

Advancing Financial Industry Longevity / AgeTech / WealthTech

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Top-150 Financial Institutions Advancing Financial Industry Longevity / AgeTech / WealthTech

AGING

AGENCY

Asset Management Firms - 30 Pension Funds - 40 Reinsurance Companies - 15

Insurance Companies - 30

Banks - 35



Top-150 Financial Institutions Advancing Financial Industry Longevity / AgeTech / WealthTech















1 Billion People in Retirement Globally - a New Multi-Trillion Opportunity



Aging should be considered not only as one of the most acute problems of our time but also as one of the most promising opportunities. Financial institutions such as investment banks, pension funds, and insurance companies can either sink or swim when hit by the oncoming Silver Tsunami. Whether they succeed at riding the wave or drowning under it will depend not only on their willingness to deploy new business models adapted to the ageing population and the emerging industries of AgeTech, WealthTech and Longevity Finance but also on the quality of longevity analytics that they use to formulate such business models.

Longevity, AgeTech & WealthTech Market

Globally
1 Billion in Retirement

In the UK
10 Million in Retirement

"The one billion retired people globally are a multi-trillion dollar opportunity for business"

~ Dmitry Kaminskiy interview in the Financial Times.

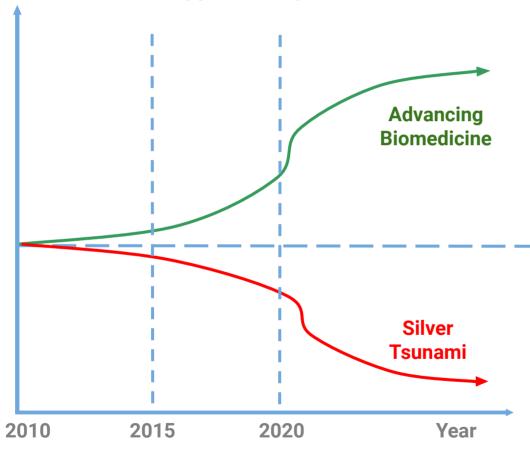
"The global spending power of those aged 60 and over will reach \$15 trillion annually by 2020"

~ Bank of America Merrill Lynch.



Longevity and Silver Tsunami - Collision of Two Opposed MegaTrends



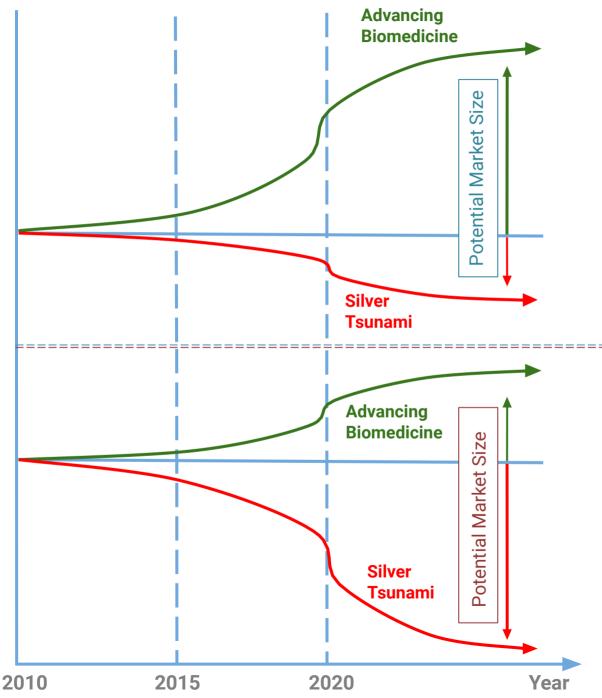


The acceleration of biomedicine has been mainly spurred by advances in the collection, gathering, and analysis of data. The industry is poised to witness a quantum leap in the near future, particularly because of impact of Artificial Intelligence in biomedicine R&D and in light of the upcoming paradigm shift from treatment to prevention.

At the same time, the inevitable Silver Tsunami (demographic ageing) poses major economic burdens not just for the healthcare systems of developing nations, but also for the major financial institutions including pension funds, insurance companies, asset management firms and retail / private wealth banks. It is expected to increase the costs associated with old age.



Two Possible Scenarios of Longevity MegaTrends



Positive Scenario

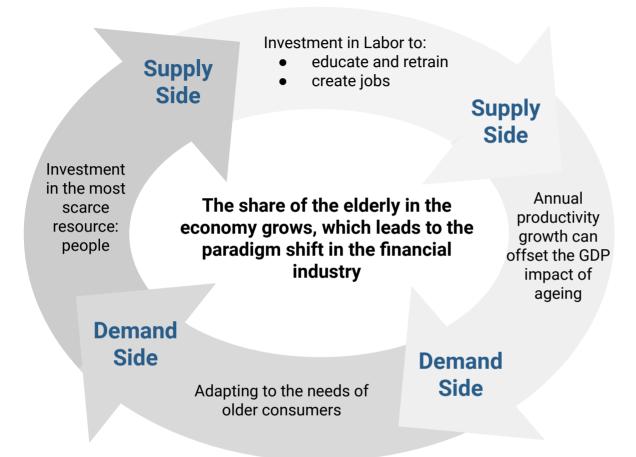
Most progressive and technocracy-driven countries will work proactively to address these issues and implement a positive scenario. Financial institutions operating in those regions should have sophisticated long-term forecasting to reformulate their business models in order to minimize the challenges and to maximize the utilization of opportunities associated with these two opposed megatrends.

Pessimistic Scenario

In reality, most countries will fail to address these challenges in advance due to a lack of will and technological capability, missing their window of opportunity to benefit from the progress in biomedicine, and to neutralize the worst effects of population ageing. Financial institutions operating in those regions should utilize pragmatic forecasting, and to adjust and optimize their business models accordingly.



Longevity Offers Opportunities Only to Those Who Can Adapt



"The major demographic shifts to I come do not call for gloom and doom but simply for a different, fresh, and I fully informed perspective."

~ Boston Consulting Group Study.

"Global businesses have positioned ageing as a lever for attracting and retaining top talent, as well as building out frameworks of sustainability and shared value"

> ~ McKinsey Institute's "No Ordinary Disruption.

"Giving provides retirees with added purpose. They are generous with their time, experience, and money. Their collective financial and volunteering contributions over the next twenty years are projected to create an \$8 trillion "Longevity Bonus" for the nation"

> ~ Bank of America Merrill Lynch Study.

"Longevity is the economic opportunity of our lifetime"

~ Andy Sieg, president of Merrill Lynch Wealth Management

Global Ageing Report

World Economic Forum

Finances in Retirement

Longevity Financial Industry Framework Threats and Opportunities

PENSION FUNDS

Population ageing may increase the costs for the funds

Highly dependent on policy regulations

Higher mortality uncertainty

INSURANCE COMPANIES

Leveraging longevity risk on macro and individual level

Intersection with banks and asset management firms

Longevity derivatives are a form of insurance themselves

ASSET MANAGEMENT FIRMS

Diversification of products for different age groups

Advanced trading strategies with longevity derivatives

Population ageing may make conservative investment strategies more popular

PRIVATE WEALTH AND RETAIL BANKS

Providing services to other financial institutions

Savings growth may give additional pressure on interest rates

Banks can substitute services of retirement planning



Top-150 Financial Institutions Advancing Financial Industry Longevity / AgeTech / WealthTech

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Bank of America Bank of Communications Lloyds Banking Group Bank of Ireland Barclays Barclays BMO Financial Group BNP Paribas Bradford & Bingley Bradford & Boyal Bank of Canada Bradford & Boyal Bank of Scotland Citi Bank Bradford & Santander UK Bradford & Scotlabank Bradford & Sumitomo Mitsui Banking Bradford & Sumitomo Mitsui Banking Corporation Bradford & Sumitomo Mitsui Banking Corporation Bradford & Bank Limited Bradford & Sumitomo Mitsui Banking Corporation Bradford & Boyal Bank Bra	BANKS		
Bank of Ireland Morgan Stanley Barclays Paragon Banking Group BNP Paribas Rabobank Bradford & Bingley Royal Bank of Canada CaixaBank Royal Bank of Scotland Citi Bank Santander UK Commerzbank Scotiabank Credit Suisse Société Générale Corporate & Investment Banking Crown Agents Bank Limited Standard Chartered Deutsche Bank Sumitomo Mitsui Banking Corporation EFG Private Bank Limited The Bank of New York Mellon Goldman Sachs UBS HSBC Holdings plc Weatherbys Private Bank Jefferies Group Wells Fargo	Bank of America	Julius Baer	
Barclays Natixis BMO Financial Group Paragon Banking Group BNP Paribas Rabobank Bradford & Bingley Royal Bank of Canada CaixaBank Royal Bank of Scotland Citi Bank Santander UK Commerzbank Scotiabank Credit Suisse Société Générale Corporate & Investment Banking Crown Agents Bank Limited Standard Chartered Deutsche Bank Sumitomo Mitsui Banking Corporation EFG Private Bank Limited The Bank of New York Mellon Goldman Sachs UBS HSBC Holdings plc Weatherbys Private Bank Jefferies Group Wells Fargo	Bank of Communications	Lloyds Banking Group	
BMO Financial Group BNP Paribas Rabobank Bradford & Bingley Royal Bank of Canada CaixaBank Royal Bank of Scotland Citi Bank Santander UK Commerzbank Credit Suisse Credit Suisse Crown Agents Bank Limited Deutsche Bank EFG Private Bank Limited Goldman Sachs HSBC Holdings plc Wells Fargo Rabobank Royal Banking Group Royal Bank of Canada Royal Bank of Scotland Socitabank Santander UK Scotiabank Société Générale Corporate & Investment Banking Standard Chartered The Bank of New York Mellon Weatherbys Private Bank Wells Fargo	Bank of Ireland	Morgan Stanley	
BNP Paribas Rabobank Bradford & Bingley Royal Bank of Canada CaixaBank Royal Bank of Scotland Citi Bank Santander UK Commerzbank Scotiabank Credit Suisse Société Générale Corporate & Investment Banking Crown Agents Bank Limited Standard Chartered Deutsche Bank Sumitomo Mitsui Banking Corporation EFG Private Bank Limited The Bank of New York Mellon Goldman Sachs UBS HSBC Holdings plc Weatherbys Private Bank Jefferies Group Wells Fargo	Barclays	Natixis	
Bradford & Bingley CaixaBank Royal Bank of Scotland Citi Bank Santander UK Commerzbank Scotiabank Credit Suisse Société Générale Corporate & Investment Banking Crown Agents Bank Limited Deutsche Bank Sumitomo Mitsui Banking Corporation EFG Private Bank Limited The Bank of New York Mellon Goldman Sachs UBS HSBC Holdings plc Weatherbys Private Bank Jefferies Group Wells Fargo	BMO Financial Group	Paragon Banking Group	
CaixaBank Royal Bank of Scotland Citi Bank Santander UK Commerzbank Scotiabank Credit Suisse Société Générale Corporate & Investment Banking Crown Agents Bank Limited Standard Chartered Deutsche Bank Sumitomo Mitsui Banking Corporation EFG Private Bank Limited The Bank of New York Mellon Goldman Sachs UBS HSBC Holdings plc Weatherbys Private Bank Jefferies Group Wells Fargo	BNP Paribas	Rabobank	
Citi Bank Commerzbank Credit Suisse Crown Agents Bank Limited Deutsche Bank EFG Private Bank Limited Goldman Sachs HSBC Holdings plc Citi Bank Santander UK Scotiabank Société Générale Corporate & Investment Banking Standard Chartered Sumitomo Mitsui Banking Corporation The Bank of New York Mellon UBS Weatherbys Private Bank Jefferies Group Wells Fargo	Bradford & Bingley	Royal Bank of Canada	
Commerzbank Credit Suisse Société Générale Corporate & Investment Banking Crown Agents Bank Limited Standard Chartered Deutsche Bank Sumitomo Mitsui Banking Corporation EFG Private Bank Limited The Bank of New York Mellon Goldman Sachs UBS HSBC Holdings plc Weatherbys Private Bank Jefferies Group Wells Fargo	CaixaBank	Royal Bank of Scotland	
Credit Suisse Société Générale Corporate & Investment Banking Crown Agents Bank Limited Standard Chartered Deutsche Bank Sumitomo Mitsui Banking Corporation EFG Private Bank Limited The Bank of New York Mellon Goldman Sachs UBS HSBC Holdings plc Weatherbys Private Bank Jefferies Group Wells Fargo	Citi Bank	Santander UK	
Credit Suisse Investment Banking Crown Agents Bank Limited Deutsche Bank Sumitomo Mitsui Banking Corporation EFG Private Bank Limited The Bank of New York Mellon Goldman Sachs UBS HSBC Holdings plc Weatherbys Private Bank Jefferies Group Wells Fargo	Commerzbank	Scotiabank	
Deutsche Bank Sumitomo Mitsui Banking Corporation EFG Private Bank Limited The Bank of New York Mellon Goldman Sachs UBS HSBC Holdings plc Weatherbys Private Bank Jefferies Group Wells Fargo	Credit Suisse		
EFG Private Bank Limited The Bank of New York Mellon Goldman Sachs UBS HSBC Holdings plc Weatherbys Private Bank Jefferies Group Wells Fargo	Crown Agents Bank Limited	Standard Chartered	
Goldman Sachs UBS HSBC Holdings plc Weatherbys Private Bank Jefferies Group Wells Fargo	Deutsche Bank	Sumitomo Mitsui Banking Corporation	
HSBC Holdings plc Weatherbys Private Bank Jefferies Group Wells Fargo	EFG Private Bank Limited	The Bank of New York Mellon	
Jefferies Group Wells Fargo	Goldman Sachs	UBS	
<u> </u>	HSBC Holdings plc	Weatherbys Private Bank	
JPMorgan Chase & Co.	Jefferies Group	Wells Fargo	
	JPMorgan Chase & Co.		

ASSET MANAGEMENT

4bio Capital	KKR&Co
Aberdeen Asset Management	Lazard
Amundi	Mesirow Financial
Barnett Waddingham	Nomura Holdings
Black Rock	Northern Trust Asset Management
BNY Mellon	Octopus Ventures
Close Brothers Group	Odey Asset Management
Cowen Group	Old Mutual Wealth Life & Pension
CPR AM	Rothschild & Co
Fidelity Investments	Schroders
Global X	Sun Life Financial Inc
Insight Investment	T.Rowe Price
Invesco	Vanguard
Janus Henderson Investors	Vida Capital
Juno Capital	Willis Tower Watson





Top-150 Financial Institutions Advancing Financial Industry Longevity / AgeTech / WealthTech

INSURANCE & REINSURANCE		
Aegon	Legal & General	
AIG	LV Insurance Management	
Allianz	Manulife	
Aon PLC	MetLife UK	
Argo Group	MunichRe	
Artex	NN Group	
Aspen	Pacific Life Re	
Aviva	Partner Re	
AXA	Phoenix Life Limited	
China life	Prudential Financial	
B&CE Insurance	RenaissanceRe	
Berkshire Hathaway	RGA Life	
Canada Life Reinsurance	Rothesay Life	
China Life	Royal London Group	
Chubb Tempest Life Re	RSA	
Discovery Ltd	SCOR Global Life SE	
Ecclesiastical Insurance Group	Scottish Re	
Generali	Scottish Windows	
Guardian Insurance	Securis Investment Partners	
Hannover Re	Transatlantic Holdings	
Hodge Life Assurance	Vitality	
Iccaria Insurance	Zurich Insurance	
ICC Ltd		

PENSION FUNDS			
AJ Bell Youinvest	ITV pension scheme		
Akzo Nobel UK Pension Scheme	Lafarge UK Pension Plan		
AstraZeneca pension fund	Marks & Spencer Financial Services Plc		
AXA UK Group Pension Scheme	Merchant Navy Officers Pension Fund		
Babcock International Group Pension Scheme	MMC UK Pension Fund		
BAE Systems Pensions	National Grid UK Pension Scheme		
Bank of England Pension Fund	Nationwide Pension Fund		
Barclays Bank Retirement Fund	Pensionbee		
BBC Pension Scheme	Pilkington Superannuation Scheme		
British Airways Pension Scheme	Pirelli Pension Fund		
BT Pension Scheme	RBS Group Pension Fund		
Cobham Pension Plan	Rolls-Royce Pension		
EMI group pension scheme	Royal County of Berkshire Pension Fund		
Essex Pension Fund	ScottishPower Pension Scheme		
Ford UK Pension Scheme	SSE Plc		
Greater Manchester Pension Fund	Strathclyde Pension Fund		
Hargreaves Lansdown	Total UK Pension Plan		
Heineken UK	Tyne & Wear Pension Fund		
IBM United Kingdom Pensions Trust	West Midlands Pension Fund		
ICI Pension Fund	West Yorkshire Pension Fund		



Top-Tier Finance and Business Media Conferences on Longevity





Longevity is now regularly embraced as a major topic of interest for panel discussions and entire conference series by top-tier finance and business media brands including *The Economist, Financial Times* and *Bloomberg*.





FINANCIAL TIMES LIVE

12:10pm Aging and Longevity

Dmitry Kaminskly, Co-Founder and Senior Partner, *Deep Knowledge Ventures*

Alex Zhavoronkov, CEO, Insilico Medicine

Joseph Antoun, Chairman & CEO, L-Nutra; Chairman, Global Healthspan Policy Institute

 $\begin{tabular}{lll} \textbf{Aubrey de Grey}, Vice President of New Technology Discovery, $AgeX$ \\ \textit{Therapeutics} \end{tabular}$

A GLOBAL NETWORK OF INNOVATORS



BLOOMBERG LONGEVITY ECONOMY CONFERENCE



Top-Tier Financial Institutions and Business Analytics Firms Show Interest in Longevity Through Conferences and Reports

CREDIT SUISSE

Credit Suisse featured Health and Aging as one of four main themes in their 2018 Global MegaTrends Conference



Julius Baer held a major forum on the topic of "Investing in Longevity" featuring a keynote presentation by Aging Analytics Agency Founder Dmitry Kaminskiy





UBS featured "Living to 150" as one of six major topics in their 2018 Healthcare Summit, featuring a keynote presentation by prominent Longevity entrepreneur Alex Zhavoronkov



UBS Investor Watch

The century club

The rising prospect of living ten decades



UBS Investor Watch

80 is the new 60

Retirement is one word, but three phases

UBS also issued a report on the "largest survey of wealth investors in the world to date", concluding: ""Don't let skepticism about living to 100 keep you from planning for it. Life expectancies are rising, and it's a real possibility. In fact globally, nine in 10 investors are already adjusting how they are planning for their life and their legacy."



CitiBank released a landmark report detailing the rise of the Longevity Industry, and highlighting it as one of the quickest-rising sectors being driven by disruptive innovation today.



FROST & SULLIVAN

Frost and Sullivan also released two prominent reports on the emerging Longevity Industry, and in 2018 created the "Award for Innovation in Artificial Intelligence for Aging Research and Drug Development"



Banks Interested in Longevity



JPMorgan has created an international index designed to benchmark and trade longevity risk.



In the report Beyond 100 Barclays Private Bank has brought together viewpoints from specialist and leading experts in longevity research and biotechnology, work, housing and the economy.



Deutsche Bank has entered into a longevity swap with the Trustees of the Rolls-Royce Pension Fund. Under the agreement, Deutsche Bank will hedge the longevity exposures of the scheme



Longevity Opportunities for Financial Industry

"The Longevity Economy is redrawing economic lines, changing the face of the workforce, advancing technology and innovations, and busting perceptions of what it means to age"

The Oxford Economics/AARP report.

Opportunities

Planning for retirement

As customers and clients prepare for longer lives, retirement remains a powerful growth driver.

Financial market

Driven by financial assets controlled by older investors, this segment of the longevity market simply cannot be ignored.

Main market players

Pension funds

Insurance companies

Reinsurance companies

Banks

Asset management firms

Steps to be taken

Develop strategy for older consumers

Reconsider what firms "know" about the elderly population to avoid ageist and outdated messaging

Incorporate older employes into product planning, design, and communications

Use focus groups that include older participants to test products and services





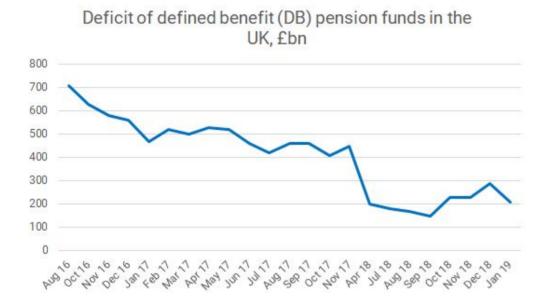
Sources Cognizant

pdf



Pension Funds

Pension fund is any plan, fund, or scheme which provides retirement income. Pension funds are pooled monetary contributions from pension plans set up by employers, unions, or other organizations to provide for their employees' or members' retirement benefits.

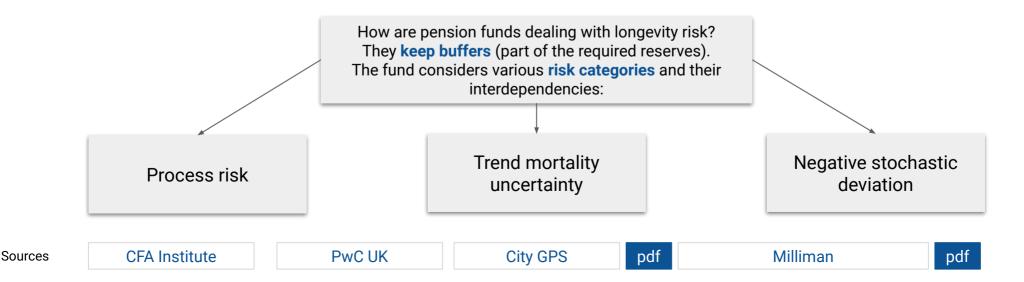


What is a pension deficit?

It is the gap between how much a pension is required to pay out vs how much money is available to pay out. The deficit occurs when there isn't enough money to pay, i.e. when the liability is greater than the assets. While a pension deficit is clearly not a positive situation, it does not necessarily mean that the scheme is going to fail.

Drivers of deficits:

- 1) discount rates;
- 2) performance of both equity and fixed income markets;
- greater-than-expected improvements to longevity. For UK company pension schemes, 1 year of additional life expectancy increases gross liabilities by about 3%.



Insurance Companies

For **institutions**, risk transfer mechanisms (buy-out, buy-in, longevity swap) + securities, indexes



Insurers: A \$750bn+ Opportunity Globally in Pension Closeouts

vs mortality risk: if life
expectancy improves more
rapidly than insurers forecast,
higher payouts on group
annuity contracts should be
offset by better life insurance
returns.



Effects

Longevity risk: a natural hedge

Services for institutions & individuals



For **individuals**, annuities within DC plan + single premium immediate annuity



Limited integration expenses allow blocks to reach target return on equity (ROE) quickly: Outside of modest onboarding costs, there are no major

(ROE) quickly: Outside of modest onboarding costs, there are no major one-time expenses for a pension risk transfer case. Thus, returns should quickly get to target levels and be immediately accretive to earnings.



Efficient way to use insurance subsidiary capital: Pension closeout transactions are written out of a company's insurance subsidiaries rather than the holding company. This can allow an insurer to use 'excess' capital in its subsidiaries.

Sources naic.org City GPS pdf



Asset Management Firms

Smaller

investments

Allow
investors to
avoid
minimum
investment
requirements
and to invest
in a larger set
of securities
with a
smaller
investment.

ow •

Competition to insurers

Insurers are well-established in key European markets, thus pose a threat to AMCs.

Profit from fees

Investment management fees account for the bulk of total fees charged





Plan administration capabilities

Well-positioned to capture the private pension growth opportunity given their capabilities in plan administration and investments.

New markets

Could capitalize in markets where insurers are weaker (which are likely to be the main source of growth through workplace defined contribution schemes)



Diversification

Offer diversification as they have a larger pool of resources than the individual investor could access on his own



Sources investopedia.com

City GPS

pdf



Banks are adding investment services:

- wealth management;
- brokerage accounts;
- private banking;
- retirement planning.

In a recent report that listed investible technologies to reap long-term economic gains for their clients, CitiBank cited anti-ageing drugs as one of 10 disruptive innovations. Recent advancements in rapidly-maturing longevity science "could spawn FDA-approved therapeutics potentially in the next decade, with the primary goal of keeping us younger and alive for longer. With scientific breakthroughs emerging this decade on the cellular origins of why the tissues in our bodies age, novel anti-ageing medicines may become one of the next big disruptions in the healthcare market." Senolytics were the most prominent longevity technology highlighted in the report, which projects that the first drug of this class could enter the market as early as 2023.

Exposed to longevity risk. Key mitigation processes:

- Governance:
- Sensitivity analysis;
- Risk Appetite Framework (RAF).

Typical mass-market banks in which individual customers use local branches of larger commercial banks. Services offered include savings and checking accounts, mortgages, personal loans, debit/credit cards and certificates of deposit (CDs). In retail banking, the focus is on the individual consumer.

Retail Banks



The primary distribution source for financial products (including private pensions) in many emerging markets, particularly in Asia and Latin America.

Sources investopedia.com axabank.be pdf City GPS pdf



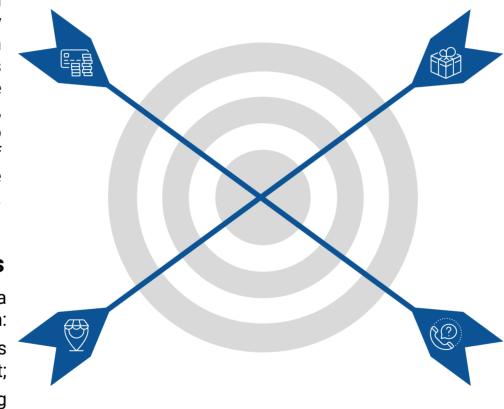
Clients

Private banking includes personalized financial and banking services generally offered to wealthy high net worth individual (HNWI) clients. HNWIs have typically accrued more wealth than the average person, so they have the means to access a larger variety of conventional and alternative investments.

Financial Services

Private Wealth Banks Address a client's entire financial situation:

- protecting and growing assets in the present;
- providing specialized financing solutions;
 - · planning retirement;
 - passing wealth on to future generations.



Occupational Pension Solutions

- Supplementary solutions for managers: the Flex Pension Fund;
- Vested benefits solutions: the Plus Pension Fund (Pillar 2b).

Personal Pension Solutions

 Pillar 3a unit-linked and securities-based savings.

investopedia.com

pbihag.ch



Investment Opportunities with Exposure to Longevity Trends

- Innovation in genome science, big data and "ammortality," which includes wearable technology and products in the so-called wellness space, could soon prolong healthy human life well beyond 100 years.
- One of the biggest investment opportunities over the next decade will be in **companies working to delay human death**.
- A market expected to be worth at least \$600 billion by 2025.

Genomics

Genomics, or the study of the human genome, is expected to be a \$41 billion industry by 2025 and will provide the "next generation of gene editing technology offering potentially revolutionary advances in prevention and disease treatments.

Al health

The growth of artificial intelligence combined with an ever-growing body of health-care data should help researchers analyze pathology, the study of the causes and effects of diseases. Improvements in technology have the potential to bring down health-related costs and enable precision medicine.

Future food

Food companies, which are expected to ensure "healthier eating and sustainable humanity on the planet," should leverage agricultural gene editing as well as healthier lifestyles and consumption.

'Ammortality'

The "ammortality" theme, expected to be worth \$504 billion by 2025, will help to improve health spans to the betterment of human vitality, enabling the world population to live free of disease rather than forever. Companies that represent "ammortality" include healthcare technology firms.

'Moonshot medicine'

These companies are working on cures or treatments for some of humanity's toughest diseases, ranging from cystic fibrosis to Parkinson's and Alzheimer's.



Challenges Facing Financial Institutions Entering the Longevity / AgeTech / WealthTech Market

Longevity Risk is a risk to which a pension fund or life insurance company could be exposed as a result of higher-than-expected payout ratios. It exists due to the increasing life expectancy trends among policyholders and pensioners, and can result in payout levels that are higher than what a company or fund originally accounted for. The types of plans exposed to the greatest levels of Longevity Risk are defined-benefit pension plans and annuities, which guarantee lifetime benefits for policy or plan holders. Only those financial institutions which can deal with longevity risk will survive and flourish.

Longevity Risk affects governments in that they must fund promises to retired individuals through pensions and healthcare, and they must do so despite a shrinking tax base. Corporate sponsors who fund retirement and health insurance obligations must deal with the Longevity Risk related to their retired employees. In addition, individuals, who may have reduced or no ability to rely on governments or corporate sponsors to fund retirement, have to deal with the risks to their own finances presented by their own Longevity. Average life expectancy figures are on the rise, and even a very small change in life expectancies can create severe solvency issues for pension plans and insurance companies. Precise measurements of Longevity Risk are still unattainable because of the limitations of medicine and its impact on life expectancies has not been quantified.

The parts of the industry left standing will be those in which the only measure of success is QALY (quality-adjusted life years), DALY (disability-adjusted life years) and HALE (health-adjusted life years).

There will be a period of crisis following the tsunami landfall, and preceding the completion of first "flood defences" in the form of healthy life-extending biomedicine.

But for many, these intervening years will be a **window of opportunity** to become captains of an entirely new industry and chart a new course for humanity.



Longevity Risks and Fiscal Challenge in Selected Countries

In many countries, the private sector does not have sufficient financial assets to deal with ageing-related costs, let alone with longevity risk. The estimated present discounted value of required retirement income under current longevity assumptions for 2010–2050 exceeds household total financial assets.

Although some of the gaps in the table would be covered by social security, housing equity, and further asset accumulation by households, it is unlikely that current household wealth is sufficient to provide the necessary retirement income in selected countries.

Table 1. Longevity Risk and Fiscal Challenges in Selected Countries

Country	Household financial assets (2016), % of GDP	Present Discounted Values of Needed Retirement Income (2010-2050)	General Government Gross Debt (2016), % of GDP
Japan	309	499 to 665	237
Spain	185	277 to 370	116
Italy	248	242 to 322	157
USA	339	272 to 363	137
France	229,3	295 to 393	121

With the private sector ill-prepared for even the expected effects of ageing, it is not unreasonable to suppose that the financial burden of an unexpected increase in longevity will ultimately fall on the public sector. The contingent liabilities from longevity risk could add to already-stretched debt-to-GDP ratios in these countries. If the risk of an extra three years of longevity were indeed to fall on the government, debt-to-GDP ratios could significantly rise in selected countries.

Table 2. Longevity Trends 2010-2050

Country	Projected change in life expectancy at birth, 2010-2050	Projected change in life expectancy at age 60, 2010-2050
United States and Canada	4,3	3,1
Advanced Europe	4,7	3,7
Emerging Europe	6,8	3,8
Australia	4,9	3,7
Japan	4,6	3,7

It is obvious that indicators in both tables correlate with each other: these regions and countries are the most 'risky' in aspect of the longevity effects.



Geography of Longevity Risk

Potentially risky regions

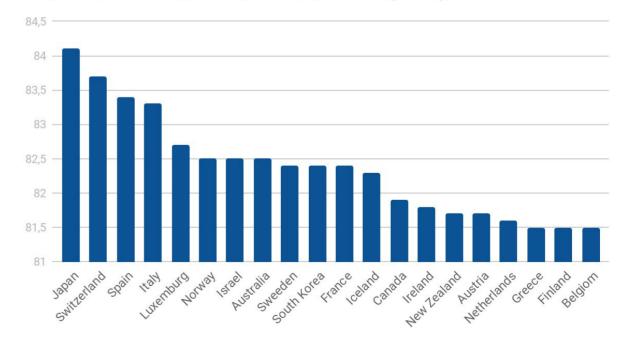
70% Europe

15% Asia

10% Australia The most "dangerous" regions in the context of longevity risks are Europe, Asia, and Australia. It is important to highlight those countries that require increased attention to the ageing regulation. According to OECD, this list includes Japan, Switzerland, Spain, Italy, and Luxembourg.

Moreover, we should take into consideration Blue Zones, which are the regions where people live much longer than average. Therefore, the US could be included in the list of "risky" countries.

Top 20 countries by life expectancy at birth (years), 2016





Rising Financial Hubs for the New Financial Industry



The map above identifies four major global preventive medicine hubs (London, Singapore, Israel and the USA), which for various reasons constitute hotspots of R&D and industry development in the Precision and Preventive Medicine Industry, as well as three major Financial Hubs, which for various other reasons represent epicentres of innovation and technological development in the Finance Industry.

It is notable that London and Singapore are distinguished as being hubs for both the Flnancial Industry and the Preventive Medicine Industry, and as such have extremely strong potential to become global leaders at the emerging intersection of Longevity and the Advancing Financial Industry.



Longevity-Progressive Countries

- Israel
- Singapore
- Switzerland
- Japan
- Hong Kong
- South Korea
- United States
- Taiwan























Several Longevity-progressive countries are working on implementing social policy programmes relevant to combatting the economic issues created by aging population, with regularly advancing biomedicine landscapes, seemingly rising life expectancies, and some in particular are establishing the grounds for fruitful future Longevity-related financial products and instruments, such as Switzerland

Switzerland in particular has all the elements necessary to become a leading Longevity financial hub, due to such factors as a lean political system that facilitates rapid implementation of integrated government programs, a strong research environment for geroscience, a strong research and business environment for digital health, and most importantly, international financial prowess. Some specific programmes that Switzerland has the power to develop in the next several years include the development a Longevity progressive pension system and insurance company ecosystem that accounts for both population ageing (which threatens to destabilize the current business models of insurance companies and pension funds) and the potential for widespread healthspan extension, and the development of a national strategy for intensively developing its geroscience 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.



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



General Conclusions - Advancing Financial Industry Longevity / AgeTech / WealthTech

In-depth analysis of financial institutions' activity confirms the following points:

Except for being perceived as a challenge, longevity and ageing could also bring new opportunities for all types of financial institutions, including pension funds.

Firstly, there appears a group of wealthy consumers, namely retirees. Thus, it creates opportunities for both financial services and insurance for them, as well as for boosting innovating startups aiming to satisfy the needs of this category of people.

Increase in life expectancy affects to a different extent main financial institutions - banks, pension funds, insurance and reinsurance companies, venture and hedge funds.

For some of them it creates an opportunity to develop new products and services aiming at satisfying the needs of the elderly. For the other ones it means the decrease in demand for current products not adapted to the use of the seniors.

In order to stay competitive, It is important for financial institutions to use the opportunity of ageing as soon as possible.

In this industry, having permanent competitive advantages and sticking to high speed of adjustment to changing market conditions are very important. Therefore, if the financial institutions do not adapt their practice to longevity trends, dynamic competitors will receive the benefit instead.



Advancing Financial Industry Longevity / AgeTech / WealthTech Volume II and Volume III

Volume II



- Deep analysis of the Longevity, AgeTech and WealthTech Industries and their main players
- Tangible forecasts on the Industry development for 2019-2023
- Fully described threats and opportunities for the financial industry as a whole and for particular types of financial institutions pension funds, insurance and asset management companies, banks
- Traditional financial derivatives, longevity swaps and longevity risk transfer
- Innovative financial derivatives that are expected to be implemented in the nearest future

Volume III



- Longevity and financial profiles of all top 150 financial institutions participating in Longevity
- Ranking of top 150 financial institutions participation based on Aging Analytics Agency's unique methodology
- Exclusive case-study of financial institutions entering the Longevity Industry
- Individualized content of the report developed for a particular type of financial organization
- Proprietary analytics in all chapters of the report



Analytical Report - Advancing Financial Industry Longevity / AgeTech / WealthTech Volume II

The second volume of the Advancing Financial Industry Longevity / AgeTech / WealthTech expands the information presented in the first volume and provides an in-depth analysis of the industry concentrating on financial derivatives, new products appearing in AgeTech and WealthTech Segments and explains the necessity of using Health-Adjusted Life Expectancy (HALE), Quality Adjusted Life Years (DALY) and Disability-Adjusted Life Years (DALY). In particular, it includes the following chapters:

1 Lo

Longevity / AgeTech / WealthTech

This chapter describes how these three industries incur fast development during recent years, as well as how they enable the growth of each other. The deep analysis of the industries also includes an overview of the main players and the forecasts for the further development of the industry. It directly shows how financial institutions are adapting their products in order to respond to the challenges of the Silver Tsunami and turn the threats of ageing to the opportunities.

2

Quantitative Metrics Bridging Longevity and Financial Industries: HALY / QALY / DALY

Currently, together with the trend of increasing life expectancy, we can observe significant improvements in people's health as well as the increase of the age till which they feel healthy. That is why the usual term of life expectancy becomes less popular and there appear a new group of notions for measuring how long people live a healthy life. The chapter provides an extensive analysis of 3 of these new terms - HALE (health-adjusted life expectancy), QALY (quality-adjusted life years) and DALY (disability-adjusted life years). All of these three matrices were widely used in the researches on longevity, that is why the chapter provides tools to navigate between the terms and provides advantages and disadvantages of all of them. This knowledge is necessary for the forecasts modelling, as well as analyzing longevity risk and other issues connected to longevity and ageing.



Analytical Report - Advancing Financial Industry Longevity / AgeTech / WealthTech Volume II

3

Major Threats and Opportunities for Financial Institutions

While deciding how to respond to Longevity trends, it is necessary to know both threats and opportunities, which Longevity presents for the financial Industry as a whole and for particular types of financial institutions. That is why the chapter defines and explains the most important threats and opportunities for insurance and asset management companies, banks and pension funds, as well as shows how the whole industry is dealing with these threats and opportunities.

4

Longevity Related Financial Derivatives

As the importance of dealing with longevity risk rises, the market of longevity-related financial derivatives develops. During recent years one of the most popular longevity risk transfer solutions was the usage of longevity swaps. Thus, on the one hand, the chapter covers traditional longevity derivatives, which already exist and became rather common. On the other hand, there is a group of future derivatives, which are expected to be implemented and are often connected with the new metrics - HALE, QALY and DALY. The chapter provides an overview of these potential derivatives, as well as other derivatives which are expected to become reality in the nearest future.

The access to the second volume of the report is available for the interested financial institutions via subscription.

To get detailed information on the conditions of the subscription, please contact us at info@aginganalytics.com

Advancing Financial Industry *Volume II*

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Analytical Report - Advancing Financial Industry Longevity / AgeTech / WealthTech Volume III

The third volume of Advancing Financial Industry Longevity / AgeTech / WealthTech report is the most individualized version of the report. It is adjusted to the interests and specific needs of a party aiming to acquire the volume of the report. Particularly, it provides tangible analysis of specific segments of Longevity, relevant for a specific type of a financial institution. Parties acquiring the access to Volume III will obtain a unique knowledge on the following points:

Longevity and financial profiles of all top 150 financial institutions participating in Longevity

As more companies enter the Longevity industry, it becomes necessary to understand the place of each of them in the industry, who are the leaders and the most efficient players and what are their main strategies. Thus, this chapter provides substantial longevity and financial profiles of the top 150 institutions, covering comprehensive analysis of Longevity activities of these companies. Besides, the chapter defines the ranking of top 150 according to the efficiency of their participation in Longevity industry, which gives a supported by evidence idea of the market leaders, as well as not efficient players.

Case-study of financial institutions entering the Longevity Industry

In order to enter the Longevity Industry in an efficient manner and use the opportunities it creates, it is necessary to study the experience of other companies, which incurred both losses and profits. Thus, the chapter provides an exclusive case study, adapted for different types of institutions, which helps to get a full understanding of what should be done to succeed in the market.

The access to the third volume of the report is available for the interested financial institutions via the purchase of individualized proprietary report. To get a detailed information on the third volume, please contact us at info@aginganalytics.com



New Editions - Advancing Financial Industry Longevity / AgeTech / WealthTech

The major analytical deliverables, insights, trends and data from this report will be aggregated and assembled into new, extended and updated editions of the main, industry-wide landscape overview reports, to be re-released every financial quarter, incrementally increasing the precision and actionability of its industry analysis, and the depth of its industry forecasts.

Each new edition will provide a more sophisticated, comprehensive and precise understanding of the challenges and opportunities related to longevity, as well as what financial institutions such as private wealth and retail banks, pension funds and insurance companies need to do in order to benefit, rather than stagnate, from the oncoming collision of two opposed longevity megatrends: advancing biomedicine and silver tsunami.

New editions will include:

- Expanded quantitative metrics of advancing financial industry institutions and its analysis methodology;
- Updated list of advancing financial industry institutions;
- Overview of the most notable events related to the industry that happened in the second quarter of 2019;
- New predictions and possible scenarios analysis;

These reports will aim to deliver a concrete set of clear deliverables relevant for the strategic interests of leading financial institutions, including:

- Concrete deep analysis of the prospects of each sector of financial industry regarding the development of longevity trends and tangible forecasts on the 3-5 years horizon, providing an overview of novel longevity-related financial products and instruments that will be market-ready by 2022-2025.
- Forecasting and scenario-building for the optimized way for assembling best possible tools and solutions to deal with longevity risk and to gain profits from the main longevity trends, and analysis and comparison of the key market players in the longevity financial landscape.



Link to the Report: https://www.aginganalytics.com/advancing-financial-industry

E-mail: info@aginganalytics.com Website: www.aginganalytics.com

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