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A Mapping of Smart Ageing Activity in Ireland and An Assessment of the Potential Smart Ageing Opportunity Areas

An independent report for the Department of Jobs, Enterprise and Innovation

Executive Summary

A Mapping of Smart Ageing Activity in Ireland and An Assessment of the Potential Smart Ageing Opportunity Areas

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Preface

The Action Plan for Jobs 2014 identified Smart Ageing as a sectoral opportunity for economic growth and jobs for Ireland. As part of the Action Plan, the Government committed to map the current economic and social activity in Ireland, to identify our assets and strengths and to identify the enterprise and job creation potential for the country. This work followed on from a recommendation of the Global Irish Economic Forum in 2013.

Smart Ageing is defined as “...using technology and innovation both in the public and private sectors to produce products, services, solutions and systems to improve the quality of life of people aged 50 and over”.

An Interdepartmental Steering Group oversaw this work and was chaired by the Department of the Taoiseach, with research and technical support from the Department of Jobs, Enterprise and Innovation.

The Technopolis Group was commissioned by the Strategic Policy Division of the Department of Jobs, Enterprise and Innovation to assist in the mapping and assessment process and the following report sets out the key findings.

The Steering Group have welcomed the report and the relevant State Agencies and Departments will consider the recommendations therein.

Executive summary

Introduction

The number of people aged 60 and over will more than double by 2050, reaching 2 billion globally. An ageing society should be considered a sign of social and economic progress that, as a result of increasing longevity, brings about further opportunities for economic, social and cultural development. The ‘older people’ of the 21st century are better educated and in better health than generations ever before. They want to live independently, continue to contribute to their communities and enjoy their later lives in good health.

Older people are shaping economies; they constitute a large and growing market segment in very many consumer markets, with a combined spending power estimated to reach \$15 trillion by 2020. Living longer also poses challenges to both the individual and to society. An ageing population means a smaller working population must help support the incomes of a larger number of people of pensionable age. The worsening dependency ratio will also impact the affordability of public healthcare with national expenditure expected to rise by 25% as a share of GDP in EU Member States by 2050. Healthcare spending is already heavily skewed toward older people with three quarters of the healthcare budget in the EU spent on people over 60.

Ireland has a relatively young population compared with most other EU countries, and does not yet have to cope with the intense pressure on public finances of the changing demographics. Ireland has, however, made an early commitment to meeting the challenge and delivering inter-generational equity. It sees Smart Ageing¹ as an opportunity rather than a crisis. Given the rapidly changing situation internationally, Smart Ageing products and services will provide Ireland with a platform for new business creation, rising exports and increasing employment.

Ireland commissioned the Technopolis Group to help identify the specific developments that may benefit older people globally and where Ireland has a competitive advantage. The review was carried out between August and December 2014, for an Inter-Departmental Steering Group, chaired by the Department of the Taoiseach and supported by the Strategic Policy Unit in the Department of Jobs, Enterprise and Innovation (DJEI).

The primary objective was to identify major economic opportunities relating to Smart Ageing, where government support was likely to be decisive in helping Irish businesses capture income and market share internationally. The focus was on innovation-related opportunities, and the study began by mapping Ireland’s various R&D activities, networks and enterprise base across key economic sectors² in order to provide a baseline of relevant skills and institutional capacity. The existence of technology and ‘smart know-how’ was considered a precondition for Ireland to exploit growth opportunities in new markets, where the competition is not yet fully established and Ireland emerging technological strengths may help secure a first-mover advantage. However, transition from R&D to a full economic activity requires the presence of certain national framework conditions that would provide supporting infrastructure, reduce risks for stakeholders, and create a favourable business environment.

¹ Smart Ageing for the purposes of this study is defined as ‘...using technology and innovation in both the public and private sectors to produce products, services, solutions and systems to improve the quality of life for people aged 50 and over’.

² Healthcare and self-care, including biomedical solutions; Educational and training services for older people; Financial services for older people; Food and nutrition for older people; Connectivity and social participation; Lifestyle products and services including tourism; Employment; Housing and transport.

Global context

Ireland is one of the first countries to see the world's rapidly ageing population as a business opportunity and not just a societal challenge, however, there is a great deal of activity in this space internationally. The European Commission has launched several Smart Ageing platforms in the recent past, which have direct relevance for the Irish private sector. These large-scale, pan-EU initiatives not only operate at the technology frontier providing learning opportunities and potential collaborations across value chains, but also provide insight about potential future market trends and shifts in the regulatory landscape. The big three platforms are the Ambient Assisted Living (AAL) Joint Programme, the More Years Better Lives (MYBL) Joint Programme, and the European Innovation Partnership for Active and Healthy Ageing (AHA). Beyond these major EU initiatives, several countries have implemented new policies focusing on the ageing population and promoting the wellbeing of older people. Although most countries have not developed a national 'Smart Ageing' strategy, specific initiatives and policies are closely related to Smart Ageing and any window of opportunity for Ireland will be time-limited.

For example, the Dutch Ministry of Health, Care and Welfare has provided subsidies for the mainstreaming of independent living technology in the serviced housing sector, through the 'Dutch Domotics Programme' to enable people to live independently for longer. The programme stimulated a large amount of experimental activities concerning the introduction of smart home solutions and ICT-enabled service delivery in more than 5,000 homes of older people across the Netherlands. Another example is Innovate UK's Assisted Living Innovation Platform (ALIP), which seeks to enable the ageing population (and those with long-term health conditions) to live with greater independence. ALIP is wrestling with the main market failures identified around the development of these new, technologically enabled care models, which need to work across the triptych of private, social and healthcare systems and require a different mixture of investments. Innovate UK is running multiple demonstrators, information campaigns and market research in an attempt to showcase solutions to institutional barriers, systems and services interoperability, statutory and regulatory challenges and the level of awareness and enthusiasm for such solutions among older people. Further afield, Japan, the country with the highest age dependency ratio, has established a dedicated Smart Ageing International Research Centre (SAIRC) with a new programme launched in 2014 to restore Japan's global competitiveness with strategic reforms linked to "creative innovation."

Opportunities linked to Smart Ageing in Ireland

Ireland exhibits a 'small country effect,' with quite strong connections across different actors in the public and private sectors, including third level institutes, research institutes and industry. In particular, the Health sector has presented a large number of important initiatives via its major research institutes and strong enterprise base which, combined with a growing sector (and fast growing sub-sectors) internationally, represents a significant opportunity for Ireland in Smart Ageing. Similarly, the Food & Nutrition sector has a strong enterprise base with collaborative opportunities with research centres, innovative SMEs and large corporations, especially in the dairy sector that is well-connected across the entire food chain from improving resource efficiency, nutritional value to reducing food waste. Areas, including Housing & Transport, especially linked to mobility and independent living, and Lifestyle products and services, including Tourism, may also successfully target older consumers and develop products and services based on current activities and further policy support.

Other areas, Education and training, Financial services, and Connectivity and social participation, may not currently represent immediate economic opportunities for Ireland, however, these are important sectors in terms of enabling and strengthening Smart Ageing in other industrial sectors.

In the following sections we discuss the specific opportunities that were uncovered by the study and validated by experts and other stakeholders active in Ireland.

1. Functional food

Functional food is a food or food component that provides an additional function or benefit beyond the basic nutritional value of the food itself. It is an ever more popular area of food science, with functional foods custom-designed to meet the needs and the desires of specific groups of the population or even individual consumers to deliver ‘personalised nutrition.’ Older consumers are increasingly conscious of opportunities to improve their health, with products that aim to maintain and/or improve mobility and joint health the most popular, with an increasing trend in demand for functional food and drink in Asia. There are many other areas where functional foods can be exploited including heart health, cognitive health, digestive health, sarcopenia (muscle loss with ageing), “mood food” or nutricosmetics. Functional food represents added value and commands premium pricing with higher margins, in comparison with a majority of conventional ingredients or products.

Healthy food has a strong foundation in Ireland with a global reputation for quality natural products from dairy through to meat and seafood, which also offers increasingly popular links with agritourism. Ireland has an internationally competitive food industry, with connected actors across the food chain, and with exports of around €10 billion in 2014 (more than 12% of all exports). There is a strong research base (with access to target consumers, for example, in technology centres) with the additional scientific and technical capacity to support Irish businesses in their efforts to develop more and better functional foods, including for older consumers, which is a developing market segment. Ireland’s agri-food and drink output however is largely focused on primary agriculture and ingredient supply to multinationals. Prepared consumer foods is a smaller business sector as compared with dairy or beef, however, it is one where Ireland has seen growth in exports in recent years and especially around value-added products for consumers. Ireland’s research outputs could usefully be leveraged further so they translate into innovative products in a more timely fashion; and having a corresponding supporting infrastructure (including IP management) for functional food should then pay additional dividends from investments in terms of future exports and employment. Ireland’s innovative SMEs tend to be more resource constrained, in comparison with their multinational counterparts, and improved targeting of government support for these indigenous firms ought to accelerate development of functional foods designed specifically to deliver the kinds of health benefits commonly found in older consumers.

Ireland could be a pioneer in integrating all aspects of functional food: from nutrition to sensorial aspects and packaging to make it attractive to older people. It could also combine the high-quality know-how about nutrition with ‘smart appliances’ to enter the mNutrition space. A focused marketing campaign around functional food, highlighting lifestyle and other activities of older people could help grow the domestic market, and provide a platform for would-be exporters. Ireland has a unique resource with nutritional data available from TILDA to be explored further. An analysis of lifestyle and health data could lead to a better market segmentation and help develop products for the conditions that tend to affect older people disproportionately (e.g., dehydration, osteoporosis, and Alzheimer’s disease). These prepared foods will tend to have different routes to market as compared with dairy products or ingredients, and Ireland may need to strengthen its international visibility and links with retailers in order to build its exports, possibly via the various EU technology platforms targeting healthy ageing.

Functional foods have a shorter product lifecycle³ than more conventional food products, which demand faster rates of innovation and favour strong, pre-existing distribution networks to guarantee market access and rapid growth. Manufacturers may also have to confront new and more exacting regulations, where they claim a

³ Functional food in the European Union. <http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1719>

specific health gain or suggest that the product may be used in the treatment or management of a specific condition.

The government could encourage and support Ireland's emerging functional food industry to focus on older consumers. In a highly competitive international environment there is a need to connect key players and help position their offering in the field. It could also work with industry interest groups to communicate the new Irish vision for functional food to the outside world and achieve a similar success as it did with baby food/formula milk. We recommend the following specific actions:

- Create a group and national champion to define a *vision and strategy* for functional food for older people, with a corresponding action plan.
- That strategy and action plan may include some or all of the following
 - Support a *coordination mechanism* that brings together the food industry with research, and other partners along the value chain;
 - Establish *flagship Functional Food projects* around specific conditions that tend to affect older people, i.e. osteoporosis or malnutrition;
 - Work with key stakeholders (DAFM, Teagasc, Food for Health Ireland, The Health Innovation Hub, Enterprise Ireland, etc) to *encourage new product development targeting the needs of older people* specifically;
 - Develop marketing materials for public institutions and businesses to increase *awareness* about the particular link between diet and health in older people and the potential positive role of functional foods to help;
 - Develop marketing materials to build brand awareness and promote Irish functional foods for older consumers (Bord Bia);
 - Include nutrition and older people as a *key module in education* of healthcare professionals in Ireland;
 - Support Irish SMEs ambitions to develop and export functional foods for older people through the marketing materials referred to already but also by commissioning *international market studies* to provide the kind of insight about market trends, routes to market, pricing, competitors and regulations that smaller businesses struggle to determine for themselves;
 - Encourage and support Irish functional food specialists to consider bidding into various EU platforms (e.g. European Technology Platform on Food For Life, NU-AGE, etc) as part of their product development strategy.

2. Connected health

Connected health is a model for healthcare delivery that uses technology to provide healthcare remotely. Connected health is especially relevant to older people, who are more likely to be affected by chronic health conditions than the population as a whole and need to access health services more frequently. People are increasingly using ambient and wearable sensors to generate continuous data through connected devices, whether that is blood pressure or distance walked. These personal devices are being used more for medical applications too. Appropriate data analytics methods and wireless technology to enable remote patient monitoring, point of care diagnostics, and self-care will transform healthcare. Connected health is a large and growing global market encompassing mobile health (mHealth) through healthcare IT to telecare and telehealth. Europe's tech and software companies are prominent players and Europe is the biggest market for mHealth with an estimated \$7bn market size by 2017.

There is an opportunity for Ireland to tap into this growing market, developing sensors and communications technologies that facilitate the remote delivery of care and software applications specifically for older consumers, designed to improve the

collection of health data and information for practitioners and even the direct provision of care, remotely.

Ireland has significant research expertise in its various research centres as well as strong industrial capacity (both indigenous and multinational) and high-quality manufacturing capability of medical devices. There are a few good examples of industry-friendly test-bed activities with connected actors including the older people as users. The government's eHealth Strategy, under eHealth Ireland, is helping to coordinate clinical and industrial activities.

Connected health is a fast moving space with individual apps or products quickly becoming obsolete as new variants are developed or new approaches to old problems. It is also very challenging for smaller players to develop and market products that can sell anywhere at a global scale due to the lack of interoperability and standards in product development. Product development is also made more expensive by the need to cope with changing expectations around data access and data security, as policy makers and regulators continuously refine the rules to protect against emerging risks. Ireland's health system has a limited capacity at present to test new connected health solutions, which is something of a brake on national innovation on the one hand, and reduces opportunities for would-be exporters to test new concepts and products in their domestic market on the other hand. However progress is being made in terms of developing an infrastructure around the Health Innovation Hub. The fact that public health and care budgets are separate in Ireland reduces the incentive to adopt connected health technologies. The drive towards more integrated health and care would provide the necessary flexibility to enhance adoption rates in connected health.

Demand for managed and personalised care is flourishing worldwide offering a large and growing export market for Ireland's businesses to address. Ireland could integrate its already existing technologies and develop interoperable, adaptable and scalable systems to export innovative products to this global market. For example, integration of telecommunication and healthcare will spill over to other areas, e.g., early detection of diseases or medication compliance. TILDA research data could once again help better understand factors relevant to the socio-economic wellbeing of older people and develop smart products and services.

Ireland's SMEs have good technologies but may struggle to gain access to strengthening international markets for connected health solutions, which tend to be dominated by institutional customers and large businesses with established supply chains. Government-backed demonstration programmes allow smaller companies to refine their prototypes in real-world settings and showcase their novel products and applications to prospective customers and supply chain partners. By facilitating early market traction and gathering real-world data on the costs and benefits of their innovative technologies compared, Ireland's SMEs will be in a better position to address global markets and supply chains. Exploiting connected medical technologies and chronic disease management systems will ultimately mean cost savings in public health expenditure and hence a significant public sector presence in the potential consumer base is expected in many countries. The government could help remove barriers in a fragmented technology landscape, facilitate the convergence of technologies, and create better incentives for developing and adopting connected health technologies in hospitals and care homes. We recommend the following specific actions:

- *Facilitate multidisciplinary experimentation* with novel systems by connecting research, industry, clinicians and users that could lead to new products / services, including linking up with international centres of excellence.

- *Support innovation in smaller businesses through public procurement* following the US Small Business Innovation Research (SBIR) programmes,⁴ focusing on smart and connected health. Consider intermediate markets, those between public healthcare and private individuals, such as care homes and sheltered housing.
- *Scale up demonstrator projects to the national level* to test system-level innovations and to provide a platform for a larger number of products and services. Ensure the demonstrators give sufficient weight to researching the costs and benefits of the solutions on trial, with a view to supporting prospective exporters in developing their sales pitch and possibly even bringing in international service providers (clients) to see the new systems in action. Expanding the Health Innovation Hub could be a practical way to increase health innovation in general, but targeting older people in particular.
- Build on existing primary healthcare IT infrastructure and support the development of a national electronic *scorecard and telehealth data system for chronic conditions*.
- Create awareness programmes and *training for frontline staff* and end-users about the benefits of connected health solutions.
- Explore the feasibility of a *health and welfare technologies programme*, a self-financing scheme with industrial stakeholders involving large hospitals. The introduction of such an innovation programme may be linked to the review of objectives of existing infrastructure.
- Raise awareness of and support applications for EU funding in areas related to connected health and assisted living.

3. Assisted living

‘Assisted living’ encapsulates the idea that we want to live our later years socially engaged and as independently as possible and away from hospitals or care homes. Assisted living opportunities are closely linked to ‘Connected health’, discussed above, and ‘Adaptable housing’, discussed below. This opportunity area includes the use of sensors, communication technology, as well as mobility aids, actuators, gaming concept, and human-machine interface to support people’s needs and wishes. The assisted living market is very large globally; in the USA \$41bn was spent on assistive technology in 2011, while the smaller, European market is predicted to grow with 22% to \$525m in 2015. The low consumer awareness and product adoption rates in Europe are expected to change in the near future.

The opportunity for Ireland is to develop and commercialise physical and electronic devices connected to communication technologies that enable older people to monitor and manage their health, thereby living longer, healthier and happier in their homes.

Ireland has a real research expertise in its various research centres, as well as a strong industrial capacity, especially in high quality manufacturing. There are a few good but somewhat limited examples of industry-friendly test-bed activities exist with older people as active participants. Ireland is also part of the European network of living labs.⁵

Ireland could focus on selected areas of assisted living where it has genuine strength. For example, researchers have developed solutions that maintain mobility as key to independence that prevents physical and cognitive decline. Adoption of new technologies by older people will require the development of novel human-machine interfaces and the introduction of gaming concepts (and social connectivity) into

⁴ For more detail, see <https://sbir.nih.gov/>

⁵ See, for example, <http://www.openlivinglabs.eu>

everyday tasks. Integration of assistive technology with the built environment will ultimately result in adaptable ‘smart homes’ for everyone to benefit from.

There are current challenges and barriers linked to data security and regulatory issues preventing convergence of technologies and industries (i.e., gaming, entertainment, and health). We recommend the following specific actions:

- Coordinate activities across research, industry, clinicians and users to support better design methodologies, to understand data collected about behaviour and needs, and to ensure maximum economic and social benefits.
- *Scale up living-lab* projects to the national level in order to demonstrate utility for the end user and profitability for private enterprises on a large-scale.
- Create an *innovation programme in the assisted living* space and attract international firms to Ireland to import specialised know-how and technology.
- *Challenge entertainment industry to develop games* for older people, linking health benefits and fun.
- *Promote the concept of assisted living*, including ‘social inclusion technologies’.
- Establish training and *awareness programmes* for designers, entrepreneurs, and end-users.
- *Expand the coverage* of national telecommunication and broadband infrastructure.

4. Adaptable housing

There is a substantial need for the adaptation of the existing housing stock to better meet the needs of an older population. This international ‘adaptation’ market requires architecture and design services, and such Irish know-how and services may be exported. Products in this space include Modular building systems, Energy efficient building products, Intelligent building management systems, Multifunction devices, and Access systems. Although Ireland has a large repair and maintenance industry in the housing sector, it represents predominantly conventional design and construction services. The local authority sector or EU regions are more likely to be able to establish a sizeable and growing market by bringing together adaptable housing and assisted living application areas. There is a large ‘smart homes’ market in North-America and while Europe’s smart home market is much smaller and highly concentrated (around Germany, France, Netherlands), it is growing.

Adaptable and smart homes will be the future in the developed world with advantages from saving energy to creating homes suitable for a lifetime. It is noted that older people may not be the direct target as consumers for smart homes, but they will be beneficiaries of this trend.

The opportunity for Ireland is to develop the know-how and commercialise the knowledge of smart housing adaptation to support assisted living for older people in their homes. This represents an export opportunity for architectural and design consultancies and specialised manufacturers.

Ireland has a design / built environment research base with an interest in adaptation and universal design. Ireland also has tech start-ups and software companies that could develop smart building products or sell into global supply chains for ‘smart housing.’

Ireland could try to link up adaptable housing with assisted living concepts to develop unique solutions for older people living in homes not suitable to their needs. Design expertise developed in the domestic market may then be exported to the growing European market if privacy concerns and significant installation costs are addressed.

The government may consider as policy objective to provide incentives and support Ireland’s design and building products sector in expanding its international sales within the smart homes and retrofit markets in general, and with a specific target

concerning the older people, in particular. Ireland launched new construction and social housing strategies in 2014, which target building (new and adapted) for older people. We recommend the following specific actions:

- Bring *housing and assisted living* together to create added value for both application areas.
- Identify links between ‘solutions for adaptable housing’ and *energy efficiency* for older people. Promote the case for ‘adaptation’ within related policies and initiatives.
- Review the possibility of creating an *international competition for Adaptive design*, for housing and for retrofit, as part of Irish Design 2015. This will bring in solutions from around the world as well as building relationships between Ireland’s design and construction industries and global leaders.
- Support efforts around *Universal Design*, which are seeking to develop solutions for lifetime homes / lifetime neighbourhoods.
- Consider supporting the Royal Institute of Architects of Ireland (RIAI) and the Construction Industries Federation in *developing working groups* to conduct market research and international promotional campaigns.
- Consider launching a scheme like the SBIR to give greater focus/innovation to that procurement activity.
- Expand the volume of underpinning research, in both the design space and technology space, perhaps by creating a virtual centre of excellence for ‘adaptation in housing for the older person’.
- Replicate demonstration projects, which bring together the HSE and Local Authorities with designers, academic groups and technology firms to develop and showcase smart buildings and smart building technologies for retrofit.
- Review planning rules with a view to increasing flexibility in terms of use and reuse of dwellings and mixed use in neighbourhoods. Look at ways to expand the Housing Adaptation Grants scheme, so it is available to a larger number of people.

5. Tourism

A thriving tourism industry for older people not only offers an economic opportunity, but beyond that it also provides social benefits in Ireland and international reputation. Tourism is an important service traded globally, and it is also an integral component of the enterprise sector in Ireland. Tourism in Ireland has returned to growth with 7.3m visitors generating €3.7bn in 2014. Most visitors, traditionally from the cohort of people aged 50+, come from the UK and USA and spend mainly on accommodation and food. Nevertheless tourism from Continental Europe is increasingly important and growth from long-haul markets (both developed and developing) is noticeable albeit from a low base. It is recognised that consumer demand has been changing and emphasis is now on visitor ‘experience’ and niche markets. Ireland can continue to tap into the growing trend of older people travelling abroad, and build on its strong market position in this space. The success of tourism is closely linked to the quality and inclusiveness of systems of transport, ICT, food, and housing.

The opportunity for Ireland is to develop globally competitive (smart) tourism market considering older travellers’ needs thereby contributing to economic growth, utilising and enhancing existing capacities in Ireland.

Ireland has several attractive points. First, it is readily accessible from Europe and the US via direct air links and it caters well for English-speaking visitors and the Irish Diaspora. Second, the government has made strides with the Irish Short Stay Visa Waiver Programme and the British Irish Visa Scheme to facilitate entry for overseas travellers. Finally, Ireland is a safe and clean destination, often important priorities for the older people looking for nature-inspired leisure programmes.

Ireland could create a unique experience for older people, blending technological innovation, cultural heritage, and natural beauty. An enhanced hospitality dimension of visitors' experience could be achieved with a blend of social interactions with the local communities and cultural heritage. We recommend the following specific actions:

- Enhance tourism services in Ireland by continuing to *improve infrastructure*, especially in rural areas, linked to the needs of the older visitors: accessible transport, age-friendly hotels and B&Bs, and communication technology.
- Support *overseas marketing of tourism* in Ireland and create a strong image / brand around 'experience', 'cultural heritage', 'environment' and 'wellness'.
- Continue to *promote* 'inclusive' and 'culturally curious' tourism in established markets (UK, US, Germany) as well as for tourists with high disposable income from emerging markets in Asia and South America.
- Create a new or extend an existing *annual event* (e.g., Bealtaine Festival), with the involvement of the entertainment industry, so that older people return to Ireland as tourists.
- Offer *advice and training* to staff on how to build technology into services to older people.
- *Review regulation* so that it facilitates the introduction of innovative approaches such as those attractive to older international visitors.
- *Provide specific incentives* from government for innovative entrepreneurs to invest in this space both in the short-term, e.g., to build age-friendly hotels, and longer term, e.g. to build a brand in untapped markets.
- Build networks with other EU regions so that Ireland is part of EU-wide offerings, e.g., via the Irish Regions Office and local authorities town twinning schemes.

Conclusions

Smart Ageing is a broad concept that combines innovation and technology to produce products and services to improve the quality of life for people aged 50 and over. It is based on the assumption that older people form a potential consumer or interest group that can be treated similarly. It is likely however that further development and differentiation will be required to meet the needs of the sub-groups within this cohort.

The private sector in Ireland has the innovative and technical capacity to excel in the field and effectively compete in the international arena. Ireland already has a strong presence in many of the application areas considered in this study and focusing on its relative strengths will help enterprises turn existing knowledge into economic returns. These emerging successful businesses will be underpinned by crucial enabling sectors including the financial services and education.

Although the scale of global markets are enormous, very few countries have set up the kind of political leadership Ireland is currently aiming at and which are necessary to help indigenous businesses with niche products and services to successfully enter fiercely contested international markets and maximise the commercial opportunities. Therefore, focused political commitment may be the single most potent action Ireland can take to exploit international opportunities in a coordinated, multi-disciplinary approach.

A central government department is best placed to 'own' Ireland's national 'Smart Ageing' strategy, as the issues are clearly cross-departmental. In terms of structures, it may be appropriate for the Inter-Departmental Steering Group to be transformed into a standing committee that would bridge departmental interests and deliver the necessary political commitment. An *Inter-Departmental Committee on Smart Ageing*

(IDCSA) would deliver leadership and oversight, while leaving the detailed planning and implementation to the most relevant department or agencies.

In addition, a *Smart Ageing Leadership Council for Ireland* (SALCI) could be set up to engage the private and third sectors, alongside central and local government, to ensure political leadership is mirrored in industry and third sector strategies. SALCI would develop the detailed Smart Ageing strategy and drive forward that agenda in multiple policy and industry settings, through advocacy, communication, and coordination. SALCI would need the authority/capacity to convene and support working groups, with the expertise and resources to drive forward the Smart Ageing agenda in a specific area.

There are a number of cross-cutting (multi-disciplinary and multi-stakeholder) issues that are contingent on the domestic research organisations, health sector, local authorities, users and enterprise working together in a safe and collaborative environment to develop products and services for older people worldwide. Based on an improved national physical and communications infrastructure, Ireland will be able to establish a Smart Ageing ecosystem that can validate the feasibility and socio-economic benefits of innovations in the Smart Ageing space.

Consequently, any implementation strategy needs to recognise there are many pre-existing initiatives/investments in Ireland, to which they should add value by galvanising actors around a bigger vision or national agenda. A national Smart Ageing competition may be an economical model, offering a small number of sizeable and high-profile prizes for major innovations related to different aspects of Smart Ageing. This could be organised as a 'National Design Challenge' for Smart Ageing.

Finally, Ireland should consider creating a *National Centre for Smart Ageing*, to bring together Ireland's research capabilities across thematic application areas, based on the opportunity areas outlined in this study. A multidisciplinary approach dedicated to Smart Ageing is currently missing in Ireland that would catalyse, incentivise and operationalize collaborative activities, and help to translate, promote and disseminate the knowledge generated through the various programmes. The new centre would provide a much needed focal point for businesses interested in Smart Ageing in Ireland. The 'Silver Valley' knowledge hub in Paris could be a model to emulate with a sustainable, public-private partnership business model. Establishing a National Centre for Smart Ageing even as a 'virtual organisation' will demonstrate Ireland's commitment and help to capture the attention of the wider public as well as the government and business communities. This may in practice be a 'Federation of Centres' working together in the background. Without a flagship organisation, however, the Smart Ageing project of the Irish government and the older population may well risk to be forgotten and the corresponding economic opportunities not fully exploited.

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