

Longevity as New Government Strategy

Citizens of progressive technocracy driven countries can expect healthier, happier, and longer lives. As smart governments utilize progress in all sectors of the Longevity industry to maximize the health, wealth, and wellness of their citizens, Longevity will become a major electoral talking-point and policy priority that will determine the success of parties and politicians.

Government has two roles in moving the Longevity industry forward: *national initiatives* such as social care, financial reforms, and infrastructure for precision medicine ecosystems, and *intergovernmental initiatives* for marshaling key technologies, resources, and experts from nations around the world. Longevity development strategies are necessary on a national scale in order to enact these reforms, and necessary on an international scale to utilize the long term strengths of each individual state. Any government wishing to seize the *Longevity Dividend* must develop a national Longevity development strategy.

The previous two articles in our weekly Global Longevity Newsletter provided a broad overview of the entire scope of the Longevity industry, and focused in on the emerging Longevity Financial Industry. This article covers Longevity Politics, with an emphasis on government-led initiatives in the global Longevity agenda.

Our first article established that:

• The Longevity industry is multi-faceted consisting of Geroscience R&D, P4 Medicine, AgeTech, and Novel Financial Systems.

- Although the challenges of realistic assessment and forecasting of such a complex industry are great, they are not unsolvable.
- The formulation of relevant, quantitative analytical frameworks for Longevity industry assessment, forecasting and optimization is a central component in the mission of Deep Knowledge Ventures and it's Longevity-focused analytical subsidiary, Aging Analytics Agency.

Our second article established that:

- The financial industry has a specific role to play in the development of the global Longevity sphere.
- It will be necessary for novel financial systems to be developed which monetize Healthy Longevity, and repeatedly reinvest in the technologically-reinvigorated working population, if they are to survive the silver tsunami.
- The opposing megatrends of aging population and advanced biomedicine are forcing the reform of business models for insurance companies, pension funds, banks, and investment firms, and opening up new opportunities around AgeTech, WealthTech, InsurTech and the rise of novel financial derivatives tied to the global Longevity Industry.

Aging Analytics Agency sees the United Kingdom - with its strong scientific base, its detailed industrial strategy which has 'aging society' as one of its central pillars, and its plans to integrate P4 medicine into its national healthcare ssystem - as a potential international leader in Longevity governance.

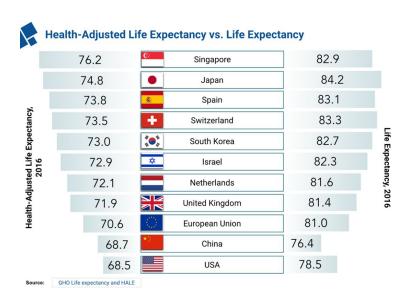
Governments and Longevity

Aging Analytics Agency's focus includes government development plans. The Agency is currently engaged with several government related organizations in their efforts to ensure that their strategic focus remains firmly on attaining synergy, and is keen to open dialogue with any Longevity-progressive governments in the formulation of their metrics for success. The Agency is also keen to engage in dialogue on the matter of cross-country and international coordination. In early 2019, Eric Kihlstrom, former Director of the UK Government-led £98 Healthy Aging Industrial Strategy Challenge Fund, was appointed as the agency's new Director. On April 30th, 2019, Dmitry Kaminskiy (Founder of Aging Analytics Agency and Co-Founder and Head of International Development for Longevity International UK) and Eric Kihlstrom convened with parliamentarians, policy directors and researchers at the UK Houses of

Parliament for the inaugural meeting of the All-Party Parliamentary Group (APPG) for Longevity to discuss key goals and strategic agenda for the coming year.

The Agency has developed open-access and proprietary analytics on the topic of government-led National Longevity Development Plans. The focus is on specific social policy, healthcare, financial reforms, and socioeconomic factors that are most likely to enable governments to develop integrated Longevity industries and ecosystems to scale, and to help them reduce their national gap between life expectancy and Health-Adjusted Life Expectancy (HALE). The most recent report, *National Longevity Development Plans: Global Overview 2019* was presented at the inaugural APPG for Longevity Advisory Board Meeting, and distributed at the APPG's official launch event.

Aging Analytics Agency's prioritization of Longevity policy and politics analytics coincides with an explosion of disconnected government initiatives around the world, each attempting to address the demographic challenges of aging population in its own unique way, each of which is documented in the report. The Agency's strategy is to harness the rise of Longevity-focused political initiatives to maximum synergetic effect.



The gap between life expectancy and health-adjusted life expectancy in 10 countries. The initiatives documented in the report are currently uncoordinated across the globe. The Agency recommends coordinated development of national and international Longevity development plans to those nations ranking highest in terms of the strength, relevance, and proactivity of their current Longevity initiatives. Governments that make Healthy Longevity a core electoral talking point with near-term results will have an advantage over those that don't. Later this year, the Agency intends to publish an in-depth follow up to its National Longevity Development Plans report which will analyze the specific social, healthcare, financial and

socioeconomic factors contributing to the gap between life expectancy and HALE for 50 countries. We also plan to publish *Longevity in UK Cross-Sector Comparative Analysis: Special Case Study* that will utilize quantitative analytics to consider the most optimal, synergetic, and effective methods of increasing the UK's National Healthy Longevity.

GOVERNMENT POLICY & STRATEGY: A PRIORITIZED AREA OF FOCUS

Nations most likely to initiate Longevity reforms will be countries characterized as Longevity-progressive with strong scientific bases in biotechnology, that are likely to integrate AI into their economic, financial, and healthcare systems. Much of the responsibility for these initiatives lie with governments.

Government has two roles in moving the Longevity industry forward: national initiatives such as social care, financial reforms, investment in biotechnologies and infrastructure for precision medicine ecosystems, and intergovernmental initiatives for marshaling the combined key technologies, resources and experts from nations around the world. Aging Analytics Agency has expanded its sphere of operations to include the comparative analysis of government programs internationally, signaling this change with the hiring of Eric Kihlstom. The Agency has been advising government-related organizations globally, such as the APPG for Longevity formed earlier this year in the UK, for which the Agency serves as the primary source of analytics and data. The Agency considers the UK central to the emergence of the global Longevity industry over the next decade owing to the UK government's 2017 industrial strategy prioritizing the *Aging Society as a Grand Challenge*, and their recently published green paper for a Preventive Medicine National Strategy, making the UK the first country to officially implement P4 medicine into its national healthcare system.

Aging Analytics Agency is keen to open dialogue and engage with government willing to seize the Longevity Dividend by offering analytical intelligence and recommendations to ensure that their strategic focus is aimed at attaining synergy. The Agency is in a strong position to assist governments in devising their metrics for success. On the international front, the Agency helps build the links necessary for cross-country coordination, and sees the UK taking leading diplomatic role in coordinating efforts.

NATIONAL LONGEVITY DEVELOPMENT PLANS: GLOBAL OVERVIEW 2019

An effective international Longevity development strategy requires playing to the long term strengths of each individual state. In order for Aging Analytics Agency to open dialogue on the formation of progressive Longevity policy proposals with individual states, a comprehensive analysis of each state is necessary. The Agency has therefore begun to direct significant resources to the production of sophisticated open-access and proprietary analytics on the topics of Longevity governance and governmental development plans.

Aging Analytics Agency presented *National Longevity Development Plans: Global Overview* 2019 at the APPG for Longevity's Strategic Advisory Board Meeting earlier this year. The report documents and assesses government initiatives that could lay the foundations for the world's first Longevity National Development Plans. It gives special mention to the UK and illustrates how far the UK is already ahead of the game in this regard, and is therefore the cradle of the fourth industrial revolution.

GOVERNMENT INITIATIVES AROUND THE WORLD

There's been a recent explosion of disconnected government initiatives around the world, each attempting to address the demographic challenge. Governments have been offering a myriad of ad hoc solutions.

Lifestyle and Fitness Programs such as:

- Japan's plans for an Ageless Society
- Singapore's smart-homes, residential master plans
- The Seoul Metropolitan Government's "2020 Master Plan for the Aged Society"
- Preventive medicine initiatives such as the UK's genomic medicine service
- The Swiss Personalized Health Network initiative

Intervening in the biology of aging itself such as:

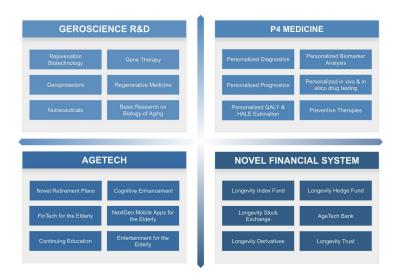
- The Netherlands' Deltaplan for Dementia
- Switzerland's Masterplan for the Promotion of Biomedical Research
- BIRAX Aging, the joint UK-Israeli Geroscience research initiative

We have even seen financial innovations such as the Swiss city of St Gallen's elderly bank. For more information on the future of Longevity finance, refer to our previous article, *The Future of the Financial Longevity Industry*.

Although no national level Longevity development strategy exists anywhere in the world, we see the beginnings of one in the UK's existing initiatives, which lay a good foundation for the development of such a plan.

LONGEVITY POLICY, POLITICS AND GOVERNANCE

In order to maintain the effectiveness and momentum of these ongoing efforts, a continuous, detailed, and up-to-date analysis of the state of the UK based on clear and robust metrics is an absolute necessity. It is for this reason that the Agency intends to publish *Longevity in UK Cross-Sector Comparative Analysis: Special Case Study* later this year. As the situation with regard to national development plans is evolving rapidly, we are releasing a second, more in-depth edition of *National Longevity Development Plans: Global Overview* in the coming months, which will focus on identifying the social policy, healthcare, medical, financial and socioeconomic factors having the greatest effect on the gap between life expectancy and Health-Adjusted Life Expectancy (HALE) for 50 countries.



Government Policy and Strategy: A Prioritized Area of Focus

Progress in Longevity is no longer simply a question of progress in Geroscience or advanced biomedicine. Progress is driven by the synergetic convergence of intersection of multiple distinct technological sectors and sub-sectors. The political conditions surrounding the Longevity sector are some of the most important factors on which its future depends. Concerted efforts to synergize government-led Longevity development plans and related efforts is very important and may very well determine the shape, rate and trajectory of the industry's development in the years to come.

AGETECH Rejuvenation Biotechnology Gene Therapy Geroprotectors Regenerative Medicine Nutraceuticals Basic Research on Biology of Ageing LONGEVITY ASSET MANAGEMENT Long-term Securities Long-term Securities Long-term Securities Robo-advisors Long-term Securities Annuities Long-term Securities Robo-advisors Strategies Diversification AgeTech Bank Longevity Derivatives Pension Planning

The various sectors and sub-sectors of Longevity Financial Industry. Source: Advancing Financial Industry Longevity/AgeTech/WealthTech Volume I

What is government's role in moving Longevity forward?

- National initiatives: Government is responsible for driving forward the development of many facets of the Longevity industry including social care, financial reforms, and also in supporting technological synergies, such as the integration of big data and healthcare. In Switzerland, the heterogeneity of health data infrastructures has delayed the development of a nationwide personalized health ecosystem as compared to countries with more homogenous national health systems. A government strategy should be developed to rectify this. The Swiss government could also intensively develop Geroscience, precision medicine, and FinTech to a state so advanced that it propels Switzerland into a central role in the internationally competitive Longevity business ecosystem, where it can rise to become a global leader in the specific field of Longevity finance.
- International initiatives: It is necessary for Longevity-progressive nations to establish
 intergovernmental initiatives that would leverage key strengths of different nations in
 order to launch programs that yield synergistic, multiplicative effects, enabling the
 sharing of key technologies, resources and experts.

Aging Analytics Agency is engaged in dialogue on the topic of Longevity policy with a number of government-related organizations globally, such as the <u>APPG for Longevity</u> formed earlier this year, for which they serve as the primary source of analytics and data.

All Party Parliamentary Group for Longevity



On April 30th, Dmitry Kaminskiy and Eric Kihlstrom convened with parliamentarians, policy directors and researchers at the UK Parliament, to participate in the inaugural meeting of the APPG for Longevity and to discuss key goals for the group's strategic agenda for the coming year.

The APPG for Longevity signals the United Kingdom's commitment to prioritize Healthy Longevity as a key component of the country's national agenda. The APPG for Longevity is the first dedicated parliamentary group to make the maintenance and extension of Healthy Longevity, innovations in preventive medicine and healthcare, and financial reform for pension systems its mission. Whereas the APPG for Longevity's current objective currently echoes Theresa May's stated commitment to adding 5 extra years on the UK's national HALE by 2035, Aging Analytic Agency has advised that a much more relevant timeline would be 2025, which would better reflect the real current rate and state of scientific and technological innovation.

APPG for Longevity Officers



According to Aging Analytics Agency's industry analysis, the biomedical technologies and therapies necessary to meet this goal are already in place, and what is now needed is big data analytics to develop optimal panels of biomarkers of aging and to determine what preventive medicine technologies are effective. Progress hereafter is less of a biotechnology problem (which requires us to wait on biotech breakthroughs), and more of a data mining, analysis and management problem. This, in turn, makes it a government problem to some extent, as only government-led initiatives would be capable of providing the necessary infrastructure for such a project on a national level.

The rate of progress in precision medicine, which plays a pivotal role in the future of HALE, relies on government coordination. It would therefore be counterproductive for government to limit its ambitions for decreasing the gap between life expectancy and HALE. The UK Government has already published a green paper for a National Strategy for the integration of P4 medicine into its healthcare system. Aging Analytics Agency sees no excuse for UK strategists to underestimate even progress in the management of data mining and analysis, let alone progress in biotechnology and HALE-extension overall.

Aging Analytics Agency participated in a number of the APPG for Longevity's advisory board meetings. The meetings brought together the most progressive and forward thinking experts and thought-leaders dedicated to the mission of Healthy Longevity. Because the field is so complex and multidimensional, a number of potential issues arose regarding the optimal formulation of the APPG's planned Blueprint and Framework for a UK National Healthy Aging Industrial Strategy.

In light of the points raised during those meetings, Aging Analytics Agency submitted a 60-page proposal to the APPG for Longevity that outlined its recommendations on how to optimize the formulation of the group's Blueprint and Framework, and to achieve maximum synergy and practical effects. Some of the major key points from that proposal included:

- The formation of a task force of experts to analyze and project the minimum estimated budget for the UK National Longevity Development Strategy in a realistic manner, considering that the practical threshold for the successful implementation of national Longevity industrial strategy in case of UK could not be less than £40 billion annually.
- Prioritized emphasis on international cooperation with other Longevity-progressive countries in the development of the Blueprint for a National Healthy Aging Industrial Strategy,
- Seeking maximum synergy between the UK's Longevity strategy on the one hand and its Al Industrial Strategy on the other, given the substantial accelerative effect that Al brings to advanced biomedicine and practical applications (P4 Medicine)

- The creation of a database of relevant partners and counter parties to be involved in the implementation of the strategy
- Incorporating the use of maximally-relevant metrics for measuring Healthy Longevity, and specifically for measuring the effectiveness of its initiatives by examining their cost versus the practical effect they can achieve in terms of increasing national Healthy Longevity. In response to these concerns, Aging Analytics Agency has compiled a comprehensive list of metrics and parameters with specific weight factors. This can serve as an excellent foundation upon which relevant governmental bodies and authorities can structure the list of metrics it will be using to judge both where it stands in terms of its National Healthy Longevity currently, as well as to measure the real-world effectiveness of its Industrial Strategies for Healthy Longevity as they move forward and develop.
- The formation and development of multiple AI Centers for Longevity in key R&D, academic, industrial metropolitan centers throughout the UK, such as Birmingham, Liverpool and Edinburgh, modeled on the recent precedent of the multiple Centers for AI and Healthcare across the UK.
- The establishment of multiple Longevity Startup Accelerators in London and other major regional industry-academic hubs.
- The development of a task force and working group to structure and roadmap a UK Division for International Longevity Cooperation. This division would focus on the establishment of industrial and technological bridges between the UK and other Longevity-progressive regions such as Israel, Singapore, Switzerland and the USA, and would also focus on the establishment of intergovernmental initiatives that would leverage the key strengths of different nations in order to launch programs that yield synergistic, multiplicative effects, enabling the sharing of key technologies, resources and experts.
- This initiative should also establish embassies with UK ambassadors present in different Longevity-progressive regions to liaison with local government officials, startups, researchers and R&D hubs.



Dmitry Kaminskiy, Andrew Scott, Geoffrey Filkin, Eric Kihlstrom, Tina Woods, Health Minister Matt Hancock, and Damien Green convene in the UK Parliament at the inaugural Advisory Board Meeting of the UK APPG for Longevity.

National Longevity Development Plans: Global Overview 2019

An effective international Longevity development strategy requires playing to the long term strengths of each individual state. Aging Analytics Agency's activities involving analytics and recommendations pertaining to the national policy of Longevity is not limited to the UK. The Agency puts significant emphasis on analyzing how each individual state around the world can maximize its strengths and assemble its existing resources for optimal effect.

All of this requires realistic, comprehensive analysis of each, both at the outset and as the industry develops. The Agency has adjusted its analytical focus accordingly. As an adjunct to its efforts in the realm of Longevity governance, policy and politics, the agency has begun to direct significant resources to the production of sophisticated open-access and proprietary analytics on the topics of Longevity governance, policy and politics, and on government-led Longevity development plans.

National Longevity Development Plans: Report Scope and Key Conclusions

Aging Analytics Agency's National Longevity Development Plans: Global Overview 2019 was presented in Parliament on April 30, as part of the APPG for Longevity's Strategic Advisory Board Meeting, and distributed to the APPG's officers, members and advisors at its official Launch Event on May 7th. The report provides a detailed international overview of the projects, initiatives and efforts that different countries across the globe are making in order to combat the issues associated with the global demographic challenge of an aging population, and to promote the extension and maintenance of their citizens' Healthy Longevity.



This report was presented by Health Secretary Matt Hancock who has recently had his position renewed by the incoming Prime Minister Boris Johnson. The report cover details how close various countries are to achieving national Longevity development plans. The flags represent the countries whose government initiatives have been assessed and documented in the report.



Dmitry Kaminskiy presented *National Longevity Development Plans Global Overview 2019* to Parliamentarians, policy directors and researchers at Room M, Portcullis House, Houses of Parliament at the Strategic Advisor Board meeting of the APPG for Longevity. The report documents and assesses government initiatives in the hope of offering governments some idea of the building blocks available for the construction of what could become the world's first Longevity National Development Plan. It gives special mention to the UK and illustrates how far the UK is already ahead of the game in this regard, and why is therefore the potential cradle of the fourth industrial revolution.

The chapter titled Infographic Summary identifies the broad categories of a government initiative to be considered: such as the different orders of magnitude, ranging from small municipal programs to national industrial strategies; and the different areas of intervention, from the

financial to the biomedical. This chapter also visualizes a number of data relevant to each country's current challenges and opportunities relating to Healthy Longevity and Aging Population, ranging from healthcare expenditure and efficiency, gaps between their Health-Adjusted Life Expectancy (HALE) and standard life expectancy, projected dates of insolvency for state-funded pension systems and social security systems, etc.

The chapter titled Report Methodology describes in detail the methods for evaluating various initiatives and ultimately ranking countries according to how close they come to executing actionable developments with a practical impact on the aging population. As such, our analysis also includes the final ranking of twelve countries according to the strength and relevancy of their Government-led aging and Longevity-related projects and initiatives, as well as their likelihood of achieving tangible deliverables such as increases in Healthy Longevity, and decreases in the economic burdens posed by aging populations.

7	Ranking Countries on the Strength, Scope and Relevance of their Government Longevity-Related Projects and Initiatives		
	POSITION	COUNTRY	COUNTRY SCORE
	1	United Kingdom	5.29
	2	Netherlands	4.36
	3	Singapore	4.15
	4	South Korea	4.00
	5	Israel	3.94
	6	Switzerland	3.93
	7	Hong Kong	3.41
	8	Japan	3.10
	9	USA	3.07
	10	Spain	1.94
	11	European Union	1.88
	12	China	1.85

Top government-led Longevity initiatives ranked by strength and relevance.

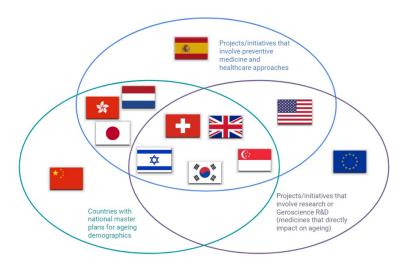
The subsequent chapters serve as an overview of government initiatives from various countries which are contending with the silver tsunami in their own way, ranging from:

Young parliamentary democracies with limited histories of government programs such as Spain, which produce government initiatives for the elderly in abundance but show little concerted effort for bringing about comprehensive solutions for dealing with the demographic crisis, and instead produce a succession of short-term plans and ad hoc regulations in order to ameliorate the experience of their aging societies.

Technocratic tiger economies such as Singapore, Hong Kong and South Korea. These countries tend to resemble what this report series has defined as Longevity-progressive countries: small technocratic countries with aging populations, who are therefore galvanized to

produce coordinated solutions. We can observe in these countries a large overall quantity of aging and Longevity-related initiatives. However, the budgets of these initiatives are much smaller than those allocated by larger countries with greater GDP. Also, these countries have begun implementing their initiatives comparatively recently - from 12 years in Singapore to 20 years in Hong Kong.

Strong and established parliamentary democracies such as the UK and Japan. These are the states that have been facing the challenge of Longevity for some time already and already making an effort to manifest the dividend in Longevity and to overcome the demographic challenges posed by an aging population. Moreover, they have already demonstrated the political will for developing bold industrial strategies. This combination of factors puts them a cut above the tiger economies. The main challenge for these countries currently is continuing to assure consistent policy in this area, as well as continuing to innovate.



Infographic from National Longevity Development Plans Global Overview 2019. Countries at the center have come the closest to developing fully integrated industrial strategies for Longevity, whereas the ones near the periphery are those who's approach is more ad hoc in manner.

Commenting on some of the major conclusions of the report, Dmitry Kaminskiy said:

"The UK is very well positioned to become an international leader of Healthy Longevity, and was ranked #1 in this report's proprietary analysis for a number of reasons including its reputation as a BioTech R&D and Financial Hub, a strong history of industry-academia partnerships focusing on scientific and technological synergies, and its commitment of £300 million to its Aging Population Industrial Grand Challenge. The nation has all necessary compounds in place to leverage and channel its existing strengths into an efficient, Government-led campaign to make

the promotion of Healthy Longevity and financial reform to neutralize the economic burden of an aging population a key priority of its national strategic agenda."

Speaking on how the report's findings strengthen the existing notion that the UK is an international leader of Government-led initiatives relating to Aging Population and Healthy Longevity, Eric Kihlstrom commented:

"This report not only shows that the UK is an international leader of Government-led Longevity development initiatives, but also highlights key next steps the nation can take to optimize its strategic execution of future initiatives. The UK Government needs to extend existing efforts and create a framework to change the deficit model of the 'Aging Society' to an asset model around 'Longevity' and be bold with a national strategy to harness the 'Longevity Dividend' to benefit all people in society. In other words, the nation needs a fully integrated Longevity National Development Plan. This requires intelligent co-ordination, and the establishment of a governing body equivalent to the UK's recently-created Office for Al. To this end, the development of a Blueprint and Framework for a Government-led National Longevity Development Strategy is one of the core aims of the recently established All-Party Parliamentary Group on Longevity and its secretariat company, Longevity International UK."

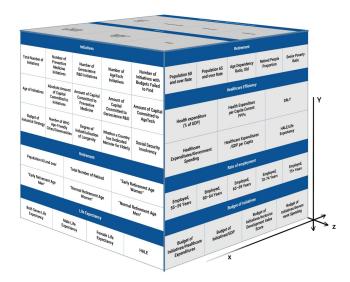


Aging Analytics Agency has examined the United Kingdom in great detail - its scientific base, its detailed industrial strategy, its economy, its financial leadership, and its popular and political will to tackle its demographic challenges head on - and concluded that it is in a unique position to spearhead the global Longevity industry.

This report necessitated the development of specifically-designed analytical metrics with which to judge the strength, proactiveness and relevance of various government-led Longevity-related

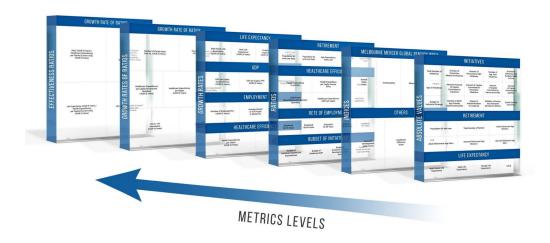
development initiatives, taking into account 77 specific parameters, each of them consisting of several dozens of data points, with specific weight factors given in proportion to their relevance and likelihood of delivering tangible deliverables such as an increase in National Healthy Longevity (as measured by Health-Adjusted Life Expectancy, or HALE), and a reduction in the economic burden of an aging population.

A complex, multi-dimensional analytical framework that applies specifically-tuned weightings to a number of tangible, quantitative metrics and parameters, including quantitative metrics relating to Longevity, aging population and its effects on the national economy with regard to variables such as life expectancy, HALE, GDP, healthcare efficiency, number of retirees projected insolvency dates of relevant programs such as social security and pension schemes, and many others, as well as specific novel metrics unique to Aging Analytics Agency's comparative analytics framework for this report, which applies specific importance factors to unique quantitative and qualitative parameters in order to classify and prioritize specific types of initiatives, and to measure the strength of Longevity-related initiatives and their likelihood of translating into tangible deliverables like increased Healthy Longevity and economic growth. Using this proprietary framework, the report compares the overall strength, efficiency, and focus of each government regarding the sum of its projects and initiatives focused on Healthy Longevity and aging population.



A multi-faceted look at Longevity-relevant government initiatives globally: Overall, there are 6 levels of proprietary metrics which differ based on the nature of the parameters they consist of. Indicators, their growth rates and their ratios are calculated separately and then integrated in the final metrics system. The whole of the metrics can also be subdivided into 2 categories based on the logic of the parameters, namely: Indicators of potential (or lack thereof), and indicators of actual success (or lack thereof). Thus, the ranking system reflects both strengths and opportunities of different countries regarding the development of national Longevity strategies. It can be applied for the evaluation of the current state of a country, as well as of its prospects.

To assess countries, a sum of metrics parameters taking into account 11 general metrics were used: Metrics Values: Each metric's absolute value is recalculated into the Relative Score within the range [0.0-1.0]. To be more specific, if a metric is numeric, the formula for score calculation is the absolute value of a country divided by the maximal absolute value among the countries. If a metric is qualitative (yes/no), a value "yes" equals to 1.0 and a value "no" equals to 0.0. The qualitative metric "Degree of government industrialization of Longevity" has 3 values according to the industrialization of Longevity in a country: Industrial Strategies (equals to 1.0); National or metropolitan master plans (equals to 0.5); Independent or municipal government programs (equals to 0.0).



The metrics developed for and used in Aging Analytics Agency's National Longevity
Development Plans: Global Overview 2019 report are broken down into 6 distinct layers, with
specific ratios being derived from 1st layer metrics, specific metric ratios and growth rates of
ratios being derived from 3rd-layer metrics, effectiveness measures being derived from 4th layer
metrics, and effectiveness measure growth rates being derived from 5th layer metrics.
Importance Factors: To equalize each metric in terms of significance among others the
Importance Factors are applied. Each Importance Factor is in the range from -1.0 to 1.0, where
1.0 - the most favorable metric, -1.0 - the most detrimental metric and 0,0 - not an important
metric at all (if the factor is negative, the higher positive magnitude of Relative Score, the worse
for a country's score). The Weighted Score of a country for a particular metric is Relative Score
multiplied by an Importance Factor.

Final Score: Consequently, the countries were ranked according to the sum of their Weighted Scores of each metric. The higher the final score the more advanced a country in terms of government Longevity-related projects and initiatives.



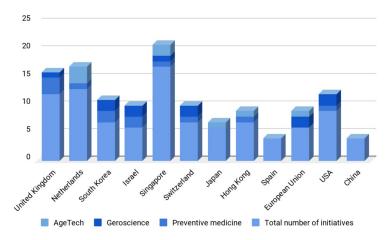
Diagram illustrating the "degree of government industrialization of Longevity" metric: Some government programs are more integrated than others, more synergistic, more long term, and more focused on bringing Healthy Longevity to its people on an industrial scale. The examples in this document fall into 3 main categories in this respect: independent or municipal programs, one plan per project (ad hoc) or per city, national or metropolitan master plans which bring together multiple sectors of government, and industrial strategies which include the use of research and development in pursuit of future economic dividends of Longevity. The next step is the Longevity Industry Strategy.

We have applied this system of analytics to the diverse range of timely initiatives which have been appearing across the globe almost simultaneously in shared recognition of the looming silver tsunami.

Government Initiatives Around the World

Aging Analytics Agency's report coincides with an explosion of disconnected government initiatives around the world, each attempting to grapple with the demographic challenge in its own unique way. In recent years we have been seeing increasingly frequent references to the 'aging society' in official government strategic documents around the world. At every layer of government planning, ranging from ad hoc projects such as municipal plans to grand industrial strategies, the aging society is cited as a challenge to be overcome.





Represented here are the total number of relevant initiatives in the UK, the Netherlands, South Korea, Israel, Singapore, Switzerland, Japan, Hong Kong, Spain, the European Union, the USA and China.

Different governments have been offering a myriad of ad hoc solutions for adapting to the demographic crisis: Lifestyle and Fitness Programs such as Japan's plans for an Ageless Society, whereby people aged 65 or older will not be automatically regarded as seniors but will be encouraged to stay healthy and work, remaining economically active. AgeTech programs, such as the Singapore Government's initiatives focused on smart-homes to improve elderly quality of life and wellbeing, and increasing their digital literacy. Residential master plans, such as the Seoul metropolitan government's "2020 Master Plan for the Aged Society" embracing the vision of Seoul as "a city whose citizens enjoy healthy and active lives of up to 100 years" under the banner of an "age-friendly city".



An infographic from Aging Analytics Agency's National Longevity Development Plans report, showing the global distribution of cities currently signed up to the World Health Organization (WHO) "age-friendly cities" guidelines. Although the WHO sets an ambitious standard, at present many of these neighborhoods amount to little more that especially effective retirement communities. Aging analytics Agency offers its own advice on the development of truly smart age-friendly cities, integrating all facets of the Longevity industry documented in its reports. We have seen initiatives for a preventive medicine approaches to aging, such as the UK's genomic medicine service and Swiss Personalized Health Network. We have seen initiatives for intervening even further upstream, in the biology of aging itself, with Geroscience initiatives such as the Netherlands' Deltaplan for Dementia and Switzerland's Masterplan for the Promotion of Biomedical Research, and BIRAX Aging, the joint UK-Israeli Geroscience research initiative.

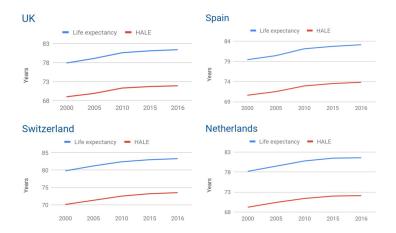
We have even seen financial innovations such as the Swiss City of St Gallen's elderly bank, where retired volunteers "deposit" hours worked looking after elderly people (and in return can use any time saved up for their own care provision later in life).



Overview of relevant Longevity projects and initiatives in 11 different regions globally, classified into National Master Plans, Industrial Strategies and Municipal Government Programs.

Initiatives such as these, however, remain uncoordinated across the globe, and without solid national and international development strategies in place, they will remain as such, with low potentials for practical results in increasing national Healthy Longevity or decreasing the gap between life expectancy and HALE. The Agency is engaged in dialogue with a number of government associated organizations internationally on the benefits of national and international development plans for Longevity. And when Healthy Longevity itself becomes a short-term issue with near-term consequences, it would become an electoral talking point. Governments that promise it could appeal to their citizenries' desire for healthier and happier lives, and before

long it will be in the interests of other governments who wish to be reelected to utilize current progress in Longevity as rapidly as possible for the benefit of all.



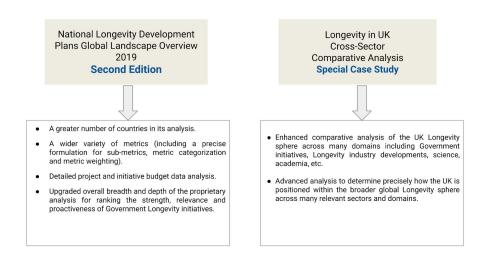
HALE (Health-Adjusted Life Expectancy) is a measure of population health that takes into account mortality and morbidity. It adjusts overall life expectancy by the amount of time lived in less than perfect health, and is already viewed by policy makers as a key metric internationally. In the National Longevity Development Plans: Global Overview 2019 analytical report, Aging Analytics Agency also added that in addition to the aforementioned technological and political facets of the industry, the financial industry will also need monitoring, development and optimization.

With the use of business model reform (and the development of novel financial instruments ties to Longevity) based on Aging Analytics Agency's quantitative analytics, financial institutions such as investment banks, pension funds, and insurance companies can either sink or swim when hit by the oncoming Silver Tsunami.

A range of novel specialized financial institutions could ride this rising tide: AgeTech Banks, Longevity index fund and hedge funds, and even a Longevity stock exchanges for Longevity startups, that will issue specialized derivatives. It is by such means that increased global Longevity will be transformed from a threat into an opportunity, and conservative investors of the future can provide unlimited liquidity to the Longevity industry, thereby establishing a self-perpetuating cycle capable of transforming aging as a source of economic loss and stagnation into Healthy Longevity as a source of economic growth and stability.

For more information on the future of Longevity finance, refer to our previous article <u>The Future</u> of the Financial Longevity Industry.

Upcoming Longevity Policy, Politics and Governance Analytical Reports by Aging Analytics Agency



The two areas of focus of Aging Analytics Agency's upcoming 2019 government policy analysis. The Agency has long regarded the UK as exceptionally suited to a leadership position and is therefore making it the topic of a special case study. As we have previously produced landscape overviews of the industry both UK-wide and globally, both are in some sense follow ups to previous works. However, the pace of change both with regard to government policy and technology necessitates frequent updates.

National Longevity Development Plans Global Landscape Overview 2019: Second Edition As governments come and go and economies fluctuate, the extremely detailed metrics used in National Longevity Development Plans Global Landscape Overview puts the report's conclusions at risk of obsolescence.

In order to keep our priorities for action in order, and to continue to provide relevant strategic analysis and recommendations to governments, it is necessary for Aging Analytics Agency to keep its analysis up to date. For this reason Aging Analytics Agency is releasing a second edition of the report, featuring an even wider range of even more precise metrics.

An updated analysis of the strengths and weaknesses of each nation is especially important for the benefit of the UK as it adopts a leading role on the global stage coordinating international Longevity planning on a global scale.

This upcoming analytical report will also aim to identify via statistical analyses the specific social policy, healthcare and financial reforms, and socioeconomic factors are most likely to enable such governments to develop integrated Longevity industries and ecosystems to scale, and to

reduce as much as possible their national gap between life expectancy and Health-Adjusted Life Expectancy (HALE).

Longevity in UK Cross-Sector Comparative Analysis: Special Case Study

Unfortunately, no nation-level Longevity development strategy exists anywhere in the world. But we can nonetheless see the rudiments of one in the UK's existing initiatives, which lay a good foundation for the development of such a plan, having taken several crucial early steps. Indeed, just this week the UK Government published the green paper of its Preventive Medicine National Strategy, entitled "Advancing our health: prevention in the 2020s – consultation document". In practice, this indicates that the UK will be the first country to officially implement P4 (Personalized, Preventive, Precision and Participatory) medicine into its national healthcare system.

This is the newest development in a series of large steps that the UK government has made in recent years towards the development of a proactive, progressive and technology-driven national Healthy Longevity development strategy, beginning with the formation of the Aging Industrial Grand Challenge (prioritizing the problem of aging population as one of four key national industrial development challenges for the nation) in 2017, followed by the launch of the £98 million Government-led Healthy Aging Industrial Strategy Challenge Fund in 2018, and the launch of the All-Party Parliamentary Group for Longevity in 2019.

These are some of the major factors that led to the UK being ranked as #1 in Aging Analytics Agency's National Longevity Development Plans: Global Overview (First Edition) analytical report, which used quantitative metrics to rank the strength, proactivity and relevance of various nations' Longevity development projects and initiatives. This new green paper strengthens and reaffirms the conclusion made in that analytical report, on the UK's leading position as a country that prioritizes the issue of aging population and the opportunity of Healthy Longevity as key national priority items of the nation's government.

There are a number of countries (including Singapore, Switzerland, South Korea, Israel, the Netherlands, Spain and Japan) that are currently ahead of the UK in terms of the gap between life expectancy and Health-Adjusted Life Expectancy (HALE), which can be considered one of the most robust measures of *Healthy Longevity*. However, this fact may be due to the comparatively smaller size of these countries populations, among other factors, which makes the implementation of national policy and preventive healthcare initiatives easier to implement. However, one of the foremost reasons that the UK's was ranked as #1 in Aging Analytics Agency's "National Longevity Development Plans" analytical report, despite the country's comparative large gap between life expectancy and Healthy Longevity, was because the nation is making boldly progressive, science and technology-driven steps to launch initiatives that can rapidly decrease this gap, and not just putting forth optimistic rhetoric, but actually following-through on its promises with concrete and tangible actions.

Given the UK's large GDP, the proactive efforts of its government to make Healthy Longevity a major priority of its national agenda, and the many steps they have taken to prove their seriousness on this topic, it is quite likely that the UK can become the clear leader in terms of government-ed National Longevity development plans, and can achieve very practical and tangible results in increasing their National Healthy Longevity within the next 5 years. The UK's potential leadership position in international Longevity development planning is also the reason why Aging Analytics Agency is publishing a dedicated Longevity in the UK cross-sector comparative analysis and special case study in the coming months to examine which sectors of the UK Longevity industry should be prioritized for maximum progress in the shortest time.

Early steps taken by the UK government include

- The UK has recognized an "aging society" as one of its 4 core industrial grand challenges, and allocated £300 million to overcome this challenge, out of which goes £98 towards "Healthy Aging Industrial Strategy Challenge Fund."
- This £98 million will drive the development of new products and services which will help people to live in their homes for longer, tackle loneliness, and increase independence and wellbeing.
- The UK has allocated £210 million towards "Data to early diagnosis and precision medicine program"
- The Centers of Excellence in Genomic Science (CEGS) program, which aims to develop novel and innovative genomic research projects using the data sets and technologies developed by the Human Genome Project.
- Innovate UK's Digitalization of Medicines Manufacturing Challenge Fund.
- In June 2018 Theresa May announced a commitment to harness AI to provide five more years of healthy independent lives by 2035.

Reviewing these initiatives, we can see that the UK has already turned its attention to cross-sector collaboration, particularly between artificial intelligence and healthcare. There has also been a general recognition of the central role of technology, and financial technology in particular, in improving the lives of the elderly.

However, there is no explicit intention of directing these agendas toward improving Healthy Longevity as a metric in itself yet. If the UK Government wants to optimize its existing initiatives for solving the aging population problem, it must create a veritable Industry of Healthy Longevity itself, which in turn requires:

- A greater focus on promoting biomedical innovations focused on extending Healthy Longevity, and on financial reform to neutralize economic risks posed by an aging society.
- A greater focus on combining these technologies in order to meet strategic goals. For
 example, it is not clear how much the UK government knows about the impact of its own
 biomedical initiatives on the 'aging society' grand challenge.

Existing efforts must be extended to create a framework for changing the deficit model of the 'Aging Society' to an asset model around 'Longevity'. And to be bold with a national strategy to harness the 'Longevity Dividend' to benefit all people in the society. In other words, we need a fully integrated Longevity National Development Plan. This requires intelligent coordination. In order for Aging Analytics Agency to serve as an effective advisor in these ongoing efforts, a continuous, detailed up-to-date analysis of the state of UK based on clear and robust metrics is an absolute necessity. It is for this reason that we intend to publish Longevity in UK Cross-Sector Comparative analysis: Special Case Study later this year.

Conclusions and Summary

- A wide range of independent Longevity-related government initiatives have recently been appearing around the world. This includes social and educational programs, urban planning solutions, biotechnological investment, programs, and national health data infrastructures.
- Aging Analytics Agency has documented these developments in their 2019 National Longevity Development Plans Global Landscape Overview analytical report and is offering its services to national and subnational governments aiming to coordinate this growing political will to achieve maximum effect and synergy.
- The United Kingdom has already turned its attention to cross-sector collaboration, particularly between artificial intelligence and healthcare. There has also been a general recognition of the central role of technology, and financial technology in particular, in improving the lives of the elderly.
- Aging Analytics Agency will continue to assist the UK to attain the best possible synergies as soon as they become possible, rather than unnecessarily limit its ambitions based on a misreading of the current state of progress, or the degree of progress necessary for immediate action.
- Aging analytics Agency will continue to produce reports focused on the role of government and the current state of Longevity development plans. The next two are

National Longevity Development Plans Global Landscape Overview 2019: Second Edition, and Longevity in UK Cross-Sector Comparative Analysis: Special Case Study.

The Future of Longevity Governance - Forecasts by the Authors

We would like to share our vision on how we foresee the rise of successful, comprehensive and integrated Longevity economies and megahubs emerging from the spread of dedicated Longevity government development plans.

- 1. In the next few years, several technologically advanced, smart, small states will emerge as global competitors in the development of integrated Longevity Industry ecosystems.
- Some will focus on specific sectors tuned to their unique strengths, while others will seek
 to create fully integrated hubs encompassing the entire multifaceted scope of the
 Longevity Industry.
- 3. Some will be sovereign states, some will be independent regions of a bigger countries.
- 4. Some will be smart city-states such as Singapore, some of the Swiss cantons.
- 5. We anticipate that some city-hubs will focus primarily on R&D, as is the case in Basel, Switzerland, while others will be focused on practical applications such as P4 medicine as is the case in Lausanne, Switzerland.
- 6. The potential of government to bring about this type of development is not to be underestimated. The previously underdeveloped Zug canton in Switzerland for example through a set of legislative initiatives, and some government coordination, as well as initiatives within the "crypto community" quickly became known worldwide as the 'Crypto Valley'. All that was required was for the cantonal authorities to foster a legislative environment (combined with some international promotional efforts) that would incentivize relevant expertise to relocate there and set up business. The government created conditions which attracted a self-selecting population of community of crypto entrepreneurs. During the early years, cryptocurrencies were vulnerable to fraud, which weakened the crypto economy. But blockchain technology suffered no such setback, so Switzerland, by making itself a blockchain capital of the world, plugged that entire gap in the market, and henceforth is likely to remain at the centre of the new wave of safe cryptoeconomy.
- 7. We are observing an explosion of similar initiatives in a number of Longevity-progressive countries. These countries are focusing on various facets of the Longevity industry, so we expect to see the formation of Longevity industrial clusters. As in Zug, governments may facilitate the growth of industrial clusters, through the formation of innovative ecosystems and legislative and industrial infrastructures, such as the establishment of

flexible progressive legal frameworks for clinical trials, government support for more rapidly implementing practical applications in the clinic to promote the practical application of AI for diagnostic, preventive medicine, precision treatments, and other advanced technologies, the establishment of financial institutions and instruments based upon the Longevity industry's participants, products and services

- 8. Some countries are now selling their citizenship to foreign expats present and working in those countries for a certain period, thereby utilizing the same technique of selectively attracting human expertise that was used by Singapore in the creation of its technological mega-hub.
- 9. We expect five years from now to see a "new normal" of small technocratic nations selling their citizenship selectively to people committed to advancing Longevity-related technologies, in exchange for access to some of the most sophisticated and advanced healthcare, life insurance, MedTech, AgeTech and WealthTech ecosystems available.
- 10. One smaller-scale analogue of this type of development can be seen in the establishment of smaller "smart cities" by big corporations such as Apple, Facebook and Google, built to accommodate the specific needs and desired of their entire scope of employees, many of whom have migrated to work.
- 11. The ideal "Longevity-progressive country" would be able to undertake similar projects: smart towns and cities that integrate all sub-sectors of the multifaceted Longevity industry to create an optimized ecosystem for the maintenance of health and wealth. The development of these Longevity megahubs would incentivize the elderly to relocate in exchange for access to the best forms of AgeTech, WealthTech and other technologies, products, services and social policies capable of enabling the highest possible quality of life, social activity, mental wellness and overall functionality. Meanwhile, the middle-aged would be incentivized to relocate in exchange for access to the highest-quality MedTech, HealthTech and P4 medicine services, and the most sophisticated life and health insurance systems that reward their clients for the maintenance of an optimal state of health.
- 12. Among the assortment of global Longevity initiatives documented in National Longevity

 Development Plans Global Overview 2019 is described the emergence of so called

 "age-friendly cities" and "age-friendly towns". This term refers to a formal commitment by
 the city authorities to attaining a particular WHO standard. Such towns and cities,
 however, in their present state of development, amount to little more than high-end
 retirement communities. A truly age-friendly city, and more importantly, the really

 "Longevity-friendly city", would combine all the facets of the Longevity industry discussed
 previously, from AgeTech to P4 medicine, WealthTech, advanced InsurTech as well as
 societal infrastructures for maintaining an optimal state of wealth and health in the age of

Healthy Longevity, empowering the elderly and the middle-aged physically, mentally and financially.

It is with this vision in mind - a globally coordinated Longevity industry led by Longevity-progressive countries, small versatile nations each intensively developing its own infrastructure for Longevity biotech hubs, Longevity finance hubs, precision medicine ecosystems, agetech towns and age-friendly cities - that Longevity.Capital and Aging Analytics Agency are engaging in active dialogue with government bodies and authorities of a number progressive countries in order to establish fruitful collaborations in advance, to utilize the upcoming advantages of these emerging Longevity megahubs supported by smart technocratic progressive governments.

The most proactive and progressive scientists, industry players, companies, investors and stakeholders should consider being present in those countries poised to become Longevity MegaHubs already now, in advance, in order to be ahead of the curve. Those readers interested to find out what those countries are, should keep an eye on the upcoming second edition of Aging Analytics Agency's "National Longevity Development Plans Global Overview, Extended Edition II".

Our Next Longevity Article

Our two previous articles and this one raised a great deal of interest. Some scientists who are working in the field of Geroscience contacted us and said they were quite disappointed because, in their view, our projections were too conservative and our article seemed overly skeptical about current progress in aging research.

In our next article, we will:

button at the top of this article.

- 1) Provide an overview of the current state of actual scientific progress in aging research.
- 2) Explain why 90% of financiers, including venture investors, are underestimating the current rate of progress.
- 3) Explain why scientists working in the field of Geroscience are overestimating the current rate of progress.
- 4) Explain how we address these disproportions and help adjust the skepticism of investors and the optimism of scientists using AI to produce tangible, quantifiable metrics that enable assessment, analysis, and forecasting in a realistic and practical manner.

 We're interested in your feedback. Please share your comments in the comments section. To receive our next article, subscribe to our Global Longevity Newsletter by clicking the subscribe

This article was written by Margaretta Colangelo and Dmitry Kaminskiy

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<u>Deep Knowledge Ventures</u> is a leading investment fund focused on the synergetic convergence of DeepTech, frontier technologies and technological megatrends, renowned for its use of sophisticated analytical system for investment target identification and due-diligence. Major investment sectors include AI, Precision Medicine, Longevity, Blockchain and InvestTech.

<u>@DeepTech_VC</u>

Aging Analytics Agency is the world's premier provider of industry analytics on the topics of Longevity, Precision Preventive Medicine and Economics of aging, and the convergence of technologies such as AI and Digital Health and their impact on healthcare. The company provides strategic consulting services in fields related to Longevity, and currently serves as the primary source of analytics for the specialized hybrid hedge fund Longevity. Capital, as well as the UK AII-Party Parliamentary Group for Longevity. Aging Analytics

<u>Longevity.Capital</u> is a specialized Longevity-Focused Hedge Fund with enhanced liquidity that uses hybrid investment technologies to combine the profitability of venture funds with the liquidity of hedge funds, significantly de-risking the interests of LPs and providing the best and most promising Longevity companies with relevant amounts of investment.