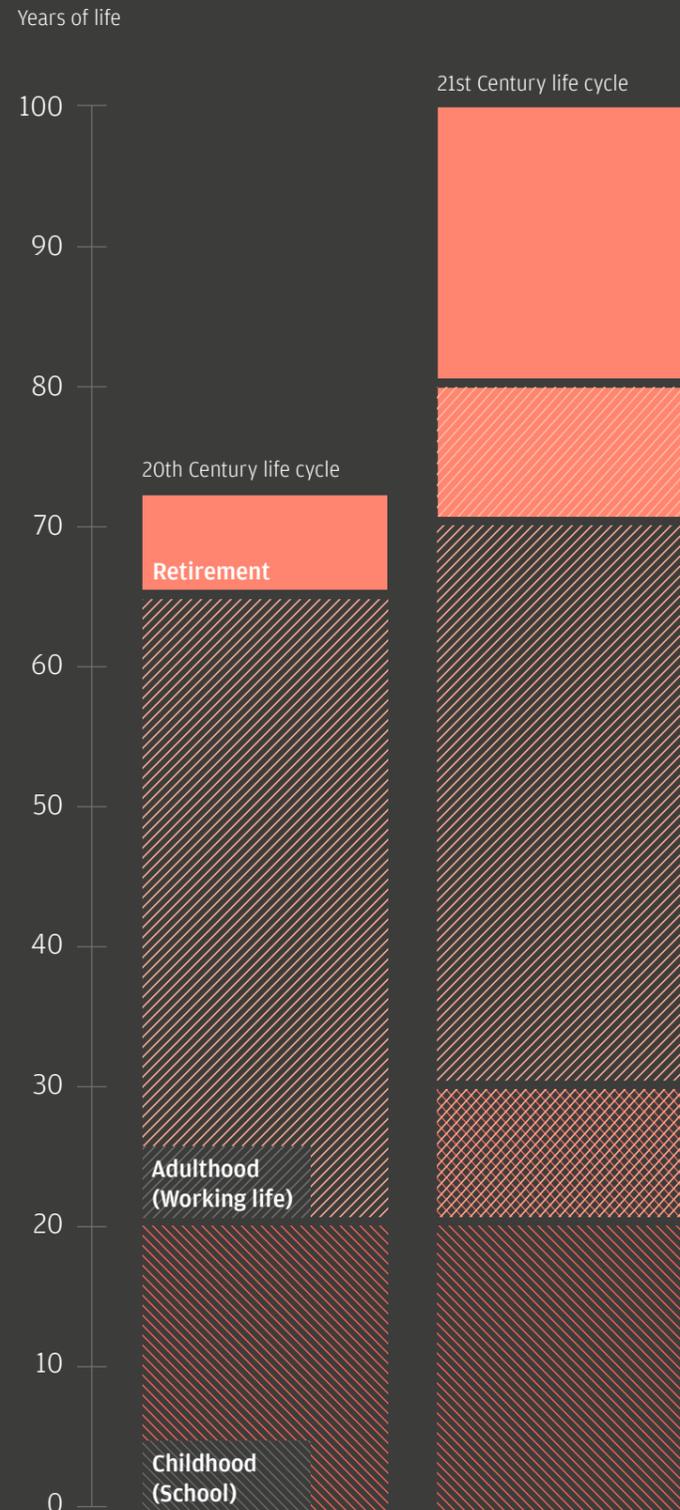


Chart 3
Proportion of population over 65 years old: UN World
Population Prospects 2017, OECD countries

The 100-year lifespan and the changing cycle of life

The steady increase in longevity is having a noticeable influence on human behaviour, especially how and when people reach major milestones in life. In particular, there are three major observed changes:

The 100-year lifespan and the changing cycle of life: UN World Population Prospects 2017, indicative average life expectancy for developed countries.



Extended retirement

Even as people work into their mid-70s, the expected period spent in retirement is likely to be between 20-30 years. This will encompass a more active period of spending and travel, but also an extended period of declining health for many.

Longer years in retirement age

Average no. years in retirement (OECD)

11
Years

15
Years

23
Years

Baby Boomers

1946 - 1965

Generation X

1966 - 1980

Millennials

1981 - 2000

Longer working life

In the future, working life is likely to be extended until workers are 75-80 years old. Workers may need to confront multiple career changes and exiting the workforce is likely to be a more gradual transition.

Working to 70+

Average job tenure (Canada)

12
Years

3.4
Years

2.7
Years

Having children later and fewer of them

Average age of mother at birth of first child (OECD)

27
Years

28
Years

30
Years

Fertility rate (OECD)

3.7

2.2

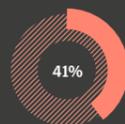
1.6

Juvenescence

A new life stage called 'Juvenescence' is emerging between childhood and adult life. Young adults are enjoying an extended period of semi-autonomous living, often living at home with their parents until they are 30.

Studying longer, more educated

% with a bachelor's degree or higher (OECD)



Marrying later

Average age at first marriage (women, OECD)

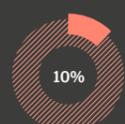
22
Years

25
Years

29
Years

Living with parents or renting for longer

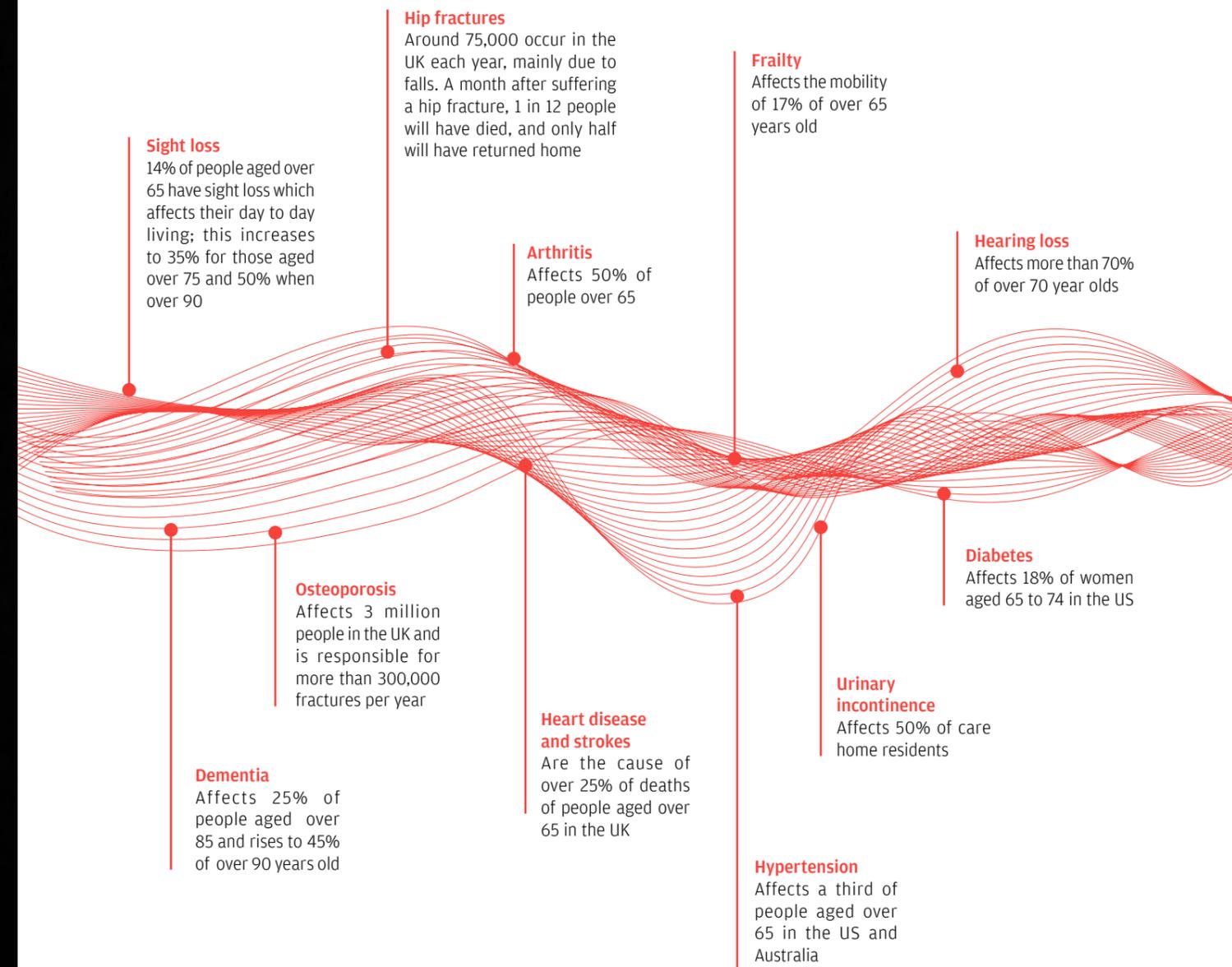
Proportion of under 25 year olds that are homeowners (UK)





“However, old age is still associated with increased health risks.”

Despite the fact that people are living longer and benefitting from continued medical advances, ageing is still associated with a host of health issues. Health begins to deteriorate noticeably after 75 years of age. On average, older adults spend most of the last decade of their life with some form of disability, as illustrated below. Wherever in the world they may live, these special health needs have major implications for their lifestyle and living arrangements.





The economics and politics of ageing



Demographic change will have profound economic implications // Economic growth will slow permanently // Living standards have started to stagnate // Global interest rates are likely to remain low // House price growth is likely to slow // Ageing will be negative for public debt // Difficult political decisions will be needed to pay for ageing // Politics is becoming fractured along generational lines

“A number of countries (particularly in North Asia and Europe) will see the size of their workforce shrink over the next 15 years.”

Demographic change will have profound economic implications

One of the more pessimistic conclusions from our analysis is the profound implications demographic change will have on economic growth and investment returns. While a number of factors could potentially mitigate the corrosive impact of demographic change (e.g. deferred retirement, increased immigration levels, a boost to productivity growth from new technologies), for now it seems more likely that we have entered a 'new normal' of sustained low growth, which will see investment returns slow.

Economic growth will slow permanently

Recent academic research suggests that much of the diminished prospects for economic growth in the post-global financial crisis era can be attributed to the unprecedented shift in the demographic structure that is now occurring across most major economies. Global population growth has peaked and will continue to slow over the remainder of the century (Chart 4). This demographic shift will be a sustained drag on global growth, particularly in the OECD, where the number of workers has now plateaued. Indeed, a number of countries (particularly in North Asia and Europe) will see the size of their workforce shrink over the next 15 years.

Living standards have started to stagnate

Rising living standards can only be sustained by higher productivity growth. Unfortunately, the latest evidence suggests that productivity is negatively correlated with ageing, due to the decline in the physical and cognitive agility of older workers. Consequently, ageing is likely to cause a decline in aggregate productivity due to the declining 'quality' of labour. The combination of fewer workers and slowing productivity supports the view that we have entered an extended era of low growth (Chart 5).

Chart 4
Global growth in working age population

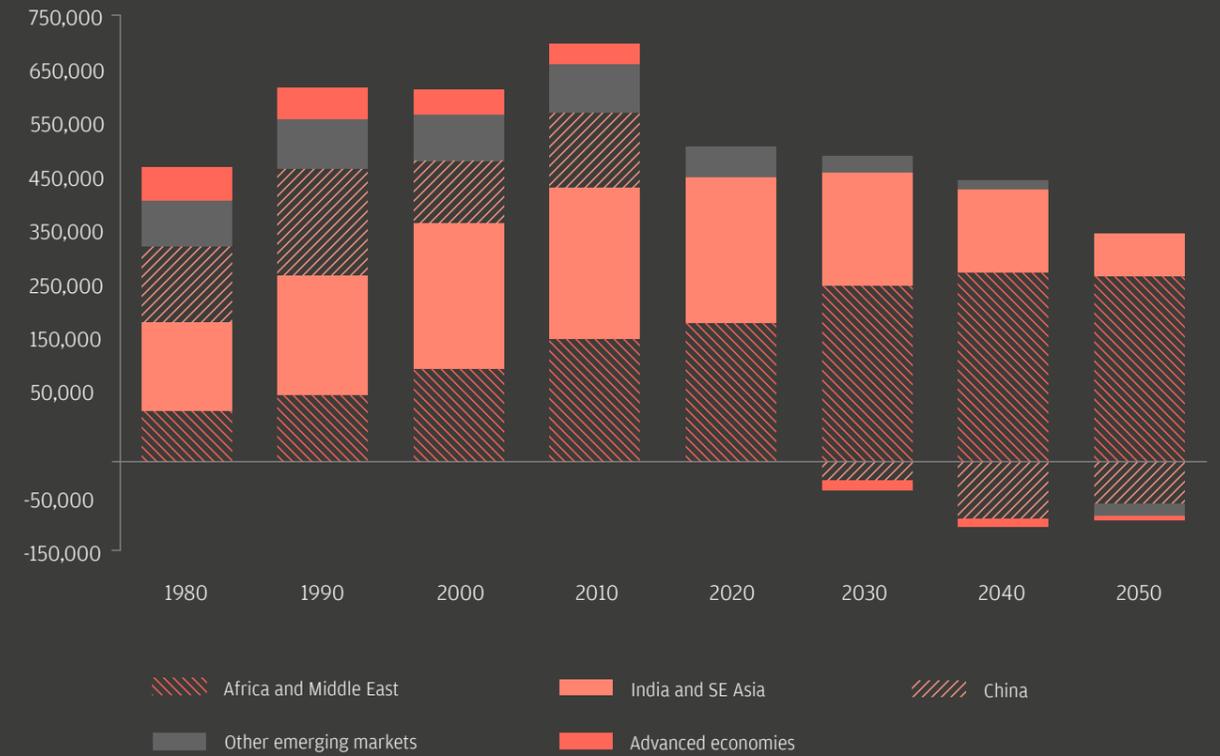


Chart 5
GDP growth

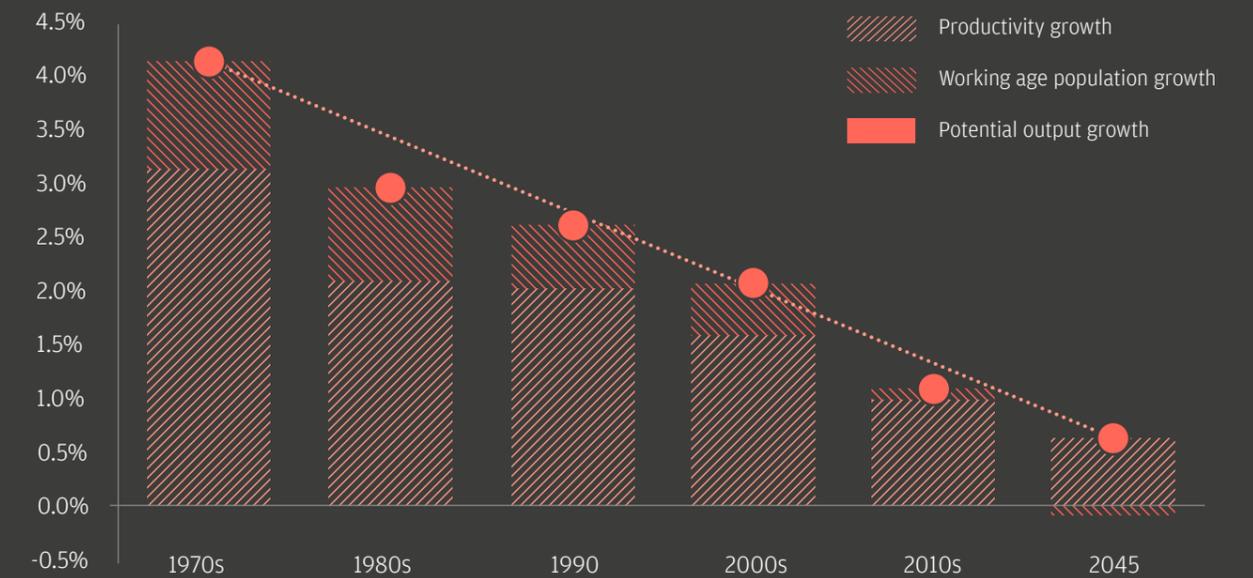


Chart 4
Global Growth in Working Age Population: UN World Population Prospects 2017

Chart 5
GDP growth: OECD, UN

Chart 6
Prime savers age population in advanced economies and world interest rates

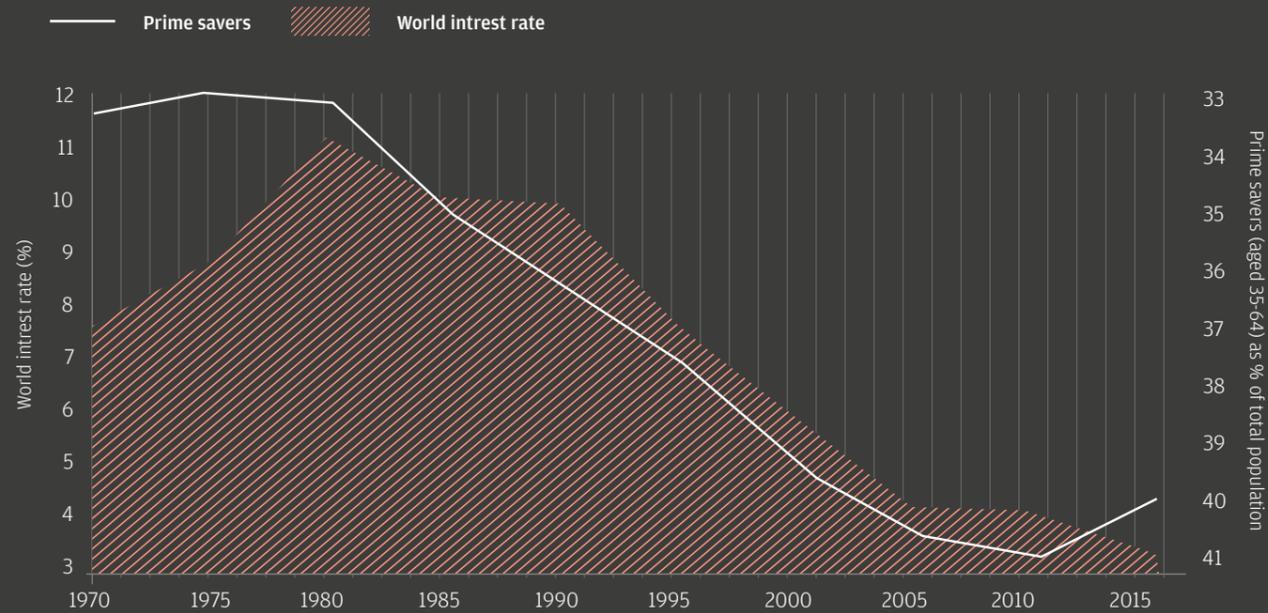


Chart 7
Number of workers per pensioner in advanced economies

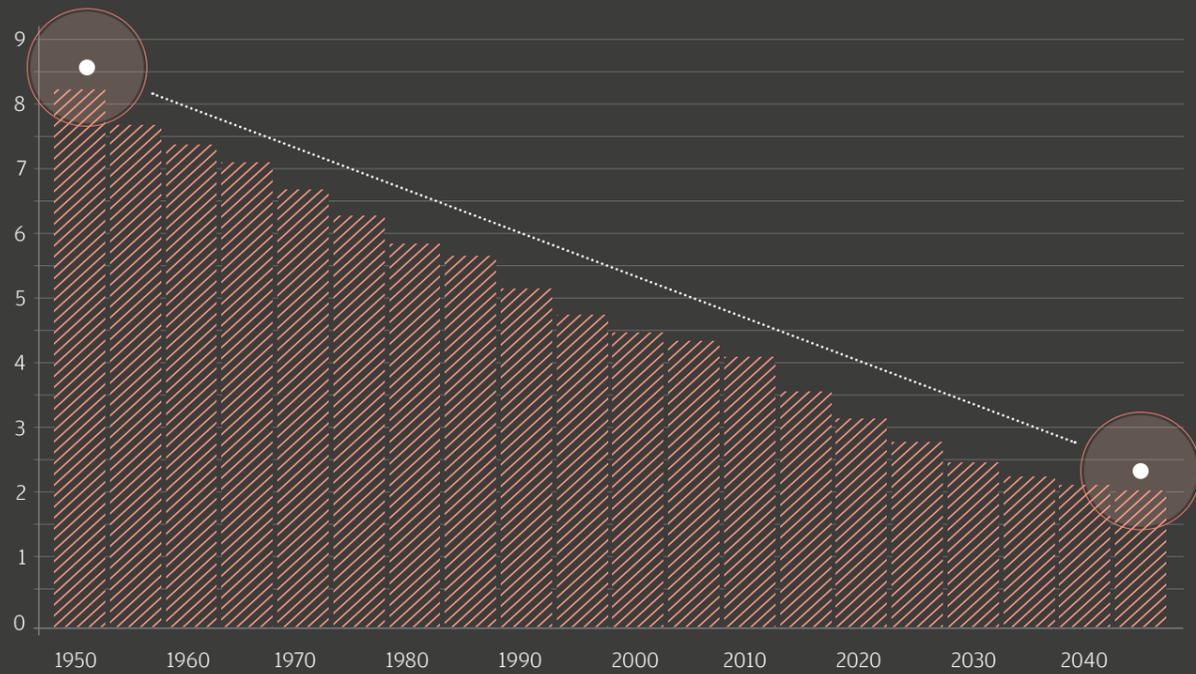


Chart 6
Prime savers in advanced economies vs world interest rates: OECD, IHS

Chart 7
Number of workers per pensioner: OECD

“The modern welfare state was created with eight workers per pensioner in the late 1940s.”

“Advanced economies will have two workers per pensioner by 2045.”

Global interest rates are likely to remain low

The changing age structure also has major implications for equilibrium long-term real interest rates. Recent academic work suggests that much of the decline in real interest rates over the past 30 years can be traced, either directly or indirectly, to demographic factors. The rise in the number of older workers (i.e. 'peak savers') accumulating savings ahead of retirement has seen global savings swell (Chart 6), pushing real interest rates lower. At the same time, ageing populations have also contributed to a decline in investment, further depressing global interest rates. Going forward, the latest research suggests that demographic factors are likely to keep global real interest rates permanently low; recent estimates suggest the equilibrium global real interest rate has now fallen to just 0-0.5%, compared with an average rate of 4-4.5% in the 1980s.

House price growth is likely to slow

Demographic change is also likely to be negative for asset prices in the coming decades, as older adults look to sell down at least part of their assets to maintain their consumption once they enter retirement. However, the fact that older adults tend to retain their housing assets for much longer than other forms of wealth, should help to cushion the residential market from any sudden dislocations. To this end, an expected increase in demand for equity-release products (e.g. reverse mortgages) in the coming years will further help older adults to defer the outright sale of their housing wealth. With that said, our analysis shows that countries with higher numbers of elderly do have weaker house price growth.

Ageing will be negative for public debt

An ageing population will create significant fiscal stress for governments in OECD economies, as a result of rising health and pension costs. A rising proportion of older people is expected to see government spending on old-age benefits (principally health and pension expenditure) to rise significantly over coming decades. The OECD estimates that rising age-related spending will increase total government expenditure by around 8% of GDP p.a. on average, by 2045. With government debt-to-GDP levels already high in many countries, covering the increased fiscal cost of ageing will require some combination of offsetting government spending cuts or raising taxes, to prevent an unsustainable rise in government debt levels.

Difficult political decisions will be needed to pay for ageing

This will force governments to confront difficult decisions about who pays for ageing; either younger workers will be forced to carry a greater tax burden, or older adults will need to fund a greater share of their own retirement costs. Our analysis of government spending suggests that there is already limited room in many countries to make further cuts to non-age related expenditure (e.g. education spending and unemployment benefits) as government spending on old-age benefits is already starting to 'crowd-out' spending on items that benefit younger generations. Meanwhile, on the revenue side, it will become harder to keep squeezing income taxes that primarily affect younger workers, as the ratio of workers to retirees is expected to continue to decline (Chart 7).

Politics is becoming fractured along generational lines

An ageing population potentially has major implications for politics. As older adults become an increasingly important political constituency; they are more politically engaged than younger generations and the evidence suggests that they increasingly have divergent fiscal priorities to younger generations. The widening gap in inter-generational political preferences is evident in the stark voting differences along age-lines in the 2016 UK Brexit referendum and the US presidential election. This growing political divide reflects the difference in economic interests of wealthy Baby Boomers; most of whom have enjoyed full-time employment and sustained house price growth over the past 30 years, with the diminished prospects of Millennials, who are struggling to buy a home, face an uncertain labour market, and potentially a rising tax bill to pay for the elderly.





Implications for real estate



The Rise of the Silver Consumer // The Silver Consumer is different // The rise of the multi-generation workforce // Better workplace design may help improve the productivity of an ageing workforce // The changing needs of the last-time buyer

Retail Sector

The rise of the Silver Consumer

The swelling number of retirees, combined with strong income and wealth levels, means the consumer market for older adults is set to grow rapidly over the next 30 years. Because a significant proportion are homeowners when they retire, their discretionary spending on non-housing consumer items is sustained well into retirement. Indeed, older adults tend to spend more on a number of key discretionary items, including travel and entertainment.

The Silver Consumer is different

Given the spending power of this growing consumer class, there will be greater emphasis on the spending

choices during their extended retirement. The expected growth in what the European Commission call the "Silver Economy" over the next 15 years presents a compelling opportunity for retailers who understand the needs and desires of older adults. While many retailers continue to target younger consumers, more work is needed to fully understand the shopping habits of the mature market segment. In general, older adults tend to be: less price sensitive, make frequent small trips, are more willing to spend on luxury items and to shop during weekdays and working hours. However, like other consumers, older consumers are also increasingly buying online. Industrial as well as retail stand to benefit from increased online shopping courtesy of older customers

Behavioural profile of the Silver Consumer

Selective, but big ticket spenders

They tend to buy fewer items, but spend more per item.

Indulging their interests

Around 2/3rds of American seniors plan to spend more time on hobbies and interest in old age.

Looking for assistance

Between 52% and 66% of the 60+ struggle to read labels, and over 60% would like to sit while shopping.

Going digital

As with the general population, 60+ are increasingly shopping online.

Young at heart

60% of the 65+ said they feel much younger than their age.

Staying close to home

68% of the elderly prefer smaller shops close to home.

Weekday shoppers

Most older consumers prefer to shop on weekdays and earlier in the day.

Less price sensitive

Only 32% of 65+ say that price is their primary purchasing criterion.

Quality over quantity

43% of 65+ people will buy on offer only if the quality is the same; many are not interested in 2-for-1.

Resistant to advertising

Between 66% and 75% of 65+ adults say advertising either depicts them negatively or does not relate to them.

Frequent small trips

Two out of three elderly shop at least twice a week, more than necessary.

Behavioural profile of the Silver Consumer: AT Kearney, Age Positive



“By the start of the next decade there will be more older workers aged over 60 still in the workforce than young workers aged under-25.”

Office Sector

The rise of the multi-generation workforce

Tomorrow’s older adults are likely to work longer than previous generations. While the number of retirees is set to swell, so too will the numbers of older workers who remain in the workforce. More ageing older adults have started to defer retirement or are now transitioning more gradually out of the workplace by switching from full-time to part-time work. By the start of the next decade there will be more older workers aged over 60 still in the workforce than young workers aged under-25 (Chart 8). However, the trend still differs markedly by region and culture. Already a quarter of people in Japan and South Korea continue to work past 65 years. In contrast, Europe has the lowest number of older workers, though the trend is for people to continue working for longer than was previously the case in all regions.

This will have significant implications for offices

An older workforce will increase the need for employers to plan office space for use by multiple generations. Older workers have different needs to younger workers. In particular, office design will need to adapt for the different spatial requirements of older workers in areas such as lighting, acoustics and ergonomics. For instance, work by the World Bank and the British Council of Offices suggests that older workers tend to appreciate the ability to control artificial light sources and prefer quieter work areas as well as furniture and desk spaces that can be adjusted to different height and comfort requirements.

Better workplace design may help improve the productivity of an ageing workforce

Research shows that the ageing brain experiences a decline in certain cognitive functions but also shows a remarkable ability to compensate by improving performance in other functions, particularly verbal and social skills (Table 1). The retention of older workers can bring benefits such as being repositories of tacit knowledge built up over years and as experienced influencers to a younger generation of workers.

“Research shows that the ageing brain experiences a decline in certain cognitive function.”

Chart 8
OECD employment by under-25s and over 60s

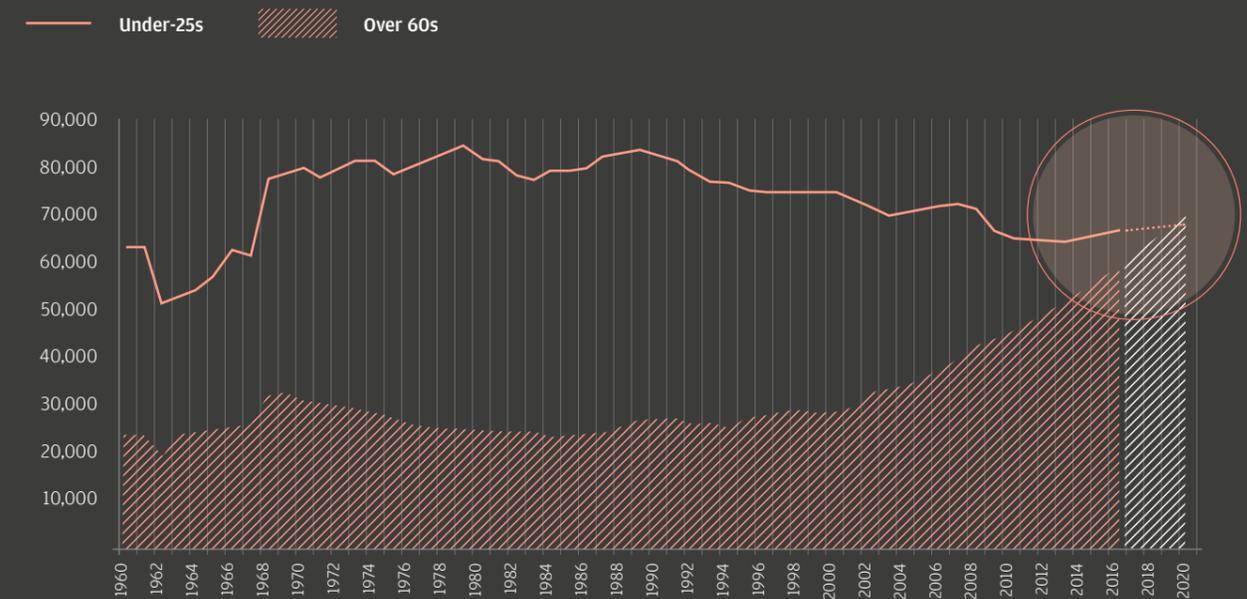


Table 1
Effects of ageing

Why offices need to be designed with an ageing workforce in mind

Function	Subfunction	Impact of ageing
Working memory	Attention resource allocation	Impaired for tasks that require high attention
	Speed of information processing	Slower processing of more complex tasks
Memory	Semantic memory	Older people have a larger knowledge set
	Implicit memory	Brain can draw on accumulated experience at older age
	Episodic memory	Lower ability to remember context deadlines
Attention	Selective attention	Older people require more time to focus
	Dual tasks	Older people require more time to divide or switch attention
Perception	Hearing and vision	Deteriorate with age, affect cognitive performance
Higher-level cognitive functions	Language and speech	Discourse skills improve with age

Chart 8
OECD employment by Under 25s and Over 60s: OECD

Table 1
Effects of ageing: Cai and Stoyanov (2014),
Wieczorkowska-Wierzbinska (2014), World Bank

Chart 9
Homeownership rates: old vs young

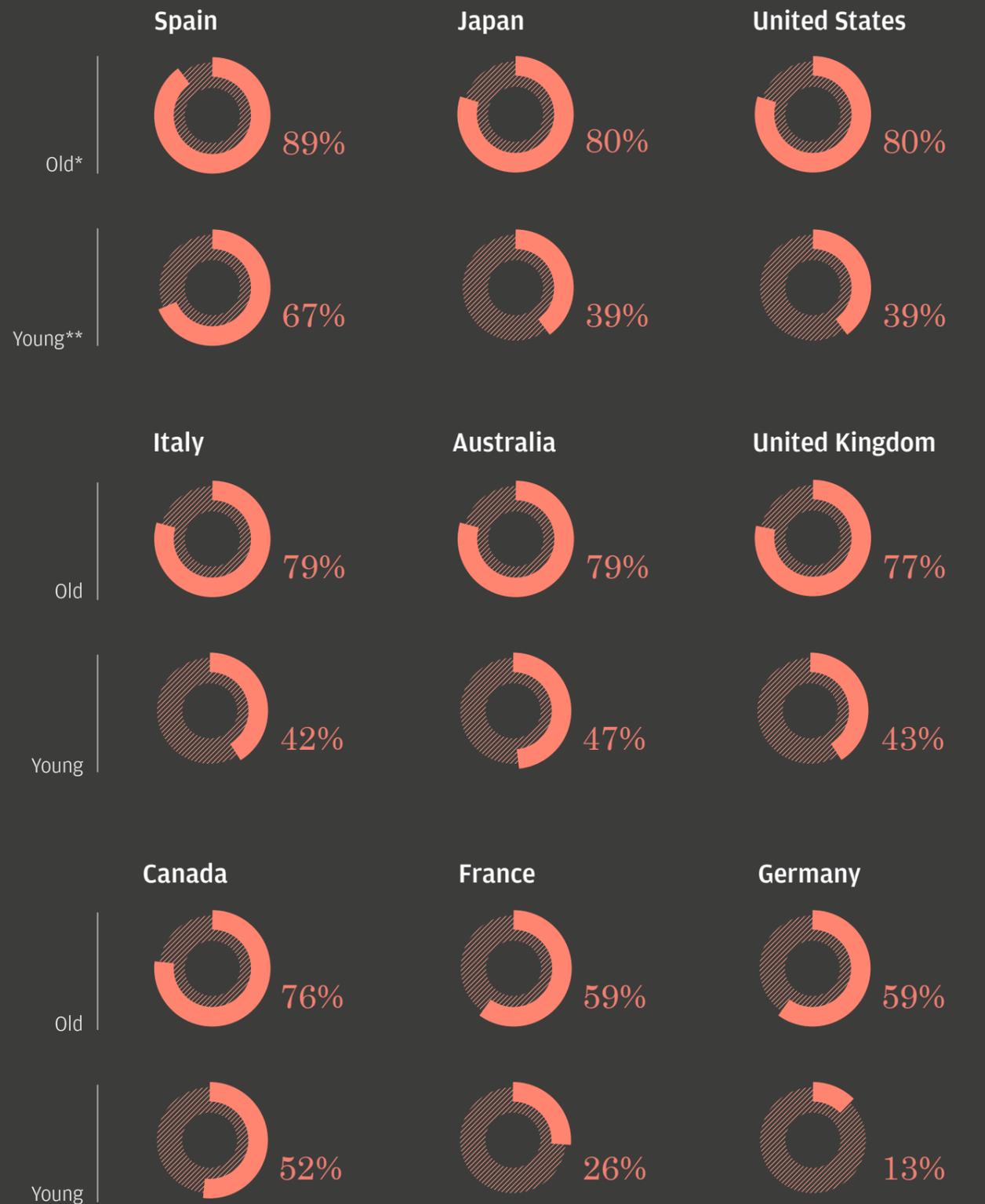


Chart 9
Home owner rates: young vs old: National statistics

*65-74 years old **25-34 years old

“In the UK, there are an estimated 11.4 million potential last-time buyers.”

Residential Sector

The changing needs of the last-time buyer

While demographic change will affect all real estate sectors, the impact on housing markets are perhaps most profound.

Older households will become a significant proportion of the residential market

An ageing population will inherently see a surge in the number of older households. By 2030, as many as a third of households in many OECD countries will include an older adult. Moreover, the proportion of households aged over 75 years will account for much of this increase, with more than half of old-aged households including someone aged over 75.

There will be a sharp rise in lone pensioner households

While most homes will continue to be occupied by couples, the number of single person households is expected to rise significantly over the next 30 years, driven by an increased number of divorces in middle age and a high proportion of widows in later life. Already, one in five older adults in the OECD live alone. In general the older the household, the more likely it is to be a lone household (usually a lone female household).

There is still little evidence of the elderly actively downsizing

Although there is a common perception that older people want to downsize to smaller dwellings, the actual international evidence is quite mixed. Rather than downsize as their housing needs change, older adults tend to 'age in place', in locations where they have long-term community attachments. In England, only 2% of households aged over 65 have moved in the past seven years, compared to 51% of 16-24 year olds and 24% of 25-34 year olds.

The majority of older households in the UK, for example, are owner-occupiers with 70-80% of the elderly owning their own home (Chart 9). Few older adults make the positive choice to move

to retirement housing until something forces them to do so, and there is limited demand for assisted living arrangements, which remains the housing option of last resort for many. Most prefer to receive long-term care at home and only move to assisted living or care facilities when deteriorating health requires them to do so. The net result is that a growing number of older adults end up living alone and under-occupying large houses, not fit for purpose, in typically quiet, low-density suburban locations.

There is an untapped potential market for quality age-friendly housing

This analysis highlights that there is a fundamental mismatch between the large, under-occupied houses that older adults currently own and the mid-sized, accessible housing they actually need. There is clearly an untapped market opportunity to build the right product to unlock the potential downsizing (or 'right-sizing') into purpose built dwellings that are better designed for their life-time needs and located in the communities where they have existing attachments. In the UK, there are an estimated 11.4 million potential last-time buyers (homeowners over 55). Furthermore, by developing housing products that are more appealing to older buyers, the real estate industry could help unlock the number of larger properties available for younger working families, who have higher space requirements.

Existing housing stock will need to be adapted

There is also likely to be significant opportunity in retrofitting existing houses to allow older adults to live independently for longer. Many countries now recognise the important link between long-term health and the houses older adults occupy. Governments are directly funding the retrofitting of housing in order to prevent wider (and more costly) 'social hospitalisation', where older people end up weighing on the healthcare system because of injuries sustained in poorly designed homes.



How an ageing population will change cities



Many cities are getting older // How an ageing population will change cities // City insight studies

“Only 9% of OECD cities currently have a high exposure to an ageing population, but this will rise to 31% by 2030.”

Global cities remain relatively young

Despite the global nature of ageing, many leading global cities have so far remained relatively insulated from the ageing trend that is now underway. Most leading global cities have a much younger demographic profile compared with the national average. This has been reinforced by internal migration patterns, with vibrant global cities attracting an inflow of high-skilled young workers and a corresponding outflow of older adults. Indeed, our analysis of the top 100 largest cities in the OECD shows that only 9% of cities currently have a high exposure to older adults (defined as over 20% of population older than 65).

But this is set to change

While cities are not ageing as rapidly as countries, the ubiquitous nature of ageing will become more pronounced over the next 15 years. By 2030 there will be a high proportion of older adults in over 30% of the OECD’s top 100 largest cities including Tokyo, Berlin, Milan, Madrid and Lisbon. Our analysis of ageing trends in global cities highlights that virtually all of the 212 ‘young’ cities in the world in 2030 will be located in emerging markets. However, while these younger cities often offer stronger economic growth prospects, they are often less resilient cities, with higher levels of corruption and less transparent real estate markets.

Cities must adapt to the changing needs of older adults

Ageing will force a rethink about how we design and build cities to be more inclusive of all adults. One area where ageing will have an impact is on what exactly is the right level of density in our cities. Most vibrant cities are implicitly designed for active, working-age populations, but given their stage of life and health requirements, older adults cannot live at the same high density as the young. Policies designed to achieve greater density often boil down to attempts by developers to build ever-smaller-sized apartments, which are unlikely to be suitable for the changing physical needs of older residents (particularly the very old). Many will become mobility-impaired as they age and thus require larger rooms, ground-floor access and additional space for in-house care.

Increasing density must be balanced with age-friendly design principles

These preferences often conflict with the smaller average size of units that developers are currently building. A strategy of simply building ever-smaller micro-apartments aimed at young workers is likely to be a short-term solution that addresses current housing needs, rather than helping to create long-term sustainable age-friendly communities. Efforts to achieve greater density would be better if focused on building medium-density to make downsizing more attractive for older people (possibly through incentives in the planning system). Ultimately the density debate will need to factor in the impact of ageing. This will have significant implications on the urban form of our cities.

Cities should incorporate age-friendly principles

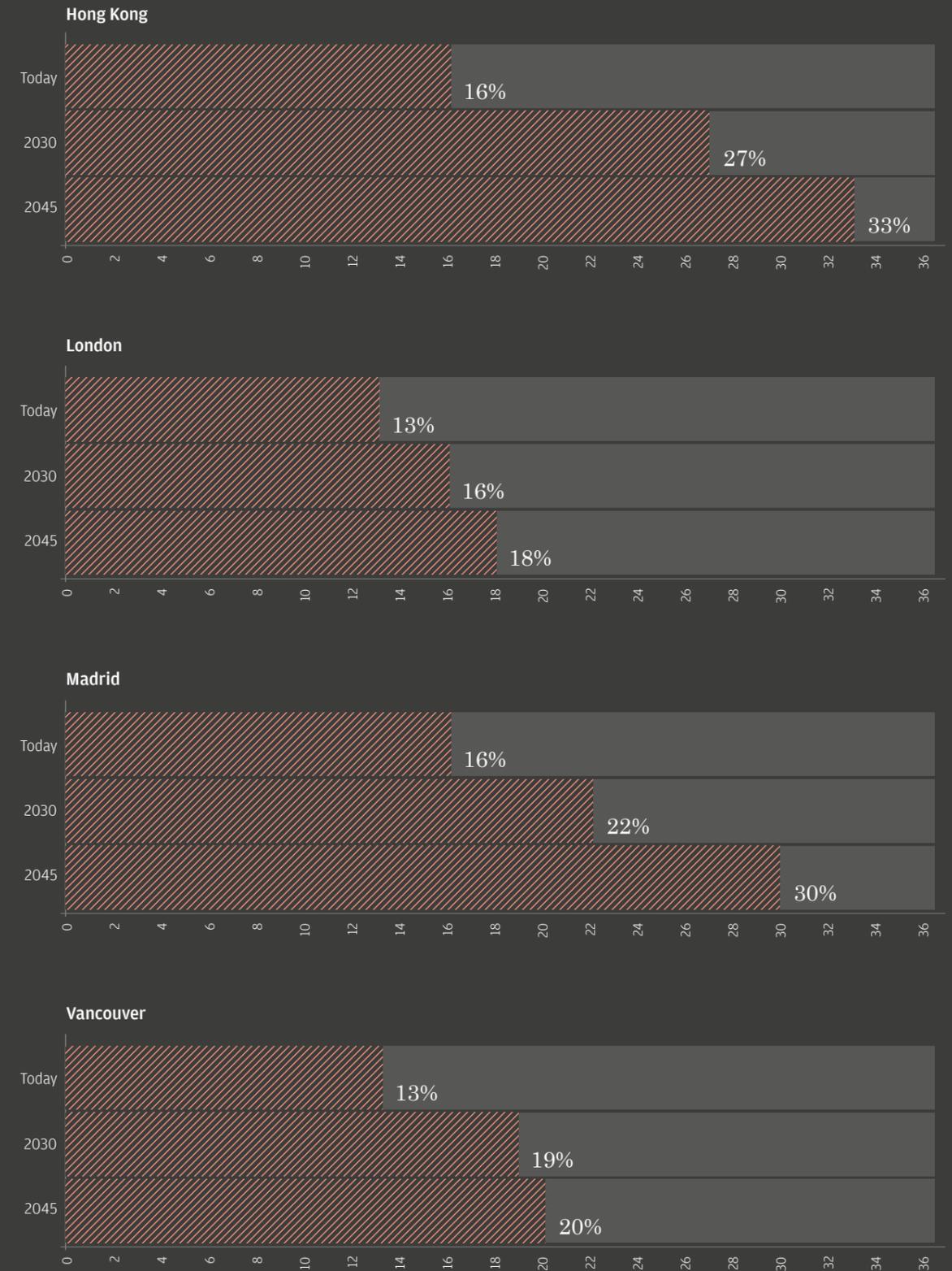
Beyond the density debate, with a greater number of older adults living in and visiting cities, increased focus is needed to make the urban environment more appealing and suitable for older people. There is a growing need to make cities more accessible and responsive to the changing needs of ageing populations. Many cities’ public transit networks are not fully accessible to the mobility impaired. For example, in Paris, only nine of 303 metro stations are fully accessible to people unable to walk up or down stairs. Increasingly, planning policy internationally is geared towards creating ‘lifetime neighbourhoods’ and ‘age-proofed’ communities.

Grosvenor’s approach

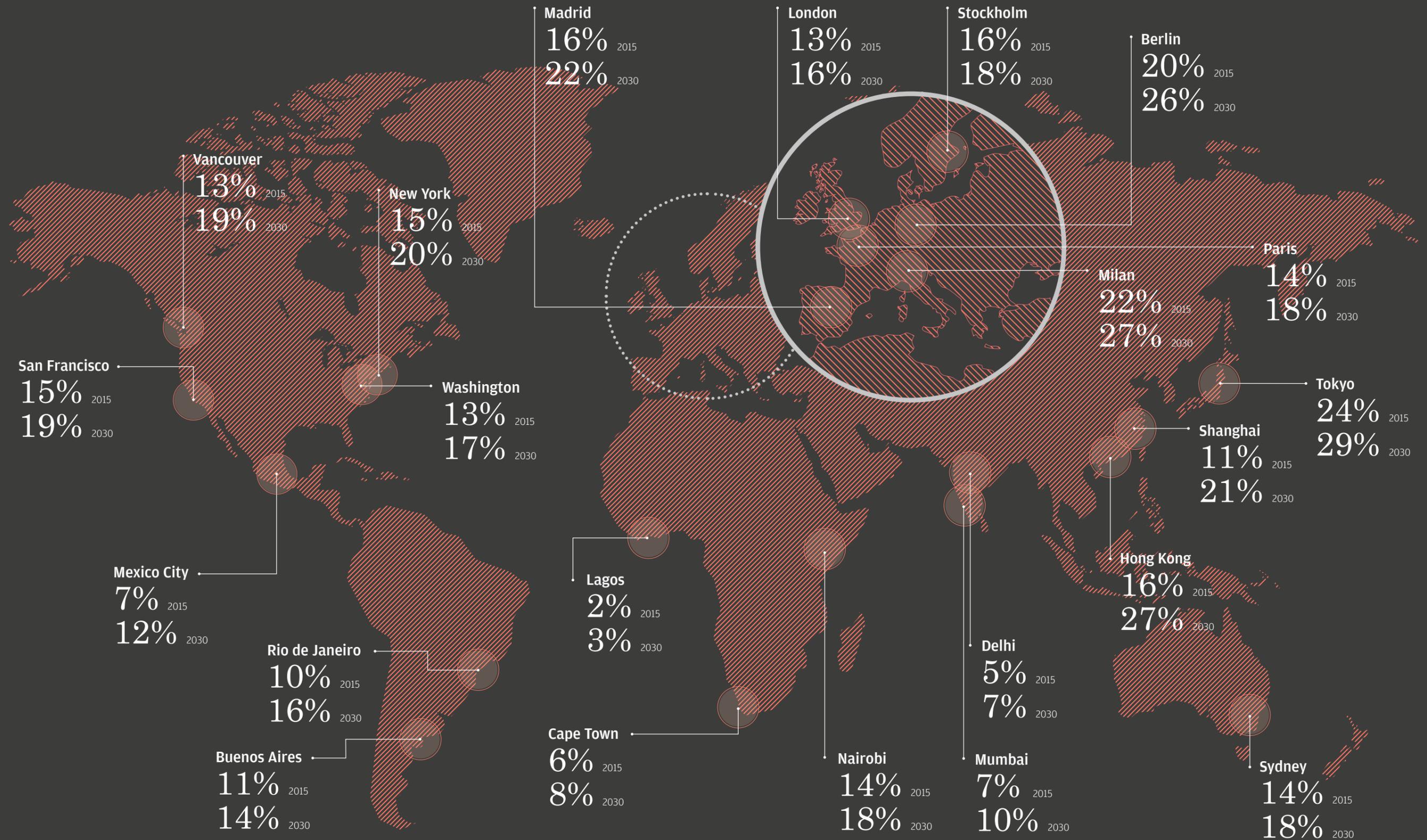
At Grosvenor, our activity is guided by combining expertise built over centuries with a far-sighted approach that is informed by research and projections of how megatrends, such as ageing, will impact cities and communities in the future. We want to play our part in helping address the challenges that cities face and deliver schemes that are flexible and able to accommodate the needs of future occupiers.

The following insights by some of our developers around the world, look at the ageing issue from a city perspective, providing a snapshot of how the implications of an ageing population are being addressed, if at all, within four very different global cities: Hong Kong, London, Madrid and Vancouver (Chart 10). These pieces also offer views on how the sector can play a part in shaping the future development of cities in a way that improves their resilience to the ageing challenge.

Chart 10
Older adults (65+) as % of total city population



Older adults (65+) as a proportion of total city population



Hong Kong

Improving the quality of homes for older people

600

square feet is a typical size home for a family of four or more to live together in

326,000

houses will have been built more than 70 years ago by 2045

27%

of the population will be over 65 by 2030 and 33% by 2045

“In Hong Kong, unless older adults require special care, it is not common to put them in a care home.”

By Gary Wong
Senior Project Development Manager,
Hong Kong

Hong Kong is one of the most densely populated cities in the world and has been ranked by Forbes as the world's most expensive city to buy property in for the seventh year running. The pricing for a residential flat is now averaging between HK\$16,000-20,000 per square foot. To make residential property more affordable, developers are increasingly focusing on the development of small flats, primarily targeted at young, single buyers.

The high cost of living in Hong Kong means that it is the norm for both parents to work, in turn relying on grandparents for childcare. This adds to the already strong cultural tradition of families staying close or together as a unit. In fact, unless the elderly require special care, it is not common for them to go to a care home. Showing filial respect for one's parents is a virtue of Chinese people.

The combination of cultural expectations and the high cost of housing mean that it is typical for a family of four or more to live together in an apartment unit of no more than 600 square feet.

But despite the obvious challenges facing Hong Kong, with its rising share of older people, limited space, and a culture of two-year lease lengths, there is sadly little awareness of the issue facing older adults among the public. There are few signs that the authorities are interested in the challenges either, instead focusing on wider issues, such as economic competitiveness.

What could the authorities do?

Since there is a respect for free trade and enterprise in Hong Kong the government is not minded to impose new conditions on private developments.

While the government already has planning rules for new developments aimed at setting minimum standards for the disabled, such as wheelchair access, these could be broadened out and extended to include senior citizens. For example, expanding the current limit on Buildable Floor Area that can be allocated towards recreational use from 5% by say two to three percentage points more, provided the developer commits to integrate a scheme or recreation space that caters to the needs and usage specifically for older adults to help them remain active and integrated in their communities.

The government could specify a minimum size for apartments in schemes when they tender a land sale for development to ensure that the homes have the flexibility to accommodate multiple generations.

There could also be tax incentives, such as tailoring allowances for people living with their parents to be more generous to those families living in more crowded accommodation.

A good example of where a project has focused on this demographic is a suite of four projects developed by the Hong Kong Housing Society, a non-government and non-profit organisation, which built 1,224 units between 2003 and 2015. Three - Jolly Place, Cheerful Court, and Tanner Hill - are wholly for older adults, while one, Harmony Place is built for a mix of buyers alongside their elderly parents and offers shared facilities such as a gym, swimming pool, and an activity room. While these schemes have been very successful, delivering fewer than 1,300 units in the past 15 years is definitely not catching up with the market demand.

For private developers, the idea of adapting schemes for elderly living is still a work in progress. The sector could look to improve the quality of the offer by working with other sectors to ensure buildings can be adapted as residents age.

Developers should also be encouraged to develop products that focus on wellness, which have a positive impact on residents' physical health, mental state and productivity. For example, it's been shown that thoughtful material usage, colours, biophilia design, lighting and use of texture, are features that become increasingly important as people age.

There are also good opportunities to cooperate with technology and service providers to include improved telecommunications and internet facilities that senior citizens increasingly take advantage of and may come to rely on more in the future.

Constraints of space and pricing will mean the solution will come from adapting existing stock rather than building new properties in Hong Kong. This means enhancing the living areas to include wider corridors, more spacious rooms, a more joyful atmosphere and more greenery as well as better public amenities, to allow older people to remain within their communities.

Looking ahead, Hong Kong will always have a high density. That is fine in itself, but in order to meet the challenge of an ageing population the government and developers must work together to ensure the existing stock is adaptable.



London

Build-to-rent to ensure our global city remains home to older people

£2.5 billion

is the cost of poor quality housing to the National Health Service every year

80%

of older adults wish to age in place

37%

increase in number of aged 65+ households by 2029

“74% of older adults move to places within 100 km (or 1 hr – 1.5 hr train ride) of Central London.”

By Simon Harding-Roots,
Executive Director,
Grosvenor Britain & Ireland

London is a young and fast-moving city but that does not mean it cannot be a city for older people.

Much of the negative language that is attached to the notion of an ageing population is both surprising and frustrating. People are not geriatric at the age of 60 or 70, and many will look forward to as many as 20 years of a really active lifestyle, taking advantage of transport, culture and leisure.

The 'silver surfer' generation is an exciting demographic and it means that what we have in London and in the real estate sector is a huge opportunity, especially in a country that does not have a strong culture of keeping older adults within the family unit.

We need to move away from the idea that the only option is for the elderly to go into a care or rest home when, in fact, most older people in London, as much as elsewhere, wish to remain independent.

The challenge is that many older Londoners are living alone in the family four-bedroomed home that they raised their family in, but which is unlikely to be suitable for an older person.

There is a strong opportunity for us as an industry to focus on building communities made up of homes for rent that will meet the needs of all demographics and not just the 25- to 35-year-olds whose faces often adorn modern development hoardings.

There is currently an acute lack of the type of accommodation in London that suits all ages. Developers need to capture those elements of a home that older people particularly value, whether that is spacious rooms, wider corridors, storage areas, or some outside space.

Including a range of different sized blocks and building with flexibility into a development so the units can be adapted later on is a very cost-efficient way of accommodating residents' future needs.

Developers should also look to include more public amenities such as ground level open spaces within a proposed new community in order to make it more attractive to the older occupier.

Grosvenor hopes to put this into practice in Bermondsey, south-east London, where we have drawn up a masterplan for a mixed use community of 1,500 flats with office, retail and community space. Building for rent means the apartments will typically come with facilities and features such as two standard sized bedrooms and two bathrooms unlike much of London's older stock where there will often be small 'box' rooms as part of the accommodation offer.

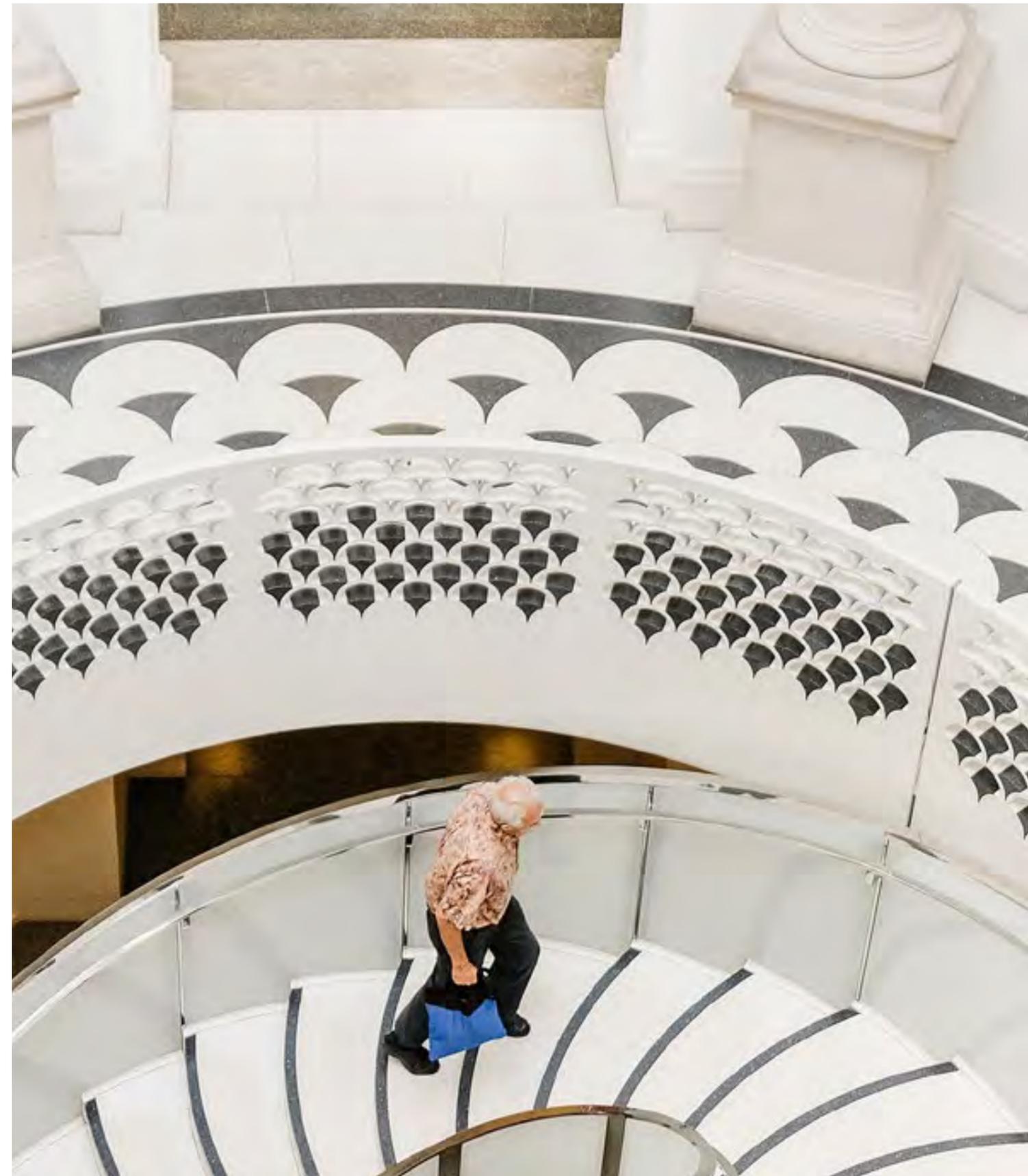
This takes into account that it is increasingly common for individuals of all ages to share homes, making living in London more affordable. New developments designed with this in mind are more appealing to people who fear being priced out of London. Technology integrated within the very fabric of new buildings will also become an important feature for the increasing tech-savvy older generation.

Renting should be seen as a functional way of life that offers flexibility where people might start off in a studio and work their way through the different types of property but within the same development, enabling people to remain in their chosen communities for longer. It can also provide a positive alternative to retrofitting large older houses, which are in demand from families.

Tax incentives could play an important role in encouraging older homeowners to sell an oversized family home and so free up housing stock, and for modern regeneration aimed at diverse and integrated communities. A financial incentive to sell, and an exemption from Stamp Duty when buying, could be very beneficial.

The good news is that London has made significant strides to make the city more accessible, not just for older adults but for everyone who needs help with mobility, including the disabled and parents with buggies. Whether it is way-finding signage, free public transport, pedestrian zones, dropped kerbs, supermarket deliveries and even taxis at the touch of an App, it makes for a friendlier city for everybody.

If we get this right, London will be a more integrated city. With people living for longer in places they are happy in.



Madrid

Designing new communities that accommodate the older person

1.1 million

older adults live in the inner city;
over half of the population

84 years

the average life expectancy in Madrid
is 84, making it the region with the
highest life expectancy in Spain

3 out of 4

older adults live in
underoccupied buildings



“New large-scale land developments in Madrid are now required to incorporate 25% social housing.”

By Fátima Sáez del Cano,
Managing Director, Spain
Grosvenor Europe

Every crisis brings an opportunity and in the case of Madrid the steep property crash of the last decade has opened a way for the city’s developers and authorities to pioneer a new approach to an age-old problem.

The downturn means that there has been little property development and low levels of public investment over the last 10 years. Now that confidence is returning, the needs of older adults are back on the agenda and there is an opportunity to implement best practices and designs that have emerged over the past decade.

New concepts coming through include shared housing aimed at single women with children, who can support each other with childcare. This idea could be easily adapted to suit older people, overcoming the issue of loneliness and enabling citizens to share costs of living and social care without having to move to a care home.

New large-scale land developments in Madrid are now required to incorporate 25% social housing and this could be adapted to include an allocation for older people.

In terms of new properties, companies are starting to look at what will appeal to older people. They have to take account of the culture in Spain, which is very much family focused. Grandparents play a large role in helping to take care of their grandchildren for example, which means that families want to live close to (but not with) each other. Therefore, there needs to be a variety of housing to enable people to move within their existing community.

This means the concept of a retirement village that is popular in the United States will not attract much interest in Spain. Instead, the industry needs to focus on designing accommodation that is ready now but to which improvements can be made later.

We need a revolution that leads to the creation of better alternatives, which will in turn stimulate demand and lead to further innovation. There is a huge opportunity for an industry that is at a

new starting point. The challenge is to produce something that is attractive to a 55- or 65-year old who may have few additional requirements, but which is flexible and can respond to their changing needs as they age.

This will include the flexibility to turn traditional layouts into open plan spaces and providing a main bedroom and bathroom that can still suit the needs of older adults with mobility issues.

There is also a huge potential for developers to collaborate with services companies to install features that can help older people, such as incorporating technology that is very intuitive for older people to use and which adds greatly to their wellbeing.

The government too can help. Four out of five Spaniards own their home, but it is often their only financial asset, which means that they are reluctant to sell in order to finance living in a retirement home, fearing they will leave nothing to their children when they pass away.

The cost of buying and selling homes, including a property transfer tax and notary and registration fees for the buyer and commissions and capital gains taxes for the seller, are high and could be reduced as an incentive to move.

The key for developers is to educate the generation who are nearing retirement, helping them understand that there are options between their existing home and a care home. If this group trust developers to deliver high-quality homes that are flexible enough to adapt to their changing needs and at a price that is not just aimed at wealthier households, they are more likely to make the move.

The future may lie in the suburbs. Although many of Madrid’s older adults live in the city centre, its history and layout make it hard to find new sites or demolish existing buildings that often have no lifts.

The move of younger people to suburbs which are well connected to the centre by metro and where there is a supply of ready to develop land, offers the potential to build new neighbourhoods where multi-generations of families can more easily live closer for longer. That would be a positive legacy from the crisis.

Vancouver

Densification key to ease shortage of homes for older adults to rent or buy

65 years

there are more people over the age of 65 than under 15 in Canada

60%

of ethnic minority seniors are Chinese

13%

of downtown Vancouver residents are over 65 years old

“The primary focus of both the public and politicians in Vancouver has been on young people and families and how they will afford to live in the city.”

By James Patillo,
Managing Director, Development,
Grosvenor Americas

Vancouver is a fast growing city but its ability to create sufficient housing to meet the demands of a growing population is generally constrained by lack of available land (surrounded by mountains to the North, an ocean to the West, the United States border to the South, and greenbelt and agricultural land to the East), long entitlement and permit timelines and public resistance. The result of this has been fast-rising property prices and an increasing affordability problem.

While this has led to a debate about housing supply, the primary focus of both the public and politicians has been on young people and families and how they will afford to live in the city. My concern is about a lack of attention to the other end of the demographic, the large increase in the ageing population.

This constraint on space means densification within existing communities is required, especially as there is a strong desire among older people to remain in neighbourhoods where they have established their lives and social networks. There is overwhelming demand for new residential condominiums and it is not unusual for 100+ unit buildings to sell out in a weekend.

However, there is resistance to these types of developments, particularly within the communities where we know there is the most demand for that product. The strong NIMBY (Not-In-My-Back-Yard) tendencies present in many municipalities means the very people who have reached or are reaching retirement are often the ones opposed to those plans.

The challenge for the municipal councils and planning departments is to find solutions to bring more supply onto the market more quickly to meet the needs of people looking to downsize without putting further strain on existing civil and transportation infrastructure.

Grosvenor has designed a number of developments aimed at the downsizing market. By way of example, our 98-unit Grosvenor Ambleside development in West Vancouver is designed to meet the needs of the ageing community by including local serving retail outlets and an enhanced public realm.

The homes have largely been purchased by local older residents who want to remain in the community where their roots are, while being able to walk to local shops and restaurants.

Our Connaught development in North Vancouver features 82 homes over three or four storeys with over 60,000 square feet of ground floor retail including full service grocery and drug stores. We have received strong local interest; particularly from downsizers in the immediate vicinity. Our proposed downtown Vancouver condominium development, The Pacific, is also attracting interest from active downsizers who want to enjoy the vibrancy of the urban environment.

Another challenge will be to meet the demand from older people who have not built up equity in their homes to fund downsizing and who will require rental apartments in a tight market where the vacancy rate is below 1% regionally. There is a big problem emerging that will likely require government intervention, which could be as simple as rezoning areas for senior assisted living and care homes.

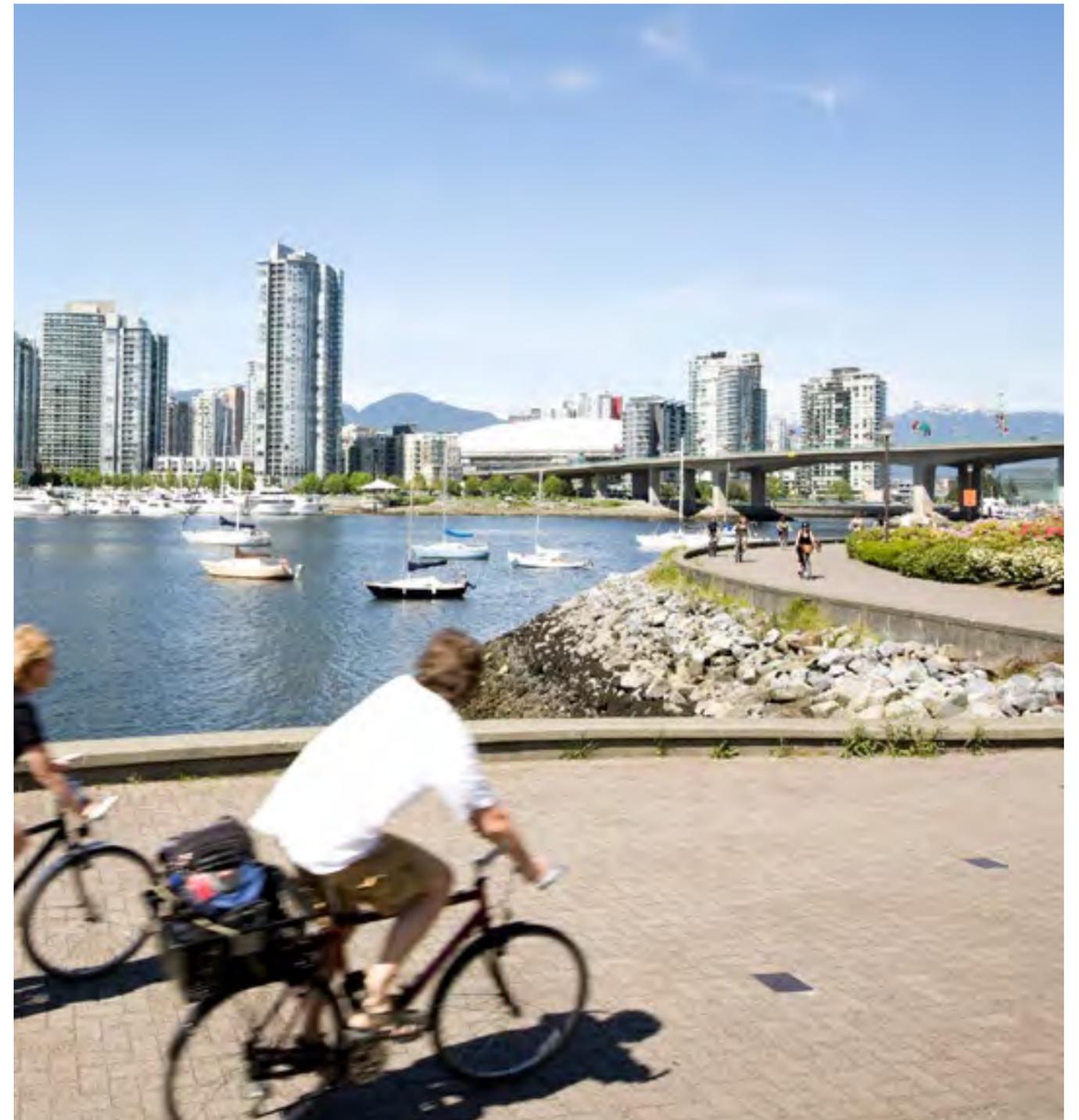
The challenge is for municipalities to encourage the construction of more accommodation for both sale and rent, marketed to older people while at the same time meeting demand from the younger generations. Creating balanced communities that serve diverse interests is how healthy societies survive.

Hopefully there will also be a change in the way developers look at senior living that produces more options between the current family home and a facility providing full care. People who are ageing nowadays are more active and want to be around like-minded people but do not want or need to go into a care facility.

The problem is that I do not see a lot of planning happening in municipalities for making specific zones or land parcels where the only approvable use is senior housing or a care facility. In the absence of deliberate zoning, land prices can escalate to a point where developing certain forms of housing for the ageing is not likely the highest and best use and therefore developers are not likely to do so.

One positive trend is the growing YIMBY (Yes-In-My-Back-Yard) movement among the younger generations who are aware that there is a need for more high density housing to respond to the demand created by a growing population and changing demographics.

As developers and planners, we have to figure out how to increase the supply while accepting that that process will change the city. That will be a big challenge but it's what has to happen to address the needs of an ageing population.



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NEIGH BOUR HOODS OF THE FUTURE

DESIGN

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Time for housing designers to flex their creative muscles

Jeremy Myerson
Helen Hamlyn Chair of Design, Royal College of Art

Britain has a unique capacity for shooting itself in the foot when it comes to homes and neighbourhoods for older people. According to research submitted to the Government Office for Science Foresight report 'Future of an Ageing Population' (2016), housing stock in the UK is not well adapted to older people, and there are many mismatches between their needs and the homes they inhabit.

Mainstream homes are often the wrong size for later life, are difficult to manage and maintain, and don't support the many physical changes that accompany old age. Even the most basic considerations such as level access, wide doors and entrance-level toilets are missing in 95% of English houses. Poor lighting on landings and stairs invite accidents; lack of insulation, damp penetration and weak heating contribute to ill health.

A shortage in provision of specialist, smaller homes for older people results in many being unable to downsize at any point before a crisis in support that catapults them into institutional care. As a result, many family homes are under-occupied at a time of significant housing shortage in Britain.

Outside the home, things don't improve. Despite research showing how a supportive neighbourhood is intrinsic to domestic wellbeing, there is frequently a lack of step-free access, ramps, handrails, seats at regular intervals, working toilets, properly maintained surfaces and removal of seasonal hazards of autumn leaves and winter snow. The result is that many older people are left prisoners in their own homes.

Rethinking the home

When I joined the Government Office for Science's academic panel to review the evidence and make recommendations to policymakers on how to manage an ageing population successfully, there was a broad consensus that smarter housing – and the technology that enables it – should be right at the top of the agenda.

Subsequently I used some of the data and insights gleaned from the Foresight report to curate an exhibition for the Design Museum, *New Old – Design for Our Future Selves*. This is now on an international tour. In my contribution to the first *Neighbourhoods of the Future* publication, I showed some of the exhibits I commissioned from leading design firms, including a 'power suit' to aid mobility and a reimagining of the mobility scooter as a nifty, desirable inter-generational vehicle.

Now, however, I increasingly believe that while single innovations can act as creative beacons for change, usefully fill market gaps and address different needs, there should be a more comprehensive design systems-led approach to the structural failings of Britain's fallible and inappropriate housing stock.

In the same way that architects, designers and manufacturers of everything from IT to furniture in the office environment have formed a broad coalition to reshape the workplace to improve employee wellbeing and productivity, so we need a similar revolution in thinking about our homes and neighbourhoods for older people.



Britain has to do much better in matching our housing stock to the needs of older people, and stating some big, bold values is not a bad place to start.

The value of the FLEX model

One of the design models I've developed for the office environment could be applied equally well to lifetime homes. This is a model that looks at making spaces and settings more adaptive and agreeable for their users – it is called the FLEX (Flexible-Legible-Experiential-Comfortable) model.

Flexibility means building in interior elements that adapt more easily to changing and unpredictable requirements over time. Legibility refers to local environments that are more easily understood and intuitively 'read' and navigated by their users, incorporating visual cues to make that happen. Experiential spaces are designed to project warmth, atmosphere and a protective mood – they offer a good experience. Finally, spaces that are really comfortable make people feel welcome, relaxed and supported.

It isn't difficult to see how these values could transfer readily to homes and neighbourhoods for our ageing society. We need a whole system approach to planning, procurement, co-design and build to deliver a new generation of homes that flex as we age, are easy to understand and manage for residents, offer a great living experience with opportunities for social interaction with others, and provide real comfort, peace of mind and dignity in terms of giving support and protection in later life.

Just a pipe dream? Not all. Britain has to do much better in matching our housing stock to the needs of older people, and stating some big, bold values is not a bad place to start.

Photo credit: Images courtesy of Jeremy Myerson and The Royal College of Art MA Architecture programme – Ohyun Kwon



Platform design has transformed the automotive industry – Could it do the same for housing?

Kieran Singleton
Co-founder, Forge Design

The UK is facing an acute housing shortage. A better use of modern construction processes and materials could fix this, enabling thousands more homes to be built faster, cheaper and more efficiently – and potentially transforming the quality and specificity of UK housing. Yet as things stand, our dependence on bricks and mortar suggests a sector that is technologically moribund. Are there lessons to be learned from the successes of the automotive industry?

Car manufacturers first recognised the benefits of platform manufacturing decades ago, to meet the challenges of increased product complexity, customisation, build quality and technological cost. Today it is standard practice.

The housing market embraced mass pre-fabrication in the post-war period, to address urgent housing needs. However, its legacy was compromised due to the quality and utility of the resulting buildings, and a lack of emphasis on user-centred design.

So why has technological innovation flourished so well in the automotive sector, while in housing it has seemed to stagnate?

Reasons may include a lack of customer choice and competition. The automotive market is fierce in terms of features and cost, and auto manufacturers have had to adapt their systems to survive. A manufacturer that doesn't compete ruthlessly on quality, feature content or price will quickly go out of business.

Better design has been central to this effort. Car companies invest millions to ensure cars are desirable. They must be evocative, thoughtfully ergonomic, beautiful in form as well as function. Cars are emotive as well as functional and high tech, yet mainstream housing has never been marketed in quite the same way – and its processes have never been under the same pressure to evolve.

Platform design

To make better products more affordable, it is standard practice in the automotive world to try and maximise the amount of inter-vehicle commonality. This extends to the structural layout, with common chassis and structural components, to the powertrain and running gear, and to any parts that carry a high development or tooling cost, such as electronic switch-packs, wiring harnesses and data distribution systems.

This level of standardisation could have led to a conveyor belt of similar products and a huge reduction in user choice. But, by employing good design, manufacturers have taken advantage of the platform approach to deliver exciting new concepts, embraced by the public at both ends of the price spectrum.

By way of example, the Fiat mini platform, which underpinned the reincarnation of the Fiat 500, was also used by the Ford Ka of the same period. This case is particularly

interesting, with the Fiat outselling its sister vehicle by a factor of 2.4 in the first three years. These sales were achieved almost entirely due to the design and market approach, and by investing in customer touchpoints, such as the interior layout and interfaces. They also came despite a higher price point than the Ford.

Forge Design, our global design company, is formed from experts in automotive design and concept design management. Our community has been involved in conceiving and designing the look and feel of vehicles ranging from modern city cars to supercars. One such example that perfectly exhibits this platform approach is the new Bentley Continental. This car shares its MSB base platform with the Porsche Panamera, allowing both companies to minimise fixed costs while preserving the highest standards of premium feel, and bespoke variation in customer experience.

Visually, these cars do not look alike – they are quite distinctive. Furthermore, the new range of Continentals reflect the current emissions-conscious trend. They feature structural components made from exotic high-strength steels to reinforce an aluminium body. This delivers a considerable weight saving, improving performance and reducing fuel consumption. The increased cost of these expensive materials is only sustainable using platforms. Could the same be true for housing?

We take it for granted that new cars will be well designed, that they will arrive on time and that when they do, they will not leak. Is the same true of the home buying experience?



Platform Designing: The same 2018 underbody components in modified layout underpin both the Porsche Panamera (above) and Bentley Continental Flying Spur (bottom)

■ Vacuum structural aluminium
■ Extrusion profiles (aluminium)
■ High strength steel
■ Sheet aluminium



Underbody Standardisation: Modular design in the shared MSB platform enables greater investment – lighter weight, higher strength and better performance



Design Freedom: Car design is driven by beauty and emotion; why shouldn't this apply to housing?

Modern cars are dependent on good design to an extraordinary degree. For aesthetics, but also for everything you touch and feel. From water management (leak prevention), to door close quality and sound. From whether a driver's hand gets greasy at the petrol pump, to whether a switch is intuitively in the right position – and delivers the right feel when pressed. All of this is enabled by investment in the right tooling, and through using a modular engineering approach.

The housing challenge

We take it for granted that new cars will be well designed, that they will arrive on time and that when they do, they will not leak. Is the same true of the home buying experience?

There could be massive potential benefits if housing developers were to embrace the platform design approach. But they would need architects, designers, developers and engineers to work together to consider cost models, life-long user requirements, and longer-term trends.

For our neighbourhoods of the future, the platform approach offers new opportunities for customisation. Designers should lead the way and focus on standardising where there is a high investment cost, geometric similarity or cross-system integration. Potential areas for interventions are not just sub-assemblies such as walls, floors or structural elements, but also wiring layouts, network infrastructure and customer interfaces.

At Forge Design we consider this a huge opportunity and have been working closely with Soho+Co (www.sohoandco.com), a forward-thinking, London-based architecture and design firm. Their research practice considers the impact of modern technologies on design and construction, and they frequently apply their significant expertise in off-site fabrication techniques to award-winning buildings.

In considering opportunities for modular housing, Soho+Co see opportunities in breaking down the traditional trade barriers in housing construction.

Historically, housing is built around sequences of trades, where specialist materials and skilled labour are layered in space and time. Repetition is used to reduce complexity and

thinking time, where different skills and tradesmen need to co-ordinate and work together. But the separation of trades builds redundancy and unit cost into the system, and takes quality out.

Each building operation seeks to limit liability by concentrating on one area of expertise (such as electrical fit-out or dry-lining) and installing materials or items in a way that minimises dependency on other trades. This drives the development of linings, systems and materials that minimise the need for collaboration. For instance, a lining of two sheets of plasterboard might guarantee a specific fire or acoustic rating – avoiding the need for individual testing, or contextual thinking. A platform approach could deliver these properties at a higher system level,

potentially making a room more spacious, with more light or easier access.

Pre-assembly in a controlled, factory environment can de-risk critical operations, such as measuring and setting-out. It enables tooling for key components that span different traditional trades and regulations, with associated benefits for cost, and design freedom.

Enabling wireless connections or being able to standardise and reduce the cost of implementing sprinkler systems, would liberate the house plan from more constrictive fire and layout regulations. This would make rooms bigger, with more light, and options for usability.

Fixturing can liberate the design process from being overly systematic, allowing more variety in the outcome, with different positions for openings and service routes in every room. The pre-fabrication opportunity is maximised when the construction process is considered holistically.

Where the right balance is struck, a platform-based design approach can provide an improved user experience. This can be achieved through standardised ergonomics, operating conditions, touchpoints and

materials. Consider, for example, the ease and familiarity of a driver moving between several different Ford vehicles. Design time, and cost, can be allocated to a reduced number of different switches, electronic systems and components; making them considerably better and easier to use.

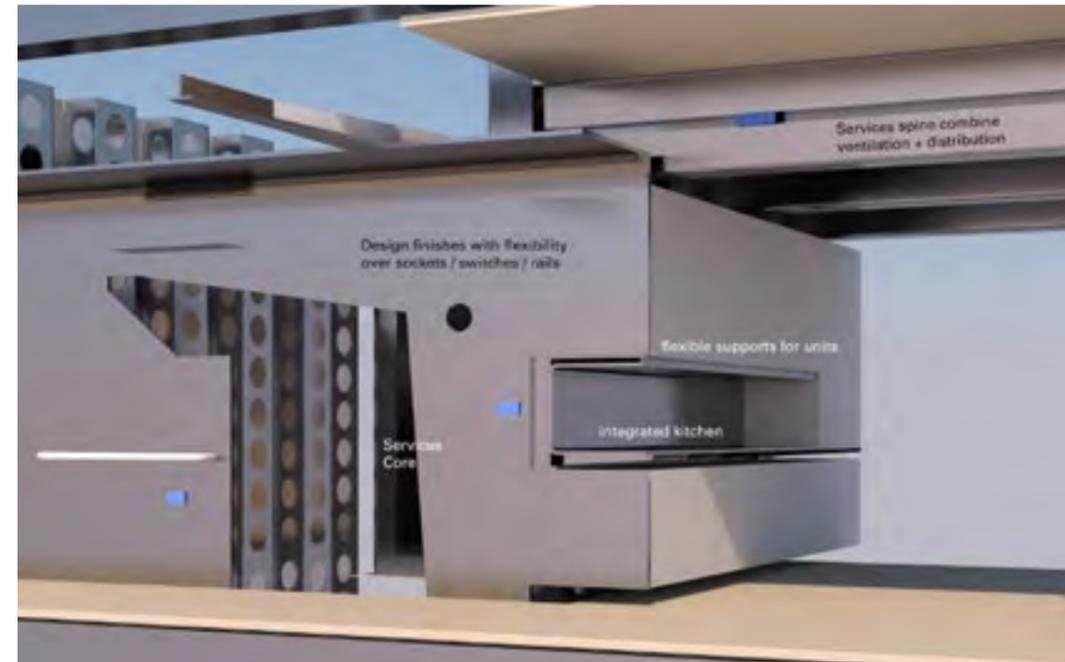
Interesting parallels can be drawn between housing and automotive design. Fundamentally, both involve structural and legislative constraints which impose costs on the designer or manufacturer. These are areas with repetitive issues, where it is worth spending money to standardise.

But both industries also involve areas of high-customisation. In housing, this is particularly the case for ageing populations whose needs become more specific as they get older.

Using a platform-type approach and unleashing the power of good design, must surely be the best answer to these shared challenges.

1 Carsalesbase.com, European sales figures 2008-10, available at www.carsalesbase.com

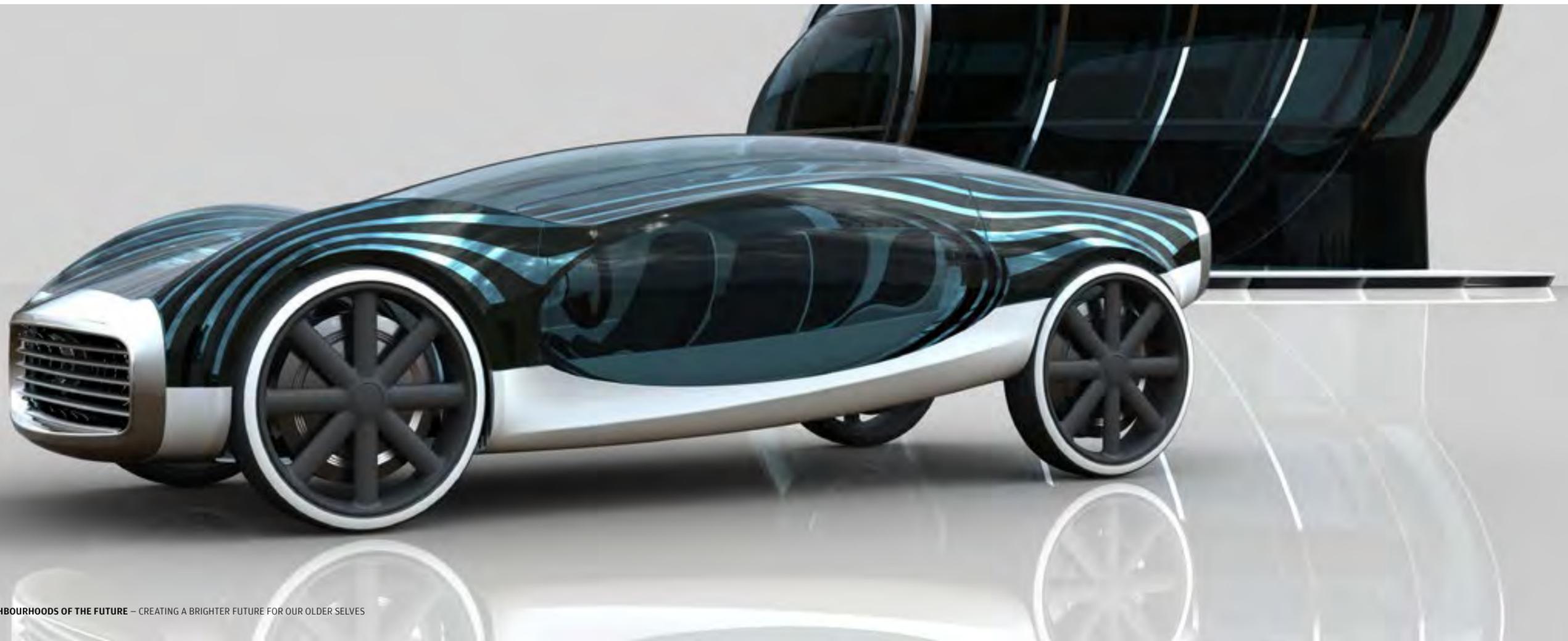
Photo credit: Images courtesy of Forge Design



Housing Platform: Tooling for and modularising the most important structures of a home could give designers unprecedented freedoms



Space: Building in sprinkler systems, and designing structures to perform multiple functions, liberates space for more flexible layouts – and more space and light





The future is social – Rethinking ageing in place

Dr Tarsha Finney
Programme Lead, City Design, Royal College of Art

The title of this investigation, Neighbourhoods of the Future, reflects the real challenge of housing and ageing: how to address our social selves.

Typically, we are thinking that solutions to ageing can be found by skinning the interior surfaces of our existing homes with new technology: smart walls, smart floors, machines that speak to us, that help us to retain mobility, that aid our getting in and out, on and off things. This is the current state of play with the broadly deployed strategy of 'Ageing in Place'. We want to keep ourselves in our homes for as long as possible, we want to stay out of institutional care, we want to be surrounded by familiar streets and rooms, by family and friends. But it's not working.

What we haven't noticed in the move from ageing in an institution, to receiving care in our homes, is that our social selves have been forgotten; the critical need we have for a finely calibrated daily life together – one that exceeds the false intimacy of the TV, of 15-minute care visits, or a robotic future of automated care. What we're ending up with is a profound and existential crisis of isolation and loneliness.

The future of ageing is a spatial challenge, it is not a technological one. The answer is a matter of design, of addressing how we organise ourselves together, spatially, and how we spatialize our deep social need for intimacy, care and connection. And it is about creating innovations in our understanding of how the city could work at multiple scales with that ambition: the scale of the individual dwelling unit, its relationship to the building block, the neighbourhood and the urban district.

Neighbourhoods of care

First and foremost, our neighbourhoods need to be dense, walkable, and intergenerational, with an intense focus on social and shared spaces to counter the isolating effect of our inherited 19th and 20th century housing, particularly in terms of both ageing and new technology.

As the global leader in post-graduate art and design education, the Royal College of Art is driven by theory and conceptual thinking. But in order to be truly transformative we equally understand that we need to build prototypes that radically challenge the status quo, that allow people to experience different ways of living together of understanding and imagining themselves together, and so that they can ask more informed questions of urban change and expect more of the

What we haven't noticed in the move from ageing in an institution, to receiving care in our homes, is that our social selves have been forgotten; the critical need we have for a finely calibrated daily life together.

changes happening around them. We need to perform post-occupancy evaluations on these projects and broadcast those findings widely. Others need to learn from this work, to be able to do better in changing their own environments, and to ask more from developments occurring in their local contexts. The value of the Neighbourhoods of the Future project is that it will empower people beyond itself to do more in their own cities and neighbourhoods.

Proximity doesn't equate to intimacy

But we need to do more than this. Proximity alone is not enough. Any work looking at the Neighbourhood of the Future needs to ask a new set of questions with a view to understanding where we find intimacy and care if the family is no longer the primary site of that function. Therefore, the logic of the single-family dwelling, or the single apartment, no longer holds – but we don't yet know what other forms of intergenerational, non-familial housing there might be.

Globally there are some clues: new housing projects in Germany, Switzerland, Australia, Austria and Spain challenge the typical forms of ownership and governance that we find in housing in the UK (for example co-operative, built to rent by institutions, shared ownership.) This, in turn, is leading to new design outcomes for shared amenities within a building block, and therefore what kind of shared amenity and democratic participation residents have in their place,

and in place-making – where place making isn't about material selection and short-term pop-ups, but about fundamental questions of governance, participation and consensus building, in the creation of resilient nimble communities of interest. This is key to meaningful intergenerational engagement. Globally, aspects of this are emerging, but nowhere has it been incorporated as a totality into an integrated project, nor has it been done within the specifics of the UK regulatory and legal context. This is why this Neighbourhoods of the Future project is so exciting and so essential.

Co-designing society

Fundamental to this process of investigation and experimentation must be the bringing together of very complex stakeholders into the design process – led or guided by specialists in spatial practice – architects and designers, but also involving artists, academics, healthcare professionals, planners and local councils, construction specialists, manufacturing, the not-for-profit sector and of course future residents – eccentric groups prepared to negotiate their differences in the interest of shared future lives together, and in so doing, to challenge the standard models of housing we currently have. This is a process that involves knowledge exchange between disciplines and silos via the design process and as part of rethinking the city at the scale of the neighbourhood: the design process is the ground of exchange, space is the material of action.



This is what we do in the RCA School of Architecture, and within the MA City Design at the Royal College of Art – and through the substantial research work specific to ageing and health emerging through the Helen Hamlyn Centre for Design. Here, we work with organisations as diverse as developer British Land, Southwark Council, the NHS England Horizons team coupled with sophisticated international transport operators such as the MTR in Hong Kong, and large tech players like Google.

In summary, the RCA is fully committed to this important collaborative initiative. The ambition is to draw a broader public into a conversation about other possible futures, creating actively engaged citizens, not passive consumers of mass produced-housing, where we are all involved in the project of questioning what is possible together, what we can share, who we can be together.

The future has not yet been written. Collectively we can make a difference.

Photo credit: Images courtesy of Tarsha Finney and The Royal College of Art MA Architecture programme – Daniel Yoell

GoGlobal: East meets west to rethink ageing societies

Benton Ching
MA/MSc candidate in the IDE programme
at the Royal College of Art and Imperial College

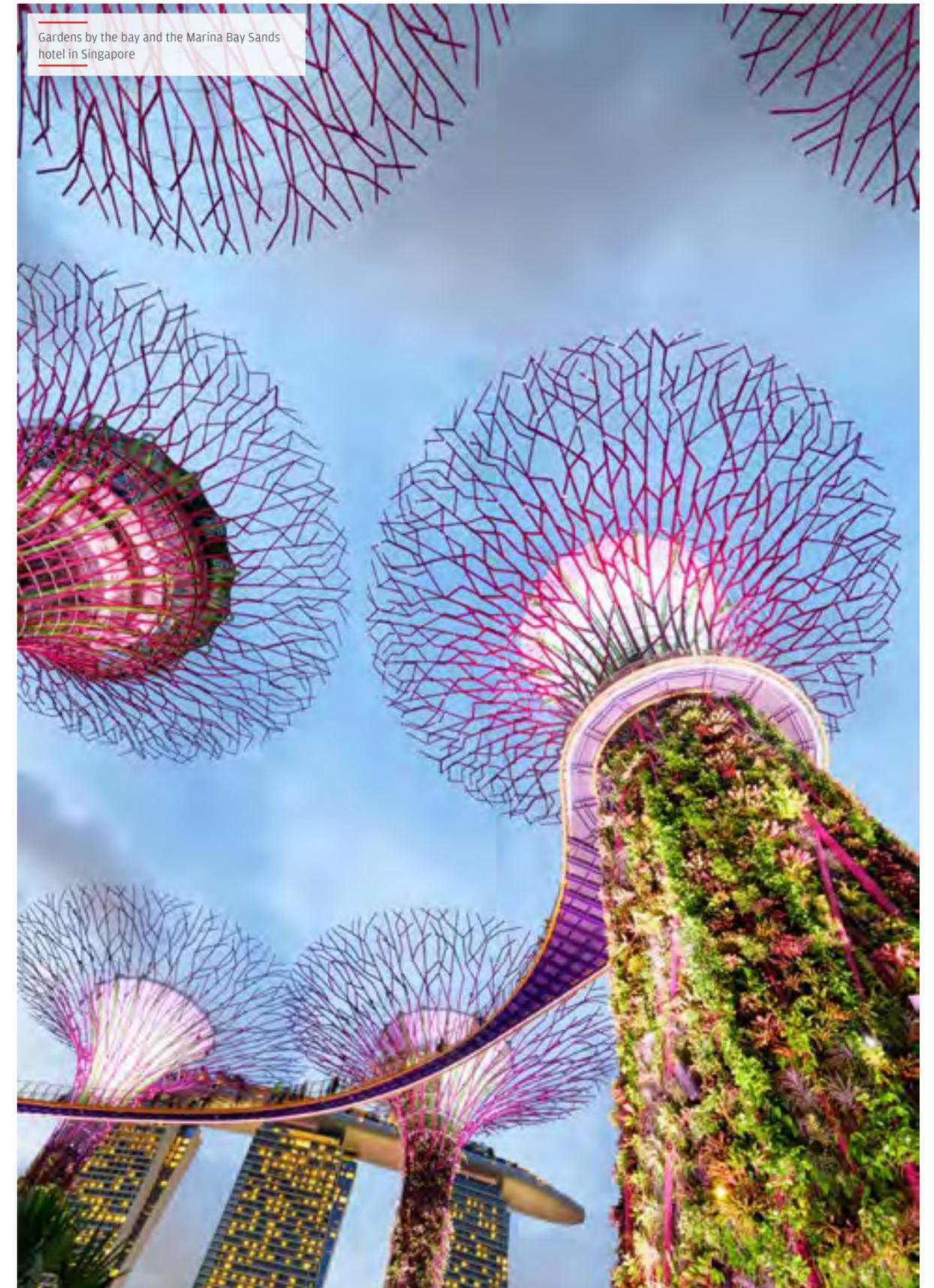
Every year, Masters students from Innovation Design Engineering (IDE), a joint Masters program between the Royal College of Art and Imperial College, take part in GoGlobal, an overseas project held alongside international partner institutions. GoGlobal provides a unique opportunity for students to hone their skills as designers, whilst building meaningful connections and global perspective through working in teams with students and experts in a new cultural context.

Innovation for an ageing population: Design for our future selves

The 48 members of the IDE cohort of 2018 are, like those who have come before, a creative mix. A seemingly disparate group of artists, designers, engineers, physicists and philosophers from around the world, tied together by the common aim of using the principles of design and engineering to making a positive impact in the world.

For GoGlobal 2018, which took place in March, we travelled to Singapore, to collaborate with students from Lasalle College of the Arts and Nanyang Technological University. The overarching theme for this year was Design for Our Future Selves. This was partly inspired by the Design Museum's 2017 New Old exhibition, which featured works looking to harness design to improve living conditions for an ageing society. We were tasked with formulating our own briefs over a three-week period, through a combination of desktop and primary research into the difficulties and aspirations of older people living in Singapore. Teams were asked to look at how design might better prepare society for living with an ageing population in the following four areas:

- Transport and Mobility
- Housing and Communities
- Leisure and Learning
- Health and Wellbeing



Exploring fresh ideas and cultural contexts

The issues of an ageing population are highly relevant in Singapore. Although this was something we were briefed on, and had researched prior to our arrival, it was vastly different experiencing the city's deeply ingrained approach to age-friendly innovation first-hand. It should not have been surprising that the country is receptive to, and actively looking for, new ideas to improve later life conditions for its citizens. It is expected that 1 in 4 Singaporeans will be aged 65 and over by 2030; changes wrought by a post-war baby boom, increased life expectancy, and low fertility rate.

Through organised lectures and talks involving leading local architects, designers, researchers and policy makers, we learnt very quickly that tackling the challenges an ageing population brings was something that extended across both private and public sectors in Singapore.

In addition to these talks, we also went on a series of insight trips, to learn more about the local context of the four thematic areas. This included visits to culturally important neighbourhoods at the crossroads of heritage preservation and urban development, multigenerational learning facilities, hospitals and research labs conducting cutting edge research at the forefront of medical technology, and test driving futuristic autonomous vehicle prototypes.

It became apparent that the real challenge was to create innovative ideas for improving life in an ageing society in an environment already accustomed to and bubbling with new ideas. Working in mixed teams of 8 with our local counterparts, we tested our ideas with Singaporeans on the street, both young and old. We found people incredibly open and willing to engage with our thinking, which provided a fantastic platform to test, experiment and prototype.

Although GoGlobal encouraged us to design solutions highly pertinent to the Singaporean context, we were also encouraged to find generalisable insights for our own local contexts, both in the UK and beyond. We brought back our findings from the trip and four projects were selected to be presented at the AAA Neighbourhoods of the Future Congress at NatWest HQ in London earlier this year. The projects presented were:

Cityscope, a design intervention to activate and incentivise the use of the growing number of vertical green spaces around Singapore, using multisensorial periscopes.



off-peak hours

Shyft, a vision for a reconfigurable urban landscape that responds to commuters' needs at different times of the day

peak hours

DESIGN

The project focused on the city's plans to reconcile urban development and the proliferation of green spaces through the Landscaping for Urban Spaces and High-Rises (LUSH) urban redevelopment programme. This policy mandates that greenery lost in development is replaced with rooftop green spaces. However, these green spaces are not actively used. By using the periscope as a means of drawing both a conceptual and visual link between ground level and elevated green spaces, Cityscope offers a playful counter to social and psychological barriers which may impede people from using these vertically segregated spaces.

For Andrew Earl, who worked on Cityscope, such interventions are useful for Singapore and beyond: "Singapore innovates on a city-wide scale and we believe that its progressive legislation around elevating urban green spaces will set an example for other major cities."

Shyft, a vision for a reconfigurable urban landscape that responds to commuters' needs at different times of the day. Its features include the use of an intelligent lamppost and bollard system that informs pedestrians about changes in road conditions over the course of the day, using lights and opening up of shades.

The project capitalizes on Singapore's active investment in creating an efficient transportation system for the future, and its plans to introduce autonomous and connected vehicles to the road by 2023. These investments enable two future possibilities: a car-lite city, and a real-time digital map that can be used to re-direct traffic. Land is limited in Singapore and currently the country aims to combat this problem by stacking the city. However, a car-lite city and real-time digital map allows for an alternative method of transport infrastructure by reclaiming road space.

According to the RCA's Insiya Jafferjee and Timi Oyedeji: "One of the key problems for a small country like Singapore is a lack of space. We designed Shyft as a way of using information systems to balance autonomous transport infrastructure with the need for Singaporeans to have accessible public space."

Dolesce, an innovative mediation tool that aims to overcome communication barriers and facilitate conversations between dementia patients and their loved ones. Looking closely at the relationship between the caregiver and the patient, one of the major sources of distress in the lives of both parties is the behavioural and personality changes that occur as a result of the disease. This makes it difficult for the caregiver to maintain meaningful conversations with their loved one and results in feelings of depression and isolation for both.

Dolesce makes use of the fact that we live in a time when almost all of us have an extensive digital footprint and there is already a vast amount of data being collected on each individual. This data can be collated to create a virtual framework of the patient's life, so that the stories of their past need not be lost. The objective of the platform is twofold: to provide prompts and triggers to the patient that encourage sharing and reminiscence, and to provide contextual information to the caregiver, to enable them to engage in meaningful conversation with their loved ones.

According to Dolesce designer Ravi Woods, "After doing primary research with nurses and at care homes, we found that, as the

It is perhaps these attitudinal shifts which are required to disrupt the existing status quo.

personality of a dementia patient drastically changes, family caregivers find it difficult to care for them. Dolesce allows family caregivers to be reminded of how the patient once was, giving context during conversations with the patient.”

Memo, is a concept for a future space and system of remembrance in Singapore, where people can reminisce, reflect, and learn from their loved ones and others. Conditions of remembrance in Singapore, and throughout the world, are transforming. Limited land space is causing burial grounds to diminish and increase in price, while death still remains an uncomfortable topic for many.

Memo is designed to exist between the retained buildings from the historical sight of Dakota Crescent – a place where a flowering, unique culture with a strong sense of community once existed. The space is designed in a natural, open area that gives a sense of reflection and encourages connection with others. Between the different levels of the open space, individuals are able to find memory flowers of the deceased, artefacts on which digital memories and other assets are stored. Families and visitors can interact with the flowers by picking them up and viewing the memories in specified areas.

Memo looks to take the transformation of remembrance in a new direction, giving a stronger sense of family and individual contribution to society. Designer States Lee, who worked on Memo, mentions the need to preserve local culture as the key take home from the project. “Through research, and the context of Singapore, Memo taught us that remembrance of the deceased and the past can be improved, as rapid modernisation dilutes cultures, removes physical burial spaces, and keeps us increasingly busy. Creating Memo caused us to think about the importance of physicality of remembrance in our lives and how technology can improve the experience instead of removing us further.”

A key insight when looking holistically at this exciting RCA project in the context of our Neighbourhoods of the Future, was the

openness to new ideas and innovation that trickled down from the reaches of policy, to entrepreneurs and designers, and even to the Singaporean public. There was also the country’s strong focus on multigenerational interaction and framing the issue of an ageing population as one that affects not only the advanced in age, but one that is deeply ingrained in the lives of people across the various social strata.

Perhaps most importantly, is to consider the importance of the nuances of human behaviour, not just in the mainstream, but also those on the fringes of accepted convention that might provide insight into how our local environments are changing. It is perhaps these attitudinal shifts which are required to disrupt the existing status quo, resulting in the creation of cities and neighbourhoods which move beyond accommodating its older residents as a footnote, to ones which are truly inclusive and in which they can feel deeply enmeshed and part of its future development.

I will leave the final words to two of my fellow students:

“This process makes you develop adaptation skills to different ways of living, different ways of thinking, different ways of designing. Human-centred design is about understanding the needs of people, and I think regardless of the success or potential of the ideas that emerged from this project, it was a great opportunity to actually engage with the people we were designing for.”

Pierre Azalbert

“Singapore runs 10 years ahead of any (other) country. To see how our designs work in the Singaporean environment is like designing for our future selves.”

Joris Olde-Rikkert

Photo credit: Images courtesy of Benton Ching



GoGlobal, an overseas project held alongside international partner institutions

Let's design for ability

Marta Fernandez
Director, RMIT Europe

All people should feel safe and confident to step out of their homes and participate in society. Well-functioning and accessible neighbourhoods have a positive impact on people's health and quality of life, and older adults in particular require a supportive and enabling built environment.

The success of housing is intimately linked to the environment and the accessibility of nearby streets, sidewalks, parks, squares, shops and so on. Looking to our homes and neighbourhoods of the future, we must start planning now how to integrate age-friendly environments in and outside of our cognitive homes.

The MacArthur Foundation describes successful ageing as "the ability to maintain three key behaviours or characteristics: low risk of disease and disease-related disability; high mental and physical function; and active engagement with life." It was in London that I learned that the space beyond the home, i.e. the neighbourhood and its community, is key for successful ageing.

My story

I started volunteering with older adults when I was fourteen. I cleaned floors, washed bedding, fed and conversed with mentally disabled older adults in a care home in the hills of Granada. This, alongside looking after various great aunts and grandparents,

developed my passion for older people's wellbeing. Little did I know the influence it would have on my professional life to come.

The care home in Granada had big, airy rooms that were full of light. The wide corridors and ample surrounding landscape made it a very pleasant space. The attentive care of a handful of nuns, working with young people like me, made it a warm place to work and live. There, I realized how important a part the environment can play in supporting or undermining the quality of care a person receives. Though every situation is unique, a successful outcome is very much dependent on the human factor.

Many years later, when I was living in London, I joined a befriending scheme where I regularly visited an older lady living by herself in West London. Whilst she was willing and able to look after herself (and you would not dare to suggest otherwise!) she was lacking companionship. My new friend was very happy to live in her own home where she had long-term attachments, even though her home was a duplex and she had mobility issues that made her dependent on a chair lift. She was not, however, confident outdoors, so the visiting community services were very important. Transportation to access the shops, the doctor and the church every Sunday were fundamental for her wellbeing.





A design workshop held with older adults

Proven methods for urban design

From a professional perspective, the needs of older people, and individuals living with disabilities, haven't been properly considered by urban designers and local authorities. Inaccessible and poor-quality urban spaces, as well as unsuitable architectural design features within buildings and facilities, impede many in fully participating in society.

In London, I had the good fortune of working for Arup as Global Research Leader. Arup is a forward-thinking design and engineering consulting firm. The company has an innovative approach to city development and improvement, from resilience, to lighting and mobility. Back then, I had an opportunity to work with the Cities unit and set up a research line into Ageing in Cities, looking into the relevant socio-economic trends, the implications for the built environment and the potential interventions to enhance wellbeing for our ageing population.

In the past, planners tended to focus on topics such as economic growth, sprawl, and allocation of scarce resources within a community. We noted that with the rise in the number of older citizens, consideration about how the community can have a positive influence on individual wellbeing was missing from the Smart City agenda. This means asking how the physical and social environments can promote independence and encourage engagement, thereby facilitating the development of 'livable communities'.

Through our research at Arup, we identified multiple examples of successful interventions across Europe, which demonstrated approaches that promote more inclusive and livable urban design. Good urban design promotes independence, provides a sense of safety, improves quality of life and enables people to participate more actively in society.

Urban developers need to provide solutions that are cost-effective and consider universal design. Universal design (i.e. design that is accessible to all) which is applied to public spaces, transport, buildings, as well as products, has been shown to enable people to maintain independent lifestyles and increase social inclusion.

In our studies, we identified simple interventions that can make a tremendous difference to how confident people feel outdoors. These may include lighting solutions for pathways, decrease of acoustic contamination, solutions to improve navigation in the city, approaches that improve safety and comfort, signposting and access to attractive infrastructure, transport networks, green spaces, amenities and easy walking routes.

Options such as easy walking routes and efficient public transport systems will add to a person's sense of safety, independence and quality of life. Easy to access green spaces, amenities and attractive infrastructure enable social interaction. This is particularly important for older adults, who already face a heightened risk of neglect. Though the value of these personal interactions is not easily measured against material or technological approaches, they must form the foundation of effective solutions.

Designing technology for independence

The current older generation demands greater independence and improved self-actualisation, and an end to patronisation. I can clearly see this in my ageing parents. Many governments around Europe, as well as the European Commission, are investing heavily in new technologies to support independent living. Technology has tremendous potential to help realise these desires, but only if sufficient attention is paid to its implementation and integration into individual lives.

Technology should not be used to define new behaviours. Technology must respond sensitively to existing needs and must seamlessly support the human side of care and services. There is a need to embed care and an understanding of users into all digital innovation. Insensitive, incorrectly applied solutions without the right user interface risk undermining independence and increasing social isolation.

The success of housing is intimately linked to the environment and the accessibility of nearby streets, sidewalks, parks, squares, shops and so on.

We do not want our children locked in their room playing videogames, so why we would want to lock our parents and grandparents away in their technologically equipped homes?

Community support is key for active and healthy ageing. Technology can play its part in mobilising and engaging the local community in the challenge of care; to help exchange skills and knowledge and support formal and informal care networks.

Looking to our homes and neighbourhoods of the future. To design meaningfully for older adults, we need to consider the great variety of needs and desires among different age groups. If we design for our older selves, we are designing for everyone; we must design spaces that are inclusive. If we find the formula for cross-generational design that stimulates interaction across the ages, we will drive cohesion and integration. From the individual, to the city scale, design must consider current and future needs, to allow for flexibility and adaptation to change. This means designing for ability to enable independence, which includes activities and access in and outside the home.

Photo credit: Images courtesy of RMIT Europe



Designing mobility for life



Paul Priestman
Chairman, PriestmanGoode

The idea of designing for ageing demographics is a curious one. We all age. Hence designing for older people is designing for everyone. Design and mobility are integral to our everyday experiences. Everything around us, from the smallest items, like light switches and mobile phones, to buses, trains and airplanes, is designed. But design can often be exclusive, catering for the able-bodied, with considerably lower consideration for those who have accessibility issues or impairments, or conditions like dementia.

I believe we need to shift our mindsets. It's time to move away from a reactionary attitude to existing problems, to a preventative outlook. That means we are designing with the aim of encouraging and facilitating a healthy and independent life for as long as possible.

The New Old exhibition at the Design Museum in London in 2017 showed that the average life expectancy of those born today is 105 years old. Our lives are getting longer. Our healthy lives are not. This means there are a whole new set of challenges that we will have to tackle, not just as individuals, but as a society. This is where good design can make a real difference.

Designers have an important part to play in affecting behaviour. Design thinking and considered resolution allow us to offer products and solutions that help people stay fit for longer. They provide older demographics with independence as their physicality may be slowing down.

Mobility is at the heart of extending our healthy lives, and there are various ways that we can rethink transport to improve individual experiences.

Walk the line

One integrated potentially disruptive solution for cities to improve pedestrian infrastructure is called 'Walk Lines'. The concept, which the PriestmanGoode studio developed, would provide dedicated walkways that create a speedier route for people wanting to get from A to B quickly. You could incentivise it by making it part of a public transport system (in London, for instance, it would be part of the bus, tube and overground network), and offer money back to passengers who choose walking instead of buses or tubes over short distances. This would have the added benefit of relieving pressure on other modes of public transport that are struggling to cope with increasing numbers of passengers.

Walk Lines has many benefits. On the one hand, it keeps people mobile. It also makes walking a more pleasurable individual experience: there would be no need to stop at junctions or wait for traffic lights. The lanes would become like highways for pedestrians, with dedicated slow and fast walking lines. Dedicated infrastructure such as 'walk stops' would be placed at regular intervals along the way. These would encompass a series of services, such as maps, coffee carts, shoe repairs etc.

Walk Lines would also improve air quality in city centres and improve quality of life for urban dwellers. You could also design these walkways as a zero energy infrastructure, by designing covered walkways with solar

Walk Lines keeps people mobile. It also makes walking a more pleasurable individual experience.

panelled roofs that would then power street lighting. Incorporating these elements would have both environmental and economic impact, by lowering energy and maintenance bills for councils. The health benefits for inhabitants would also decrease the pressure on national health services.

Design can be patronising

The idea of using design to improve healthy life is absolutely key both on an individual basis to extend healthy life, as well as to ease pressure on our infrastructure and from an environmental viewpoint. Aside from walking, we also need to consider other ways to improve travel over short distances, and tackle what is known as 'the last mile', the distance between where public transport stops (e.g. a train station) and the destination (e.g. home or work).

I think a lot of design for older generations can be quite patronising. Products are designed with a certain look. Assumptions are made about the lifestyle that older people have, and the type of design that speaks to them. I believe it's all wrong, and we need to rethink design for ageing demographics.

The Design Museum enabled me to do just that. For their exhibition 'NEW OLD – Designing for our Future Selves' I developed a concept for a push scooter that was designed to transform both people's experiences of mobility in older age, as well as challenge public perception of what a mobility product for an older demographic should look like.

The idea for the Scooter came to me from observing people during the morning and evening rush hour. I would always see children on scooters on their way to school, and increasingly, I would see adults using scooters as part of their commute. It led me to think about why people stop using them. Is it a fear of falling? Is it because scooters aren't deemed stable enough for older people? Or is it simply that as they haven't been part of the person's life, late adoption is low to non-existent?

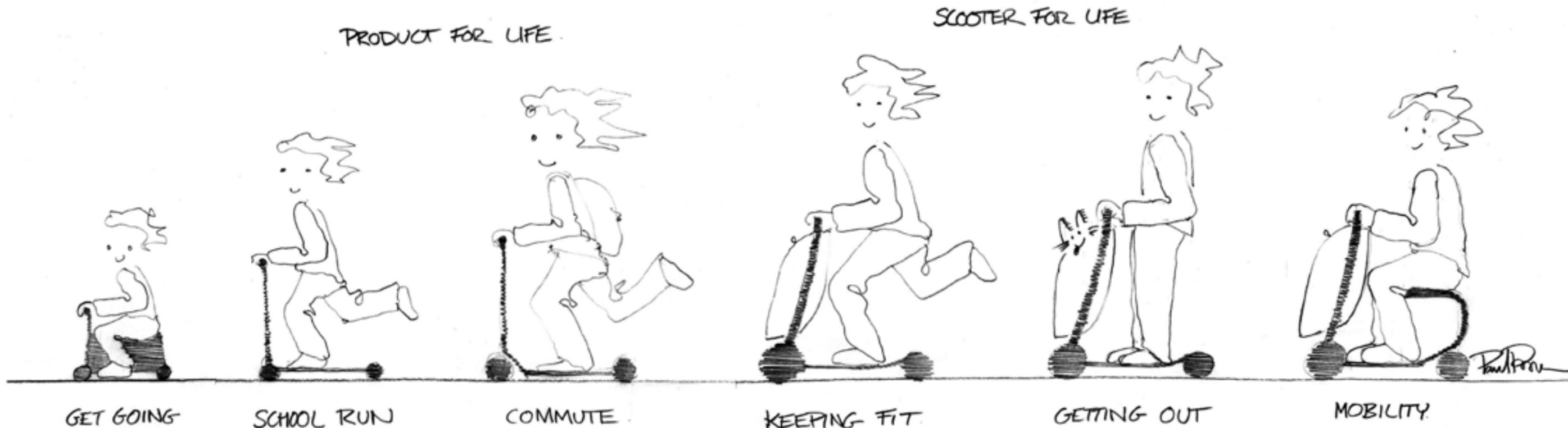
As I started working on this concept with my team, we held a number of research sessions with user groups. In one of these, where we were looking at different ways of getting around, one user looked at a traditional motorised mobility scooter and exclaimed 'you can smell the stench of decay on that!'

Scooter for life

There is undoubtedly a stigma associated with mobility aids – and ageing more generally – and we were determined that our solution would address this. Many of the users we spoke to felt that current solutions felt like having 'one foot in the grave.' So we wanted to design something that was both beautiful as well as highly practical. We discussed what requirements people had for a mobility aid and came up with a list of boxes that our solution would need to tick: you had to be able to take it on a bus, to take it into a shop, it needed to be able to fold down, there needed to be space to store groceries, and it had to be able to be taken into a flat or a house.

Based on these key considerations, we developed the Scooter for Life, a product for all ages that is highly adaptable and helps older demographics improve their mobility on a very practical basis.

The Scooter for Life has received enormous interest from consumers all over the world. We are regularly contacted by older people who say they finally feel that here is a product that will make their day to day life easier, and crucially, represents who they are as individuals.



One integrated potentially disruptive solution for cities to improve pedestrian infrastructure is called "Walk Lines"



The sharing economy model

The benefit of the Scooter for Life is evident in urban areas, where it facilitates shorter journeys, but it's also critical that we develop these solutions for rural areas that are less well served by public transport. There is a great irony in the fact that many people move to the countryside as they get older, where infrastructure is poorer, when that is the time they need it the most. There have been countless discussions in local governments and in the media in recent years about the lack of public transport services in rural areas, and the negative effects that this has on communities as well as on individual experiences. We need to reconsider the way services are distributed.

We decided to invest time reimagining the way things are normally done.

Using the sharing economy model for rural transport services would have the additional benefit of strengthening communities. I think we will see these new types of public transport services as social hubs, that have the benefit of improving individual day-to-day experience and create a sense of belonging to a greater community.

The sharing economy provides an interesting model, as it makes better use of resources and existing infrastructure, both on an individual level, as well as from a sustainable one. This is imperative if we want to truly affect change.

Air access

One of the most challenging experiences for passengers with reduced mobility is flying. PriestmanGoode has significant expertise working on aircraft design so we decided to invest time reimagining the way things are normally done and developed a concept that facilitates air travel by enabling an easier transition from gate to aircraft. Named Air Access, the design meets the needs of an increasingly older and less mobile population. It consists of two elements: a detachable wheelchair by which passengers can be transported onto and off of the plane, and a fixed-frame aisle seat on the aircraft into which the wheelchair is mated to create a regular airline seat. By enabling people to get into their seat at the gate, Air Access reduces the indignity, discrimination and anxiety that many people with reduced mobility face when travelling by air. But what makes this a viable solution is that it makes the most of existing infrastructure and products. Furthermore, it works within the confines of one of the most heavily certified industries. As designers, we need to strike a balance between the future concepts we develop and the realities of the industries we operate within.

In conclusion as a society we need to have greater consideration for what it means to get older, for the individual experiences that people encounter, and that we will all have to face at some point in our lives. We need to address the stigma attached to getting older. Design can help us improve our everyday experiences in the neighbourhoods of the future, by making better products that are easier and more intuitive to use.

More than anything, we need to revisit the very notion of 'old age' and create new products and services that recognise the accrued experiences of ageing as a benefit, when one has the time to enjoy life, and enable us to promote and prolong healthy lives.

Photo credit: Images courtesy of PriestmanGoode

Priestmangoode Air Access, for mobility when flying



The case for new vehicle typologies

Jose Paris
European Program Director, aiPod

Mobility will be a crucial driver in the creation of more liveable, accessible, and attractive towns and neighbourhoods in the 21st Century.

Profound changes to the industry have been gaining pace, and despite everything (streets, vehicles etc.) still “looking the same”, it won’t be long before we can experience a very different way of getting around. Even the leading actor of 20th Century mobility, the car, will not be spared.

Kings of the road

From a cultural point of view, pride of ownership and personal freedom still loom large in the decision to buy and use a car. As the second biggest purchase after the home, people are understandably practical and conservative when deciding what to drive, as one vehicle must do it all.

This customer pull for do-it-all vehicles, combined with the technical requirements for mass production and high levels of crash safety, results in cars designed and built for the extremes: high speed, long distance, five-seat occupancy and engineered to survive a severe crash.

The reality, of course, is that the average speed inside cities can drop below 10mph¹, a large amount of driving is single occupancy commuting², and pedestrians and cyclists are the ones at risk, not car occupants³.

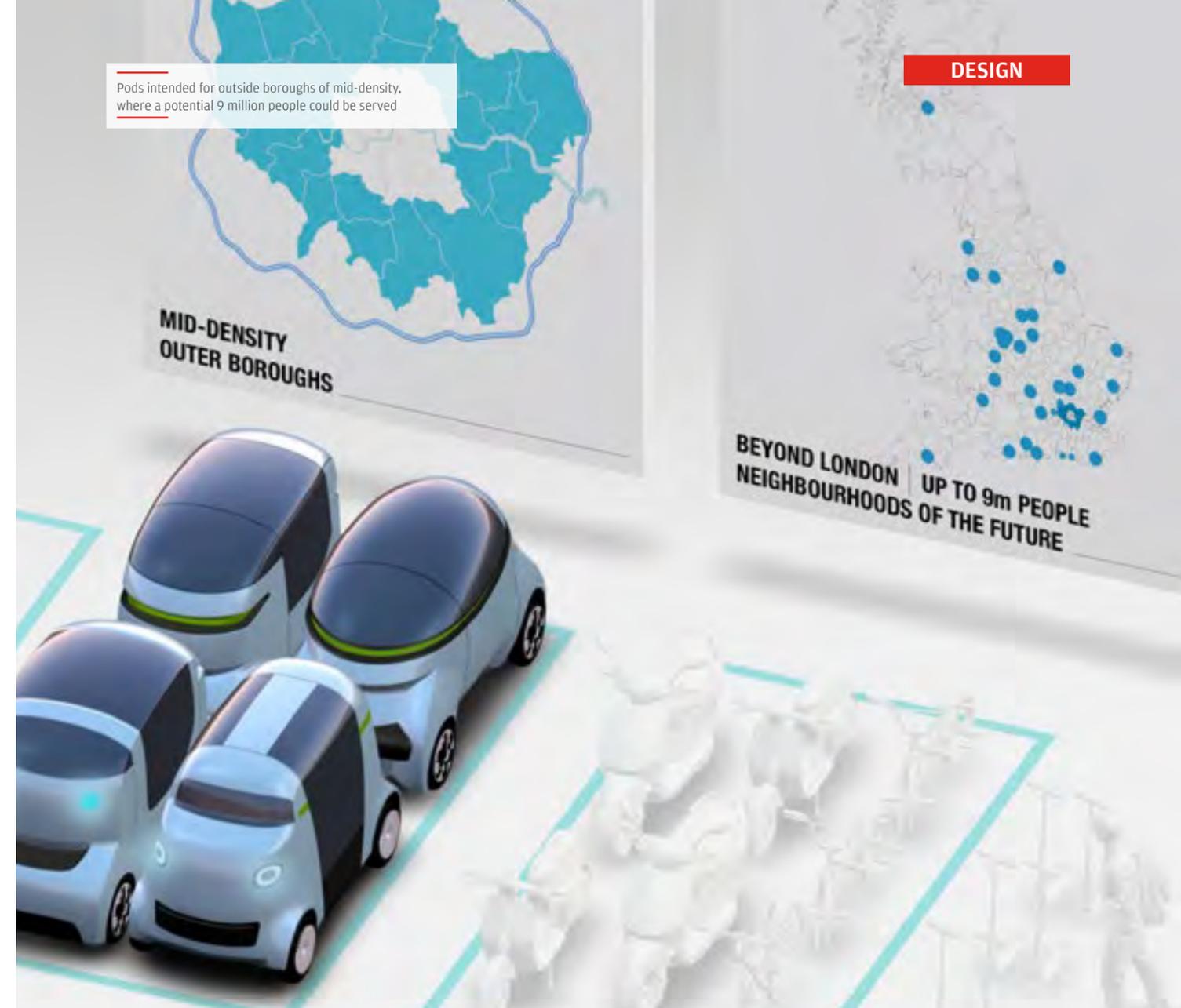
Because of the inertia and legacy costs (both real and figurative) carried by the automotive industry, even when mobility disruptors like Uber start operating, the benefits to the host communities are unclear. In a city like London, the result is up to 40,000 extra five-seat vehicles driving only the driver around half the time. Hardly an improvement over the current status quo⁴.

A new species...

If we fast forward 20 years, however, everything indicates that future mobility, especially in cities, will be built around zero-emission, shared, autonomous fleets. Privately owned, five-seat vehicles will still have a role to play, but the decline (or elimination) of ownership, accidents, and high-speed driving, plus the greater focus on liveability, will create a very different habitat.

Benefiting segments of the population currently underserved: the disabled, the old, and the underage.

New vehicle typologies, tailored to personal or societal needs, can flourish. The vehicle itself will finally evolve from horseless carriage to the intelligent, tailored, humanistic node in a transportation system that modern technology allows.



Most urban users can be served by fleets of small footprint, efficient pods, designed with the personal user (not the autobahn⁵) in mind. This new personal public-private transit system will be able to satisfy not only the average driver but segments of the population currently underserved: the disabled, the old, and the underage.

Rather than converted products, personalised solutions can be viable; vehicles that work both functionally (big doors for easy access, integrated ramps, accessible digital technologies) and emotionally (through a better user experience). Higher utilisation rates will mean faster fleet replacements, with the possibility to modify and improve aspects of the vehicle at a more rapid pace.

...For a new habitat

Neighbourhoods will naturally change in response. While traffic will still exist, it will be of a very different kind: silent, clean, responsive to pedestrian needs, and when placed in the context of an intelligent city platform (like the one aiPod is building), fluid and seamless; a gentle stream rather than the noisy stop-go-stop flood we suffer today.

By eliminating the need for street parking, large amounts of curb space will be freed up. This means bigger sidewalks and cycling lanes, or perhaps even space given back to homeowners as new front gardens! In newly built areas, a more compact and efficient planning will be possible, without needing to sacrifice available space or mobility needs for the individual citizen.

By eliminating the need for street parking, large amounts of curb space will be freed up.

The primary beneficiaries will be the outer rings of cities, as well as small and mid-size towns. Areas where density is high enough to suffer traffic, but not enough to support an extensive public transit network. By solving the last 3-mile problem (as the often mentioned “last mile” should probably be walked!) most short car trips can be eliminated altogether, which will see people reconnecting with more efficient transit, like rail.

Work has already started...

What can we do today? Many private and public sector actors are actively engaged in bringing this vision of the future to fruition. The UK Government (through Innovate UK and the Industrial Strategy Challenge Fund) has been at the global forefront, supporting the combined effort of British businesses and academia, and we hope this visionary approach does not change regardless of the potential turmoil in 2019.

Our project, “Paradigm-Shift”, under the Innovate UK-sponsored IDP14 grant program, is aiming to explore some of these new mobility opportunities. Together with UK-based SMEs, Gordon Murray Design and Delta, we at aiPod are helping develop a ground-breaking, single occupant pod designed for autonomous fleets, to be presented at the end of 2019.

...But this is only the beginning

Back in the early days of personal computing, many people thought of the PC as nothing more than a glorified typewriter. Equally today, it is tempting to imagine fleets of driverless cars as nothing more than glorified black cabs. However, if history teaches us anything, it is that hard-to-predict second and third level changes will transform society.

We are only scratching the surface of the innovations ahead, but one thing's for sure: we are in for an exciting ride.

- 1 CityLab, March 2016. London's Traffic Really Is Moving More Slowly [online]. Available here
- 2 Department for Transport, July 2018. NTS0905: Car occupancy, England: since 2002 [online]. Available here
- 3 Department for Transport, September 2017. Reported Road Casualties in Great Britain: 2016 Annual Report, p.7 Chart 2 [online]. Available here
- 4 The Guardian, 15 Aug 2018. Sadiq Khan wants to restrict number of Uber drivers in London [online]. Available here
- 5 The term “autobahn”, and not “motorway” (speed limited) is consciously chosen.

Photo credit: Image courtesy of aiPod



First do no harm: the hippocratic oath as an inspiration for compassionate architecture



Dr Evangelia Chryssikou
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the Bartlett Real Estate Institute UCL, UK

The ageing of the population highlighted the need for inclusive and enabling societies. This created a market for new sectors of the economy to target products and services towards increasing personal autonomy and inclusivity. However, this article argues that the two alone do not suffice, despite medicine and IT constituting key areas that contribute to significant advancements to people's health and autonomy. As long as the built environment remains our physical context, we do need buildings to be fit for purpose. Contrary, the current building stock limits opportunities for meaningful and autonomous lives, contributing to increased loneliness and isolation in old age, let alone problems of physical health.

Scholars of architecture and architectural theory tend to focus on abstract concepts around the process of design, aesthetics and form. User experience in terms of ordinary built environment is rarely the subject of architectural education. Our houses tend to be less complex in terms of design requirements but are nonetheless significant for our well-being. After all, these

are the spaces where we generally spend most of our time. Yet, both the architectural theory regarding housing and the building regulations tend to be uninformed by issues related to the interface between human health and interior design. Moreover, our perception of space, the elements in our environment that we find restorative or tiring, helpful or strenuous, change during our lives. This happens together with changes in our bodies. Currently the gap created by inadequate architectural built environments is covered by technology but this is mostly for implementing mechanisms for early intervention in falls, such as sensors. Adding the built environment into this equation, could prevent some of those falls in the first place.

In what follows I will provide four examples that illustrate this gap between physiology, perception, and the built environment and will illustrate the imperative to change the paradigm that our built environment is designed and created without us being asked or directly involved.

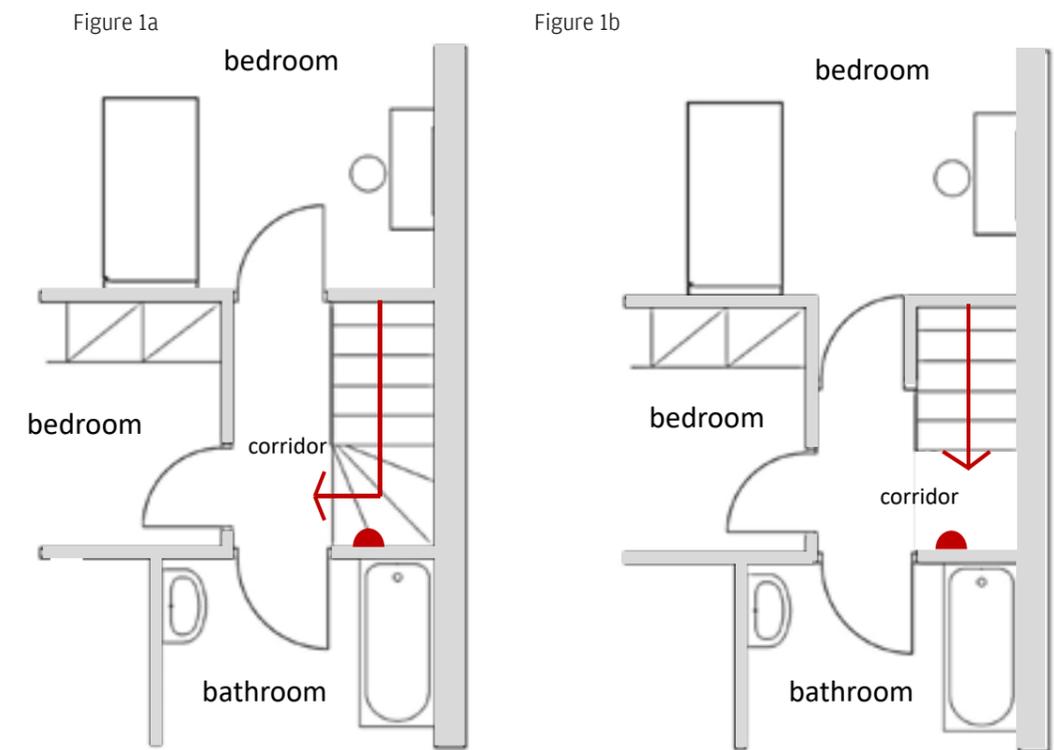


Figure 1: Current social housing floorplan (1a) and hypothetical redesigned floorplan (1b)

1. The intimate setting

BBC news featured an 87-year-old rescued after being stuck in her bathtub for four days (BBC news, 2016). She “kept calm” and poured hot water to prevent hypothermia. The story could raise questions about the direct or indirect implications of the design with regards to social isolation, the use of technological devices and preventive environments. First, space and its configuration can influence both the frequency and the type of social encounters (Hillier, 1996). Second, in residences, technologies such as cameras could keep an eye on us, especially in areas of perceived high risk. Finally, we should rethink the design of the bathtub itself.

2. The private setting

Building regulations barely mention any measures to mitigate accidents in residential environments. On the contrary, in the area of assisted housing and home environments there is an absence of standards for practice

to inform design professionals on the needs of vulnerable people (Zeeman et al., 2016). Figure 1 shows a social housing floorplan where a non-frail 79-year-old died following a fall during a night visit to the toilet when she was half asleep. The example demonstrates that poor design, in combination with other physical or perception factors – in this case reduced alertness – could add to the risk. Figure 1a features the layout and the interior floorplan of a home where a couple lived. The woman got out of bed, walked through the corridor and fell as she tried to reach the bathroom light switch, i.e., the red dot on the wall, located by the toilet door over the staircase. Everything in this house complied with building regulations. However, Figure 1b illustrates an alternative design where the fall could have been prevented by safe, no-barrier zone between the bedroom and the bathroom. The incident was partially the result of design decisions and regulations that were uninformed about the needs of older adults.

3. The healthcare setting

The third example represents a more specialized healthcare architecture. It highlights a key finding from a project investigating the architecture of the first dementia village in the Netherlands (Chrysikou et al., 2016). The village aims to incorporate in its built environment what was considered state-of-the-art in design for residences for dementia patients, employing technology, landscaping and a protected environment with positive distraction stimuli and art as

visual memory aids. Yet, the most private space of the village, the toilet of the common area, where residents go unescorted, lacks any visual or physical aid. Everything follows the same colour scheme, without visual discrimination between vertical and horizontal surfaces or the toilet seat and accessories. Plus, there is a complete absence of any mobility aids for people to support themselves. However, even if there is best practice guidance for the design of healthcare facilities, architects do not always have to comply.

4. The public setting

Finally, I will concentrate on public projects created by “star architects”. My example involves a public car park, well known to people interested in architectural avant-garde. A world-leading figure at a star-architect firm used it as an example of architectural excellence during a presentation to post-graduate architectural students. The famous car park featured floor patterns that could be perceived as changes of level by people with dementia or partial visual impairment. Addressing the question about the lack of consideration for neurodiversity, the architect commented that their firm did not design for healthcare but rather buildings such as luxury offices or airports. Yet, airports rely heavily on design means for navigation especially since older people need architectural information for orientation. Occasionally, architectural avant-garde has delivered stations and public areas that were deprived even of seating, ensuring that the design would remain unpolluted by such amenities (De Morgen, 2011).

The need for seamless, integrated environment at the heart of the stakeholder initiatives

The examples outlined concern the whole spectrum of the built environment and constitute anecdotes regarding the state of the built environment as the global population ages. The examples mentioned indicate what AGE Platform Europe advocates: that universal accessibility aids are not a panacea for the psychosocial integration of older people and it is imperative that both perception and physical needs be addressed.



A call for paradigm shift

Currently our built environment is too fragmented and far too partial. If we want the built environment not to be our societal weak link, it is important to determine how to bring on board the people who actually experience these spaces daily and encounter the difficulties of old age from the beginning as decision makers.

Involving end-users in their environments from day one is a clear path to success, as my research on environments for acute mentally ill people shows (Chryssikou, 2014). The project “It takes a Village” (The I’m Still Here Foundation, 2016) demonstrate that even Alzheimer’s patients with the right multi-disciplinary approach could reclaim their cities.

It also has to be everywhere and in everyplace. For dementia-friendly supermarkets, for instance, staff training is a common measure and is necessary. Let’s consider an age-friendly till with a non-discriminatory, take-your-time sign over it, a wider space for people to pass next to it and a folded seat for the people still waiting in the queue (Lab4 Living, 2015).

For that we need everybody. We must explain to people the benefits of inclusive societies. We need to remember that for the architect to design a ‘take-your-time till’ we need a supermarket owner to approve it or, even better, request it. Finally, this new paradigm needs to be taught in architectural schools where most students are younger than 25 years old and at that age are generally unable to imagine physical or mental decline in older age. Last but not least, these concepts should be provided in courses of continuous education of all professionals working on the planning and the delivery of built environment.

As a teacher I often use the paradigm of the Hippocratic Oath, a phrase that is cited by all physicians, insisting that it should equally apply to architects: “First do no harm. Then, try to do good”. These two lines, in that order, should support a new paradigm that all architects and professionals of the built environment should be aware of and incorporate in their practice.

Scholars of architecture and architectural theory tend to focus on abstract concepts around the process of design, aesthetics and form.

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Photo credit: Images courtesy of Dr Evangelia Chryssikou



The salutogenic house of tomorrow

Richard Mazuch
Director of Design Research and Innovation, IBI Group

With an increasingly ageing population facing chronic health challenges and decreasing filial support, one's understanding of healthcare strategies must be recalibrated...

No – deconstructed, reconstructed and rebooted. The focus must be toward delivering a 'new look' service embedded within the community. This could range from assisted living, self-care, tele-care and tele-medicine within a single housing unit, to multiple units supported by social care services, nurses, doctors, physiotherapists, occupational health visitors, psychiatric nurses and local pharmacists.

Chronic and lifestyle-related diseases are on the rise, and healthcare services are struggling to keep up with the consequent accelerating demand. Simultaneously, we are finding new ways of taking control of our personal health and wellbeing. Increasingly, the goal is to establish a long and fulfilled lifestyle addressing preventative as well as curative health management regimes. We have a very real opportunity to deliver optimal therapeutic environments that are supportive of wellbeing, diagnostics, treatments and recovery, in new settings such as the home and within the public realm.

How can the design of tomorrow's home symbiotically respond and evolve to the ever-changing needs of an ageing population and its healthcare requirements? Can this be achieved in an innovative, elegant, supportive, dignified and exciting way, without it appearing mentally and visually debilitating, degrading and stigmatising? How can we reverse the perception created by the usual proliferation of awkward hinged/swing metal grab rails, handrails, frames, slow moving stair-lifts and inappropriate, awkward looking furniture, together with an eclectic variety of dated fittings?

Time for a new paradigm- Reinventing domestic cells

Individual spaces and components that constitute the traditional perception of the typical home will have to be dismantled to address the health and wellbeing issues of today and tomorrow. These salutogenic spaces are to be flexible and agile to adapt to 'Ageless', 'Multigenerational' and 'Multi-morbidity' scenarios. Individual domestic living cells, such as the long unedited bedroom, will have to be re-assessed in depth. We spend approximately one third of our life here. We may be conceived, delivered and indeed die here. We reboot our mind and body here daily to empower us to engage with a new day.

Technology and communication networks are examples of real-time clinical telehealth and telecare that can help alleviate the overburdened global healthcare system.

Lack of sleep increases the risk of medical conditions including diabetes, heart disease, obesity and ultimately shortens life expectancy. Recent research informs us that lack of sleep costs the UK £40 billion a year. What can we do to ameliorate the situation? Healthcare insights and evidence-based research are to be harnessed and embedded in our designs. We have to consider:

1. What are the health issues? These may be sleep apnoea, respiratory problems, snoring, sundowning, incontinence and restless leg syndrome.
2. What are the dangers? Possibly temperature drops, dehydration, infections, sound/air pollution, falls, walkabout, mental health, darkness, anxiety, night time navigation.
3. What may be the interventions, both in terms of assistive design and technology?

Remarkably, many solutions may have little or no cost impact, such as: correct colour ways, bed inclination, amber illumination, bed/WC orientation and biophilic design. More exotic solutions may be the Med Bedhead, sensory doors, Robotics, smart floors, LED WC seats, LED pillows, Axo suits, Toto WC/Bidets, ODE emitters and Tomek fittings.

This brief investigation touches solely on issues related to bedroom design and its

impact on health and wellbeing. There are effectively another twelve domestic cells within the envelope of the home which require similar interrogation and development.

Key ergonomic and anthropometric data will help design a supportive home with details, fabrics and finishes, equipment and devices designed to accommodate the ageing body: its predicted postures, movements, weight, size, properties and cognitive abilities. Design tools, such as virtual reality, augmented reality and sense sensitive design will ensure successful outcomes.

Technology and communication networks are examples of real-time clinical telehealth and telecare that can help alleviate the overburdened global healthcare system. Companies such as Amazon, Google and Microsoft are actively progressing to digitize our homes. With high definition video telehealthcare systems, doctors and nurses will be able to hold virtual consultations with patients, remote from surgeries or hospitals in a "virtual ward" scenario. Monitoring sensors can be used to capture and transmit physiological data e.g. Tele-ECG devices and monitors. There are already successful examples of real-time clinical tele-health, such as tele-mental health, tele-audiology, and tele-nursing.



A clear understanding of the ageing process, the maturation of the body systems, physiology and sensory receptors, together with a true comprehension of related medical issues, morbidity levels and salutogenic needs, will clearly inform the design of tomorrow's home. Key design features of the future salutogenic home will also incorporate spaces for diagnosis, treatment, healing and ultimately sustained and supportive wellbeing which will define the overall design solutions.

Let us embrace today's challenges, deconstructing, reconstructing and rebooting them into unique forward-looking salutogenic homes of the tomorrow focusing on key design features supportive of multigenerational health and wellbeing. It has been said that "the best way to predict the future is to create it" "abeamus" let's go do it!

Photo credit: Image courtesy of Richard Mazuch

A design revolution for living aids

Clare Cooper
Co-Director, ellihome

In the autumn of 2013, my sister and I were 18 months into developing our first venture together – a social enterprise that offers moving, down-sizing and ageing-in-place services to older people and their families in Scotland¹.

During that time, we met Nancy, an Occupational Therapist by training, who shared a distressingly familiar story involving one of our clients. This story highlighted the problems with existing daily living aids, such as grab rails, shower stool and toilet frames. She had advised our client that these items were needed for her to remain safe and independent in her own home. The response was heart-breaking.

“It’s so distressing to see how unhappy she was at the thought of having to have these products in her home”, Olivia said. “She knew she needed them but all she kept saying to me was that they were so ugly, that they would make her home look like a hospital and make her feel like an invalid. It really upset her.” “I know” I said, “I wouldn’t want them in our home either”. I paused. “Why don’t we try to make beautifully designed grab rails, shower stool and toilet frames ourselves – and chair raisers too! The existing options completely and utterly destroy the look of your furniture. Having to use what’s on the market now would utterly depress me beyond words too.”

And so, our second venture together was born.

Fast forward to 2018 and our plans to design and manufacture beautiful daily living aids for older and less able people is close to fruition.

Over the course of our journey, we’ve understood just how much and how quickly the world is ageing. We’ve learned just how important aesthetic matters are to wellbeing and how being able to express personal style can hugely affect our self-esteem. We’ve conducted one-to-one interviews with older and less able people, which confirm that as we age, our emotional attachment to our home grows.

This should not be surprising, after all, our homes will have become the repository of many things. Memories are one, connections to friends and family who live nearby another, and all the things we have collected over the decades. There is overwhelming evidence that as we get older, our preference is to stay independent in our own homes for as long as possible.

But how can we future proof our home to allow us to do just that and how can we break away from the solely needs-based response models that currently dominate? What we need to offer is truly user-driven models that support active, healthy ageing and galvanise our wellbeing.

Over the past three decades or so, an approach called ‘ageing in place’ has been developed. This approach helps us to work out what products, services and conveniences will enable us to stay safe and independent in our own home. Generally, it focuses on Home Adaptations – things we can do to remodel our home to make it easier and safer for us to stay there, such as wheelchair accessible wet rooms and redesigns of the kitchen. It also includes Daily Living Aids, such as the ones my sister and I are on the verge of manufacturing. But up until recently, the quality of their design has been secondary to their function, resulting in medical looking products that feel overwhelmingly institutional. The result is to stigmatise their users in a negative and unnecessary way.

What we need to offer is truly user-driven models that support active, healthy ageing and galvanise our wellbeing.



Yet baby boomers and the generations behind them have become accustomed to high design standards in the everyday products they take for granted – from their iPhones, to their cars. Our research, and the research of others, bears out that this demographic expects no less from the household equipment they purchase to retain their independence and wellbeing.

With public sector service provision diminishing, due to reduced funding and stringent application of the Fair Access to Care Services criteria (FACS), there is no doubt that in the area of assisted living, there is potential for the consumer market to develop.

But for that potential to be realised, everyone involved in creating homes and

home environments for older people needs to see this longevity revolution through new eyes. They must recognise the vital contribution design makes to all our lives, not only in smart technology and breakthrough innovations in genetic engineering, but in the simple everyday things like the grab rails, shower stool and toilet frames that ellihome², our new business, is focusing on.

¹ www.thehomestraight.org.uk

² www.ellihome.com

Photo credit: Image courtesy of Elli (Assisted Living Technology) Ltd.

Designing robots to look after our future selves

Sebastian Conran
CEO, Consequential Robotics

We have been using robotic devices in our homes for decades. The sewing machine, washing machine, dishwasher and TV remote are all robotic, labour-saving devices that you will find in practically every household living above the poverty line. However, these devices are mainly designed to repeat one process – they are not autonomous.

Many of us are also now buying into the new generation of Internet of Things (IoT) enabled devices, like the Amazon Echo and Google Home, which operate the lighting, heating and CCTV, and can order an ever-increasing variety of goods, including groceries. The big difference between the existing situation and the next generation of home robotics is autonomy and physical flexibility. These will be multifunctional devices that not only obey our commands, but also anticipate situations, needs and wants, and reliably act on them appropriately and safely. They will ask you what you want for dinner, order the fresh ingredients, cook and serve it to you

and clear up afterwards (they will also notice whether you are enjoying a balanced diet). These labour-saving servants will also help look after us in later life as, inevitably, our bodies and minds begin to fail.

In the near future it will be social/companion robots that will share our personal space, interact with us and with each other, to provide emotional engagement and entertainment. They need to be suited to robot-human interaction, as well as robot-device interaction. They could also discreetly help monitor our health, through wearables like bracelet sensors and smart mirrors. They will observe our body language, tone of voice, behaviour and adherence to normal routine, and anticipate bodily needs, like medicines, food and liquid intake.

In the near future it will be social/companion robots that will share our personal space, interact with us and with each other, to provide emotional engagement and entertainment.





Jeeves the robot; I don't think so...

Regarding physical, quasi-humanoid robots, with current material and digital technologies we can't get near to reliable functional behaviour, nor the cognition and performance of a human toddler, let alone the legendary Jeeves. The fact is that no research laboratory on this planet is close to making an autonomous robot that could open the door, walk into your home, boil a kettle of water and make you a cup of tea, let alone open and serve a bottle of champagne!

One approach is to build devices that think and operate very much like familiar animals; from their senses and decision-making processes, all the way through to their bodies and behaviours. The Consequential Robotics MiRo robotic pet is an example of this, based on the simple premise that animals are familiar and have qualities that are desirable in today's social robots – we all speak to our pets without any idea of their understanding.

Companion robots need to be robust, adaptable and able to communicate their intentions and feelings without necessarily using voice (Alexa can be so intrusive!).

Despite these challenges, there is still a huge demand for friendly-looking, flexible autonomous devices that will physically carry out dull, dirty and dangerous jobs, such as emptying our bins, deep mining or decommissioning redundant nuclear power plants. Apart from in Japan, sadly it is mainly defence organisations which seem to have the sufficiently deep pockets to fund this vital research and innovation.

There are emerging materials and fabrication technologies, such as graphene and 3D printing, which will make our devices lighter, stronger and more compact. Quiet and powerful electric motors and power cells are also making great progress, due to the pent-up demand for efficient electric autonomous transport. There are simple things to overcome, like navigating a cluttered

Companion robots need to be robust, adaptable and able to communicate their intentions and feelings without necessarily using voice.

inhabited home, which is significantly more difficult than a road, where other vehicles obey rules.

Rethinking the basics

Domestic stairs conventionally require legs to scale them. The trouble is that legs can use up to 30 times the amount of energy to operate than smart omnidirectional wheels. So, let's expect more lateral living, with smooth floors in the future, or maybe a robotic version of a funicular stairlift that looks like a simple handrail – that humans can use too.

As optical and touch sensors become increasingly more sensitive and sophisticated, they will demand more and more computing power. Moore's law of exponential improvement of processor performance is finished – we have hit a barrier where things cannot get much smaller. Meanwhile, we are still waiting for someone to actually make a Quantum super-computer that works for longer than a nanosecond, to give us the level of reliable high-performance that is required to process all the data from sensors and memory.

As we get older, we become more physically and mentally fragile. Due to this, our design studio is actively developing things such as smart bathrooms that help prevent and detect falls, as well as monitor our physical health through observation and analysis of our lavatorial waste. They can also be comfortable, calm and meditative spaces.

We have had domestic dishwashers for over half a century, but now we are also collaborating on the design of kitchens that can fully prepare and cook meals from fresh ingredients, as well as clean up afterwards (ironically, as cooking is one of my great personal pleasures in life!). We are also developing a comfortable robotic chair that can move omnidirectionally and autonomously around your home. It can raise up to the sink or cooker, and help you get in and out of bed. Vitally, all of this needs to look like something we aspire to have in our homes – not in a hospital ward.

In 20 years' time, when I am 83, I fully expect there will be many universal autonomous robotic devices in my home to help with home chores such as cooking, ironing and making the bed, as well as helping me out of a chair/bed/bath. This said, I don't expect or want them to look much like human beings and hope to see them featured in the then equivalent of aspirational lifestyle magazines. Outstanding product design has a vital role to play in ensuring that these devices are emotionally things we crave, not just physically need.

Photo credit: Images courtesy of Consequential Robotics

NEIGH BOUR HOODS OF THE FUTURE

HEALTH & CARE

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Working smarter, not harder

The gains and opportunities will redefine what it means to be human in the 21st century.

Martin Green OBE
CEO, Care England

In 20 years' time, our lives will be transformed by technology. The building blocks of this revolution are already in place. This will be remembered as a period of seismic change akin to that of the Industrial Revolution. There will be no aspect of our lives left untouched. The gains and opportunities of this new era will be immeasurable and will redefine what it means to be human in the 21st Century.

Whilst I extol the virtues of this technological era, I am also conscious that there is a caveat. Like with any major upheaval, there is the potential for positive or negative outcomes. Success requires society to have a clear vision for the technological age, and for all the agencies of society and Government to work in harmony to deliver the best outcome possible.

The ripples of change will start with a personal transformation in how individuals use technology. It will then go into our homes, where technological advances will enable us to interact with our immediate environment in new ways. Beyond this, our neighbourhoods will evolve. The patterns of how we work will develop beyond recognition. In this new era, our nation's status will be defined by the technological advance of our country, in comparison to others.

Monitor, advise and intervene

One of the myriad of things that technology will help us to do is to proactively monitor health. The future will see everybody wearing a device which will take constant measures of our health and wellbeing. These devices will identify the interventions that will support us to maintain our health. The hospital will become obsolete because the vast majority of services will be delivered remotely through digital means. In the last few years, we have seen the rise of computer-based diagnostics, which are showing a much higher level of accuracy than humans in diagnosing health conditions.

In the future, our fitness trackers will tell us the state of our health and find the solutions that will enable us to live well. We will not only receive dietary advice, but we will know exactly what our food intake has been and to what extent this either enables or impedes a healthy life. There will be continual checks on cholesterol, blood pressure, eyesight and all other aspects of health. Before a condition can reach an acute phase, the system will have identified it and sought to cure it.



Within our home there will be enormous changes to our lifestyles. In the coming years, we will see the automatic vacuum cleaner becoming commonplace, robotic assistants that can do things such as stack and empty the dishwasher, put our clothes into the wash and iron them when they are finished. These robots will be so intuitive that they can respond to a range of commands and will be able to act as both servant and companion. This sort of artificial intelligence and robotics will be particularly supportive of people who are living with long-term conditions, such as dementia or physical disability. The robot will be available 24/7 and will not need to have time off. This will lead to more independence, autonomy and choice for the citizen.

Bringing residential care into the heart of the community

The care sector, and residential care in particular, is well positioned to transform from services that support particular individuals with needs, into becoming the centre of local communities. In these centres,

a range of health, care, information and lifestyle activities will be brought together in one local resource. Not only do we need to transform our buildings and our services, but we need to transform our attitudes to care and to redefine what we do and how we do it.

I have a vision which puts residential care firmly at the centre of the community. I want to see residential units providing care and support to the people who live there. I want them to be open to offering care, support and information to local people on how they can live well with a range of long-term conditions. I want us to understand that residential care centres can be the place where people's wellbeing takes centre stage, as well as their physical needs. It can become a place where every generation is catered for in a dynamic and creative environment. We have good evidence that intergenerational connections improve the lives of every citizen. We need to build on this and see care services as multi-generational spaces, where reciprocity and community connection can flourish.

In the future, our fitness trackers will tell us the state of our health and find the solutions that will enable us to live well.

Tackling the deficit model

One of the key challenges of the 21st-century is loneliness and isolation. I think the care home of the future could be a local space where people come together to reduce isolation, to hear preventative health messages and to engage in activities that will prolong active life and sustained well-being.

All too often, current services work on the deficit model, which focuses on what people cannot do, rather than champions their abilities and work to maximise independence. However old, frail or sick we may be, we are still a citizen with a great deal to contribute. I have seen countless examples of older people acting as advisers and mentors to younger people, helping them to navigate the challenges of life. I want to see care homes nurturing the capacity of all residents and ensuring that this experience is available to all communities.

There is a paradox at the centre of our 21st-century challenge for care. That is that we will increasingly become more specialised in how we treat particular conditions. But we must remember that everything we do should be about the person, not their diagnosis. We need to be generalists as well as specialists, and this will require a revolution in how we train and support staff. Currently, residential care services tend to train people to do things to residents. In the future, we will have to be enablers and supporters, who do whatever is needed to deliver a good quality experience and a life worth living.

Harnessing data

Neighbourhoods of the future will also be very different. Our homes will be equipped with a myriad of ways in which data can be collected. Data will be brought together and used as the basis for predicting the needs of the locality and delivering creative solutions. There is currently the capacity to deliver enormous amounts of data, but often this is not well used. We are reaching the century of data, when every single act will be analysed and the data will be collected in order to inform future decision-making. This data analysis will inform such things as energy requirements within the locality, identifying any areas where there is not maximum efficiency in terms of the use of both buildings and energy. The power of data is that it can be used to inform decision-making on a large scale, and at the same time, can be used to personalise and tailor services to the needs of the individual.

Our current transport system, which is heavily reliant on human operation, will be changed into a system that works without humans and is flexible, delivering a service whenever you need it. Not only will we see driverless trains, but local areas will be crisscrossed by a range of autonomous vehicles which the citizen can call up to take you automatically from one destination to the next. The way in which the services will be controlled by computer will enable far greater use of the current road network. There will be no such thing as a traffic jam, because the system would



have identified how many people will be using the road and would have automatically re-calibrated the signalling and traffic flow system to make it work to optimum capacity. One of the most promising aspects of new technology will be the way in which we can flex and change the system in line with the needs of our society. Data collection will be done in real-time, so that the response to any challenges in the system will take place immediately.

Reaping the rewards of research

One of the areas where there have been the most significant developments technologically has been in warfare. We now have the capacity to shield ourselves from attack using satellites and drone-based weapons. These technological developments have been brought about by billions of dollars of investment, just like we saw with the space race. Eventually those technologies will make their way into our lives and will be given peaceful and useful applications. There are few of us who could imagine life without the non-stick frying pan; yet this invention is a dividend of the race to the moon. Similarly, we will see the delivery of our groceries and a range of other commodities coming directly to our door via a drone.

The only thing that could be an impediment to the march of technology and data is the response of governments. What we need is the Government to create a vision for a caring technological society and then enable individuals and organisations to respond positively to the technology challenge. This will allow them to deliver a system that works for us all in the future.

It is good to see that the Government has developed The Industrial Strategy Challenge Fund, because this will give impetus to change and a framework for development. We cannot rely on this revolution being delivered in a haphazard way, with each organisation doing things in a piecemeal, uncoordinated fashion. The reality of the 21st-century is that we will neither have the capacity nor the personnel for business as usual and our future will be dependent on our ability to harness technology and to work smarter, not harder.

It is all to play for. The future is looking very exciting.

Photo credit: Image courtesy of Care England



The blueprint for a new public health

Shirley Cramer OBE
CEO, The Royal Society of Public Health

Public health has never stood still.

Traditionally, the mission was seen as 'prevent and protect', addressing the 19th and early 20th century issues of sanitation, personal hygiene, and epidemics. But as the 20th century wore on, our population health challenges shifted towards non-communicable diseases caused by poor diet, substance abuse, and smoking. The public health vision shifted accordingly, focusing more on the social determinants of health and behaviour change. Today, these challenges are still far from resolved. If we are to keep pace with the 21st century, we must think carefully, but also boldly about the new challenges and opportunities facing us. So, if the 19th century was about health protection, and the challenges of today are around health improvement, what changes in society should shape our future vision for the public's health?

If we are to keep pace with the 21st century, we must think carefully, but also boldly about the new challenges and opportunities facing us.



Our ideal neighbourhood of the future should have more inter connectivity, more green space, better footpaths, efficient and accessible public transport and more outdoor seating and venues, encouraging frailer, older people to venture outdoors.

With our increasing ageing population come new opportunities for learning and working longer. Both employers and governments need to work on policies to enable life-long learning and to keep people in the workforce. This will have benefits for society, particularly in terms of health and wellbeing. Too often, old age is debated in disparaging terms, with older people described as a burden rather than an asset. In the new era of public health, our focus should be on developing all our assets. We know that healthy retirements involve planning, continued involvement in some type of meaningful work, and engagement with communities to maintain an active social life, as highlighted by the Chief Medical Officer in 2016.¹ Making sure that those transitioning into retirement are well prepared and well plugged into their local communities is important not just for their own wellbeing in retirement, but because people in later life have a huge amount to contribute to society.

Accommodating for population shifts

Arguably the most significant ongoing shift in population in the UK is down to the successes we have had in public health. People are living and working longer than ever before, and the trend is set to continue, with nearly one in seven projected to be aged over 75 by 2040.² This is a positive trend, but we have done little to plan for this demographic change. We need to confront the issues that disproportionately affect the older generation – loneliness, social isolation, and insufficient

social care. These are critical problems that cannot be ignored. We must also consider the opportunities that an increasing older generation will bring to society. Key to this will be harnessing the influence of neighbourhood, community, and more generally, place as a determinant of wellbeing.

The failure to meet the accommodation needs of older people has reached a critical stage. Poor quality housing disproportionately affects older people, and much of the current stock is not designed to adapt to people's changing needs as they age: whether that be through the increasing prevalence of home-working among older people, or the increasing number that will require home healthcare. It's also vital that housing for older people is integrated into the local community and not provided in silos.

Ideas from overseas

There is a lot that can be learned from work going on overseas. One interesting example is a private sector programme in Belgium called the Inter-Generational Family loan,³ whereby reduced rate loans are offered to low-income families who want to adapt their property to allow them to house older relatives. This is a financial incentive scheme which rewards behaviour that promotes social cohesion and community development. Indeed, schemes that promote the co-habitation of the old and young are cropping up across Europe, trialing innovative ways to bring generations together in a sustainable and positive environment.

Homeshare – when an older person with a spare room is matched with a younger person in need of low-cost accommodation – has been successful around the world, including in the USA, Australia and Europe. Here in the UK, a three-year funded and evaluated programme was recently completed, revealing a significant reduction in loneliness and isolation of those involved.⁴ This chimes with the evidence about the effects of intergenerational contact that is based on trust and mutual companionship. In Spain, a project with similar aims has seen the construction of 'inter-generational buildings', consisting of rental homes reserved for both over 65s living independently and under 35s who commit to providing services to the local community.⁵

Another idea gaining international momentum is that of intergenerational care homes – co-locating nursery services and older person care under the same roof. These have been introduced to varying degrees in countries including Germany, Australia and Japan, and in late 2017 the first one in the UK opened its doors in South London.⁶ In a context of scarce public finances and increasing numbers of people in need of different forms of care, it makes sense to bring groups that require similar care services, but traditionally operate in isolation, under one roof. It is an approach we would want to see emulated across the UK. Centres could provide valuable community services, such as youth groups, support groups for young mothers, and activity hubs sensitive to the strengths and needs of the local area.

Optimising health and wellbeing through our neighbourhoods

What should our homes and neighbourhood look like to optimise health and wellbeing? We would need to incorporate the very best of international and national practice which would comprise flexible, technology enhanced homes, which are well connected to people and services to ensure that no one is left without the support they need. We know that older people want to stay in their own home for as long as possible which is the best outcome for the individual, family and society as a whole. We urgently need to reduce demand on the NHS and residential care which means providing tailored home care and using technology to increase access to GPs, allied health professionals, hospitals and to decrease social isolation. We need people whose role is to coordinate a variety of services for improved individual health outcomes and to make sure that we are using public resources effectively. Buurgholz in the Netherlands operates a brilliant home care system which provides personal, tailored, compassionate support, enabled by technology, loved by families and cost effective for the state. We need all professionals in the neighbourhood to be part of the wider workforce for the public's health and to understand prevention.

Our ideal neighbourhood of the future should have more inter connectivity, more green space, better footpaths, efficient and accessible public transport and more outdoor seating and venues, encouraging frailer, older people to venture outdoors. Physical activity, fun and friends is important for all ages and older people need a broad range of participatory activities including dancing, singing, art, comedy, cooking and all the kinds of learning opportunities offered by the University of the Third Age. The Campaign to End Loneliness estimates that 10% of the UK population aged over 65 is lonely all or most of the time, this doesn't have to be the case.

Reimagining our public services

RSPH's vision for the future of the public's health and wellbeing, particularly for the most vulnerable, is that a much broader group of professionals and volunteers will be involved in improving and protecting the public's health. We call this the wider workforce for the public's health. It involves the fire service, police, and ambulance service as well as housing officers, leisure centre workers, occupational therapists and even hairdressers. We are making progress

with this vision, as thousands of individuals have received training and gained confidence in having 'healthy conversations' with people they meet as they do their jobs. Firefighters are able to coordinate prevention services with 241 fire services in England now doing safe and well checks rather than fire safety.

If we are to create the kind of neighbourhoods we want to grow old in, we need to develop comprehensive strategies around 'place'. This will involve planning for homes and neighbourhoods across a range of sectors including local government, health, transport, education, the public, voluntary and private sectors. It will involve creating a single vision; but with distributed leadership and thoughtful coordination. Most importantly, it will require us to invest wisely for the long term. Our political cycles have too often left us with short-term solutions to long-term problems, which are costly for the individual and the public purse.

If we are to successfully maximise the wellbeing of our ageing population, Government, employers, families and local communities must all play their part. Then we can support those entering and living through later life in being healthy, skilled and active members of society.

- 1 Baby Boomers: Fit for the Future, Professor Dame Sally Davies, Chief Medical Officer for England. Available at <https://www.gov.uk/government/news/health-of-the-baby-boomer-generation>
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- 4 Evaluation of the Homeshare pilots, 15 May 2018. Social Care Institute for Excellence. Report available at <https://homeshareuk.org/hs-resource-library/homeshare-offers-solution-to-loneliness-and-housing-crisis/>
- 5 Foresight Future of an Ageing Population – International Case Studies; Centre for Policy on Ageing, 2016. Available at <http://www.cpa.org.uk/information/reviews/CPA-International-Case-Study-12-Intergenerational-living-in-Spain.pdf>
- 6 Apples and Honey Nursery, Nightingale House <https://www.applesandhoneynightingale.com/>

Photo credit: Images courtesy of Shirley Cramer





Smart homes for health and wellbeing

George Crooks
CEO, Digital Health and Care Institute (DHI)

The digital revolution has created a growing expectation that technology and information services should be integrated throughout the delivery of health and care services. The need for digitisation of health and care is fuelled by the effort to deliver more person-centred services. Ideally, these services will be delivered out of the standard clinical environment – at home, or in a community setting when appropriate. Services will be supported through self-management on the part of the citizen and the use of evolving remote monitoring technologies.

This change in approach, combined with an aging population who will typically have multiple long-term conditions, highlights the need for innovative approaches to housing. Smart housing and neighbourhoods will be pivotal in revolutionising how healthcare is delivered and will enable citizens to live long, healthy and independent lives at home.

Driving innovation

An increase in real-time data collection, driven by developments in smart housing technologies, will enable healthcare professionals to provide more appropriate treatment, support and care for their patients. The resulting datasets could inform future research, potentially helping improve prevention and early intervention. By detecting and delaying the onset of frailty, it will enable professionals to provide better support for those living with long term conditions.

In the next 10-20 years, our homes will remain largely the same. The next batch of housing stock is based on current designs and is likely to have the same structural issues we are already faced with today. However, the natural demographic shift of the young becoming older means we have a more digitally literate older population. This will more easily allow the introduction of digital tools to help us avoid some of these issues.

This means that instead of having a small number of people living in purpose built smart housing, every person will have the opportunity and capability to live in their own, digitally enhanced smart home. This can be achieved through the development of standardised smart health kits. These can be tailor made for the individual and their own health and care requirements. This will be similar to the British Gas heating and hot water HIVE system, which offers differing plans for its users and a range of supplementary smart technologies for home security and energy control.

We can bring digital health solutions together to create smart home health kits that monitor health and wellbeing. Rather than wearable technologies, the use of passive sensing will become the norm. This is technology that detects and responds to the environment, rather than the user, removing the need for individuals to remember to put on their device. Our aim is to utilise technologies that will become part of everyday living in the home and don't just remind the user that they are unwell!

The importance of collaboration

For smart neighbourhoods to be realised, we must combine the disparate array of existing digital health solutions, products, devices and services into interoperable sets, designed for easy deployment and use. It is imperative that smart home health technologies are aligned with the design of smart neighbourhoods, as well as the health and care services that support their users. Interoperability is key. In an ideal system, every device should be contextually aware of what the other devices are doing and be able to share and adapt to information without human intervention. The roll out of low-power wireless networks across the UK, and 5G mobile technologies, can transform the Internet of Things into a powerful vehicle for the common good, if we are smart in our thinking and planning.

Additionally, these neighbourhoods need to be adaptable to future change, to ensure user experience is not affected by emerging technologies. For health and wellbeing, this is especially necessary, as new health trends begin to emerge and impact citizens in ways yet unforeseen. Smart houses, neighbourhoods and cities must be developed as flexible spaces, to ensure integration of new technologies doesn't require regular physical adaption.

Digital solutions cannot and should not replace face to face care for those who require it, but they can empower individuals and communities to become more self-reliant. They can also improve the efficiency and effectiveness of formal community health and care services utilisation and management. Most importantly, they can reduce anxiety, and the feelings of loneliness and helplessness that are drivers of increased health and care service use.

The role of government

For smart housing to benefit all citizens, governing bodies across the public, private and third sector must work with health and care services to develop the infrastructure, technical architecture and clear standards for these technologies. These standards must include the development of stringent security measures, and information governance and privacy policies to which all health technologies must abide.

The health technology industry must work with governing bodies to develop new business and procurement models. This will help accelerate the uptake of technology and boost market growth within the health and

care sector. Additionally, these bodies and leading industry figures must work to foster a cultural and capability shift across health and care services. This will enable the health data collected from smart housing technologies to be trusted and acted upon by health and care professionals.

However, to allow this technology to scale, there is a need for data to flow freely to where it is needed. The key to success, is a simplified but robust consent model, owned by us as individuals. It will be based on a clear set of principles and supported by a trust architecture designed to empower appropriate use. With this in place, we can truly start to make a difference.

Digital solutions cannot and should not replace face to face care for those who require it, but they can empower individuals and communities to become more self-reliant.

The health technology industry must work with governing bodies to develop new business and procurement models.

Reimagining the pharmacy of the future

Sarah Haywood,
Chief Executive, MedCity – partner in DigitalHealth.London

The traditional model of community pharmacy is being challenged, as £170m cuts, rising patient expectations, increasing use of automated dispensing, and the use of e-prescribing bear down on community pharmacies' income and drive change. In the next 10 years the pharmacy world will look very different – but as the third largest health profession, what do we want to happen and what changes do we need to start making now to disrupt the status quo?

State of play

The NHS is not one organisation, but many different organisations, units and departments with differing priorities, which, historically, have been a challenge to join up. However, with new models of care, roles are overlapping. The pharmacist is now expected to wear many hats: as caregiver, educator, business developer, researcher – and often as a stand-in for the GP. Services are being configured to be closer to patients' homes, as compelling evidence suggests that patients recover quicker in their home environment.

As a key member of the community where patients live, this means that the pharmacist is ideally placed to play a more prominent role in helping patients to stay and be cared for within their communities and neighbourhoods.

The system is gradually changing to allow for this, with better joining up of the healthcare system with social and community care, allowing patients to receive medications, consultations, and follow-ups at home. In addition to this, there is an emphasis on earlier screening and diagnosis to enable

health practitioners, in particular pharmacists, to deliver care in the community and so prevent patient flow to primary and acute care.

The pharmacist is now expected to wear many hats: as caregiver, educator, business developer, researcher – and often as a stand-in for the GP.

The advent of mobile apps such as Babylon Health and Push Doctor, is allowing patients to video call a private doctor, creating the potential to support pharmacist delivered care in the community. Patients, as consumers, are increasingly utilising technology to help them manage their condition, improve their health and wellbeing, and improve medication adherence, which in turn brings opportunities for pharmacies. More people managing and monitoring their condition leads to more data which can be shared with healthcare professionals, which can in turn improve diagnosis and condition management. This may will provide new opportunities for pharmacies to be at the heart of managing and curating this data.



The future

As some GPs are attracted to offering online consultations and patients are increasingly open to engaging electronically, the community pharmacy will need to fill the gap for face-to-face consultations and medicine delivery. Pharmacists should become ever more visible, providing proactive patient care, including care of people with long-term conditions, the management of medicines for people taking multiple drugs, the provision of advice for minor ailments, and the delivery of public health and health improvement services.

For example, if you are visiting your pharmacy to collect your statin prescription, the pharmacist will be best placed to advise on adherence and to determine whether your blood pressure and type 2 diabetes is being controlled. All of this can be delivered in the location that is most convenient for the patient, and in the case of community pharmacy, providing valuable continuity of contact and relationships with patients.

Medicines will continue to be supplied from community pharmacies, but as new incumbents enter the market, fulfilment will be done in new ways – through mail and even through new means, such as drones.

The future pharmacy will put emphasis on a health-care environment that looks at the whole person.

The future pharmacy will put emphasis on a healthcare environment that looks at the whole person. Care will go beyond prescriptions; it will provide a view of individual health and wellness needs, with NHS and private services that offer a range of preventative and diagnostic services, as well as wellbeing services. These could be delivered in the home setting for house-bound patients, through advanced services such as genetic testing to determine suitability for certain types of medication, diagnostics for bacterial infection, and tele-pharmacy.



As Mark Ackland-Snow, who is Head of Category, Commercial Strategy and Shopper Marketing at Bayer Consumer Health, told us:

“A mindset shift is needed to ensure community pharmacy is in the best position to thrive in the future. Pharmacies that invest in understanding the needs of their customers and who tailor their offering accordingly will ensure they retain their position at the heart of the community.”

The future pharmacy will no longer look like a shop of medicines, but increasingly could become more like an Apple store, where patients will access information on technologies to support early diagnosis, health education and preventative advice and services. Along with health and wellness programmes, the pharmacy of the future could offer a ‘technology counter’ where people can learn about new technology, such as the latest wearables and devices. These will link into existing patient care records and offer support on medicines adherence, patient information relating to medicines, apps linking to carers, appointments for services, tele-pharmacist support, link to

homes through the internet of things and interface with other parts of the ecosystem such as district nurses and mental health services.

We should also not neglect the importance of relationships. As older patients become more isolated and loneliness becomes a health issue in its own right, we need to find new ways to help anchor health services to the individual and their carers and to localities. Pharmacies, by nature positioned within communities, have a pivotal role to play in developing new services and acting as the glue that brings different components together – NHS, private sector, community, social care, consumer health – deploying technology and data to act as trusted advisor and convenor. This is not without its challenges, particularly in rural communities, where the local pharmacy may not be just around the corner, but several bus rides away. There is also a need to define new business models so that pharmacy business – stand alone individual businesses and multi-national chains – are incentivised to develop services and secure their role at the heart of healthcare provision.



Services are springing up to help pharmacists take on this challenge. Mark Ackland-Snow adds:

“Our research shows that pharmacists are one of the most trusted sources of advice for healthcare information. Pharmacy teams should therefore focus on keeping themselves up to date on the latest offerings in healthcare, be that new products, services or information and guidance. At Bayer Consumer Health, we’ve launched a training programme called Business Fit for the Future, specifically designed to build commercial confidence and business acumen, providing pharmacy teams with the practical skills to support their efforts to run a profitable business that is ready for the future.”

While younger and fitter patients may appreciate the convenience of app-based medicines ordering systems, fulfilled by online marketplaces, individuals with complex, multiple health needs will require a personal and relationship-based approach and service.

With NHS budget cuts and increasing restrictions on pharmacies in their prescription duties, pharmacies have had to explore new business avenues and communications to enhance their status as healthcare providers in their own right. Adopting Healthera has been one of the strategies community pharmacies employed to control patient retention and advance their business.

“Online pharmacies have recently adopted new growth strategies by using digital marketing to target specific audiences. Although they still control less than 1% market share, their rapid rise is causing concern to high street pharmacies as more patients become aware of and trust online suppliers. Community pharmacies will need to adapt to compete with this, which is why pharmacies are turning to app-based prescribing solutions as a digital channel of patient acquisition while still maintaining the advantage of a local presence.”

Quintus Liu, Chief Executive Officer at Healthera Ltd

What now?

As the GP role changes and pharmacies take on some of their workload, they should prepare to be more actively involved in decision-making and taking on greater leadership responsibilities. Pharmacists will need to be able to move more flexibly, such as between hospital and community settings, and to understand that their roles will change throughout their careers.

To have a chance of making this happen, pharmacy must move to a culture and practice that works as one with other care providers and is centred around people’s needs. The goal should be to become the care hub for a community. This also involves significant culture change within broader primary care community, including from general practice.

Increased use of technology and automation does not mean that centralised dispensing and robotics are always the solution; however, if they cost-effectively release capacity to deliver more health-related services, then they should be considered seriously.

New knowledge and skills, including enhanced clinical knowledge and technological capabilities, will be required to take on these roles and to offer a ‘one stop shop’ for patients to access knowledge and devices to help them manage their care. Most importantly, premises should be located in the community, and pharmacists should be prepared for home visits, whilst technicians should be handed the responsibility to prescribe and ensure accurate monitoring.

We are in an era where people are drawn to new and shiny technology, but to reach the people who have the biggest problems with medicines management, pharmacists will still need to rely on more old-fashioned methods – including face-to-face discussions and rationalised medicines routines. By retaining their proven strengths of patient interactions and medicines expertise, while taking their pick of the most relevant technological innovations, pharmacists will be able to find a solution that works for each of their patients.

Photo credit: Images courtesy of MedCity

Reducing NHS demand with digitally-enabled prevention

Dr Mark Jenkins
UK Managing and Medical Director, Oviva UK Ltd

As an NHS doctor working in A&E, and as Medical Director of the digital health company Oviva, which combines professional support from dietitians and an app & learning portal to help people change their diet & lifestyle, I was very excited when I saw that NHS England Chief Executive Simon Stevens had made prevention a key priority for the NHS as part of the Five Year Forward View. I founded Oviva as I saw the growing tide of demand from lifestyle related conditions in the NHS. I felt we had to transform the patient experience to make advice on changing their diet, activity levels and habits, such as smoking, both easier to access and lower cost than traditional face-to-face services. Fortunately, Matt Hancock, the new Secretary of State for Health & Social Care, shares this focus on prevention and digital transformation.

Prevention is so high up the agenda because of the spiralling costs of treating the avoidable complications of health conditions related to diet, physical activity, mental wellbeing and smoking. These are conditions such as malnutrition, type 2 diabetes, obesity, cardiovascular diseases and chronic obstructive pulmonary disease – conditions that I saw daily in A&E. Indeed, the costs of these conditions to the NHS per year are estimated at £20 billion, £10 billion, £6 billion, £9 billion and £2 billion respectively (BAPEN, NHS England, British Heart Foundation, British Lung Foundation).

The NHS is seeing 4% year-on-year growth in demands placed on it. This is due to the current 'reactive' care model where we only intervene when people present to A&E departments or to hospital outpatient clinics with complications of their conditions, which are often associated with long hospital stays. The UK and the NHS need to shift to a 'proactive' care model, where people at high risk of multi-morbidity and associated complications are identified in the community and supported to improve their own health before they present to hospitals.

Such a 'proactive' shift requires advanced analytics on population risk levels, in-home patient monitoring and healthcare-professional supported digital self-help tools. However, these areas have struggled to achieve investment against the backdrop of mere 1-2% annual increases in total NHS funding. Many hospitals are in significant financial deficits due to the aforementioned 4% annual demand growth. This situation is likely to further deteriorate due to 5% year-on-year cuts in Local Authority public health budgets.

The UK and the NHS need to shift to a 'proactive' care model, where people at high risk of multi-morbidity and associated complications are identified in the community and supported to improve their own health before they present to hospitals.

Excitingly, pockets of innovation are occurring. In 2017, the NHS England Diabetes team launched the largest ever evaluation of digital health solutions for diabetes prevention in the world. They recruited 5000 patients to test 5 solutions, including my company Oviva's services. Meanwhile, falls prevention technologies such as Kinesis are being tested in East Lancashire.

What we could achieve with digitally-enabled prevention in 10-20 years

The neighbourhood of the future will have 3 circles of support for people with long term health conditions that dramatically reduces their risk of requiring a hospital admission.

First, Local Authorities and NHS Clinical Commissioning Groups will have powerful risk-profiling and monitoring tools at their fingertips. This will enable them to map at the street and house level which of their local population are most at risk on a number of metrics. These include family support, mental wellbeing and presence of physiological risk factors and highest intensity users of current services. With this data, they can work with local health service providers to stratify people to undertake different intensities of monitoring and interventions that maximise reductions in future service use whilst ensuring these interventions are cost effective.

Second, local providers of care will use advanced in-home monitoring and early-warning solutions, such as tailored falls monitoring tools like Kinesis and InHealthcare, as well as wireless weight tracking with automatic updating on clinician systems and physical activity trackers to identify those at risk of malnutrition and type 2 diabetes complications.



Third, healthcare professionals will be delivering digital-enabled prevention interventions in the person's home. This means combining human support from a coach, technology for the patient to interact with their coach such as a smartphone app or web-portal, and connected devices for monitoring such as blood glucose monitors and activity trackers. Current examples being used in the NHS include Oviva's type 2 diabetes self-management programme, KiActiv's cardiac rehabilitation programme, Oviva's Adult Malnutrition programme and Silvercloud's depression & anxiety treatments. These exciting new programmes typically offer the same clinical outcomes as existing face-to-face services at less than 50% of the cost.

Oviva's type 2 diabetes programme (called Diabetes Support) helps people with diabetes understand their condition through engaging videos and podcasts, learning how to change their behaviour through dedicated support from a dietitian, and monitoring their food intake, activity and weight using the Oviva smartphone app. With this revolutionary approach we have shown equivalent outcomes to face-to-face interventions at less than 25% of the cost, and cost savings of c. £900/patient. If this was scaled to 100,000 people with type 2 diabetes per year, the NHS would save over £90 million pounds per year by reducing avoidable complications and medication costs.

Diabetes Support is now commissioned in over 40 NHS regions (called Clinical Commissioning Groups), and is one of the key reasons why Oviva is one of the fastest growing digital health companies in Europe.

Innovate UK has been crucial to this success by financing our real-world evaluation of the programme, which NHS clinicians state is essential to drive adoption.

What needs to be done now to disrupt the status quo

There are two key barriers to implementing these solutions today.

First, a risk-adverse culture among healthcare professionals where all new models of care are expected to have full randomised control trials to support their use. This is a major barrier for SMEs developing them, as such trials are prohibitively expensive for SMEs to conduct (at £1-5 million each) and also take 2-3 years to complete. This is too long for many of them to wait for first revenues.



All funds are pre-allocated to existing services which themselves do not have the money or time to invest in change due to the ever-rising tide of demand.

Second, as almost all Local Authorities and NHS Clinical Commissioning Groups are in deficit there is very little money to invest in new solutions. All funds are pre-allocated to existing services which themselves do not have the money or time to invest in change due to the ever-rising tide of demand.

To address these barriers, a clear, concerted effort is required from the government to develop protected funding envelopes (i.e. that cannot be used to plug gaps in existing budgets) for best-in-class digital health solutions to be evaluated at scale within the NHS. Crucially, this funding has to also include protected NHS clinician time to support the evaluation and embedding of new approaches. Otherwise they will not achieve their desired outcomes.

Innovate UK is playing a key role providing funding to advance real world development & evaluations of new innovations through its Digital Health Catalyst grants, which could help overcome this barrier. Furthermore, recent initiatives by the NHS England Diabetes team, such as the digital diabetes prevention programme evaluation, have shown that such approaches are possible. We look forward to seeing this approach being rolled out in other disease areas.

About Oviva

Oviva is a digitally-enabled provider of healthcare services including dietetics, psychological therapies and nursing. Oviva's transformative approach is combining healthcare professional support, with a smartphone app for self-monitoring, engaging online learning materials, and IoT wearables for tracking – allowing us to treat a broad array of health conditions 100% remotely, including malnutrition, type 2 diabetes, complex obesity and paediatric allergy.

Oviva was formed by former NHS clinicians, academics, and experts in health IT and user experience design and support health insurers, such as NHS Clinical Commissioner Groups, and providers, such as NHS Trusts, to dramatically lower the cost of care delivery whilst increasing both access to care and care quality.

Photo credit: Images courtesy of Oviva UK Ltd

Joining the dots for care innovation

Paul Gaudin
CEO, The Carerooms Ltd

Looking back on my 30s and 40s, bringing up three lively children and travelling the world to build a business, I realise that the last thing on my mind was preparing for the next phase of life as a carer for my parents. I think that I'm representative of most of us in focusing on what's directly in front of me and hoping for the best. For me, the last 15 years have been a journey of discovery within the health and social care system. I've seen how challenged the whole model is. If only for selfish reasons, I wish I had planned for my parents' care requirements. It would have reduced the impact on all our lives and improved my parents' health and lifestyle outcomes.

Up until the passing of my father in 2016, I had been his advocate and part-time carer for 15 years. My mother suffered a total nervous breakdown with the stress of looking after him. And so, we had two patients to look after, with completely different needs. On this journey, we, as a family, experienced most of the gaps in the system and had to fight for every aspect of my parents' care. They became victims of a system which applies two very blunt solutions to care: a care home bed or a domiciliary care package.

After experiencing a local care home, my father made me promise never to send him there again. So, we turned to domiciliary care as the only option for discharge from his regular visits to hospital. Both my parents found their lives invaded by total strangers visiting at random times of day, to reheat a

meal and to fill out some forms. They lost all privacy. Yet if we weren't available, they were left on their own for 21 hours a day to fend for themselves. In my opinion, this was not care.

When my father passed away, my mother became increasingly socially isolated. After having to fund their care for so long, she had no money, and no purpose in life.

Repurposing care

We had fitted out two rooms for my father's care with all the necessary rails, air mattress and hoists. When it came time to reinstate the rooms, we found there was no second-hand market for the equipment. We had to take it to the local refuse tip.

On the morning of the reinstatement, I had an idea. Imagine if we could find a way to safely rent the rooms to a patient trying to find a local place to recover from hospital treatment, or for respite, or for some simple TLC.

We would have to safeguard the patient from my mother's cooking, and my mother from a patient who may become ill, but if this was possible, the idea would solve some key issues in today's society. My mother would have a new purpose in life. She would earn much-needed income, allowing her to live independently. The project would also reduce the social isolation for both her and the patient. Finally, the idea would release a much-needed bed in the local hospital.





We set about researching the idea and the technology. Two and a half years later, we are beginning to get some traction. Our pilots show that there are thousands of wonderful people, many of whom are retired health professionals, who are willing to become hosts, to help their communities and to top up their pensions.

As we have developed the concept, we've refined it by introducing our Care Concierge service. This further reduces the impact on the host, who now does not provide intimate care. We remotely monitor the patient for any health issues, such as a UTI or infection. By introducing preventive health services, we are able to reduce hospital readmission rates. A video GP service run by NHS GPs is available in the room. We have also introduced video education to the computer tablet, to help the patient recover their independence as quickly as possible.

Our carefully selected and vetted hosts support the patients, and they all become part of a local community who continue to care for each other and to help freely, even after the stay. This is the only way to build a sustainable model, as the ratio of younger carers to patients reaches a critical point.

My vision for the next ten to twenty years

In the coming decades, I believe that our communities will have to come together to share resources. It is a human instinct to want to share and to be socially active. People will use their lifestyle and medical data to maximise on our healthy years and to plan for our care needs.

Financial services products will emerge to release capital from our estates. This can then be invested in a care room, just as you might in a flat or a hotel/timeshare room, thus protecting our capital by deploying it wisely. This will leave an asset for our loved ones, instead of depleting our capital. This will be backed up by insurance products, in case we need support earlier than planned.

Governments will create tax incentives for us to invest in our care. Investors, builders and developers will be incentivised to build homes and flats which cater for care. Home owners will receive an income tax break for hosting a person who needs care or support.

There is an opportunity and an urgency for society, government and commerce to participate in this exciting opportunity. The alternative of stagnation will only result in a chaotic and thoroughly sub-optimal last stage of our lives.

Photo credit: Image courtesy of The Carerooms Ltd

I wish I had planned for my parents' care requirements. It would have reduced the impact on all our lives and improved my parents' health and lifestyle outcomes.



Let's bring people together – To nourish body and soul

Sara McKee
Founder and Market Innovation Director, Evermore Wellbeing

We start growing older from the moment we are born, so ageing is the one thing common to us all. Yet the conversation around ageing continues to be negative. Discussion surrounds 'putting people into care' and 'housing older people' when really, we are talking about lifestyle choices in later life. We need to recognise this subject affects us all and it requires a radical approach. We must engage everyone in a discussion about how we want to live a potential 100-year lifetime.

The home must be at the heart of this discussion. Le Corbusier, one of the pioneers of modern architecture, said "The home should be the treasure chest of living." He recognised that our home is about more than simply occupying a space. It gives us a sense of belonging and enables participation and cooperation.

Equally, the life of a community is as important as the built environment. This means investing in things that bring people together, nourishing both body and soul. This investment can be modest – like a park bench, a play area or even one large dining table – which will lead to small incremental changes. Building informal relationships is a slow process but that's the foundation from which long-term connection and neighbourhood ownership are truly developed.

Driving disruption from within

We've been working with the NHS in Manchester for two years to reimagine their approach to supporting older people in their post-hospital rehabilitation. We were commissioned due to the NHS-wide challenge of Delayed Transfer of Care (DTOC), commonly referred to as bed-blocking, which sees many patients stay in an acute hospital bed longer than necessary.

DTOC occurs for a number of reasons, ranging from patients waiting on non-acute care, through to a lack of social care available to support the patient's safe return home. It's detrimental to patient outcomes and the health system as a whole, as it reduces the number of beds available and costs the NHS millions each year.

You might think the concepts of home and community are unrelated to DTOC but we've proven the positive impact both can have in a health care setting.

Working with staff and patients in Withington Hospital, we introduced the small household model to Buccleuch Lodge – a unit which provides intermediate care for older people. The small household model involves a group of people living together in a domestic setting, with a focus on companionship and living life with meaning and purpose. The goal is to create a normal daily living experience where residents dictate the rhythm of their day, and are supported by staff to participate fully in the household.

At Buccleuch, it has meant removing anything that resembles a typical hospital ward, from nurses' stations to equipment cluttering hallways, to create an environment akin to home. We now have a large dining table where people can share meals or chat with family, there are paintings on the wall, and a small library of books. Homely touches like fresh flowers are dotted throughout the unit.

Power to the people

The introduction of the small household has required more than a physical refurbishment of the unit for it to be successful, it's also required staff to change their own attitudes and behaviours. We've worked with staff to co-design a new cultural approach which encourages people to think differently.

We've abolished the hierarchical and institutional feel of the unit, through the simple act of everyone wearing the same polo shirt. The colour teal was chosen by the Buccleuch workforce and it means staff are identifiable by team rather than rank.

Reinvigorated staff members have created new ways of engaging patients that are not task-based. They've designed new activities, spend more time chatting with patients, and have created zoned spaces, so people can choose whether to be in a quiet area or in the midst of the action! There's no hiding in offices to write up notes, with staff working at the central dining table and pitching in with mealtimes, cleaning and activities. We've got champions across nursing and therapy teams from the bottom up.

Therapy is now undertaken with purpose and imitates real-life. Patients work towards a goal, for example making a cup of tea in the kitchen, rather than spending their entire rehabilitation time in a gym. They are supported by staff and their fellow patients, and have grown in confidence. We've seen fuller participation in daily activities, with patients deciding what to do, with the TV often switched off to make way for conversation.

Multiple small households in multiple neighbourhoods can drive connection, collaboration and companionship.



This low-budget test of concept has disrupted the traditional approach to supporting people through their rehabilitation, successfully increasing patient flow and providing a much better experience. It's been done on a shoestring but there's been positive feedback throughout, with patients and families telling us that Buccleuch feels more homely and relaxed – definitely not like a hospital!

Small is where the magic happens

The small household approach recognises staff and patients as individuals. They're not defined by a job title or illness, and everyone is treated equally. The unit reconfiguration and the way staff engage with patients has fostered a greater understanding of each other. As one resident, Major John, told us – 'we're not all old plonkers you know'.

Evermore believes that small is beautiful. We also recognise that achieving the aims of this challenge at scale means working cooperatively and thinking big. Multiple small households in multiple neighbourhoods can drive connection, collaboration and companionship. Technology can play a big role in enabling neighbourhoods to flourish, but it won't beget success on its own.

Photo credit: Images courtesy of Evermore Wellbeing

Mobilizing society to tackle isolation

Catherine McClen
Founder and CEO, BuddyHub

It is believed that prehistoric mankind lived together in small, close, intergenerational communities, hunting and gathering and supporting one another for survival – and for the good of the community. Fast forward to the present day and we are instead living in an age of isolation.

The numbers are striking: 9 million people always or sometimes feel lonely in the UK^[1]. This can particularly affect older people, who may feel lonely or isolated due to retirement, changes to health, and loss of friends and partners. This may lead to a form of involuntary solitary confinement with 200,000 older people saying they have not had a conversation with friends or family for an entire month.^[2]

Yet, as social animals, we need to be connected to one another and feel that we belong to a group which can support us.^[3] 'Friendship is the single most important factor influencing our health, well-being, and happiness', affirms anthropologist and evolutionary psychologist Robin Dunbar.

Our earliest ancestors have taught us this, but how do we get back to a way of living that better resembles those supportive and close intergenerational communities in the modern world we live in?

**The numbers are striking:
9 million people always or
sometimes feel lonely in the UK.**





Communities in the modern world

Firstly, the way we live and socialise in our communities should be more varied in terms of age and background. In an ideal world, our communities would be unified. We would easily cross generational, ethnic, socio-economic, cultural and health divides so that people are connected around what they have in common and their passions.

Secondly, the way we connect to each other will need to overcome trends in modern life. Transitory living and places of work don't give people the same sense of belonging than before. Likewise, the growing predominance of digital communications and long working

hours are changing the nature of our interactions.

To future-proof our communities, we need to unlock the potential of technology to help remove the barriers which prevent us from connecting with one another and to support our relationships. We should focus on those vital face-to-face interactions with a close friendship group, as our ancestors did, and not substitute them with lower quality virtual interactions.

Addressing the needs

We need to mobilize society around shared interests and leverage technology to create

new, meaningful friendships for older adults feeling lonely or isolated. Solutions must reach those who are not digitally literate too. This will help older people to rebuild their social circle at a time of life when it can be extremely hard to do so.

BuddyHub uses technology to enable us to carefully match and introduce an older adult to three new volunteers, creating a new supportive social circle to them close to home. We factor in location, interests, passions and personality to make great matches. This increases the likelihood of bonds being developed so new friendships can flourish naturally regardless of age or background. A flexible approach that uses smart technology to ease peer-to-peer communications also supports these new connections to turn into meaningful long-term relationships.

The objective is to help ensure we have strong social connections throughout our lives, preventing the detrimental impacts of loneliness on our well-being and bringing happiness, comfort and resilience.^[4]

Clearing the obstacles and mobilising our modern-day tribe

A key challenge to building these interconnected communities is mobilizing this army of volunteers, whilst safeguarding vulnerable older adults. We need an easier way to conduct criminal record checks. We need to move beyond a system that requires applicants to produce three original paper documents (in our paperless world) to prove that they are who they say they are. The answer may lie in the introduction of national identity cards, to easily verify someone's criminal record status, though this seems politically difficult in the UK. The data needed is already stored. Accessing it efficiently would allow voluntary organisations and employers to more easily mobilise volunteers and staff.

Another obstacle is the too-prevalent and ageist viewpoint of many stakeholders within the public, voluntary and grant-making sectors that older adults or 'pensioners' should have free services paid for via grants or the public purse. Given the lack of available funding, the logical outcome of this viewpoint is to deny choice and services to those who need them. BuddyHub is a membership club with affordable fees based on income. We are seeking third parties to cover the membership fees of those for whom any form of payment is a barrier. We empower older adults as our customers and recognise that engagement with a paid service has better outcomes.

A key challenge to building these interconnected communities is mobilizing this army of volunteers.

As a society, we need to feel more relaxed about the 'commercialisation of friendship'. This is similar to our new attitudes towards the commercialisation of dating. Attracting private capital is vital in helping to solve some of society's greatest problems, especially when investment in technology is required. BuddyHub's 'double bottom line' legal structure reflects our firm commitment to the public good and our offer of fair returns to investors. Some stakeholders need to move away from a common 'profit is bad' mentality and focus on outcomes.

A global solution to a global problem

Issues around demographic ageing and loneliness are widespread. Therefore, solutions to this problem can attract global interest. However, transporting solutions around the world requires a consideration of cultural and ethnic differences and social norms around community, volunteering and family relationships that could require adaptation. Engaging with organisations, on the ground in other countries, could help ensure that local sensitivities are taken into account and enable successful international expansion.

Taking down obstacles would help mobilise our modern-day tribe and build a community around equality and respect, one that is truly inclusive and welcomes anyone. By 'anyone' I really mean 'everyone'. Nobody should be marginalised on the basis of their mental or physical health, ethnicity, sexuality, age or anything else. That's an ideal world I'd really like to live in.

[1] British Red Cross and Kantar Public (2016) Trapped in a bubble: An investigation into triggers for loneliness in the UK here.

[2] Age UK (2017) here

[3] Roy Baumeister and Mark Leary (1995) The need to belong: Desire for interpersonal attachments as a fundamental human motivation.

[4] Campaign to End Loneliness here.

Photo credit: Images courtesy of BuddyHub and Angels Vicente

NEIGH BOUR HOODS OF THE FUTURE

TECHNOLOGY

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Home smart home

In the spirit of looking forward, a principle this publication is built on, we invited Jakub Rozanski and Katarzyna Mackowiak, of architectural and design visualisation studio, We Mapout, to reimagine what a retirement home might look like in the next twenty years.

Their concept encompasses an expansive building type, with bespoke, prefabricated units which slot into a steel grid structure. Featuring large outdoor terraces and double height living spaces, the building is designed to embrace natural light and facilitate the growth of free-standing plants and trees.

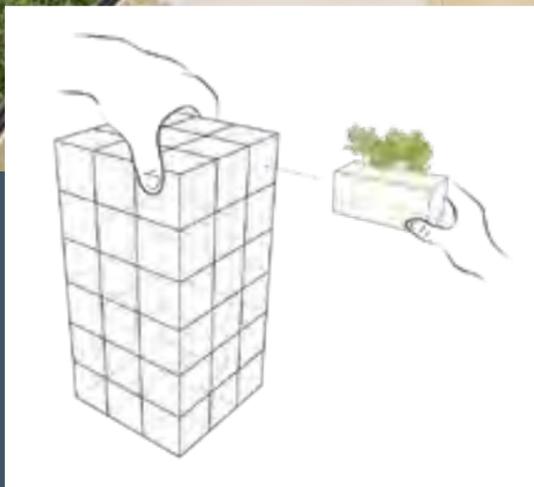
Jakub and Katarzyna were inspired by Milan's 'Vertical Forest', an award-winning development which uses more than 20,000 trees and shrubs, each positioned according to their resistance to wind and preference for sunlight and humidity. Speaking to 'thejournal.ie', the forest's architect, Stefano Boeri, explains that beyond the aesthetic his design is a weapon to combat climate change:

"Cities now produce about 75% of the CO₂ present in the atmosphere. Bringing more trees into the city means fighting the enemy on the spot."

In this section, Jakub and Katarzyna highlight innovations in design and architecture, together with a selection of new products and services, which could improve, and in some instances revolutionise the quality of life for older adults in years to come.

Photo credit: Image courtesy of Ian Spero





Concept for expansive building. Bespoke prefabricated units slot into steel grid structure

Exterior

- Large open courtyards with visible pathways
- Enclosed social spaces with plants and seating areas
- Large open balconies
- Pharmacy and other services located on the ground floor

- Secure and friendly environment
- Vertical design – Architecture
- Vertical gardens
- Interactive facade – Shading system for living comfort
- Exterior lighting – Way finding system

Lanzavecchia + wai: no country for old men domestic objects for the elderly
<https://www.designboom.com/design/lanzavecchia-wai-no-country-for-old-men-domestic-objects-for-the-elderly/>

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Intuition robotics elli•q
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PriestmanGoode's Scooter For Life
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Postmates – delivery robot
<https://www.designboom.com/technology/postmates-serve-autonomous-delivery-robot-serve-12-14-2018/>

Pavegen's floor tiles could power future cities with footsteps
<https://www.dezeen.com/2017/10/27/movie-mini-living-pavegen-flooring-system-power-future-smart-cities-video/>



Communal living space

- Interactive wall screen
- Large windows
- Adjustable pendant lighting systems
- Outside communal space with access to vertical gardens
- Bridges that connect to neighbourhood towers

Google Daydream View virtual-reality headset
<https://www.dezeen.com/2018/11/21/fabric-covered-gadgets-technology-cosy/>

Kuri robot
<https://www.dezeen.com/2017/01/05/kuri-home-robot-mayfield-robotics-ces-consumer-electronics-show-technology/>

Segway loomo robot
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Virtualphones Technology
<http://www.futurelab.sony.net/N/technology/>

Care-O-bot 4
<https://www.care-o-bot.de/en/care-o-bot-4.html>

Interactive Table "T" Future Lab Program
<http://www.futurelab.sony.net/T/>

Intuition robotics elli•q
<https://www.dezeen.com/2017/01/11/elliq-robot-yves-behar-fuseproject-helps-older-adults-stay-connected-world-design-technology/>

Icaros combines fitness and virtual reality
<https://www.icaros.com/>

U touch interactive screen
<http://www.u-touch.co.uk/touch-wall/>

i-SIT resting chair
<http://inclusivedesign.no/furniture-and-interior/i-sit-resting-chair-article129-263.html>

CarePoint – Philips
<https://philipsseniorliving.com/carepoint/>

Home Smart Home research, visualisation and CGI images courtesy of Jakub Rozanski for WE.MAPOUT Architectural & Design Visualisation Studio Manchester

- Smooth surfaces
- Fall detection floor with light fitted sensors
- Use of acoustic panels (ceiling)
- Dedicated space for exercising



Postmates – delivery robot

<https://www.designboom.com/technology/postmates-serve-autonomous-delivery-robot-serve-12-14-2018/>

British gas hive view

<https://fuseproject.com/work/british-gas/hive-view/?focus=overview>

Intuition robotics elli•q

<https://www.dezeen.com/2017/01/11/elliq-robot-yves-behar-fuseproject-helps-older-adults-stay-connected-world-design-technology/>

MiRo

<http://consequentialrobotics.com/miro/>

Food Probe by Philips Design

<https://www.dezeen.com/2009/09/08/food-probe-by-philips-design/>

Moley robotics – kitchen robot arm

<http://www.moley.com/>

<https://www.smithsonianmag.com/innovation/robot-make-me-dinner-180957535/>

Care-O-bot 4

<https://www.care-o-bot.de/en/care-o-bot-4.html>

Aged Care virtual reality

<http://www.agedcarevirtualreality.com/>

Samsung Family Hub – Interactive Refrigerator

<https://www.samsung.com/us/explore/family-hub-refrigerator/overview/>

Pull Down Cabinets – Kitchen ideas

<https://ageinplace.com/at-home/aging-in-place-home-ideas/kitchen/>

Kitchen living space

- Interactive wall screen
- Large windows
- Adjustable pendant lighting systems
- Outside communal space with access to vertical gardens
- Bridges that connect to neighbourhood towers
- Bio wall (growing your own food)
- Smooth surfaces
- Easy access to plugs
- Use of colour for visual impairment
- Fall detection floor with light fitted sensors
- Use of acoustic panels (ceiling)

Technology for health and wellbeing – an NHS perspective

Professor Wendy Tindale OBE
CEO, NHS England Test Bed, Devices for Dignity

Philippa Hedley-Takhar
Business Development Manager, Digital Care Home
– NHS England Test Bed, Devices for Dignity

The NHS is a system under unprecedented strain.

With demand for care exceeding funding growth and provider capacity, the current model of health and social care is widely acknowledged as unsustainable in light of our ageing population. Many individuals are encountering difficulties living in their own home due to the collective effect of ageing, frailty and overlapping complications of long-term conditions. This has contributed to year-on-year increases in admissions to hospital.

Patients are delayed in being discharged from hospital back to home settings, due to waiting for care packages to be available at home or availability of beds within nursing homes. This is adding pressure to an already fragile health system. There is an ever-increasing urgency for the system to change and evolve.

The message from the top

These challenges to the healthcare system require bold responses.

The Health Secretary has made it clear that we 'can't wait' to shift NHS spend away from hospitals in order to grow GP and community services which focus on preventative measures. We know that

successfully digitising the NHS will be essential to achieving the triple aim of better health, better healthcare and lower cost. Technology has the capacity to create efficiencies in the delivery of care, early diagnosis and personalisation of treatments, and transform the ability of individuals to participate actively in their own care and management of long-term conditions.

The vision and direction of travel within health and social care is working in partnership with 'Integrated Care Systems' which comprise NHS organisations, local authorities and other partners. These would then take collective responsibility for managing resources and improving the health of the population they serve.

The need for a system-wide response and shared responsibility not only means investment and re-allocation of resources in the NHS, but also investment in future homes, communities and wider services. We need creative approaches to using assistive technologies, and to design services to meet the wide variety of circumstances, aspirations and needs of people as they age.



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Innovation in partnership

Artificial intelligence has the potential to revolutionise healthcare. Point of care diagnostics are accelerating the journey from early diagnosis to treatment. And telehealth is taking outpatients conversations from the hospital to the home environment. If there is a national commitment to making use of these technologies in delivery of care, exciting opportunities emerge.

These opportunities extend beyond public services. Could future homes facilitate access to peer support networks as solutions for social isolation and loneliness? Could technology and the built environment support individuals through social prescribing, voluntary networks and the use of community resources and assets? We could see improved health, emotional wellbeing and social inclusion, creating a connection between the citizen and the neighbourhoods where they live.

There is no shortage of innovation from within the NHS. The challenge lies with the capacity to take that creativity and expertise from concept to reality, and to evidence the value and impact of working in new ways delivering cost efficiencies and improved health outcomes and experiences. Fortunately, investment in NHS innovation infrastructure is growing this capacity and recognising the importance of collaborative working with partners.

Devices for dignity

Devices for Dignity¹ is a national MedTech Co-operative embedded in the heart of the NHS. It acts as a catalyst for the development of new technology and connected health solutions to meet clinical needs. Many of these needs are associated with loss of dignity and independence. Crucially, it operates in multi-stakeholder partnerships

from across health and care and industry, and with the patient and public voice at its heart.

Devices for Dignity's person-centred care approach has led to the 'Digital Care Home', a digital solution which predicts risk of health deterioration and integrates information from care home residents into patient records. These can be accessed by health teams for joint decision-making, with the aim of reducing demand on emergency services and avoiding hospital admissions.

Building on our principles

Solutions building on the principles of the Digital Care Home can support an ageing population living independently or in a supported living environment. We have the opportunity to create living spaces where assistive technologies are part of the fabric of the built environment. Innovation in assistive technologies through engagement with clinical networks and patients working with specialist organisations like Devices for Dignity are making huge leaps on the journey to take healthcare out of hospitals.

Recent breakthroughs:

- Patients can take dialysis to the home in the form of portable units.
- We can test for atrial fibrillation (which increases the risk of stroke) using a handheld mobile device at community pharmacies.
- We can use text messaging telehealth solutions to communicate with community nurses and GPs for virtual home visits using smartphones.
- We can use virtual reality robotics to aid home-based rehabilitation.
- We can monitor medication adherence for people with asthma and diabetes.

- We can place ambient sensors in the home environment to provide information to carers, families and health professionals about the safety of the more vulnerable population, such as those living with dementia.

These innovations are already improving lives. However, a technology 'push' is not enough. If we want to be truly transformative, services will need to be redesigned to maximise the value and acceptance of technology, with adaptive housing in our neighbourhoods of the future which avoid living spaces that look like a hospital ward.

Putting the users at the centre

Digital transformation in health is an ongoing journey that requires putting the user at the centre. Services and systems need to take the people with them and empower them to take ownership. Change requires a shift in the power dynamics between citizens, patients and health professionals. To make this possible, we need to anticipate any obstacles to the adoption of the new technology.

Engagement with the ageing population and provision of training and support for digital inclusion will be essential for sustained long-term use. Meaningful co-production with citizens brings users

of services into the partnership as those best placed to help design for the future. It leads to better use of resources, increased capability-building for individuals and communities, and more effective outcomes.

Devices for Dignity's ambition, by working with people to understand how they want their homes to work for them as they age, is to define and co-create the 'Future Digital Neighbourhood', an intelligent platform for residents to link assistive and lifestyle technologies and robotics which are specific to their personal needs. A platform that builds on artificial intelligence to generate information and knowledge which can be applied to give people the confidence they need to live the life they want, removing barriers to participation in society and enabling self-management and supported care to be delivered irrespective of location. This supports people in moving away from a medical model of care to one of lifestyle choice and helping to make loneliness and social isolation a thing of the past.

We need to support active ageing in our older populations today and, in parallel, provide a test bed for ongoing adaptation and technology innovation as user needs evolve in response to the question 'What matters to you?'

¹ National Institute of Health Research Devices for Dignity MedTech Co-operative

Photo credit: Images courtesy of Devices for Dignity





Know before you go – The transformative power of building information management (BIM)

Alex Small
BIM and Digital Platforms Manager, Tata Steel

A number of articles in this white paper talk about the need to build homes off-site using modular platform-based production methodology. At Tata Steel, we see this as an excellent opportunity to revolutionise a static housing market. Innovation in construction and advances in technology have opened up new horizons for architectural design. But as this development increases levels of complexity, there is a corresponding increase in the likelihood of errors.

For decades, a lack of coordination has led to clashes, errors, inefficiencies and bodged quick fixes which caused projects to overrun both their schedule and their budget. Additionally, not having key information like maintenance requirements readily available on building assets has caused huge inefficiencies in operational and facilities management. The only way to increase reliability and productivity is to make the whole process more efficient from end to end. This should also result in housing which is faster and cheaper to build and maintain.

This is where Building Information Modelling (BIM) comes in.

There are many definitions of BIM, but all of them agree on the key elements: the utilisation of 3D CAD platforms, interoperable data and working collaboratively. By making data machine-readable in 3D models, it can be accessed and utilised in a myriad of ways. This enables digital platforms, such as facility management tools, to make information immediately and freely available to anyone along the lifetime of the asset.

A 3D BIM model helps facilitate coordination between the construction supply chain. It can act as a “Digital Twin” to make information visual and interactive on all the elements of the architectural and structural design, as well as on electrical, mechanical and plumbing services.

It is this level of detail, and the ability to build and easily amend an interconnected design, that makes it ideal for mitigating the problems caused by changes, clashes, misalignments and errors. And that same information is made available for the operational management of the building.

The levels of BIM

There are three established “levels” of BIM.

Level 1 requires coordination between the construction supply chain and encourages the adoption of 3D CAD. (This is, generally speaking, where we are now.)

Level 2 requires 3D CAD to be utilised, with models being passed between all parties to improve collaboration. It also necessitates the addition of structured product and project data (such as maintenance and performance data) to enhance the detail in the model – (Current best practice is getting close to this.)

Level 3 seeks to have one 3D digital model that all parties contribute to. Interconnected systems and IoT integration enhance the quality and depth of data as well as the functional capability of the asset. (This is the future.)

As you progress through these levels, the increasingly efficient usage of information drives productivity improvements. For example, in Level 2, if a facilities management company was told that a light bulb had blown in an office on the second floor, they would be able to quickly find out not just what type of lightbulb was needed, but also what size of ladder would be required to change it. We call this “know before you go” and it helps drive operational efficiency. In Level 3, the light bulb would be “smart” and would send a message to the company suggesting it be replaced before it evens flickers. This is called “predictive maintenance” and helps drive functional efficiency.

There are many definitions of BIM, but all of them agree on the key elements: the utilisation of 3D CAD platforms, interoperable data and working collaboratively.

As steel becomes an ever more significant enabling component of modern housing, this is where Tata Steel aims to add huge value.

Opportunity lies ahead

As the industry starts to understand the opportunity that lies ahead, construction product manufacturers are being called on to lead the charge. They are thinking increasingly within a framework of componentisation. Manufacturers make products; products make systems (or assemblies); systems make buildings. By starting with the individual products, or components, you have the range of parts needed to build anything you like. (Think LEGO!)

This concept of componentisation has many benefits. Firstly, you can link every physical asset to a digital component in a 3D model, either uniquely or as part of a system. This means that, as you install them on site, you can build a 3D digital replica (a Digital Twin) of the construction progress. This certainly improves programming and planning but also enables a wide range of benefits, including simplifying invoicing, product performance and provenance, commissioning, maintenance and handover. This why in his recent review of the construction industry entitled “Modernise or Die”, Mark Farmer suggested the “Manufacturer-led construction” could be one of the main drivers for change in the industry.

As Terry Stocks will explain in his contribution to this publication, huge potential productivity benefits can be gained by manufacturers collaborating with the industry to develop new, standardised components and digital tools to enable faster, simpler, building design and assembly/construction on and off site. As steel becomes an ever more significant enabling component of modern housing, this is where Tata Steel aims to add huge value.

There is no doubt that BIM is a key driver, but the opportunity is wider than that. Technologies such as blockchain can help provide confidence in product provenance and in-use performance. Artificial intelligence and IoT implementation can be used at all stages in a project, from enabling flex of supply chains during construction to managing building performance and energy use. The future vision for housebuilding could be that potential buyers can create their own house design online and see it built within weeks. A well-oiled supply chain using rules-based generative design tools, offsite manufacturing efficiency and the right, smart products can achieve great things.



Applied artificial intelligence in our global neighbourhood

Daniel Hulme
CEO, Satalia
Director, UCL's Business Analytics MSc

Over the coming few decades, AI is going to bring about a massive change in the way we interact with our environment, and each other. This shift will raise many ethical questions, and will force us to reassess our social and economic models. Many of the questions that philosophers have been pontificating over the millennia will now have to be practically addressed. But what should be the goal of a smart city or neighbourhood? I hope that countries will optimise for happiness as opposed for GDP, and I hope that we will start to cooperate as a united planet instead of a divided one.

The best definition of intelligence that I've ever found is "goal-directed adaptive behaviour", by Steinberg & Salter (1982). Without an objective – a goal – it's impossible to compare the success of one intelligent system over another. Naturally, the system has to have the ability to move – or behave – towards a goal. The critical element that distinguishes the intelligence of one system over another is its ability to adapt. If a system can adapt its physical body and mental model faster and better than another system with the same goal, then I would argue that it's more intelligent.

Evolving our environment

Through the process of evolution, biological life has developed physical and mental plasticities which allow it to adapt to the environment, such as the ability to regulate temperature, to learn from mistakes, and to change pigment as camouflage. Our bodies interact with the environment in complex ways, like foraging for food, seeking suitable mates, and fending off predators. Some

biological life has developed the ability to not just adapt itself to the physical environment, but to adapt the physical environment to itself, such as building nests, cultivating food and setting traps. Some species collaborate to form complex societies and even cooperate with other species to form ecosystems to increase their robustness and resilience. Others have even developed tools and technologies that have extended their physical reach so to adapt the environment to better suit their needs.

We've learnt to master fire and electricity, to heat our homes and communicate over incredible distances. It could be argued that humans are the most adaptable species on this planet. We can't fly or survive underwater, but we can adapt our environment and build technologies that enable us to survive in even the most hostile places. Perhaps there are more resilient and robust species – ones that could survive unpredictable changes in our environment such as an unexpected volcanic eruption that would make our atmosphere uninhabitable by humans – but there are arguably none as creatively agile as us.

For millions of years, biological life has been intelligently adapting its environment to enable it to thrive. However, since the start of this century our species has established a new paradigm; we've begun building environments that intelligently adapt to us. AI is starting to be used to automatically control the temperature in our homes, recommend what products we should buy, and advise us about what to eat to live longer, healthier and happier lives. Like biological systems, AI consumes data from a myriad of sensors. Whether we carry these devices around –

like our phones – or they are embedded in the walls and objects we interact with, we're seeing an explosion of sensory data that is being mined for insights. This technology is often called the Internet of Things (IoT), and it's becoming the eyes and ears of AI.

Environments building environments

If Moore's Law continues – where computing doubles in speed every 18 months – then over the coming decades these devices will become exponentially smaller, perhaps small enough to run through our veins and gather detailed data about our physiology. This data will surface insights that will enable our environment to intelligently interact with us in ways we can't yet imagine. Some people believe that it will even allow us to cheat death.

Aside from predicting when to make us coffee or when our autonomous car should pick us up from the office, our environments will learn to make our lives more comfortable by collaborating and interacting intelligently with itself. 400 million years ago the formation of the earliest eyes caused the Cambrian Explosion of diverse biological life. I would imagine that we will see a similar explosion of technology, stemming from the convergence of an abundance of sensory data with the ability of our environments to reconfigure and perhaps construct themselves without human intervention or guidance – environments building environments.

The intelligent environments we're building form the fabric of our physical and digital interactions. With virtual and augmented reality on the horizon, we might see people living more and more in virtual worlds; worlds that allow us to suspend all of physics and reality. Perhaps we can't yet imagine how magnificent and absorbing those worlds will

be, or how they will evolve. We don't know how it will change the way we interact with physical and virtual objects, AI agents and each other. Nor do we know what impact these adapting environments and intelligent worlds will have on our physiological development, emotional intelligence and social attachments.

The ethics of AI

For millennia, philosophers have been debating about how society should be structured and what it means to live a 'good' life. As our environments start intelligently interacting with us we're giving them the power to create and destroy. We have to embed ethical behaviours into these systems, which makes it an extremely exciting time for humanity, because we now have to agree on what those ethical behaviours should be.

Blockchain technology is giving the world a trusted data platform, and AI is providing the means to collaborate and connect without friction.

Blockchain technology is giving the world a trusted data platform, and AI is providing the means to collaborate and connect without friction. Over the coming decade we might see the emergence of a DAO (Decentralised

Autonomous Organisation) that will allow for truly decentralised and distributed decisions and actions. I can imagine a world whereby anyone could boot up a project by launching a DAO that enables contributions from anywhere in the world. The DAO is similar to the open-source movement, but in this new paradigm, anyone – software engineers, designers, marketers, accountants and even strategists – will be able to rally around an idea and contribute to its development. Work won't be provided for free or kudos, as in the open-source model: instead, fiscal remuneration will be determined by the quantity and quality of the contribution. This means that anyone will be able to contribute to a project, even just for a few hours, and they would be rewarded fairly for their work. As people work on these open projects, the DAO captures their contribution on a public blockchain. These contributions accumulated to form a reputation that determines the rate of remuneration on future projects. People develop different rates for different skills, and the rate evolves dynamically over time. You would be paid a different rate for marketing work than for software development, depending on your relative skill in each.

A cambrian explosion of funding models

Many of these open projects will use digital tokens as their economic model. A Cambrian Explosion of funding models will appear, such as ICOs (initial coin offerings) and other types of token sales. Selling tokens will give DAO projects the capital to get started. By reducing the waste and friction we may reach a point whereby new innovations help ensure that everyone's basic needs are met. Giving everyone seamless access to healthcare, nutrition and education will mean that people have the freedom to create and contribute to DAO projects without the need for initial funding. Since digital tokens have

no jurisdiction, contributors from anywhere in the world can be remunerated with the same currency. Someone in Europe who contributed the same value to a DAO project as someone in India would receive the same remuneration. And because everyone has a fair opportunity to contribute to DAO projects, there may be a rapid redistribution of wealth.

One of the founding principles of the DAO is that all products are open source. The creation of a completely frictionless free market, where the cheapest and best-placed people could contribute mean that toxic companies are starved of labour and customers. Efficient markets coupled with conscientious consumption could spawn tens of thousands of new organisations whose products and services are developed to meet real needs and provide real benefits.

People will be able to work anywhere they want, which could cause mass migration. Digital nomads could force governments to reassess and innovate their policies to attract and retain corporations and talent by reducing taxes, and slackening employment laws. The freedom to work anywhere will cause substantial population shifts, and re-energised communities, with people growing their own food, harnessing natural energy sources, and turning away from mass-produced or packaged solutions. This re-emergence of community after years of isolated self-interest could have a huge impact on happiness levels of all age groups.

Photo credit: Image courtesy of Satalia



Finding the balance between security and technological advancement

Andrew Cameron
Founder and Director, Camaderon Ltd

The rate of technological progress only shows signs of speeding up

It often amazes me how fast the technology sector moves, and how it continues to enhance lives across the world. Just think: it's only ten years ago that we started to use smart phones. Back then, we thought smart home technology was something reserved for techno wizards and that electric cars were simply milk floats. Even Bitcoin was yet to be released. A lot has changed.

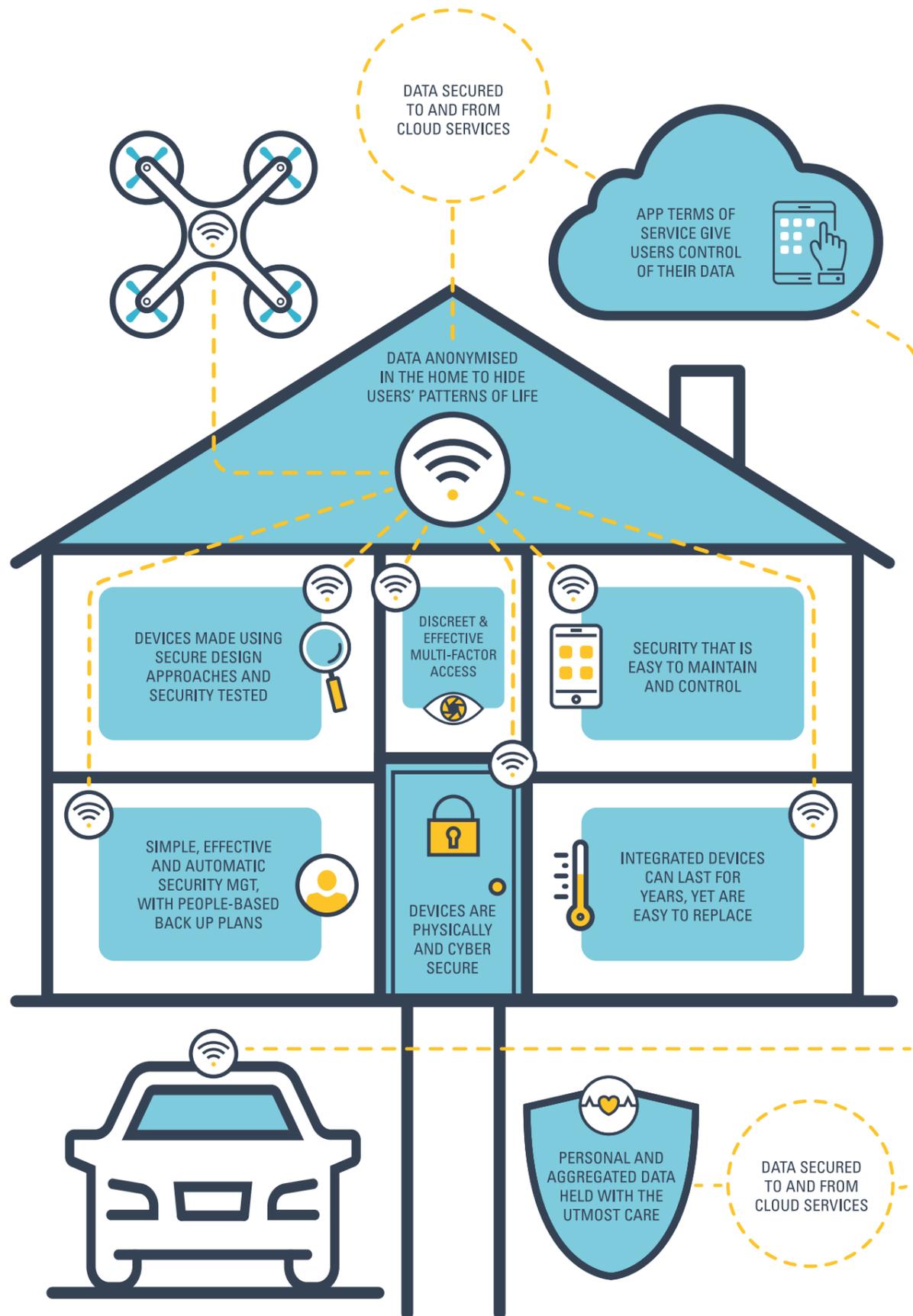
The next ten years will continue to see tech innovation become commonplace. We can expect more personalised digital assistants, greater use of virtual and augmented reality, and autonomous everything. Most of these technologies will be enabled through the Internet of Things (IoT) and various forms of Artificial Intelligence (AI). Many of them will help us to stay in our own home for longer.

However, as well as more readily embracing technology, we now also understand much more about privacy and security. We have had to consider how targeted advertisers are making use of our personal data. We know that cybercrime syndicates steal identities and use ransomware to extract money via our internet connected devices. Numerous high-profile data breaches have affected us all, with businesses now striving for compliance with upgraded data protection legislation. Sadly, with our lack of human 'cyber senses', methods to stop, spot and fix privacy and security issues are only going to become more important.

Immediate cyber security isn't easy

As an IT system builder and advisor on cyber security, I know first-hand how tricky it can be to successfully integrate security. It has to be balanced with cost, functionality, customer expectations, and time to market. For those who have tried, it is fairly straightforward to create a device or service that meets a direct need. However, testing it properly for the many mishaps and attacks that can occur, requires much more effort and funding. As consumers, we must remember that the technology for tech-assisted living advances quickly. It isn't perfectly developed, has numerous vulnerabilities, and will need to be replaced.

That said, I think that steps can be taken to ensure we get the secure products and services we want in our future homes and neighbourhoods. It simply requires each person in the 'neighbourhood system' to think carefully about their interaction with technology, to collaborate to refine their ideas, and to act purposefully.



I know first-hand how tricky it can be to successfully integrate security. It has to be balanced with cost, functionality, customer expectations, and time to market.

Good security and privacy are achievable

There are some security measures that can be achieved now:

Currently, most advertising for security products focuses on the lifestyle benefits, features and price. However, if we want safety for our homes and neighbourhoods, the products and services we buy must consider the security aspect. This should include standards reached, tests performed, and limitations. This will enable better buying decisions to be made.

The Terms of Service (ToS) on too many apps and services give a vague indication of how personal data will be used. Users need to know what personal information is going to be taken and how it will be anonymised; with only the minimum amount of data used to deliver a service. Ideally, I'd like to see the creators of these services write simple 'ladybird-book' style ToS, and clearly indicate how likely changes are going to be. It will then be easier to analyse the risk of integrating those services into our homes and neighbourhoods.

No one can foresee how technologies can fail, and users need to manage their expectations accordingly. That said, I'd recommend several precautions. Use services and devices that come with high reliability, availability and supportability. Ignore 'faddy', short-lived, low-utility, low-security tech e.g. smart toasters and kettles. Consider how much money, time and disruption will take place to replace a smart installation. Lastly, think about having a people-based backup plan or process, just in case the worst should happen.

Developers can enable security at many stages of their devices and services

One of the big security gaps in recent years has been failings to secure the supply chain. We need to know what tests each supply company, and its products/services have undergone. It would also be great if developers could do regular penetration tests, advertising the findings, and making good on any deficiencies.

Developers should also be building IoT devices and services with good security built in, based on a thorough knowledge and experience of cyber-attack methods. Many good technologies already exist that have been tested by the wider technology community. These can be integrated into secure designs.

Most home technology is currently quite basic and doesn't get replaced often e.g. boilers, cookers and thermostats. However, with IoT we should expect to see technology being replaced every 3-5 years, with batteries replaced every year (if not mains connected). Developers need to make sure that devices are easy to replace, and only loosely coupled to the rest of the building systems and Internet of Things. Otherwise, users are likely to continue with out of date devices with their inherent security risks.

Demonstrators can enable us to integrate and test security with functionality

In a world where cyber security skills are in shorter supply than needed, and behaviours towards maximising profit are quite deep rooted, these thoughts may be difficult to achieve. However, NoTF demonstrators will be a great place to test whether these and many other integrated security advancements and behaviour changes are achievable.

Photo credit: Images courtesy of Camaderon Ltd

We can't allow technology to disrupt our legal and ethical frameworks

Karen Holden
Founder, A City Law Firm Ltd

With any advancing technology, we must balance its capabilities with human rights and privacy. By their nature, new technologies tend to be invasive. With an overwhelming volume of data already being generated, failure to properly protect data is an ever growing concern, especially in the context of healthcare. This risk is only going to increase as AI enabled technologies become smarter and more and more personal information is generated. For example, in a smart home using IoT devices, everything from your TV to your fridge is likely to be collecting considerable personal data; from your favourite programmes to how much milk you use or how often you order a particular takeaway meal.

The potential for abuse is growing every day. Anyone designing disruptive technology should be thinking strategically about data protection, beyond the here and now. This is particularly true for any technology designed for the home, and especially the homes of potentially vulnerable people. Product and system designers and their companies should be working with legislators and regulators to ensure the authorities are fully aware of what's coming down the pipeline and how these could affect society. It may even be that the regulators become involved in the design and implementation of new technologies 'upstream', moving to a 'pre-approved' or 'pre-validated' internal operating system.



Failure to properly protect data is an ever growing concern, especially in the context of healthcare.

The times they are a-changin’

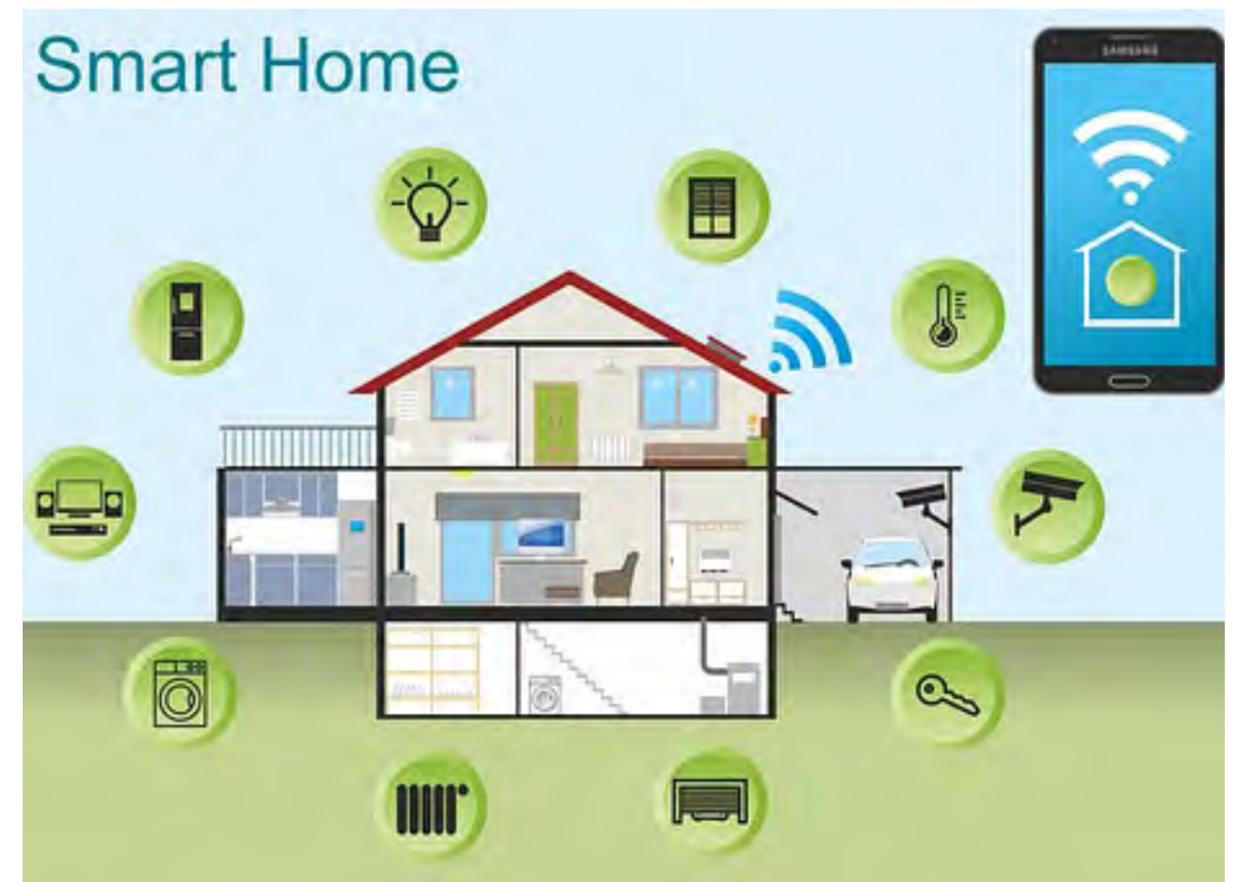
In the UK, the legal system is based on centuries of decisions. Technology, of course, advances much faster than the law. Whilst this is exciting for innovators, it presents challenges for legislators, regulators, and those in the legal profession. This challenge is not new. Whilst it is difficult now to imagine what life was like before we had smart phones, contactless payments and satellite navigation systems, lawmakers have still had to work to adapt to these developments. The same process will continue over the next 10-20 years, as our society works out how to adjust to widespread use of smart contracts, automated vehicles and IOT smart cities and homes.

Considering that it is, by its nature, constantly evolving, the English legal system is surprisingly robust. This is fundamentally because the law is based on a moral and ethical code. Invariably, the starting point is dealing with things which have gone wrong. The ethics of these infringements are inextricably tied to human nature. Whilst the action may be unprecedented, or caused by a new technology, the underlying legal principle can still be completely valid. For example, a contract may still be formed even if this is done using a new form of technology, say your smart fridge! And a nuisance is still a nuisance, even if this is caused by low-flying drones circling over your property.

New models, new challenges

As technologies change, and society with it, there are hurdles that lawmakers, legal profession and technologists will have to overcome. Yet technology itself may go some way to disrupt the role of traditional legal institutions. There may be little need for some offences to be enforced if technology makes that crime impossible to commit. For example, we may see automated vehicles, or vehicles which cannot be controlled by someone over a prescribed alcohol limit, or which will not start unless all passengers are wearing a seatbelt. Further, there may be no need for specific licensing terms if a smart contract prevents a device from operating in contravention of such rights. And certain areas of employment law may become redundant when applied to a robotic workforce.

Another area of law in need of clarity in the 21st Century is ownership. We foresee a rise of the use of digital assets, be that digital music libraries such as iTunes, tokens earned from an online game, or digital currencies like Bitcoin. We should be considering how society can make proper provision for an individual's digital assets within their Wills. We should also recognise that security features, such as passwords, will also need to be transferred to their estates to enable beneficiaries to access such assets. Indeed, it is likely that the whole idea of administering someone's estate will need to change radically.

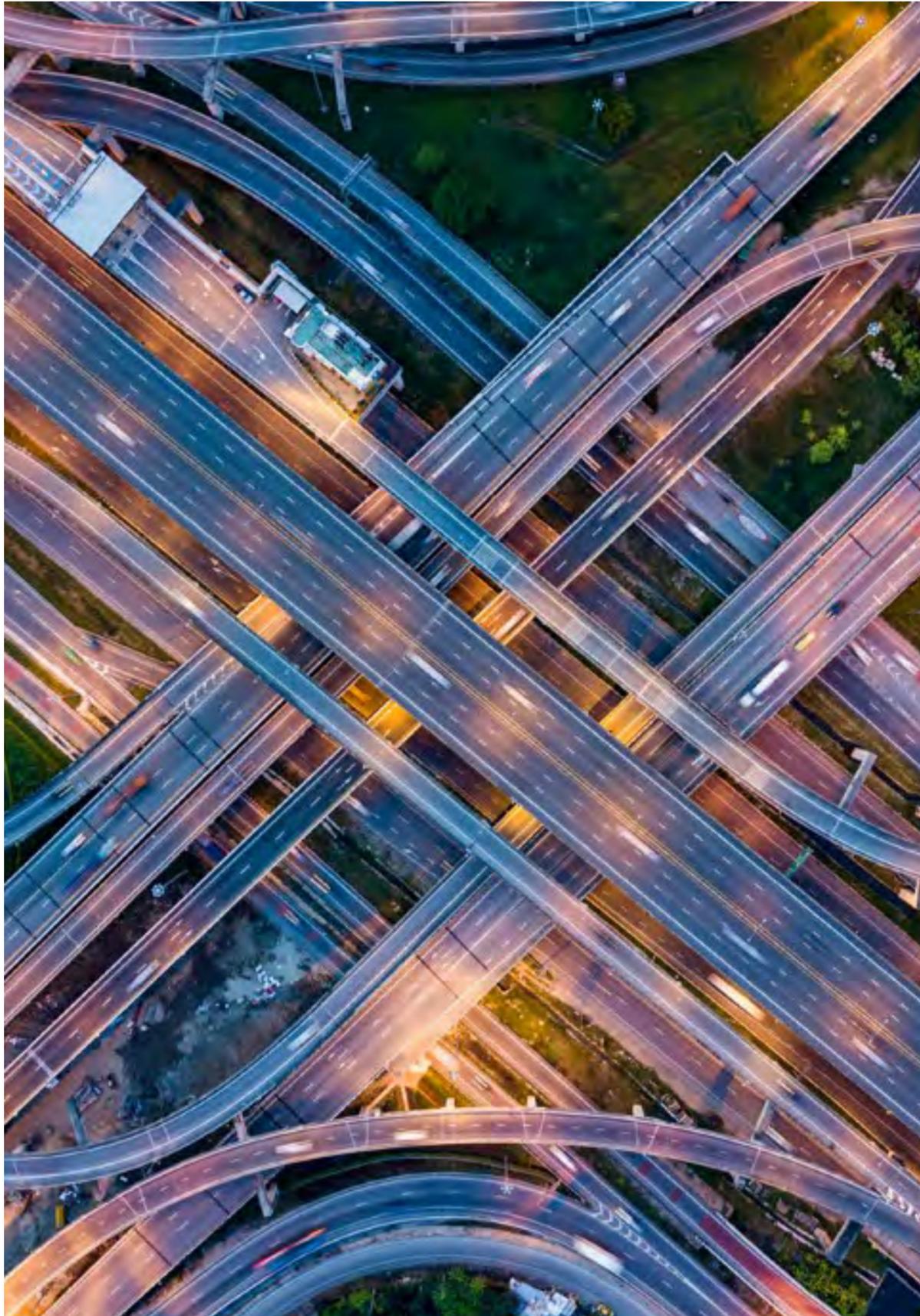


These changes should not be left solely to regulators. The technological innovators should be working in tandem with the authorities to ensure that there are proper provisions for the transfer of digital assets. Technology itself can aid the transmission of an estate. For instance, we could see blockchain replacing a traditional Will. But while there is any human involvement, disputes will still arise, even if the legal landscape looks very different.

The question remains

Whose moral compass will be incorporated into the technology? With large conglomerates controlling the advancing technologies, it is important that some form of human element is retained in this process. Humans will be present in the use of the technology, even if this is simply as the end user. Technology will continue to shape our society. The process of guiding this development into an ethical path should not be left to a single party, be it the developers and owners of the technology, or the legislators. This debate will affect all of our lives, and we must all have a voice in it.

Photo credit: Images courtesy of A City Law Firm Ltd



Smart technology must be interoperable

Robert McLaren

Head of Industrial Technology and Innovation, Policy Connect

Paul Doyle

ACCESS, Research and Development Manager, Hereward College

Interoperability is one of the foundations of our increasingly connected homes and neighbourhoods of the future. It's unlikely that any one company will be able to provide all the technology we will require for our age friendly homes – or that we would want a single developer to have that status. Customers' individual needs and preferences will require a mix and match approach to technology based on individual needs and preferences that shift over time. Devices and products from different developers have to learn to play together.

We come to this issue from two complementary perspectives: practitioner and policy professional. Paul Doyle is manager of the Access Centre at Hereward College, where he leads on assessments for environmental control and telecare, as well as research on user experience and workforce development.

Robert McLaren is head of Industry Technology and Innovation at the cross-party think tank Policy Connect, where he manages the All-Party Parliamentary Group for Assistive Technology.

To see what needs to be done, we look at the interoperability challenge faced by the environmental control and telecare sectors. These established technologies are evolving and have the very real potential to become an integral component of the emergent assisted smart, or cognitive home project. Interoperability practices that begin with the environmental control and telecare sectors can help build a wider infrastructure for interoperability in age-friendly accessible homes.

Business as usual

Environmental control technology allows disabled people and older adults to carry out daily tasks and control their home using a variety of input methods, including eye

gaze, switches and/or voice control. There are a series of NHS specialist commissioning hubs for environmental control that support patients with conditions such as multiple sclerosis and severe arthritis. However, as the technology progresses to form part of the assisted living project, it may be used by a much wider group of people. Environmental control already incorporates and integrates with telecare in many cases, allowing people to call for assistance when needed. Furthermore, as telecare goes digital, it can integrate more deeply with environmental control technology, e.g. using data from environmental control devices to both monitor activity and inform care.

This technology is based on communication between devices, but the use of proprietary protocols is still common, and a resulting lack of interoperability means users often have to 'buy into' an entire product range (controllers and peripherals) from a single developer, rather than mix and match. The environmental control and telecare sectors have seen the development of standards and requirements, but these haven't yet resulted in widespread interoperability. Some standards in this space focus on reliability and safety (see MHRA, Electrical Safety and ISO standards) but don't currently require interoperability. In contrast, open standards for interoperability such as KNX (ISO/IEC 14543-3) haven't gained wide adherence. To understand the challenge, we spoke to several developers and experts in these sectors and identified three key tests for any successful interoperability standard.

Robustness. If we understand robustness to cover both reliability and safety, it is perhaps the most significant challenge. Any interoperability standard that takes away a developer's ability to guarantee reliability and safety for their customers simply won't gain adherents. We asked Philip



Robinson, Managing Director of the assistive technology and telecare developer Possum, how important this is to his business.

‘Everyone who uses environmental control and telecare has their own needs and lifestyle, so no two set-ups are alike. That means the technology has to be flexible and interoperability between devices is a big part of that. We provide personalised bespoke systems for our clients to best serve their needs and lifestyle preferences. But what must remain constant across all the different set-ups is safety. For example, all of our controllers continue to work in the case of a power cut. If you depend upon this technology, it has to work when you need it: reliability is essential for safety.’

It’s true that these systems can be beneficial to a wider range of people, many of whom will enjoy technology as a lifestyle improvement rather than a life or death necessity. For that reason, it can be tempting to regard the kind of robustness that is required by environmental control and telecare as a niche concern within the wider smart homes project. But it is precisely because smart home technology is used to meet such a wide range of needs and preferences that an interoperability standard for the whole sector must be robust. The same user may start with a set-up aimed at convenience and then come to rely on it in more significant ways as they age, adding new elements to their smart-home as they do so. True interoperability would allow for this seamless transition by connecting the whole smart-home market, so the standards we adopt must allow the sections of the market with higher needs to maintain their current reliability and safety.

Consistency. Several environmental control developers have noted that their customers expect products to last many years more than a mere gadget. This can be because of the expense of environmental control and telecare equipment and installation, or because of the disruption to daily living that is caused when even just one item in a set-up needs to be replaced. Dave Gilbert, Director of assistive technology and environmental control developer, Pretorian Technologies explained:

‘The life cycle of retail products is becoming ever shorter and as a result, communications standards for retail environmental controls come and go quite quickly. In contrast, environmental controls for disabled users are expected to have a life cycle which is much longer and be well supported throughout. For this reason alone, we would be very wary of tying ourselves into using retail-oriented wireless protocols. Our priority is to offer support throughout the long-life cycle that our users rightly expect of our products.’

Here again, developers who offer more convenience-focused smart home technologies may have different requirements than those working on environmental controls, but interoperability between convenience and needs-focused technology requires backwards compatibility.

Governance. Interoperability is as much a challenge of collective action as a technical challenge. When a company endorses and uses a standard, they give up a degree of control over their own product development. In return, all their products are enhanced by their interoperability with other smart home devices. For this reason, in order to make the move of adopting a standard, a developer

must have confidence that the standard’s further development will be managed through a governance structure that will continue to be responsive to the needs of their customers. Such a governance structure should therefore be established at the beginning of the process to create the first iteration of the standard, with participation from developers, care professionals, and most importantly of all, older adults and disabled people. In addition, the benefits of adopting a standard are determined in large part by how many others choose to do the same, meaning these other developers’ products are in fact able to work with one’s own. Richard Parry, Head of Global Accounts at technology enabled care developer Doro, explained this by noting that:

‘As the market in smart and self-directed care develops, we have players ranging from global technology companies, like Microsoft, to established SMEs, to start-ups with just a single innovative product. That makes the development and governance of a standard challenging but it also provides the impetus to do it: the diversity of the market has to prove a benefit for consumers, and interoperability is key to that.’

Here again, a governance structure that includes representatives from a wide range of developers is important to inspire confidence that others will adopt, and stick with, the interoperability standard. There are governance models to consider from related technologies, such as Bluetooth and talking books (DASY).

Let’s join the dots now

There is a growing recognition that the environmental control and telecare sectors need to join together to establish intrinsically safe levels of interoperability. The government also has an important role to play in helping the sector develop the infrastructure for interoperability, facilitating the development of standards and shaping policy to encourage the widest possible adoption. To take this forward, representatives of sector bodies including the Institute of Engineering and Technology, the British Standards Institute and international trade associations (CEDIA) are forming a working party to scope for the possibility of new standards in this area. At the policy level, the All-Party Parliamentary Group for Assistive Technology, managed by the think tank Policy Connect, are preparing to take evidence from technology developers and users, for a joint submission to government. These are early steps, but the direction is clear: the environmental control and telecare sectors can make a major contribution to the development of our homes and neighbourhoods of the future by starting now to build the infrastructure for joined-up technology.

A smart home needs a heart

Aditya Mohan
Founder, Skive it Inc

Companion homes

Imagine a home that continuously evolves based on its interaction with you and external factors like the weather. Instead of you telling it what to do, it acts, learns and adapts for your optimal comfort. Your home will not be a monolithic concrete structure, but a set of modular pods (Figure 2), each for a specific purpose. For example, a mobile pod that can drive you to your work or your next vacation (Figure 3). A week-long vacation pod would combine the modular kitchen pod with the mobile pod.

It is your robotic home companion that talks to you, keeps track of your health 24/7, orders your medications, cleans up the home and recommends you ice cream when you come home feeling sad.

Companion Homes will be robotics systems that can move, reconfigure based on seasons or weather patterns and evolve with, and learn from their owner.. It can reorient its location relative to the sun depending on the time of the year to make full use of natural light to warm the house and conserve energy (Figure 4).

Everything in the home will be driven by not just a 'brain' to make the home smart, but a 'heart' to make the home much more like a living robotics system that can sense the home owner and evolves its behavior accordingly on a continuous basis, proactively acting with the goal to maximize your comfort. A Physical manifestation of the home heart is your familiar looking robotic cat that has been with you for last 20 years (figure 6).

Companion neighbourhoods

Companion homes are the key component to companion neighbourhoods (Figure 5) that are not organized by land prices, as there is no concept of land ownership, but instead home ownership with a guaranteed level of comfort backed by insurers.

Towards vision 2030: disrupting the status quo today

Vision 2030 changes fundamentals of how we perceive of homes including construction, ownership contracts and technology, some of which need – and can – take shape today.

Rethinking home construction

The Companion Home units will be organized as modular pods that attached together to form a home. Titanium and high-grade steel will need to be used for construction of pod modules to keep them lightweight, strong and can withstand extreme temperatures that is believed to be common in next 20 years due to global warming. Construction companies should invest in moving away from concrete and wood-based building structures to those made of steel and titanium.

Rethinking home ownership contracts

Today, renting a home is becoming much more popular in large cosmopolitan cities like London and San Francisco. Renting gives the owner the option to move to a new home based on her needs, income and level of comfort needed. The rental agreement is a temporary contract with a time period and price (rent) attached to it. The price is still



dependent majorly on property location with less variability based on the comfort level the home will guarantee in the future.

These temporary 'ownership' contracts can be slowly moved to permanent ownership contracts with guaranteed comfort level with these guaranteed service levels backed by home insurers, large construction companies and state government.

Building the heart of a companion home

The 'heart' of the home is an autonomous neural networked based AI system that connects various IoT appliances in the home including the control systems for the individual pods that make up the home structure. It is designed to evolve through interaction with the owner of the house, just like your cat and dog, learning and acting – as opposed to just reacting – as it knows

you better. At Skive itfi, a UK/US based Deep Learning based startup, we call this autonomous AI, the Robometricsfi kernel. It is a morality layer on top of the AI enabled brain of your Companion Home. We believe that this should form part of any robotics system that interacts with humans and corporations worldwide should accelerate R&D and investment spend on such technologies today that form the AI morality layer.

Imagine what life would be like if you wake up with the sound of the birds and a greeting from your robot companion cat that has been with you for the last 20 years. Won't it be the best moment in the world if your Companion Home can provide you comfort and care when you most need as we all work together to make Vision 2030 a reality?

Photo credit: Image courtesy of Aditya Mohan. Image © Skive it Ltd. **Legal:** Skive it and Robometrics are registered trademarks of Skive it.

Vision 2030 changes fundamentals of how we perceive of homes including construction, ownership contracts and technology, some of which need – and can – take shape today.

User experience: The missing link in technology design

Lee Omar
CEO, Red Ninja Studios

The importance of user experience in design

A child born today will live to the age of 100. Collectively, we are living longer lives, and the baby boomer generation is reaching what was traditionally retirement age. This generation is probably the most consumerist ever. They have bought into digital products and the modern health and wellbeing industry in a big way. This is the generation that bought their music on vinyl, then CDs and now use an iPod or mobile device. They have high standards and are the wealthiest demographic. It is this generation that will drive the market to respond to their needs and design products for ageing that match the UX design of the consumer goods they are used to buying.

Designing the future

Design for the ageing population has traditionally seen an approach of 'you get what you are given'. Think of a mobility scooter or Zimmer frame. These are ugly, functional contraptions with little style. They stigmatise people, perpetuate ageism and basically say 'you're old, frail and past your sell-by date'.

Innovation is needed, with a focus on UX design. But what is UX design? UX is shorthand for User Experience. UX design is the process of designing products that are useful, easy to use, and delightful to interact with. It's a commitment to developing products and services with purpose, compassion and integrity.



As we all grow older, our needs will change, and we will demand products that enable us to live our lives to the full.

It is about anticipating users' needs and giving them something they didn't think to ask for.

UX design is the value a designer delivers at each touch point. Apple are masters at this. Think about the experience you have when buying an Apple product – the packaging, the ease of set up and the downloading of apps. Even when an Apple product is broken, you don't find a fault centre, you visit a 'genius bar' to help fix the problem.

Let's consider the Zimmer frame again. Was this product designed with the customer in mind? Is the user delighted at any point? The answer is no. Now, let's think about the problem this product solves. It is solving the problem of limited mobility. Could this problem be solved in another way, by leveraging UX design? Can we create a wearable solution, for example? Think Wallace and Gromit's 'Wrong Trousers' but designed by Gucci.

Good product designers use design thinking in their approach to new products. Design thinking utilises elements from the designer's toolkit, like empathy and experimentation, to arrive at innovative solutions. By using design thinking, you make decisions based on what future customers really want, instead of relying on historical data or making risky bets based on instinct instead of evidence.

As we all grow older, our needs will change, and we will demand products that enable us to live our lives to the full. The products we need will be aspirational as well as functional. Think iPad rather than stair lift. Products for the ageing society must become mainstream products that have been well designed with UX in mind. Only then can we start to look beyond age and instead focus on living well.

Disrupting the status quo

We need to innovate, not just in terms of technology, but the way the government and the public sector work with the private sector to deliver innovation. Take a look to the US for an example of this. NASA is a federal government agency who famously put a man on the moon, but in recent years their rate of innovation

has stagnated. Traditional rocket companies create rockets that fly into space once and then become space debris that wastes millions of dollars in expensive hardware. Elon Musk's Space X have disrupted this model and have created a rocket that can fly into space and then land back on earth, meaning the rocket can be reused, saving millions. Space X now supply their rockets to NASA. NASA is now working with Uber to create a flying taxi that will be launched in 2020.

How can our public bodies, such as NHS and Ministry of Housing, Communities and Local Government, work with innovative companies to create the homes, neighbourhoods and health systems of the future that work for everybody? Elon Musk understands the importance of UX, this is one of the reasons Tesla and Space X are so successful. We should take the model where disruptive innovative companies such as Elon's become a major part of the supply chain to the public sector bodies, such as the NHS and Ministry of Housing, Communities and Local Government. These companies drive a high-quality User Experience as part of their constant design process. It needs to be easier for companies like this and some of the small, innovative start-ups to work with the public sector to design new products and services that meet the needs of the neighbourhoods of the future.

It's no secret that Silicon Valley companies, on the whole steer clear of health and social care products and services as they find it too difficult to monetise. This is because there is a market failure in major markets such as the US and UK.

The opportunity is for government to address this market failure through industrial strategy and investment that will pump prime more high-risk innovative companies that understand UX. Agile companies that create the products and services that will populate our neighbourhoods of the future. Without this, expect the brightest companies to avoid risk and stick with the safest sectors where they know they can earn a living.

Photo credit: Image courtesy of Red Ninja Studios



A technological utopia?

Professor Theodore Scaltsas
University of Edinburgh

Everything has come alive! It's as if Beauty and the Beast has come true. Mr. Teapot greets me with a cheery 'Good morning!' and chats about the day. Mr. Breakfast-Table is guiding me on what choices to make at my meals that day, while Ms. Fork is recommending smaller bites. Sadly, my Mr. Belt agrees with her, but whispers sweet jokes to cheer me up. You would expect that a mere pinch would see me waking up in my own bed; but no, here I am, in the flesh, two decades hence, in my comfy drawing room in our Neighbourhood of the Future – 2038!

I am Rob, 78, healthy for my age, and I would consider myself active. I read some; watch some; walk some; and also cook, write and talk; yes, talk. Well, cooking is a bit of a challenge, because Maya is so convinced she can do much better than me. It is hard for her to let me take charge in the kitchen – she's so attentive! Watching shows and reading is a challenge – and a surprise! Maya invariably knows better than me what I would like to read or watch, so I let her choose.

Writing has become easier; and not only because all I have to do is speak. It only takes a peep from me and the screen takes off and puts it in the best literary style – I mean, the literary style that the screen knows I prefer. I save for last: walking every day. There, I let Maya take me by the hand. She physically walks me through digital palaces; glorious galas; adventures in the city or the jungle; back to my family home; and even my school. There's little old me at my desk during maths class...

The most wonderful thing is that I don't need to anticipate and direct, but only respond, expressing myself freely. Maya somehow knows instinctively what excites me, interests me. She detects my desires, which I could not tell myself, even if I tried!

What is wellbeing?

We know that it is not 'instinct', or 'intuition' that is informing Maya. Maya is a digital creature, dedicated to the welfare of our Rob. You could say that she orchestrates the lives of all the communicator-gadgets in Rob's household, from the carpet to his comb and shower. They all know everything there is to know about Rob's past, present, and all that can be predicted about Rob's long-term and immediate future. Rob is safe; Rob is protected; Rob is cared for, pampered, even spoiled a little, and Rob is adored by all of them. So, Rob is flourishing.

Rob enjoys his days in the Neighbourhood, which are certainly prolonged by the care and attention he receives in that perfect habitat of the future.

Maya is online with all the monitors in Rob's body, and all the monitors surrounding Rob's body, so that there will never be an unanticipated event to catch them out. They are ready for any contingency, and they like to be one or more steps ahead of Rob's desires. If they sense that Rob needs human companionship, there are a thousand ways in which they can bring him in touch.

Therefore, Rob enjoys his days in the Neighbourhood, which are certainly prolonged by the care and attention he receives in that perfect habitat of the future. Rob has found his home there, his private paradise. He lets himself drift in this heaven, until he withers away into happiness.

No, thank you

I do not want to be a cog in a wellbeing-machine. I do not want to wither away into happiness. I certainly do not believe Maya has any idea of what my welfare is, or my wellbeing. Maya does not experience my sensations; she only measures them. She cannot experience what challenges me, but only record my heartrate. And she can never know what is meaningful to me; not from monitoring my irises, or by my heartrate, or by the activated regions of my brain.

Maya can track the biological machine; but I am a psychological machine, which she can only guess at. Some say there is also the spiritual me, which Maya cannot begin to fathom. Maya's imagination is limited to science, to my history and to my family history, my vital signs, as well as my 'trivial' signs, all of which she finds in human data. These are not who I am, or who I want to be. Maya misses out on one critical item: me. My feelings, my emotions, my experiences – these Maya can only guess at by measuring my body and scanning my brain. But that's not me! I want to do; to accomplish; to create; to make a difference.

If I sound hard to please, do let me clarify. I think of the Neighbourhoods of the Future as the caring machine I can only dream of today. I'd be lucky to be in it. Its commercially developed smart-technology will offer us pleasurable pastimes, much like the way Maya entertained Rob. (Although Rob would have a much firmer grip on the remote control!) However, my future paradise has more dimensions than these – it will also challenge me. My dream neighbourhood should also be an 'Enabling Facility'.

I create, therefore I am

The way the Neighbourhoods of the Future will enable us is by challenging us. This social mechanism has its roots in human evolution. Because our entire biological history has been a series of challenges we faced, rewarding those of us who can overcome challenges turned out to be a successful evolutionary strategy. Put simply, evolution made sure that addressing challenges successfully felt good to humans, so humans would desire to pursue problem resolution.

*'Vienna's Center for Medical Physics and Biomedical Engineering, in collaboration with Goldsmiths University London, has uncovered the secret of the 'Aha!-moment'. When people solve a puzzle through a flash of insight, the mood-enhancing substance dopamine is released and deep-brain structures are activated.'*¹

Dopamine is released in the brain in every instance of problem-solving a person engages with, regardless of the problem's significance and urgency.² The result is the person's experience of motivational intensity, which promotes engagement, determination, and intensity behaviours in the pursuit of goals in present activities.³

Anyone could engage in problem-solving abstractly, just for the sheer high of it. However, older people face real problems themselves, as well as being aware of and concerned about problems that their families and loved ones are facing. And then there are the pressing global issues that reach deadlocks every day. Including the Neighbourhoods' residents in addressing these problems would already be a very desirable reversal of roles that are commonly associated with older people.

Designing our own wellbeing

Yet today, societal factors are preventing this from taking place. The answer is not to leave it to super-intelligent machines to decide and design our wellbeing for us, following on from the way social media is presently redrafting our values for us. What we need, to match super-intelligent machines, is creatively thinking humans. We need to innovatively design our own wellbeing. In my opinion, the Neighbourhoods of the Future should enable its residents to contribute to our society's demand for creative problem-solving. The rewards would be emotional, psychological, and even physical, because of the residents' engagement in activities that are meaningful to them.

No, this does not mean turning Rob into a dopamine addict! Problem-solving and creative thinking do not do this to people. Rob wants and needs a beautiful, caring environment; he is not looking for nice things to do, orchestrated by the commercial streak in Maya. Rob is seeking meaning in his life; he wants to engage, and he wants to make a difference. Rob, like all of us, is crafted by evolution to problem-solve. The stakes are getting higher as we speak, requiring creative solutions in unprecedented contexts, which will captivate Rob's interest, and engross him in the challenges he chooses to take on. This will make Rob fulfilled and creative, with a strong sense of making a difference. We call this meaningfulness, which I really hope my cognitive dream home will facilitate.

The way the Neighbourhoods of the Future will enable us is by challenging us.

Theodore Scaltsas was Professor of Creative Thinking in Philosophy, University of Edinburgh, and is now heading Creativity Crossroads Ltd., which specialises in engagements in creativity. His theory of 'BrainMining' is published by the Harvard Business Review

- 1 Medical University of Vienna (2018), 'Dopamine-producing areas of the brain inspire creativity', from M. Tik, R. Sladky, C. Di Bernardi Luft, D. Willinger, A. Hoffmann, M.J. Banissy, J. Bhattacharya, C. Windischberg (2018), 'Ultra-high-field fMRI insights on insight: Neural correlates of the Aha!-moment', *Human Brain Mapping*, 39:3241-3252.
- 2 P Dayan & Y Niv (2008), 'Reinforcement learning and the brain: The Good, The Bad and The Ugly', *Current Opinion in Neurobiology*, 18(2), 185-196.
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Photo credit: Image courtesy of Theodore Scaltsas

NEIGH BOUR HOODS OF THE FUTURE

FINANCE

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Unlocking the potential of the silver economy

Paul Simmonds
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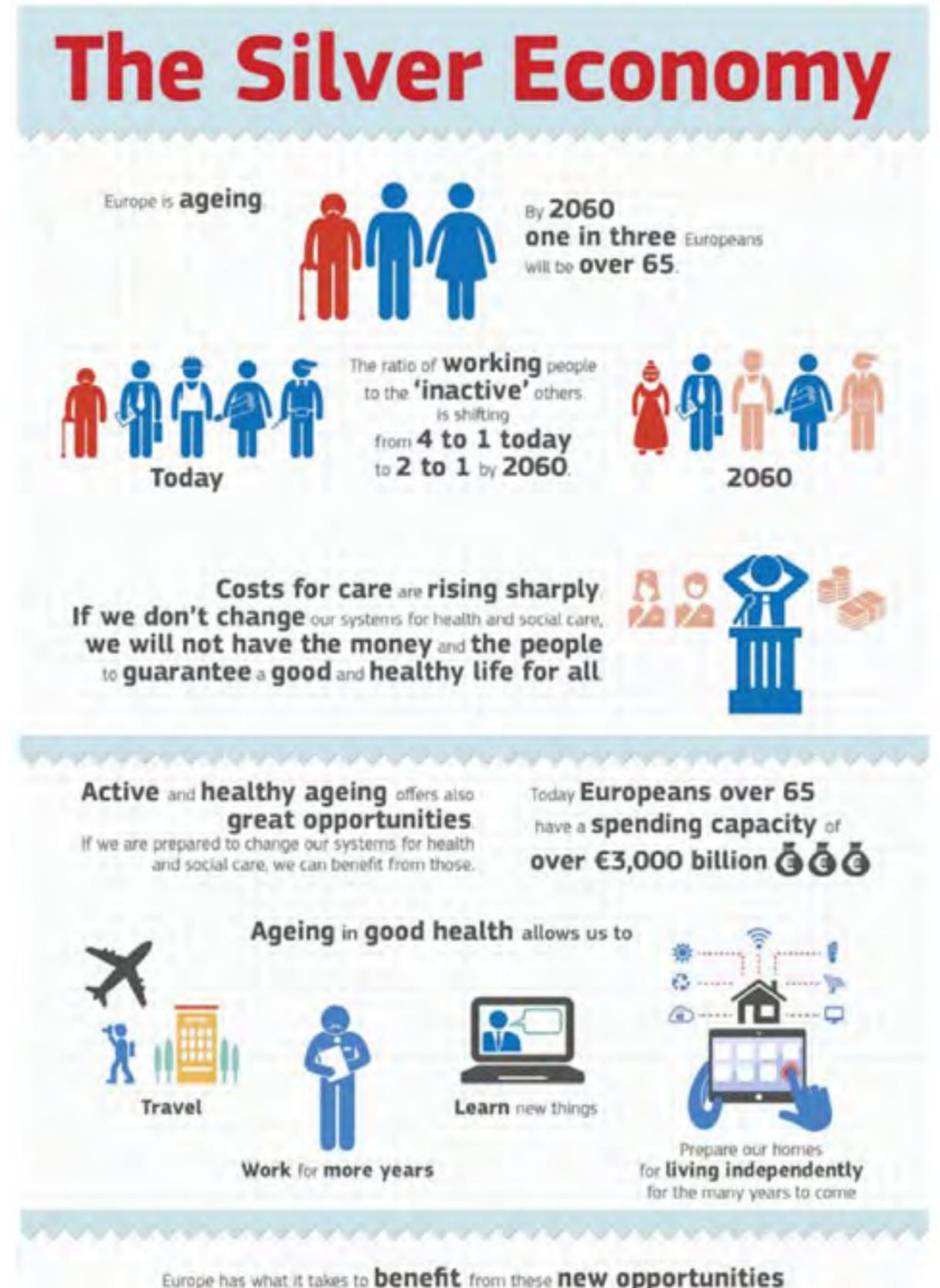
There is growing policy interest across Europe in capitalising on the ageing society. It is widely seen as an opportunity to create new jobs and economic growth, while improving our ability to live healthy, independent lives for longer. However, it is recognised that the changing needs of older citizens as customers must be explored, so that businesses can develop suitable products and services.

A recent report explored the market size and opportunity areas of the 'Silver Economy'¹ in the EU member states, as part of a broader agenda of the EU to 'Growing the Silver Economy'². The report found that in 2015, the 24m people in the UK aged 50+ (over a third of the UK population) consumed close to £400bn products and services.

By 2025, this demographic will climb to close to 40% of the population and will consume an estimated £565bn products and services. This consumption is dominated by private expenditure and according to Eurostat figures, transport, recreation, food and beverages, and housing make up half of all spending. The economic impact of this direct consumption is also significant (about a quarter of UK's GDP) and sustained over 9m jobs across the UK.

The opportunity provided by the Silver Economy across the EU digital single market is even larger. In 2015, over 50s had a combined spending power of €3.7tr. This is expected to grow to an estimated €5.7tr in 2025. Older citizens represent critical consumer groups in multiple markets and better coordination across broader policy areas is needed. Amongst others, the report made the important policy recommendation to continue to support innovation of products and services targeted at independent living in age-friendly neighbourhoods and cities, to enable all citizens to live healthy lives for longer.

This aim is also the focus of the UK's Industrial Strategy Ageing Society Grand Challenge. This is to ensure that people can enjoy at least five extra healthy, independent life years by 2035, whilst narrowing the gap between the experience of the richest and poorest.



Source: European Commission: Growing the Silver Economy in Europe

AAL technologies and anage-friendly environment

Europe's Active and Assisted Living (AAL) programme is investing in numerous innovative products and services that use information and communication technology to maintain or improve our quality of life as we age. These innovations encompass a full spectrum of areas, from leisure and mobility, to health and care, and the home and work environments.³

The AAL programme, co-financed by the European Commission and individual countries, has funded projects that work towards creating market-ready products and services for older people, their families and carers. Each project consists of SMEs, research bodies and end-user organisations. These projects also aim to strengthen industrial opportunities in the field of healthy ageing technology and innovation.

The AAL programme has recently published⁴ its first 'AAL Market and Investment Report', to serve as a guide to policy makers, investors, entrepreneurs and other businesses interested in understanding the AAL market. It presents an overview of trends and developments, as well as a selection of emerging products, addressing both the consumer and regulated markets.

The AAL market exists at the intersection of the smart home, eHealth and wearable technology market. A range of recent technological developments have expanded the opportunities to integrate these technologies and age-friendly environments:

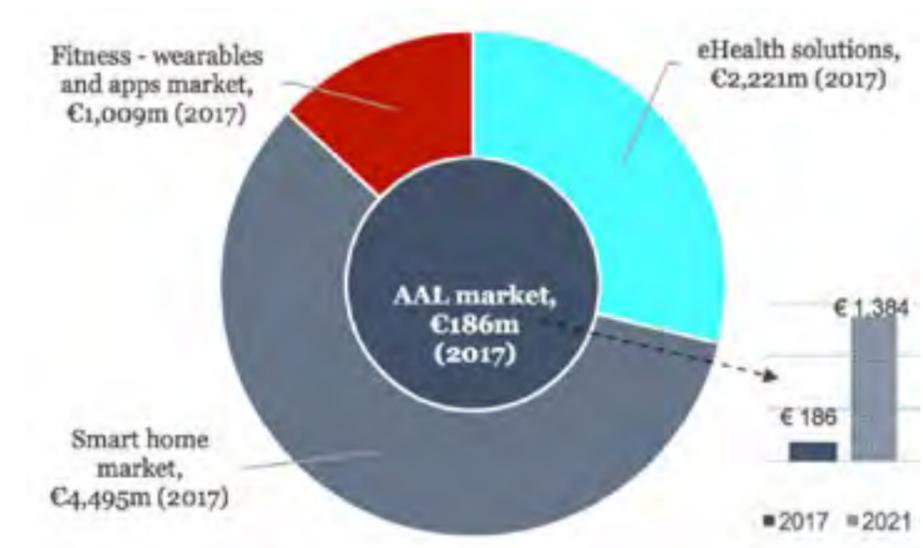
- Sensor technology, such as wearable or ambient sensors, are included in a wide range of AAL solutions. Sensor technology has become more readily available and affordable, which is positively influencing the affordability of AAL solutions.

- Reasoning technology is used to aggregate, process and analyse data. This includes machine learning models that are applied to telecare solutions and decision support systems.
- Acting technology, and the development of smart actuators, are responsible for moving or controlling a mechanism or system. They have been integrated in various solutions, such as companion robots.
- Interacting technology facilitates human-machine interactions (interface technology) and leverages the accessibility and usefulness of the solution to the end-user.
- Communicating technology enables different components of a system to exchange information.

The market research portal, Statista, is tracking market and consumer data relating to smart homes,⁵ and published a report in 2017 that estimated the size of the AAL segment within the broader EU smart homes market. They are predicting rapid growth in European and global demand for smart home technologies (especially relating to control, security and smart appliances) in the next five years, driven by younger private consumers.

The AAL segment is a small component of total smart home demand, defined as products and services for networked emergency alarms, accident detection, activity monitoring (by means of sensors) and comparable connected products that are aimed to support independent living for the older people. The EU AAL market is also projected to grow strongly, from €186m in 2017, to €1.4bn in 2021. This is driven by the proliferation of easy-to-use, affordable devices that offer immediate improvements in convenience, and a sense of personal safety and well-being.

Figure 1 The EU AAL market embedded in the broader smart homes, wearables and eHealth markets



Source: Statista 2017

Adopting the change in smart technology

Behavioural research suggests older people may be slower to adopt major new technologies and new housing formats. Partly because we tend to move home less as we get older, and because of a general wariness about the value of such technologies. It seems likely that it will be the more discreet and attractive items that are embraced first and that the implementation of more extensive and fully-integrated smart-home solutions will be adopted more gradually by older citizens.

The change agents may well be younger family members and friends, who embrace these solutions more quickly and excitedly and then reveal their power in familiar and unpressurised environments. Therefore, the emphasis is firmly on the application of inclusive and universal design principles, so that we can continue to use products and services as we grow older.

There is also increasing interest in policy circles, which may well trigger a push for new standards and specifications in social housing, as well as a greater push by the health and care services to developing frameworks – and infrastructure – to promote personalised health and care.

The AAL Market and Investment Report fits well with the views expressed by the IMechE in its report, 'Healthy Homes: Accommodating an Ageing Population' (January 2018)⁶. It too anticipates some growth in demand for smart homes amongst older people and advocates the dual benefit of healthier and more independent living, along with a reduction in the cost of living. The IMechE estimates that the move to smart homes could save individuals and the government (by lessening the burden on the care system) billions of pounds each year. The increasing demand for new or upgraded smart homes also promises to provide a boost to the businesses that deliver these services and components, as well as injecting a little extra dynamism into



The change agents may well be younger family members and friends, who embrace these solutions more quickly and excitedly and then reveal their power in familiar and unpressurised environments.

the housing market, freeing up larger, family homes.

AAL is being adopted to different degrees and with different models in mind, dependent on the national health and care system. For example, in the UK, Germany and France, the telecare market is largely driven by the public sector, demonstrating that the public procurement approaches can influence the overall market penetration of AAL solutions in many countries.

While public sector can kick-start the procurement of new services, it may reduce

the end-user's incentive to purchase AAL services themselves. It is likely that insurers and health authorities would invest more in the future, recognising the need to encourage longer independent living. The demonstration of economic and efficiency gains will further increase interest from this consumer group. Statista's AAL projections for 2021 suggest that Europe's larger economies will dominate future AAL markets: Germany – 31% (€58m); UK – 21% (€40m); France – 13% (€24m); and Italy, 6% (€11m).

Figure 2 The global AAL market



Source: Statista 2017

The EU market already represents a fifth of the global AAL market, and by 2021, the EU market is expected to grow to over a quarter of the global market. The country with the largest market share remains the US, accounting for 60% of the total in 2017 and an estimated 40% of total in 2021. The penetration of AAL technologies in the US is already substantially higher than in the EU. In comparison to the US market, the EU market is heterogeneous and fragmented. EU countries have different health systems, policy systems and legal rules, and a wider range of consumer expectation and cultural differences. This means that expanding quickly may be more challenging in the EU, with businesses needing to work across borders and evolve business models that are able to cope with the many different private and institutional markets.

Our homes and neighbourhoods in 20 years' time

The economic opportunities offered by the ageing population is incontestable, and together with the social imperative to create a cohesive society that provides equal access for all its citizens, innovate products, services and home environments need to be developed. This will allow older people to live active, healthy and happy lives for longer.

To start the process, designers and engineers of the future will need to adopt principles where the needs, abilities and desires of older people are considered equally to those of younger generations. This will provide a blueprint for living environments that are adaptive and intergenerational, where connected technology will be embedded in objects that provide intuitive, safe and

enjoyable links to daily social, physical, and cognitive activities.

Financing of these new neighbourhoods will pay off, both for public (health and care) procurers and private investors. However, a shift in attitude and behaviour will be required, so that segmentation of the consumer of the future will no longer be age categories alone.

- 1 The Silver Economy. Technopolis Group & Oxford Economics (2018) Available at: <https://publications.europa.eu/en/publication-detail/-/publication/a9efa929-3ec7-11e8-b5fe-01aa75ed71a1/language-en>
- 2 Growing the Silver Economy in Europe. Available at: <https://ec.europa.eu/digital-single-market/en/news/growing-silver-economy-europe>
- 3 Ambient Assisted Living Association funded projects are available at: <http://www.aal-europe.eu/projects-main/>
- 4 AAL Market and Investment Report. Technopolis Group (2018) Available at: <https://aal.challenges.org/2018/06/21/aal-market-and-investments-report/>
- 5 The Smart Home global market. Statista (2017) Available at: <http://www.statista.com/outlook/279/100/smart-home/worldwide>
- 6 Healthy Homes: Accommodating an Ageing Population. IMechE (2018) Available at: <http://www.imeche.org/policy-and-press/reports/detail/healthy-homes-accommodating-an-ageing-population>

Photo credit: Image courtesy of Technopolis Group

The final chimes of carriage clock retirement



Steven Ellis
CEO, Legal & General Home Finance

This white paper challenges leading stakeholders to reimagine our neighbourhoods of the future and asks us to spell out what should we be doing now to make this vision a reality. I'd like to home in on a "stop" and a "start" for my sector of the economy; financial services. So, first the 'stop': stop thinking that retirement is a discrete event that looks and feels the same to everyone. And the 'start'? Start designing solutions that meet the wide-ranging needs of people post sixty, rather than products that fit in neat silos.

Let me explain.

Firstly, let's dispel this notion that retirement is 20 years and a carriage clock. "It" (and we will come on to what to call it a little later) has many phases; spells of employment, both voluntary and paid, child and other caring duties, adapting homes to maintain personal independence, funding children's home purchases and a myriad of other scenarios which reflect the ever-changing set of personal circumstances people face during their lives. These things don't stop just because we've reached a set number of years old. That's the picture for many today. And that's before we talk about the so-called "Generation X".

This group are the generation that follows the baby boomers. They will be heading into their sixties and seventies by 2030 and carriage-clock retirement is not their style: this is the MTV generation after all. Generation Xers have always found their own way: flexibility in retirement, it seems, will be king.

Across Legal & General, our teams are working hard to design new propositions that will allow Gen Xers to build their own retirement strategies to meet the demands of a demographic group that will shortly account for 1 in 4 of the population (Office for National Statistics).

And this ageing population isn't 'other people'. It's every one of us, from teenagers to centenarians. It's the legacy of the twentieth century's drive to improve the lives (and life expectancies) of everyone. In its 70 years, the National Health Service has transformed health and wellbeing in the UK – and it's been an unparalleled success. Very soon the UK will have a retired community of more than twenty million people. In a few more years, the number of over 80s will double to six million.

It's a curious feature of our society that we still have rather staid expectations of what retirement is.

A new definition for retirement?

It's a curious feature of our society that we will still have rather staid expectations of what retirement is. Indeed, the fact that we still have one word to describe a period which might last 40 years is, frankly, incredible. People over 65 are no more one homogenous group than 'children' or 'adults' and I would not be surprised to see the word retirement falling out of use altogether within a few decades.

Legal & General's oldest customer is 109 years old and 'retired' in the 1950s. Not everyone makes it past the century mark, but it is not unusual for our customers to experience a 40-year retirement. Research shows that our customers don't want 40 years of their life to be about one thing. I know I won't. For many people, this period will be longer than their career lifetime.

The end of a default retirement age has also boosted employment among the over 65s – there are now more than a million people over this age in work – in 1992 the number was less than half a million.

We asked our customers about their life goals earlier this year and the majority (72%) said

they still have goals in life that they would like to achieve. Aspirations among over 55s ranged from 'get a six-pack' to 'start dating again'. Others included holidays, travel and helping the family. Indeed, our research showed a strong desire among the over 65s to help grandchildren onto the housing ladder.

UK seniors are also passionate about volunteering. Age UK reports that nearly 4.9 million people aged 65 and over in England take part in volunteering or civic engagement.

Overcoming the stigma around social care

Then there's the elephant in the room – social care in older age. Research by the Institute for Fiscal Studies showed that 26% of over 65s receive some sort of assistance with daily living – this may not be formal care, but it illustrates the scale of the challenge. Over an eight-year span, 50% of older adults reported receiving care at some point. We have worked with the think tank, Demos, to understand the scale of the contribution that informal care makes and found that the equivalent of £139bn of care is being provided informally – this is nearly the same as the total NHS budget.





85%

of the UK's housing wealth is owned by the over 55s.

42%

growth of lifetime mortgage value in 2017.

If rates hold at 2010 levels, by 2030 the number of UK people aged over 65 with a limiting, long-standing illness could rise by 44%, from 4.2 million to 6 million (evidence to the Work and Pensions Select Committee). The Secretary of State for Health and Social Care recently announced a £240m boost for adult social care – more evidence that the system is under pressure as winter approaches. The government is due to publish a green paper before Christmas which should outline a longer-term policy for social care.

When you add all of that up, you come to two inescapable conclusions: Retirement isn't going to be short. Furthermore, it isn't going to be cheap. So where will the money come from?

Let's talk housing equity

The over 55 age group own 85% of the UK's housing wealth. That's staggering when you think about it. But the means to access this wealth from what, for many people, will be their best performing asset have been inflexible.

But over the last five years or so, a lot has changed. The latest iteration of equity release products, lifetime mortgages, are more flexible than ever. Consumers can borrow a lump sum against their house as a first charge mortgage. They can borrow a series of lump sums or even take a regular income. They can repay the loan, often without charge, in lump sums, or as a regular payment.

In return for this consumer flexibility, the lifetime mortgage market has flourished. In the last five years over 60,000 people chose a lifetime mortgage with Legal & General. The value of lifetime mortgages has doubled in value, with 42% growth in 2017 alone. By 2021, the market could be £10bn with more than 75,000 new customers a year releasing (on average) £110,000.

So why chose lifetime mortgages as opposed to say, downsizing? Many of us say "our home is our pension" but we don't always intend to see that statement through by selling up. Our research overwhelmingly demonstrates that when push comes to shove, the UK's older adults want to stay in their family home.

Is that a bad thing?

The rise of silver spenders and the bank of mum and dad

Our Silver Spenders research shows that for every £1 of lifetime mortgage borrowing, the economy benefits by £3 – across the country that's a boost to gross UK output of £7bn last year alone. Our bank of Mum and Dad (BoMad) research suggests that some of the released equity is helping sons and daughters to buy homes. We estimate that BoMad is the equivalent of a £5.7bn mortgage lender¹.

Mortgages are about more than economics – they can enable significant improvements in the quality of a person or family's life. Through improvements and/or modifications to homes which are not age-friendly, older adults are able to maintain their independence by living in their own homes for longer.

By way of example, the London Rebuilding Society (a social enterprise working with Legal & General) asked my team to help a client of theirs who lives in Leyton, East London². His house was run down; there was no upstairs running water or electricity and there was a hole in the roof. Our team worked with the Society team and their client to develop a solution. This involved a lifetime mortgage to release equity in the home. The team was able to refurbish the house to the Decent Homes Standard and our customer is now enjoying living in a safe and warm home.

The role of legal & general

Legal & General began life in a coffee shop in 1830s London, after a conversation among a group of six lawyers. Our first policy holder was Mr Thomas Smith, who was assured for the sum of £1,000. We are still committed to supporting the development of 'inclusive capitalism' in the UK, because we have both a social and economic purpose. Long-term thinking is in our DNA and it is clear to my team that 2030 is not that far away.

We will be playing our part and creating financial solutions that help people enjoy their best retirement and play their role in the neighbourhoods of the future.

¹ <https://www.legalandgeneral.com/retirement/retirement-news/2018/the-generosity-of-the-bank-of-mum-and-dad.html>

² <http://www.impactinvestmentnetwork.com/membernews/london-rebuilding-society-completes-east-london-home-refurbishment-2/>

Photo credit: Images courtesy of Legal & General Group PLC

How to spot, build and pitch solutions for an ageing society

Nick Howe
Regional Enterprise Manager, London, NatWest

The trends caused by our evolving population are being felt by us all.

- 70% of UK wealth is held by 50+ year olds.
- The fastest growing segment of smartphone sales is to those over 60.
- Between 2007-2016, only the segments of households aged between 65-75 and over 75 have seen increases in spending.

The progress around Neighbourhoods of the Future has been viewed as slow by many. There are limited projects taking place, but learnings are not always easy to find to help inform a different project in another area.

This is due to the need to bring together a multitude of different skills, sectors and decision-makers to start to provide solutions.

At such an early stage, the benefits achieved might not necessarily impact the area that the budget or resource is coming from. A programme commissioned by the NHS might achieve savings in a council's social care

budget. Conversely, proactive investment in projects to tackle social isolation could alleviate the strain on the NHS.

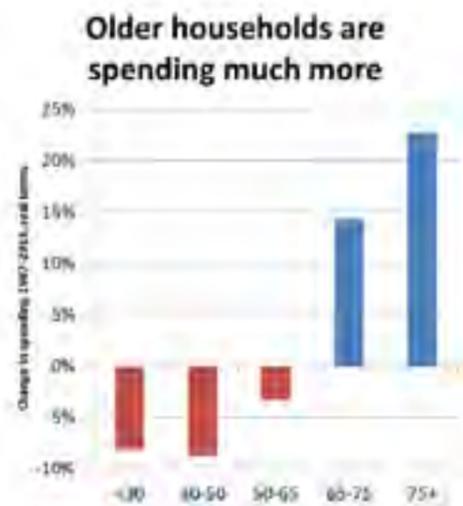
To ensure the grand sum of progress across Neighbourhoods of the Future, wide-ranging collaboration is a necessity. Channel 4's 'Old People's Home for 4 Year Olds' captures this beautifully, with young children benefitting from the precious time and attention of the home's residents. The children develop key communication skills, whilst the residents themselves enjoy greater interaction, exercise and sense of purpose.

Tackling the big questions

NatWest have been a collaborator in the Agile Ageing Alliance for the past four years. Some of the questions we have been investigating are:

- Are the right financial products available for people in their later lives?
- Are there further innovations that can be made to build companionship, given we have 4.9 million active mobile bank app users?
- Should our specialist sector teams, such as public sector, healthcare, third sector, technology, construction and property come together more formally to influence and learn from collaboration within this developing sector?

Our involvement is due to two main reasons. Firstly, this is a societal problem that will affect us all and so it is the right thing for us to consider what part we should play. Secondly, there exists a huge potential business opportunity. One that, if done right, could provide a chance for the UK to lead the world when it comes to thought leadership, prototypes, products, services and business models.



This is a societal problem that will affect us all and so it is the right thing for us to consider what part we should play.

This would allow exports to countries all over the world, who also will need to adapt to these issues.

Pitching the products

There has been a growing trend to divide ourselves into generational groups. This has highlighted discontent between those said to have gained and those said to have lost out. Nevertheless, dividing products and services across sectors and generations not only restricts advances relevant to the ageing society, but also reduces the chances of success of commercial products and services.

No-one likes to think of themselves as growing old or needing help. Therefore, the products or services most likely to see commercial success will be those that market themselves as having a great solution to the problems faced at any age. Smartphone sale growth is a great example where simple solutions are taken up by those over the age of 60. Yet these products are designed for all ages.

Pushing the debate forward

As we see a growing awareness of the challenges of our ageing societies, there are some encouraging early stage collaboration and small-scale projects taking shape. However, on a larger scale, we haven't yet managed to turn these problems into physical products, services and business models that consumers will validate by parting with their money.

To those with an interest in creating change and opportunities, we are currently viewed as a vitamin. That is, most can see there may

be a long-term benefit to participation, and that someone will profit from doing so, but most think it is something for other people to worry about. Despite the marketing and publicity we may see, they will very likely decide to invest their time and budget in something else. Therefore, to progress this debate, we need to position ourselves to stakeholders as a medicine. That is, something that consumers and business leaders not only desire but that they need to see the tangible benefits for themselves. To achieve this, traction is required.

Road-testing the future

Traction can only be achieved once the public have seen and contributed to the vision of a Neighbourhood of the Future. It is just as crucial for them to see how different elements start to knit together. This is why we need demonstrators, which will comprise of physical neighbourhoods to be built around the UK. These will start to bring to life our Neighbourhoods of the Future. They will allow people with all levels of interest, be it the public, planners, schools, health groups, investors, landlords, tech entrepreneurs, or healthcare providers, to experience the proposed innovations for themselves.

Only then will they see why a community might want to part with their hard-earned money to participate. Achieving this will not only mean improved health benefits and reduced isolation and loneliness, but will also help to deliver successful sales for businesses, generate employment opportunities and contribute to greater community cohesion. This improves the quality of life for all.

Photo credit: Image courtesy of National Westminster Bank Plc.

Money makes the world go round... right?

Martin Clark
Director of Impact Innovation, Allia

The way we pay for and fund the things society really needs is changing fast. As government pulls back and the banks operate under tighter controls, a range of alternatives is beginning to emerge. There is a growing social investment movement which links ethical investors with targeted impact-creating activities. Alongside these dedicated social investment products, we are seeing more use of crowdfunding, peer to peer lending, and even blockchain applications entering the market.

Those of us who want to secure provision for our ageing selves and see a change in housing should be asking: how can we make sure all these funding approaches are engaged with the challenge of funding whatever will have the greatest impact?

At Allia, we envision a world with a range of suitable social funding solutions to support development of new types of communities, in which age-friendly housing and retirement villages play a key part. Funding these developments is generally more challenging than traditional housing schemes, but that does not mean it is impossible. For example, we've recently raised £35M as a retail charity bond listed on the London Stock Exchange for 'Belong', the specialist dementia village charity. This will help fund two further villages to add to the seven that they already operate. These are state of the art 24-hour care communities with brilliant design. They boast features which help people to retain choice and independence in as many areas of their lives as possible when their needs change. The latest village opened in Newcastle-under-Lyme in April 2018 with space for 530 people. It left a lasting positive impression on those members of our team who visited it.

Money, health and ageing

And now we hear that pension funds are handing back excess cash to investors because life expectancy is unexpectedly declining in the UK. What a terrible indictment of our society, that healthy life is diminishing while potentially useful funds are spent on things that, by implication, are not doing us good. This health crisis should spur us to find creative ways to use some of these funds to tackle the problem.

Allia is committed to facilitating some of the proven alternative finance solutions to meet the demand within the AAA/NOTF project and complementary initiatives inspired by it. Having now issued over £300 million in social investment bonds, we are confident this approach can develop into a credible asset class that catalyses a range of exciting projects in wider fields.

Another recent successful Retail Bond achieved £33M for Greensleeves Care, the charitable operator of care homes for older adults. We would love to see hundreds of innovative senior housing developments spring up, and to provide either the core funding or the balance of other funding if required.

Some believe that social impact bonds (SIBs) have potential, and there have been experiments in the fields of reoffending, family intervention and obesity among others. It may be that the principle of using private investment to pay for targeted interventions, where a public sector commissioner pays only for positive outcomes, could be applied to healthy ageing. (So, they are more accurately described as 'contracts for outcomes' rather than what the financial sector would understand as 'bonds'). The challenge is showing that there is clear attribution between the intervention and the outcome.

Six activities that need funding

Whatever the specific financial solutions, what sort of transformational activities should we be trying to support?

- 1 First and foremost, we need more age-friendly housing, from small clusters of units to whole neighbourhoods – as described by the Agile Ageing Alliance in this publication.
- 2 We need to retrofit the most effective innovations into existing housing stock – which is by far the larger challenge in terms of scale – so that people can live happily and safely there for longer.
- 3 We must face the challenge of financial and other support for downsizing or ‘rightsizing’ for those with a housing asset. This ensures that no one is ripped off or at financial risk when they transition, and that there is funding for their future care.
- 4 At the same time, we want to be developing the pipeline of upcoming innovations which will be embedded in the housing of the future. These need to be better and cheaper, and work seamlessly and intuitively with people’s everyday lives, so that they are available to all and not the preserve of the rich or those whose health conditions merit higher state support. The AgeTech Accelerator in which Allia is involved is one of the ways this can be done. It offers business support services alongside living lab testing of promising innovations, in a collaboration between UK, French, Belgian and Dutch partners.
- 5 Let’s not forget to support the social capital organisations that we need as part of the new communities. These communities cannot be perceived as, nor should they ever become, mechanised holding pens for older people. They should be among the most joyous and meaningful places to live in the country.
- 6 Finally, we need to keep the pressure on government. For example, under what circumstances would HM Treasury be willing to invest low cost or zero interest finance to enable substantial home adaptations? The loans would be repayable over a long term and secured on the property so that they are recovered in the event of a sale on downsizing or death. Could social investment help to pump-prime this approach or offset some of the cost of capital? The cost benefit case would include reduced NHS costs, as well as improvements to housing stock, and the creation of a higher proportion of age-friendly housing units. We already know that poor housing costs the NHS around £1.4bn per year; more work needs to be done on how some of that could be used effectively on preventative measures.

We must face the challenge of financial and other support for downsizing or ‘rightsizing’ for those with a housing asset.

£46bn

invested capital by private investors in 2017 (Financial Times)

£63bn

total amount invested into UK funds

£1,234bn

of total funds are under management (The Investment Association)

A new way of thinking and investing

Those who work in finance suggest there is an almost limitless supply of capital for the right projects. According to the Financial Times (12 Feb 2018), private investors invested a record-breaking £46bn into funds during 2017. With institutional investment included, the total amount invested into UK funds in 2017 reached £63bn. And in total there is a staggering £1,234bn under management (The Investment Association, Aug 2018).

We need to grow the amount of dedicated social investment within and alongside this industry, as even on the broadest definition of ‘ethical funds’, they only represent around 1.3% of the total. Socially motivated investors of all kinds should be demanding more uses of their money that are good for our ageing society. And the social investors can themselves become the initiator of projects. People and businesses with financial reserves and connections to or awareness of those with land should be able to come to the AAA Neighbourhoods of the Future consortium and put forward a project which can come under the bigger umbrella.

So, let us put our money – to the extent we control and influence where it is held – at the disposal of the kind of future housing and communities that will make all our lives longer, more fulfilling and more independent. If this also reduces the financial burden on the public sector in caring for us now and in the future, that is an added benefit which opens up the potential to partner government on a serious strategic level. Together, imagine the progress we could make.

Six disruptive business models to power our neighbourhoods of the future



Stephen Johnston
Co-Founder, Aging2.0

Over the past few years, there has been a dramatic increase in the number of start-ups focused on 'healthy ageing'. Since 2012, when I co-founded Aging2.0, we have hosted over 500 start-up pitch events across 65 chaptersⁱⁱ in 20 countries and are now tracking over 3000 companies globally. Most tend to focus on their breakthrough technologies, while others their novel user experience. Very few propose radically new business models. This is one of the reasons I believe we are seeing few small companies get to scale.

The majority of companies today use some version of B2B or B2B2C (i.e. business-to-business, or business-to-business-to-consumer.), and most equate ageing with health. That is a shame, since ageing – and building the neighbourhoods of the future – is about living richly in multiple dimensions. Here are six alternative approaches that could help disrupt the status quo:

1. Direct to consumer

This is the simplest idea, yet it is surprisingly radical to those steeped in 'Ageing 1.0' (a siloed, low-tech, 'dependency' view of ageing). This is about unleashing the 70% of household wealth locked up in the 50+ population. It's about expanding Europe's €3 trillion 'silver economy' by creating attractive products that people desire, not just require. BestBuy's recent \$800m acquisition of GreatCallⁱⁱⁱ is validating, but more is needed. The key elements of success are distribution, design, branding, and an ability to curate products and educate consumers. iPads and Oxo products are two worthy examples – succeeding via superior quality matched with person-centred, ageless design. The dementia products portal Unforgettable.org is taking a market-building approach, offering community and curation to spark commerce.

2. Personal budgets

While consumer marketplaces sound attractive, especially to red-blooded, free-market libertarians, in reality many who would benefit can't afford to pay. Money spent by governments or insurance companies can 'prime the pump'. The Australians have been pioneering personal budgets^{iv} for years, and there are fledgling examples elsewhere (including in the UK.). Unfortunately, bureaucrats picking winners is not always a recipe for success; a fixed shortlist of 'safe' products can protect incumbents from innovators. Looking forward, giving people money to spend on curated portals (such as Unforgettable) could help, together with a more commercial, experimental mindset by those who have already large numbers of consumers, such as AgeUK^v.

3. Capitated payments

What if some older persons are not best placed to be the empowered, sovereign consumer? They may not be interested in comparing vital sign monitors and prefer Krispy Kreme to kale salad. Enter capitated payments – a monthly lump sum paid to an organisation to do everything necessary to take care of older adults. This ties health and social together neatly. It solves the enduring problem of no-one being in charge of keeping older people happy, healthy and independent.





The more effectively we test, learn and iterate in a collaborative way, the quicker the progress we'll make towards enabling all generations to fulfil their ambitions and together realise the promise of the neighbourhoods of the future.

Early trial versions of this have emerged in the US as 'health maintenance organizations', but these ended up being seen as cost-cutters, rather than advocates for their customers' happiness and quality of life. An updated version, the Program for All Inclusive Care for the Elderly (PACE) was created by Onlok^{vi} in San Francisco and has proven effective at improving quality of life, while reducing care costs. For-profit companies with talented entrepreneurial teams, such as Welbe^{vii} and Edenbridge Health^{viii}, are now offering similar products across the United States.

4. Pay for success models

While the capitated model provides an all-important holistic solution, there is a danger that this approach can lead to stasis. The revenues paid to the provider are fixed; it is usually a set monthly amount equivalent to similar or less than a nursing home; in California this is around \$3-5k per month. Pay-for-success instead offers to pay on mutually agreed-upon metrics of success. These include social impact "bonds"^{ix} (which are actually closer in risk and behaviour to a capped equity investment). While most SIBs have been related to prison reform, education or the environment^x, some are focused on healthy ageing, such as the Meals on Wheels project in Maryland^{xi}, or the Connections program in Worcester (though this is decidedly low-tech).

5. Universal long-term care insurance

While SIBs are intellectually attractive, they have political downsides – strapped local governments paying Goldman Sachs doesn't look good – and don't create a new original source of funding. A long-term care insurance fund would. In the 1990s, Japan's ageing population was precipitating a national crisis. As workers retired and got sick, budgets ballooned, growth stalled, and family caregivers were burning out. Hospitals become de facto nursing homes, with average length of stays for older adults of 50 days^{xii}. Compulsory long-term care insurance for people over 40, introduced

in 2000, provides discounted care based on five acuity levels, and seems to have, so far, averted further system breakdown. A similar model could help the UK system, and could be combined with some of the more market-oriented efforts, such as personal budgets, to create a unique approach tailored to the UK's needs.

6. Funding via health data

The final model taps into the power of data, the buzzword du jour. The world's most valuable, reusable asset has powered trillions of dollars of market value to Silicon Valley companies and won't be relinquished lightly. A few weeks ago, the UK's House of Lords started debating this very topic^{xiii}, with some estimates emerging that pharma companies could pay up to £10-15bn per year for the data. This is one of the most complex and charged topics, with its importance only matched by the confusion surrounding it. An expert, independent team should be convened to advise the nation – conducting an 'audit' of what's at stake and developing principles (such as giving people the right to own and manage their own data) that are then implemented in pro-growth ways.

We're still in the early stages of exploring which business models will work in different contexts – differing populations, use cases and technologies will play a part in constructing systems that successfully deliver change. There won't be one particular dominant solution, instead there will be a variety of models, some in parallel, and there needs to be significant real-world experimentation and feedback about 'what works'. Ideally, we will be having a shared conversation across industries and vital lessons won't be held hostage within corporate strategy departments. The more effectively we test, learn and iterate in a collaborative way, the quicker the progress we'll make towards enabling all generations to fulfil their ambitions and together realise the promise of the neighbourhoods of the future.

Photo credit: Image courtesy of Aging2.0

NEIGH BOUR HOODS OF THE FUTURE

AGEING SOCIETIES

...

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Living with millennials

Marieke Sjerps
Head of Content, Creative Quills

Speaking as a millennial, I don't see the upside to waging war on our elders. Granted, there are conflicting interests and resentment – and there are good reasons for this. Still, it doesn't amount to war. Baby boomers are our parents. To claim that we hate them all would be grossly unfair – even absurd. As Torsten Bell, director of the Resolution Foundation, told the Guardian: "Intergenerational war doesn't reflect how people feel about the issues or how they live their lives as families."

Let's not quibble over past slights. Arrows have been shot by both sides, the 'elderly' have robbed us of our future and millennials have singlehandedly destroyed the mayonnaise industry! For the record, I love mayonnaise, but that's beside the point. We could weaponize these comments to argue who's worse off, baby boomers or millennials. I'm ready to move beyond all that. Our ageing population is a challenge to us all. We each have a stake, and a part to play. Millennials are going to be part of building and converting our Neighbourhoods of the Future. And we'll be living in them, too.

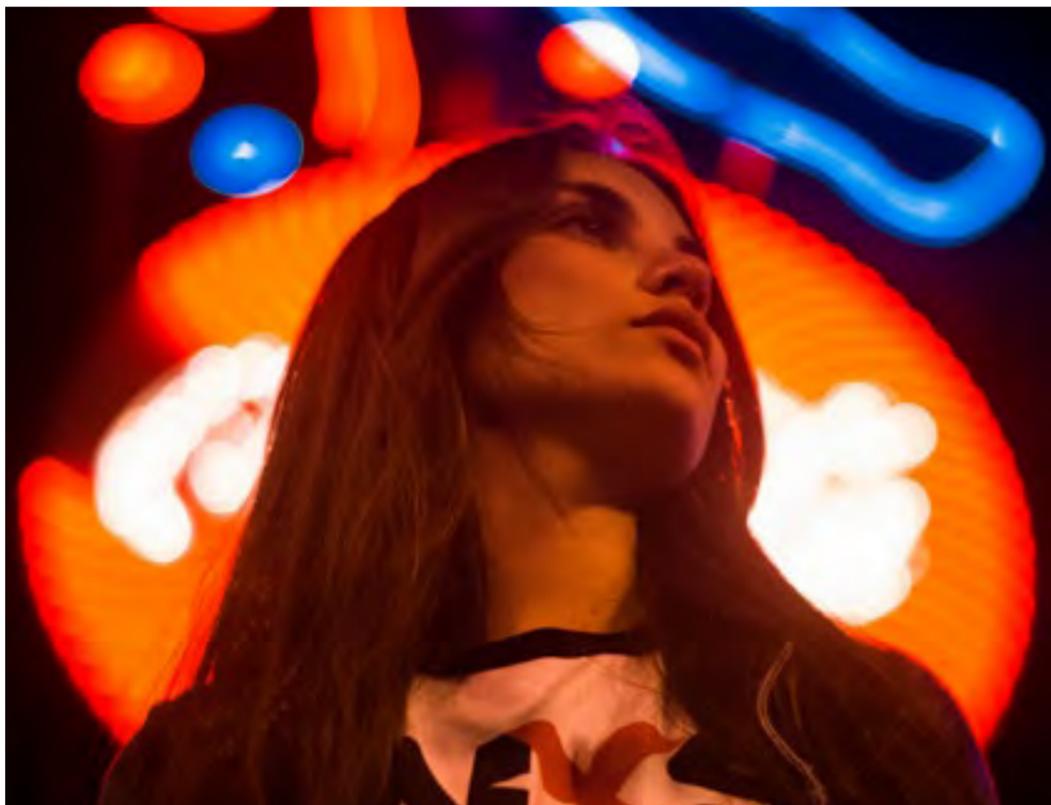
Generation	Birth years	Age in 2019
The Silent Generation	1928-1945	74-91
Baby Boomers	1946-1964	55-73
Generation X	1965-1980	39-54
Millennials/Gen Y	1981-1996	23-38
Post-Millennials/Gen Z	1997-Present	0-22

Source: Mentalfloss

Destigmatising the neighbourhood

My biggest fear about getting older is losing the freedom to make decisions about my life. But having a thousand options available to you can also have a detrimental effect when you're young. It can be hard to choose – and choose right, especially if you don't have the right information. Millennials can (and do) choose to postpone milestones like buying a house, getting married, having children. If we feel like living in a cramped London flat with six housemates while rage-tweeting about the property ladder over our #iconic avocado toast, then you better believe we will.

But we'd rather have a place within a decent community. As a member of the Neighbourhoods of the Future AAA editorial team, I have read many great things about destigmatising ageing, and the role that empathic design can play in making aids for older adults attractive. We should be putting the same effort into destigmatising



the very idea of care; of community; of intergenerational living. Dr Tarsha Finney writes eloquently in her article (see page 184) that we must remember our “critical need for a finely calibrated daily life together” to avoid remaining in “a profound and existential crisis of isolation and loneliness.” This message should be directed towards everyone, of all ages, acknowledging that millennials get lonely, too. Otherwise, our shiny ‘cognitive homes’ will stand empty, simply because the younger generations haven’t been involved in shaping them.

Yes, most of us millennials would rather wallow in an urban hellscape than live in the much-maligned “old people’s home” before our time. But this attitude isn’t unique to twenty to thirty-year olds. Older adults often feel exactly the same way! My grandparents hoped to die before they had to leave their home, even when staying put meant sleeping in the living room and washing at the kitchen sink.

And it’s not as if there is a viable alternative solution. A 2018 survey by University College London found that abuse takes place in 99% of care homes amid ‘chronic’ underfunding. Meanwhile, demand for care home places will soar by more than three quarters in less than 20 years. The system is clearly under

immense strain. Our current housing stock isn’t being adequately adapted to the needs of older adults, and our supported living facilities are understaffed. We need better solutions. Yet the building industry appears stuck in its own little time warp while rents keep rising.

Living with a millennial

This white paper makes a clear case for multigenerational living. Speaking as a millennial, I am convinced that many of my contemporaries would welcome an older adult into their homes. Alternatively, we would be open to co-habiting with older adults and providing informal care –and friendship –in exchange for reduced or rent free accommodation. (After all, if any generation is adept at living with their parents, it’s us!) All millennials need is the right facilities, support and messaging that will make us see it as an attractive choice. Once that is in place, I believe that our baby boomer friends will find that we can be as willing to make concessions as any generation before us.

However, to live up to my reputation as an entitled millennial, I do have one unconditional demand.



Embracing diversity

To get millennials on board, we must embrace diversity. Demographically, many ‘visions of the future’ look strikingly like they were born in the 1950s. And we don’t like the idea of our older housemates tut-tutting when we bring our boyfriends, girlfriends or non-binary friends of any ethnicity home. We need to be told that the Neighbourhoods of the Future will welcome everyone, regardless of ethnicity, background, gender, sexual orientation and religion. Otherwise, we won’t want any part in it.

But we can be flexible too. If the realisation of all this means that we don’t end up owning a three-bedroom terrace outright anytime soon, we won’t go to war. Property doesn’t mean the same thing to us as it does to our parents. There is a growing understanding among my generation that things aren’t going to go back to the way they were. And if that’s not possible, why not remake them, even better than before?

Photo credit: Image courtesy of Stephanie Humphries Photography

Intergenerational war doesn’t reflect how people feel about the issues or how they live their lives as families.

A future without ageism

Richard Norman
Lead, Age Allies Programme, Age UK London

Older people are often referred to as if they were one homogenous group, defined by a broad stereotype. These stereotypes¹ pervade society; they inform our political choices^{2,3,4,5,6} and have profound effects on our quality of life, both now and in the future. Unconscious bias,^{7,8} (thoughts based on stereotypes and prejudices that we may not even realise we have⁹), will inevitably influence policy decisions, access to resources and service design. Stereotyping can lead to discrimination and older people are regularly affected by negative attitudes to age in their interactions with others.

There is a growing body of research evidencing the real-life consequences that negative attitudes to ageing have on individual health outcomes.

Those with a negative attitude towards ageing tend to have worse health outcomes and live a shocking seven and a half years fewer on average, even after considering other health factors.¹⁰ Even for individuals who carried high-risk genetic factors for dementia, those with positive age beliefs were around half as likely to develop dementia as those with negative age beliefs.¹¹

A recent RSPH study showed two out of five (40%) young people (18-24) believe “there isn’t any way to escape getting dementia as you age”¹²; whilst the reality is that just 7% of over 65s actually have dementia.¹³ Children as young as six years old can show an awareness of ageist stereotypes; however, only in later life will the negative effects of self-stereotyping be realised.¹⁴

Addressing negative attitudes to ageing and their consequences will require action at all ages.





Hiding in plain sight

Although few people would think of themselves as 'ageist', socially ingrained ageist attitudes and behaviours are often openly expressed and displayed within mainstream culture without challenge.¹⁵ Any narrative which focuses solely on tensions between the generations, or pitting one against the other, is symptomatic of a harmful underlying mindset that frames ageing as a problem.¹⁶

Whilst age discrimination is substantially referenced in the Equalities Act 2010, understanding of its practical application and responsibility for compliance is slow to gain acceptance. Clause 12 of the Editors' Code of Practice, compiled by IPSO, which regulates the print media, makes no reference to age discrimination at all.

Benevolent intent offers no immunity. It could be argued that much of the campaigning which publicises the

concerns of older adults actually contribute to their creation. By presenting a relentlessly bleak narrative¹⁷ we only go to propagate the belief among 25% of millennials that "it is normal to be unhappy and depressed when you are old"¹⁸.

Addressing negative attitudes to ageing and their consequences will require action at all ages and across a variety of settings, not just those traditionally associated with older people.¹⁹

Age UK London's Age Allies programme²⁰ is providing age awareness workshops to people from organisations across the capital. The objective is to facilitate awareness among participants of their own unconscious bias. Take up of this free service has been limited however, particularly among business which is yet to see the opportunity that such awareness represents.

The world in which our future selves will live

The 2018 RSPH/Calouste Gulbenkian Foundation report, "That Age Old Question", gives compelling evidence of the public health imperative of addressing the issues of ageism and makes a series of practical policy recommendations. These include:

- Integrating generations by promoting positive inter-generational interaction
- Addressing positive ageing within schools
- Promotion of age diversity in the workplace
- Training for healthcare professionals on the effects of ageism in clinical and care settings
- An independent and comprehensive review of the media representation of ageing and older people

I wholeheartedly endorse these recommendations, and I would add:

- Positive ageing to be addressed with all ages in all sectors. Providing unconscious bias training for adults, particularly in the workplace can have significant positive results both for individuals and organisations
- Training for gatekeepers. Unconscious bias affects access to services for older people, including through service design and policy decisions
- Work with the age sector to consistently apply a message that describes ageism as a contributing cause of the problems older society faces

We are all ageing; it is a natural consequence of time. As our population ages the consequences of inaction will have a profoundly negative effect on the health and social care system, our relationships, neighbourhoods and our economy. The inverse is also true. Being pro-active now will see a future that benefits all of us as we age.

Acknowledgements

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Photo credit: Images courtesy of Maria Dowell @ Urban Pilot and Richard Norman FRSA – Age Allies Programme, Age UK London

EVOLUTION

Reimagining our Neighbourhood of the Future

...

The Agile Ageing Alliance and Tata Steel would like this whitepaper to serve as a roadmap and a blueprint for action, leading to a series of interconnected, large scale demonstrators.

UK Research and Innovation (UKRI), the organisation responsible for implementing the ISCF Ageing Society Grand Challenge, has assessed our proposal and concluded that this “compelling challenge could have a transformational social and economic impact on the UK construction and healthy ageing sectors.” UKRI have made it clear that they “would like to continue to work together to establish how we can further develop some of the great ideas behind the proposal.”

This means exploring new forms of collaboration, by sharing capacity and developing risk-sharing models in a spirit of open innovation. Let’s reimagine a future where, instead of imposing our own exclusive standards, we focus on improving user experience, interoperability and value. While we will still be competing, we can share a long-term vision based on a common set of principles, a voluntary code of conduct and a common language.

It is worth pointing out that Tata Steel does not intend, nor wish, to become a house builder. The company recognises that there is space for new entrants in the sector and are open to exploring new concepts that will enable a progressive socioeconomic experiment in construction.

Our aim is to focus on clear deliverables, working in collaboration with a wide

representation of the housing supply chain, to deliver a sustainable prototype neighbourhood of the future.

Rewarding audacity, ambition and agility

Sir Mark Walport, UKRI Chief Executive, is the man who conceived the Industrial Strategy Challenge Fund. His objective: “To stimulate and reward audacity, ambition and agility, where imagination and innovation are actively encouraged and important proposals do not fall foul of artificial divides.”

If you are audacious, ambitious and agile. If you find the ideas in this whitepaper exciting and really would like to change the world, visit www.agileageing.org and let us know how you, or your organisation, can contribute. Working cooperatively across borders and disciplines will ensure that we craft a better living environment for our older selves.

I will leave the final words to Peter Drucker, an Austrian-born, American entrepreneur, educator, and author who has been described as “the founder of modern management”. Peter said:

The best way to predict the future is to create it

Let’s get to work...

Ian Spero
Founder, Agile Ageing Alliance

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THANKS

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FUTURE

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NEIGHBOURHOODS OF THE FUTURE

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The text is rendered in a playful, multi-colored font where each letter is composed of overlapping horizontal and vertical bars in red, yellow, green, blue, orange, and purple. Small black circles are placed at the intersections of these bars. The word 'NEIGHBOURHOODS' is on the first line, 'OF THE' on the second, and 'FUTURE' on the third. The year '2019' is centered within the second 'O' of 'NEIGHBOURHOODS'.

CREATING A BRIGHTER FUTURE FOR OUR OLDER SELVES
AN AGILE AGEING ALLIANCE PRODUCTION MADE POSSIBLE BY TATA STEEL