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ANALYTICS
AGENCY

INVESTMENT DIGEST

LONGEVITY INDUSTRY IN ASIA 2021

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Longevity Investment Digest at a Glance

This Investment Digest is summarizing key players and observations in the private equity and venture capital ecosystem, focusing on the longevity industry. Here we have summarized information about key industry trends, more than 1700 promising longevity companies, 50 leading investors in this sector, and more than 50 longevity-focused publicly traded corporations, outlining major investment rounds and relevant R&D trends illustrating the industry traction and readiness of institutional investors (big pharma/biotech) to potentially acquire most successful AgeTech and Longevity Biomedicine startups.

Covid pandemic has facilitated not only biotech capital market development in general, but longevity sector in particular, resulting in more than 30% of growth compared to the previous year.

Longevity market growth outperforms general trend of biotech market, yet remains more volatile. Only one company in Asia made an IPO.

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.

The industry is poised to witness a quantum leap in the near future, particularly because of the impact of Artificial Intelligence in biomedicine R&D and in light of the upcoming paradigm shift from treatment to prevention.

Longevity Industry: Multi Trillion Dollar Opportunity

The longevity market is not limited only to the anti-aging applications of life sciences, but also includes advancing sectors of the financial industry, as well as government projects (national longevity development plans). Overall market size thus can exceed 25 trillion USD. Most developed longevity startups are quickly becoming matured companies, large institutional investors are being attracted into the industry, full-fledged longevity infrastructure is emerging.

There are at least 350 publicly traded corporations that can be considered as related to the Longevity industry.

Longevity Biomedicine, FinTech, and AgeTech industries include 16000+ companies, 8000+ investors, 14 sectors, and 114 subsectors.

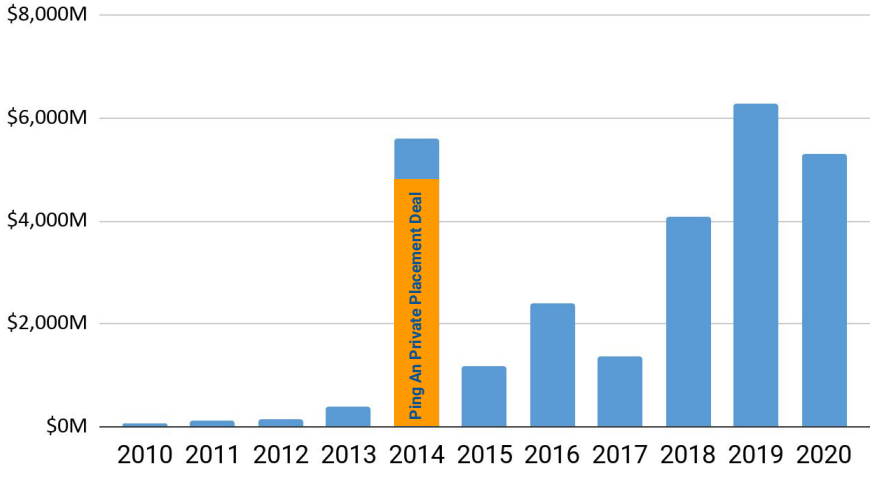
The longevity Financial Industry includes 1000+ corporations, 15 sectors, and 50 subsectors.

Longevity Governance Landscape includes national healthcare budgets and development plans of at least 100 governments.

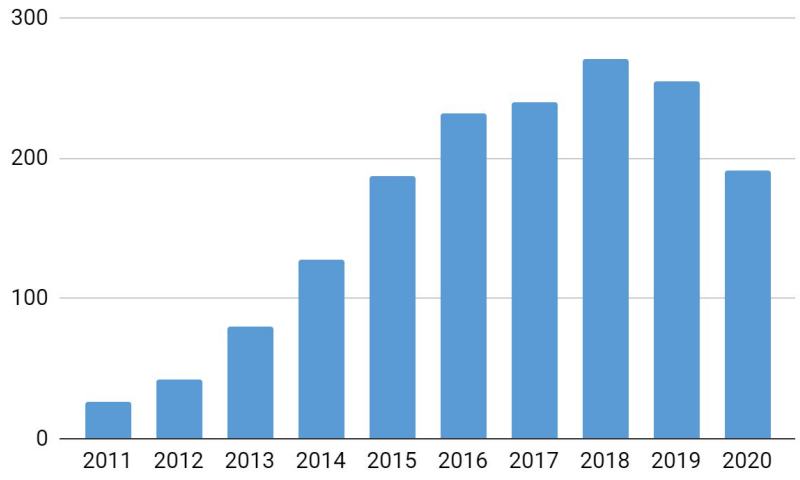
The numbers presented in the graph are approximate since there is no generally accepted methodology for their estimation.

Investments in Asia Longevity Industry

Total amount of investments by year



Total amount of deals by year

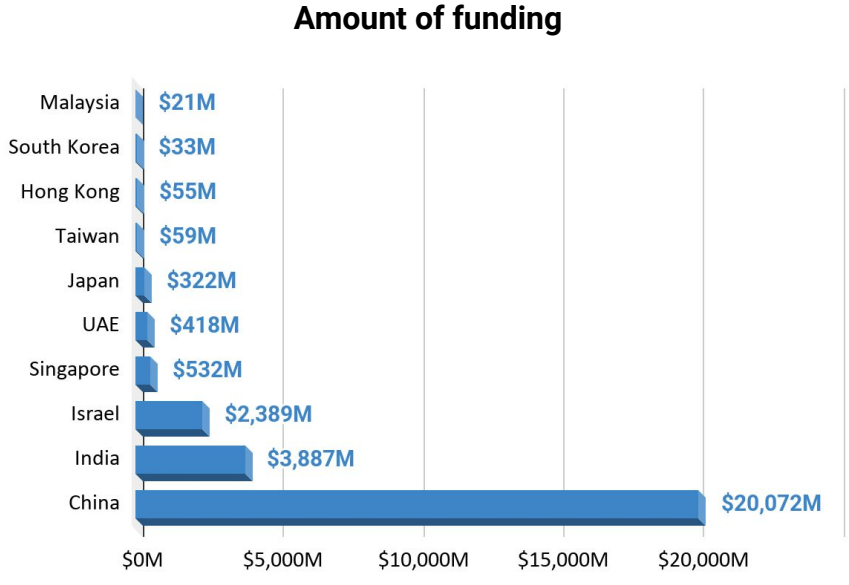


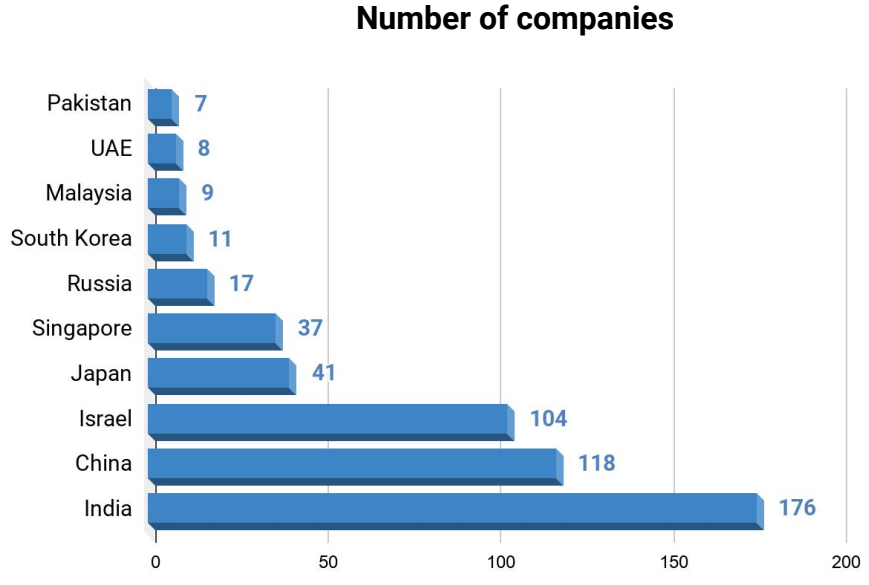
Total early stage investments into longevity by 2021: $26.8B

P4 Medicine (Precision, Preventive, Personalized, Participatory) is the largest sector within the Longevity Industry in terms of both total funding raised and the number of companies. The most active capital-raising P4 Medicine subsectors are Diagnostics and Mobile Health.

The distribution of investments across different Longevity sectors demonstrates that drugs and gene therapies are more attractive for investors than devices (**AgeTech**). However, as society's focus is now shifting towards keeping older people healthy and active for longer, such key areas of age-tech as tech-enabled care and mobility aids are very likely to attract more investments in the nearest future.

Top-10 Countries in Longevity Sector in 2020





The chart ot the right represents the distribution of funding received by companies located in 10 countries in Asia and the Middle East with the largest total investments into the Longevity Industry by 2020 in the region. China is an unconditional leader with a total amount of $20 billion overall investments in 118 companies. This is more than 5 times bigger amount received by the companies from India, which is the second most invested country in the Asia & Middle East region with total investments of $3,887M in 176 companies. The closest competitor of India is Israel.

Top-20 Longevity Companies in Asia

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China

Beijing

- **BeiGene** — Changping, China
- **Waterdrop** — Beijing, Beijing, China
- **Miaoshou Doctor** — Beijing, Beijing, China
- **Genetron Health** — Beijing, Beijing, China
- **Annoroad** — Beijing, Beijing, China

Guangdong

- **Ping An** — Shenzhen, Guangdong, China
- **Vision Medicals** — Guangzhou, Guangdong, China

Shanghai

- **Quyi Network** — Shanghai, Shanghai, China
- **OrigiMed** — Shanghai, Shanghai, China

Zhejiang

- **Zhangshang Tangyi** — Hangzhou, Zhejiang, China

Jiangsu

- **Ascentage Pharma** — Suzhou, Jiangsu, China

India

Maharashtra

- **PharmEasy** — Mumbai, Maharashtra, India

Karnataka

- **Practo** — Bangalore, Karnataka, India
- **DocsApp** — Bangalore, Karnataka, India

Haryana

- **Eye-Q** — Gurgaon, Haryana, India

Australia

New South Wales

- **GenesisCare** — Sydney, New South Wales, Australia
- **Wisr** — Sydney, New South Wales, Australia

Israel

Yerushalayim

- **BiolineRx** — Jerusalem, Yerushalayim, Israel

Hong-Kong

Hong Kong Island

- **Deep Longevity** — Hong Kong, Hong Kong Island, Hong Kong

Singapore

Central Region

- **CXA Group** — Singapore, Central Region, Singapore

Global Longevity Ecosystem 2021

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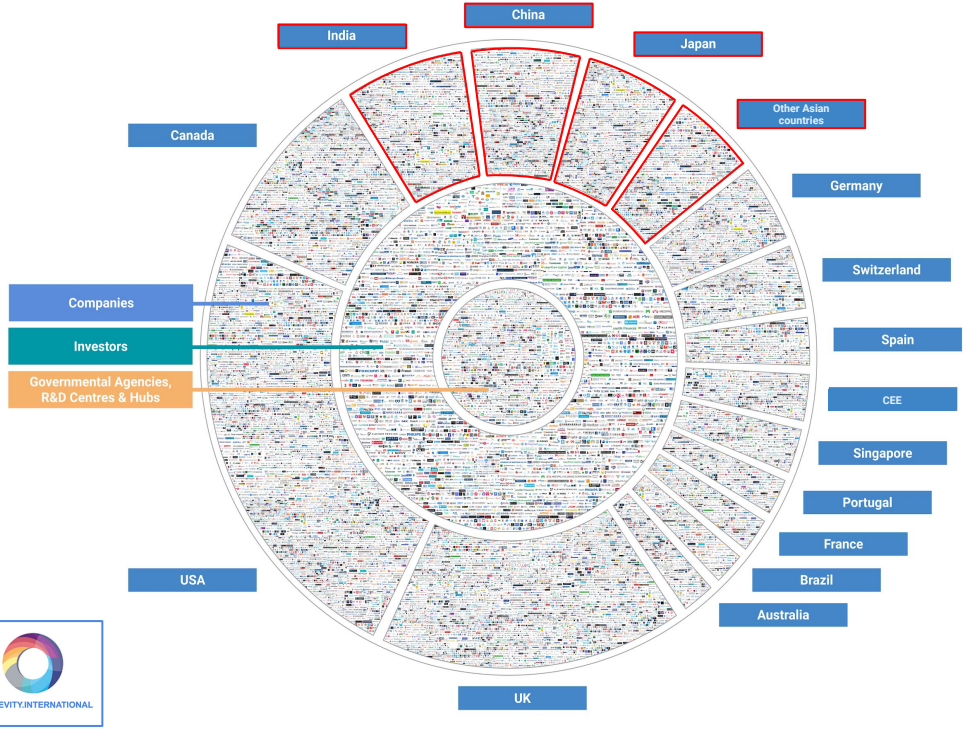
20 000 Companies	8000 Investors	400 Hubs



USA	UK
Canada	India
Japan	China
Sweden	Germany
Switzerland	Spain
CEE*	Singapore
Portugal	France
Brazil	Australia
Gulf Region	EU

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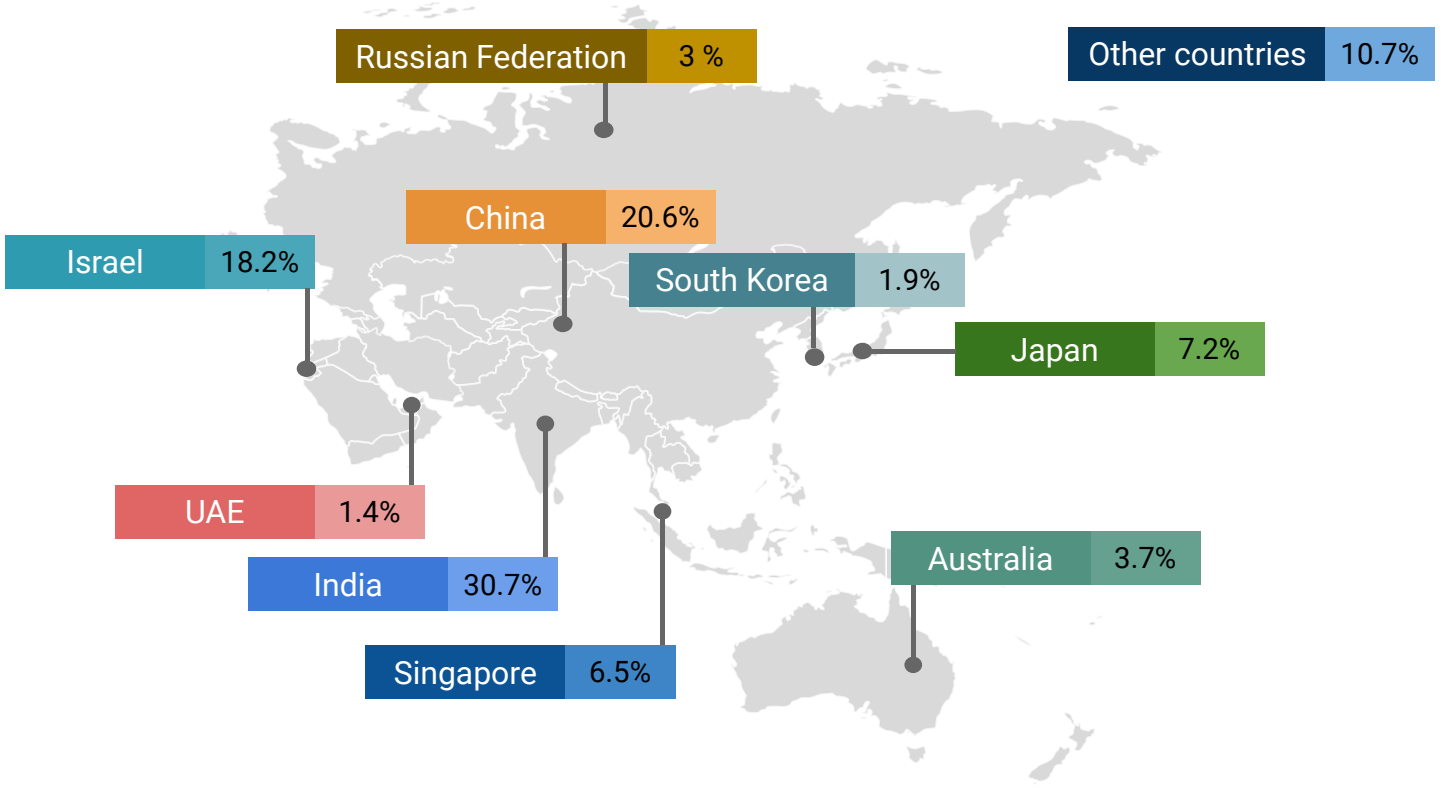
* – Central and Eastern Europe

1727 Longevity Companies: Country Breakdown



Companies based in India, China, and Israel make up the largest proportion of Asian longevity market. The main players in the market are national healthcare companies and longevity financial companies. Longevity biomedicine companies, which take the smaller market share, have been the main focus of longevity venture investments.

Longevity Industry: Multi Trillion Dollar Opportunity

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

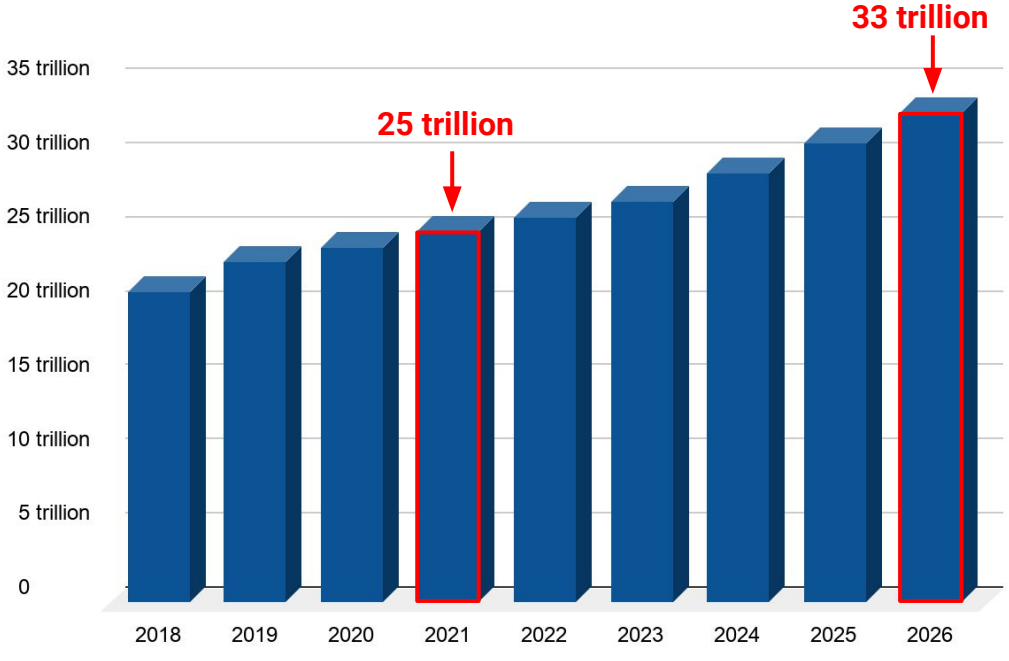
~ Dmitry Kaminskiy, inverview in the Financial Times

"We expect to add 1 billion older individuals in the next three to four decades, atop the more than 700 million older people we have today "

~ International Monetary Fund

World Longevity Economy Size

World Longevity Economy Size Projections, US$



Longevity Biomedicine is the main focus of longevity venture investments currently, yet it is only a tiny fraction of the longevity market.

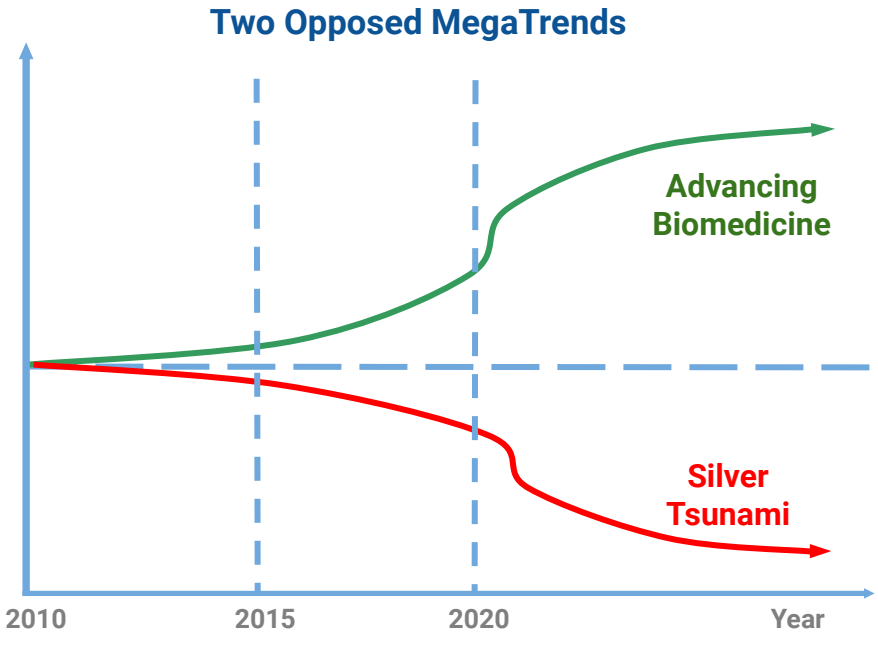
Aging should be considered not only as one of the most acute problems of our time but also as one of the most promising opportunities. Financial institutions such as investment banks, pension funds, and insurance companies can either sink or swim when hit by the oncoming Silver Tsunami. Whether they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

We define the Longevity Industry as a combination of aging, advanced preventing precision biomedicine, AgeTech, relevant parts of national healthcare budgets, and global financial industry that is related to such sub-industries.

The “7th Continent” of 1 Billion People in Retirement

There are more than 1 billion people over 60 years old in the world and thus could be considered the citizens of the ‘7th Continent’. They represent not only a significant share of the global purchasing power, but also hold the largest amount of financial assets compared to other age groups.

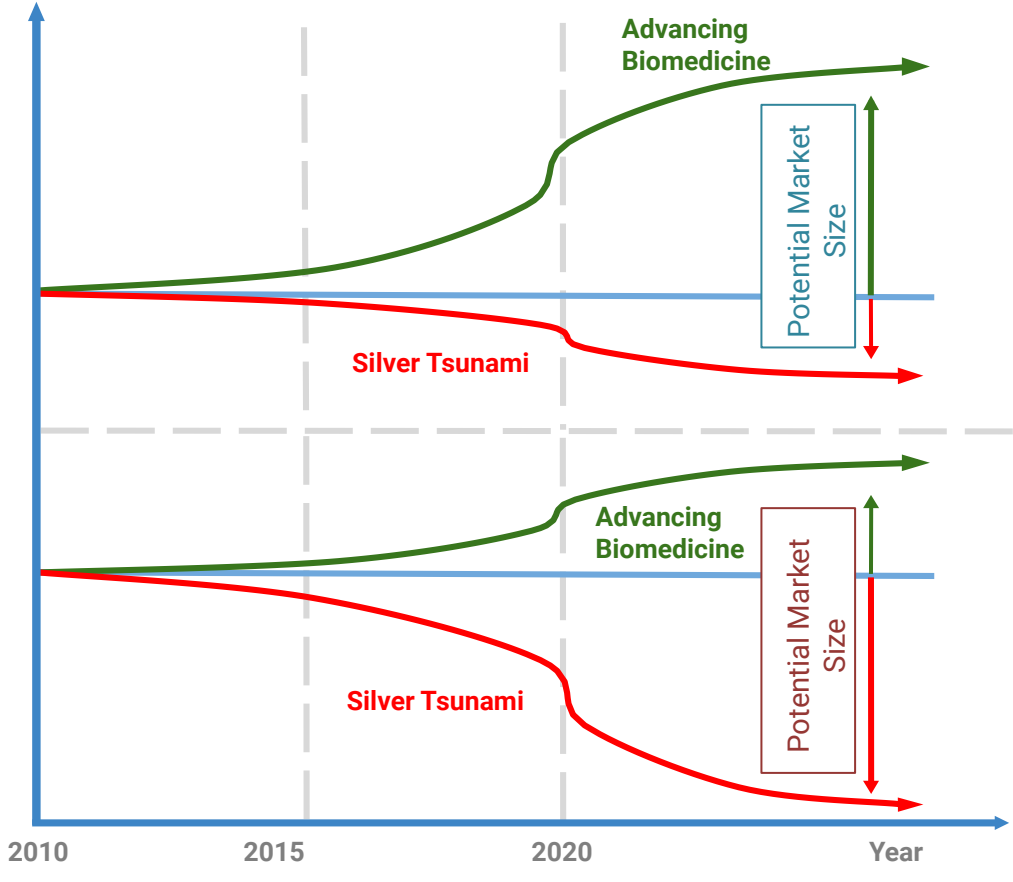
Longevity and Silver Tsunami - Collision of Two Opposed MegaTrends



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.

Longevity and Silver Tsunami — Collision of Two Opposed MegaTrends



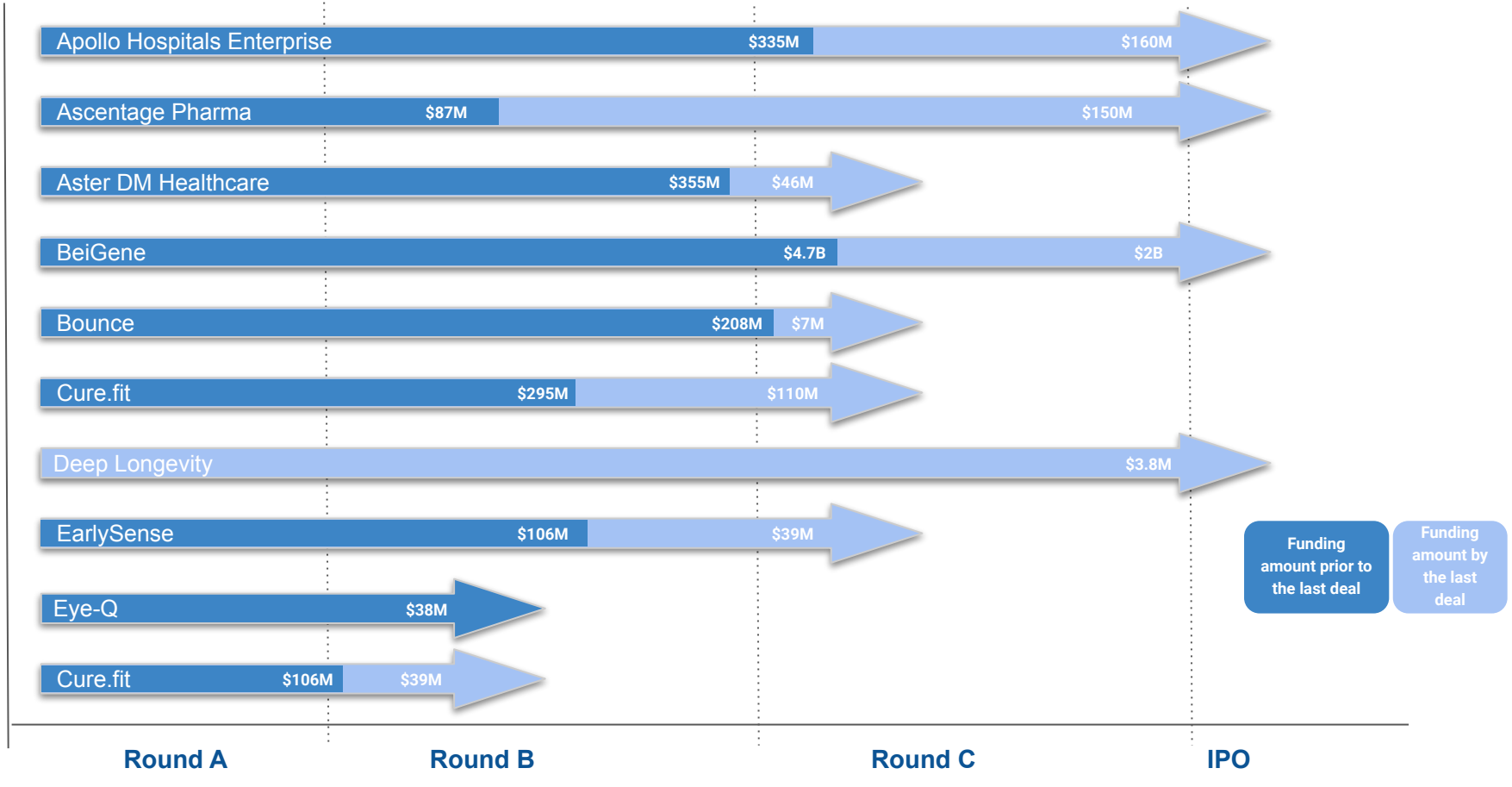
Positive Scenario

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.

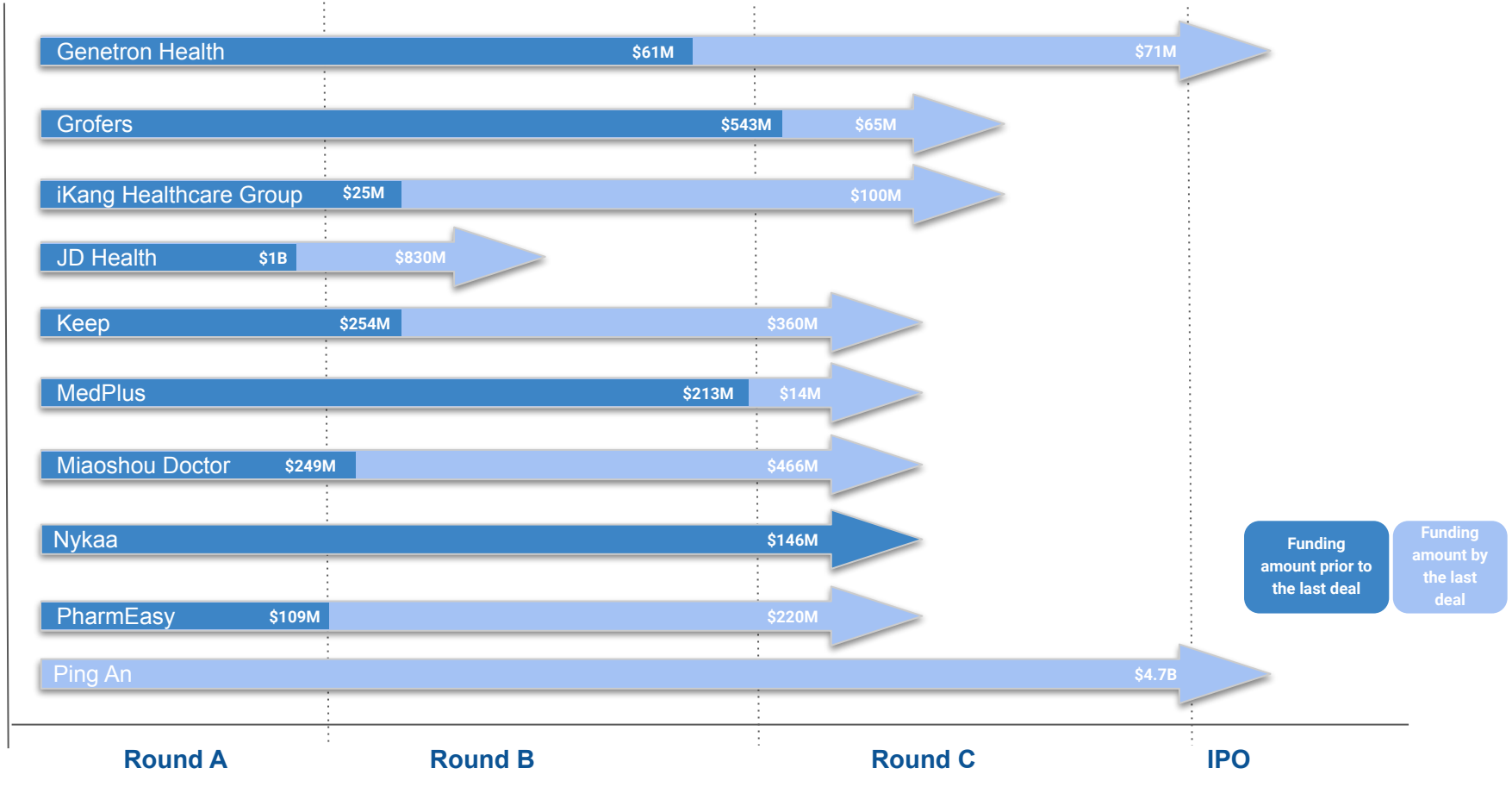
Pessimistic Scenario

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.

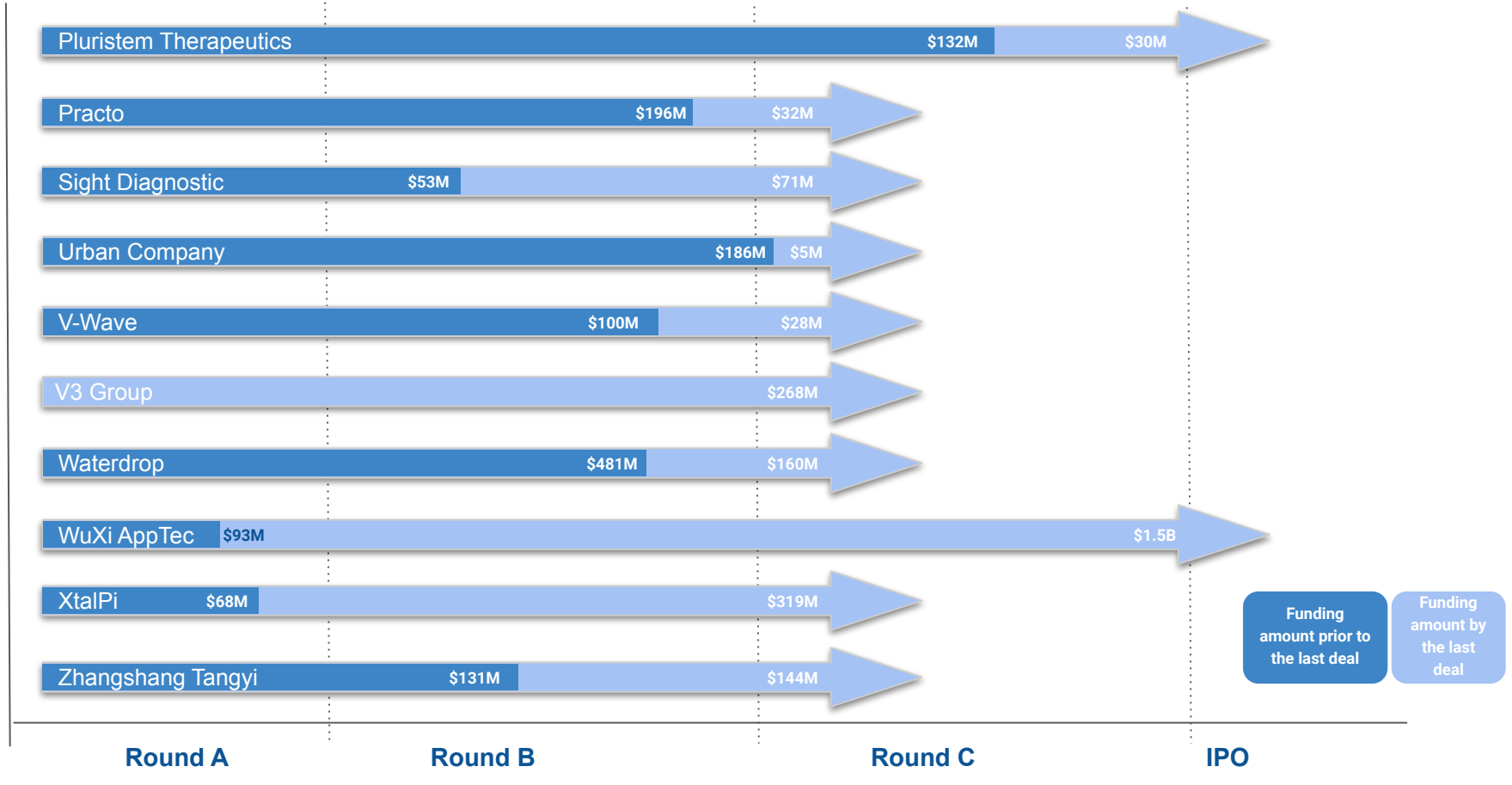
Leading Companies by Amount and Stage of Funding



Leading Companies by Amount and Stage of Funding



Leading Companies by Amount and Stage of Funding



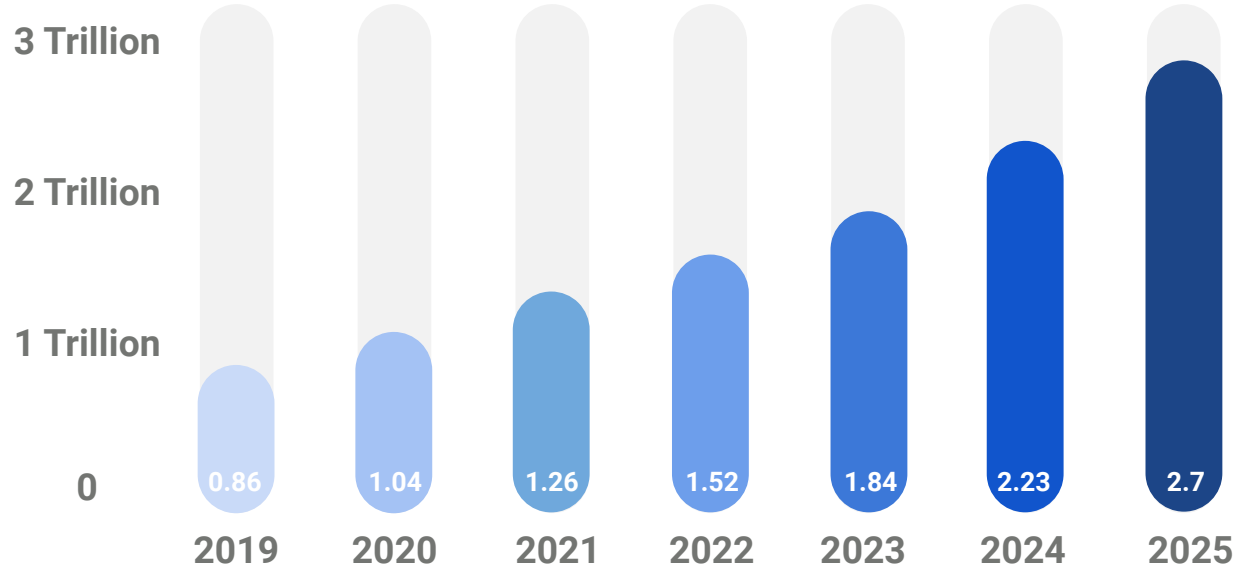
Investment Landscape at a Glance (Q4 2019 — 2020)

In 2020, total investments into Longevity companies had crossed the $27 billion mark, of which $5B were raised during the last year.

Some of the major deals included:

- BeiGene — $2,080M in post-IPOl financing working capital of the company and other general corporate purposes (Post-IPO equity, lead investor - Hillhouse Capital Group) ;
- JD Health — $830M for further strengthen its pharmacy supply chain capabilities and explore additional healthcare service (Series B Round led by Hillhouse Capital Group);
- XtalPi— $318.8M for developing is AI and cloud powered platform (Series C Round, lead investors - 5Y Capital, PICC Capital Investment Management, SoftBank Vision Fund);
- Waterdrop — $230M and $150 from Swiss Re and Tencent for expanding (Series D Round and E);
- Zhangshang Tangyi — $144M (Series D Round).

AgeTech Industry Market Capitalisation



World AgeTech Industry Size Projections, current US $

AgeTech Sector:

- Elderly Care
- FinTech
- m-Health
- Senior Living Communities
- Social and Communication Caregiving
- Independence
- Social Protection
- Cognitive Care

The global longevity economy reached $17 trillion in 2019 and is showing stable growth to achieve $27 trillion in 2026. According to the most conservative estimates, it takes 20% of the global GDP. While the global Longevity Economy is projected to reach $27 trillion in 2026, the Age-Tech segment alone will reach $2.7 trillion by 2025.

This would imply 21% annual growth in the global Age-Tech market. This growth is driven by the general development of the elderly care sector enhanced by advancing IT, FinTech, and other digital technologies.

Longevity Industry Subsectors

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AGETECH

Digital, IT and mechanical technologies aiming to prolong physical functionality and wellbeing in elderly demographics

AI FOR LONGEVITY

The application of Artificial Intelligence for Longevity research and development, including AI for drug discovery and biomarker development

FEMTECH

FemTech products and services targeting core female-specific hallmarks of aging and/or aspects of aging. Prominent sectors include fertility, ovarian rejuvenation

GEROSCIENCE

Biomedical therapies targeting the root causes (or "hallmarks") of aging, including Cellular Senescence, Stem Cell Exhaustion, Epigenetic Alterations, Altered InterCellular Communication, Loss of Proteostasis, Deregulated Nutrient Sensing, Mitochondrial Dysfunction, Telomere Attrition and Genomic Instability

P4 MEDICINE

P4 (Precision Preventive Personalized Participatory) diagnostic, prognostic and therapeutic technologies to maintain an optimal state of health for as long as possible. Considered as the leading edge of practical applications of Longevity technologies

REGENERATIVE MEDICINE

Cell therapies, bioengineered organs, tissue engineering and xenotransplantation targeting core hallmarks of aging

BIOMARKERS FOR LONGEVITY

Discovery and development of panels of biomarkers of aging, the core infrastructure required for testing the safety and efficacy of Longevity therapies and the effectiveness of interventions

LONGEVITY NEUROTECH

NeuroTechnologies to improve and maintain cognitive abilities, neurological plasticity, sleep quality (SleepTech) and psychological well-being into later stages of life

Longevity Landscape Framework

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Geroscience R&D

- Rejuvenation Biotechnology
- Basic Research on Biology of Ageing
- Geroprotectors
- Regenerative Medicine
- Nutraceuticals
- Gene Therapy

P4 Medicine

- Personalized Diagnostics
- Personalized HALE and QALE Estimation
- Personalized Prognostics
- Personalized in vivo and in silico Drug Testing
- Preventive Therapies
- Participatory Medicine

AgeTech

- NeuroTech
- Cognitive Enhancement
- Smart Homes
- NextGen Mobile Apps for the Elderly
- Continuing Education
- Entertainment for the Elderly

Longevity WealthTech

- Financial Planning
- Asset Management
- Micro-Investments
- Digital Brokers
- AI-Driven Assistants
- Long-Term Securities

Longevity Finance

- Longevity Index Fund
- Longevity Hedge Fund
- Longevity Stock Exchange
- AgeTech Bank
- Longevity Derivatives
- Longevity Investment Bank

Longevity Governance

- Pension Plans
- National Healthcare Budgets
- Longevity Development Strategies
- Elderly Care Programs
- National Insurance
- Elderly Education

Longevity Financial Industry Framework

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InsurTech

- HALE/QALE-Based Insurance
- AI-Driven Insurance Premium Calculation
- NextGen Mobile Apps
- Healthy Lifestyle Bonuses
- Big Data Actuarial Models
- Biological Age Estimation

WealthTech

- Robo-Retirement
- Digital Brokers
- Micro-Investments
- Annuities
- Long-Term Securities
- AI-Driven Advisors

Longevity and Asset Management

- Novel Retirement Plans
- Portfolio Management
- FinTech for the Elderly
- NextGen Mobile Apps for the Elderly
- Financial Planning
- De-Risking

Novel Financial System

- Longevity Index Fund
- Longevity Hedge Fund
- Strategies Diversification
- AgeTech Bank
- Longevity Derivatives
- Pension Planning

Top Longevity Companies

Regenerative Medicine

Ascentage Pharma · mesoblast · CYFUSE · Pluristem · advancells · 鑫品生醫 VectoriteBiomedical

P4 Medicine

BGI 华大 · FRONTEO · 微芯生物 CHIPSCREEN · GENETRON 泛生子 · BeiGene

Biomarkers for Longevity

DEEP LONGEVITY · INSILICO MEDICINE · NUCLEIX · ANOROAD 安诺优达

Geroscience

DEEP LONGEVITY · Creative Thinking Labs

AgeTech

妙手医生 · EarlySense · 弘晖资本 HighLight Capital · iXensor · fine

AI for Longevity

YOUTH · DEEP LONGEVITY · INSILICO MEDICINE · cxagroup · sight

FemTech

Bonzun

Longevity NeuroTech

sosei HEPTARES · TauRx Pharmaceuticals · saluda MEDICAL · Actinogen Medical

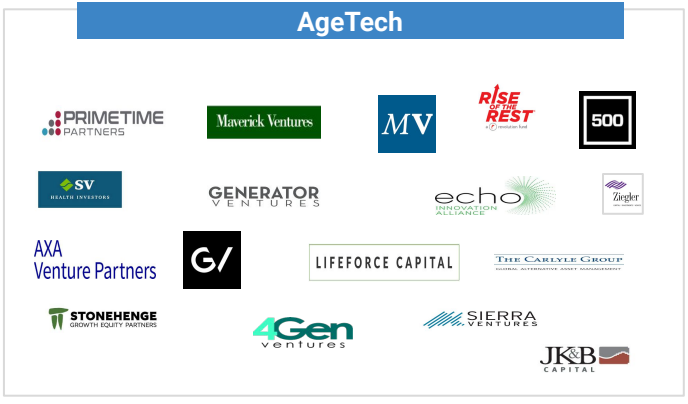
Top Longevity Venture Firms Landscape

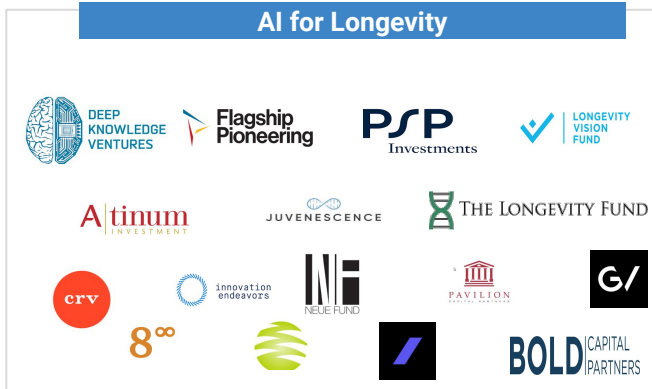
Regenerative Medicine

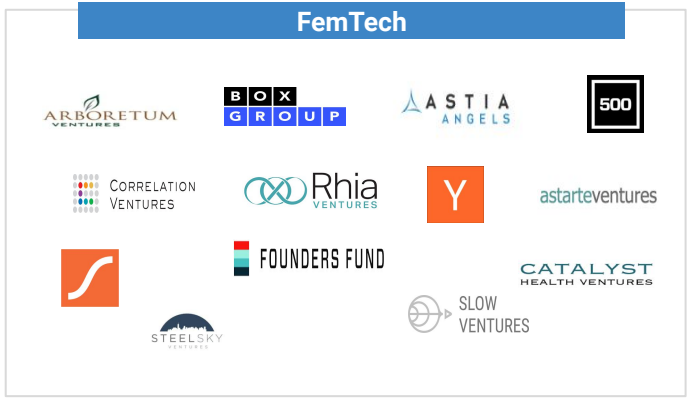
Geroscience

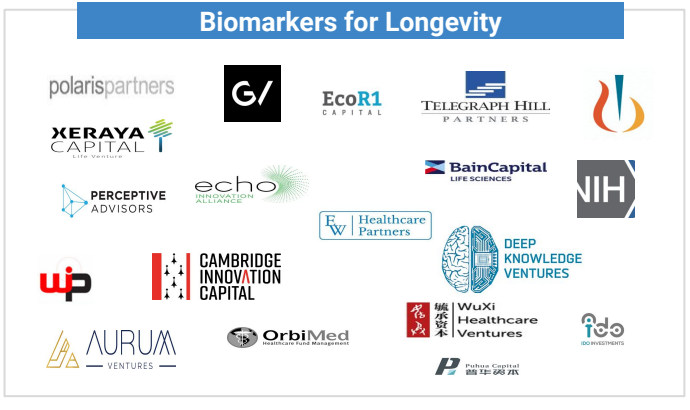
P4 Medicine

Top Longevity Venture Firms Landscape

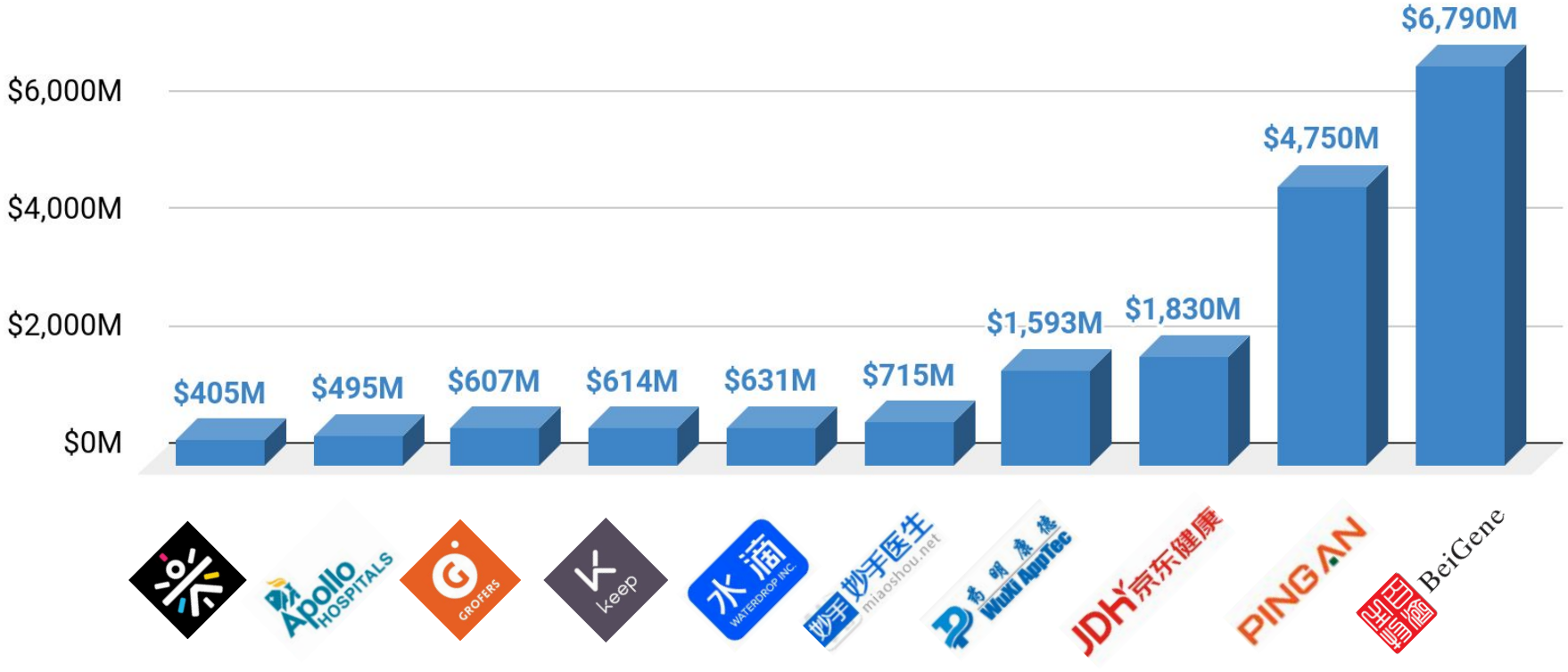








Top-10 Longevity Companies by Total Investments in 2020



This chart represents the leaders in raising investments in Asia. Bei Gene — a China-based company, that is developing molecularly targeted cancer treatment, is an absolute leader of the list. With the last successful funding in 2019 and 2020 with a cumulative amount of $4.8B, the company expanded its production facilities and moved to second place Ping An — a large life insurance player on the Asia market.

50 Leading Companies in Longevity Sector

1	Alterity Therapeutics
2	AnchorDx
3	Annoroad
4	Ascentage Pharma
5	Baidu
6	BeiGene
7	Beijing Gene+ Technology
8	BiolineRx
9	CXA Group
10	Deep Longevity
11	DocsApp
12	Doctor Anywhere
13	EarlySense
14	Eye-Q
15	GenesisCare
16	Genetron Health
17	GenomiCare Biotechnology
18	Global Kinetics Corporation
19	Holmusk
20	iXensor
21	Lucence
22	Medibio
23	MediBuddy
24	Medwell Ventures
25	mfine
26	Miaoshou Doctor
27	Motherhood India
28	Nanovision Technology
29	OrigiMed
30	Owlytics Healthcare

50 Leading Companies in Longevity Sector

32	PharmEasy
33	PhiSkin
34	Phosphagenics
35	Ping An
36	Practo
37	Protalix BioTherapeutics
38	Qiagen Suzhou Translational Medicine
39	Quyi Network
40	Sight Diagnostics
41	Sunshine Insurance Group
42	TopGene
43	Tynorindia
44	Vision Medicals
45	Walvax Biotechnology
46	Waterdrop
47	Wisr
48	WuXi AppTec
49	YAP
49	Yingsheng Biology
50	Zhangshang Tangyi

50 Leading Investors in Longevity Sector

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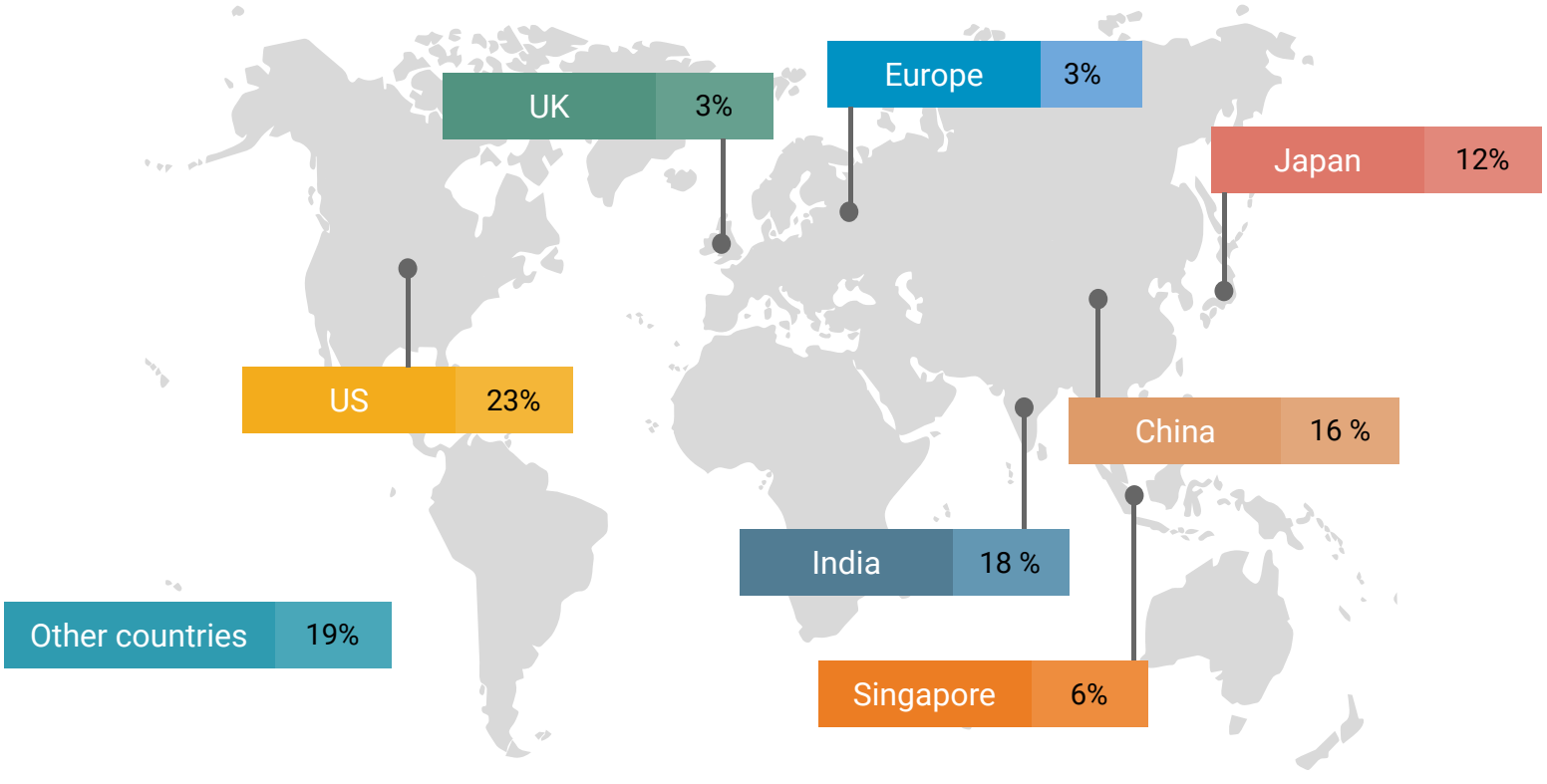
1929 Investors: Regional Proportion



50 Leading Investors in Longevity Sector

1	500 Startups
2	Accel
3	Aflac Corporate Ventures
4	ARCH Venture Partners
5	Atlas Venture
6	Bessemer Venture Partners
7	BOLD Capital Partners
8	Deep Knowledge Ventures
9	EASME - EU Executive Agency for SMEs
10	Eight Roads Ventures
11	F-Prime Capital
12	Formic Ventures
13	GGV Capital
14	Global Brain Corporation
15	Goldman Sachs
16	Heritas Capital Management
17	Highlight Capital
18	IDG Capital
19	JAFCO Japan
20	Kleiner Perkins
21	Legend Capital
22	Legend Star
23	Longevity Vision Fund
24	MassChallenge
25	Matrix Partners China
26	Mizuho Capital
27	New Enterprise Associates
28	Northern Light Venture Capital
29	Openspace Ventures
30	OrbiMed

50 Leading Investors in Longevity Sector

31	Oriza Seed Capital (Oriza Yuandian)
32	Pitango Venture Capital
33	Qiming Venture Partners
34	Sequoia Capital
35	Sequoia Capital China
36	Sequoia Capital India
37	Shenzhen Capital Group
38	SIG China (SIG Asia Investments)
39	Singtel Innov8
40	SMBC Venture Capital
41	Techstars
42	Temasek Holdings
43	Tencent Holdings
44	Venrock
45	Vivo Capital
46	Warburg Pincus
47	WONIK Investment Partners
48	Y Combinator
49	YuanMing Capital
50	ZhenFund

Comparison of Longevity Investment Funds
Funding Round Focus / Company Stage Focus

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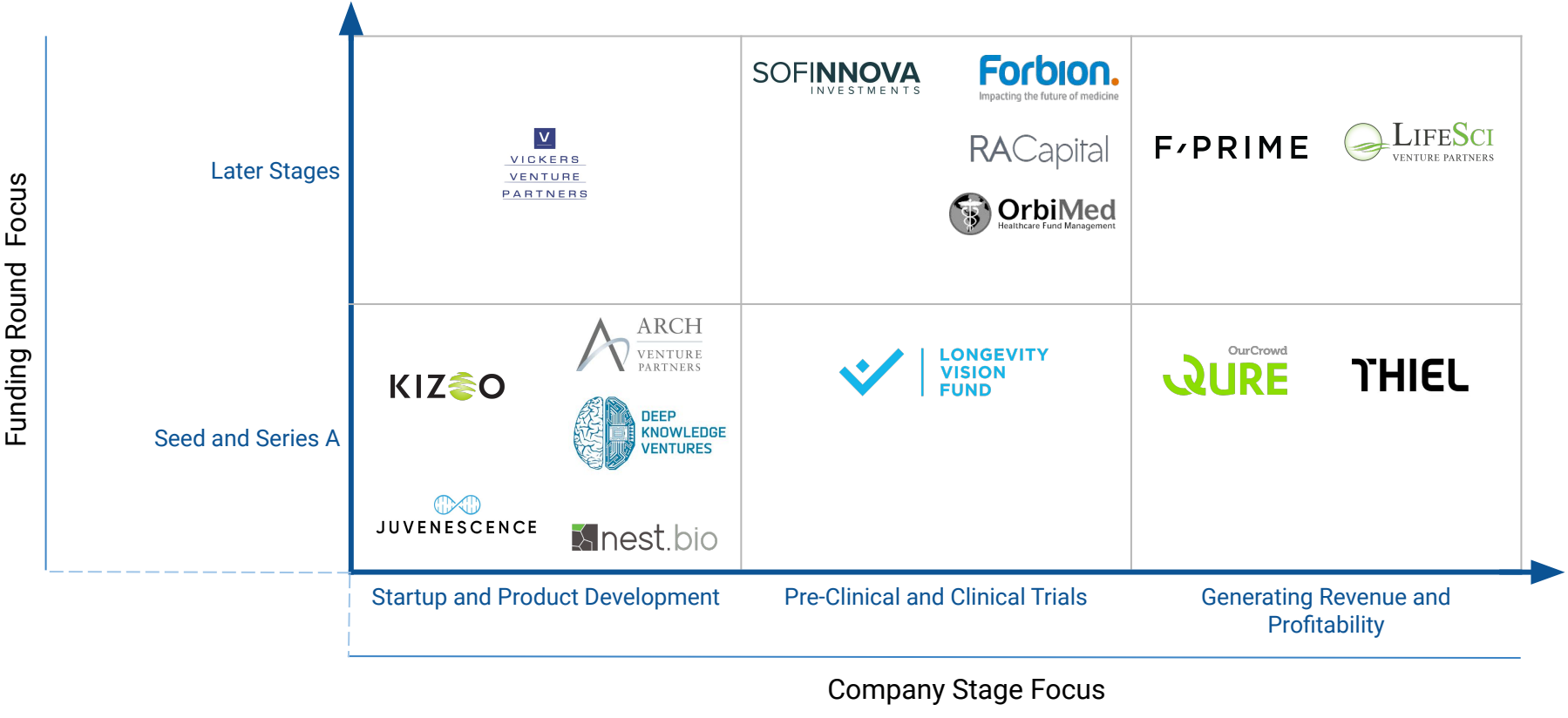

Comparison of Longevity Investment Funds
Research Focus / Investment Portfolio Focus

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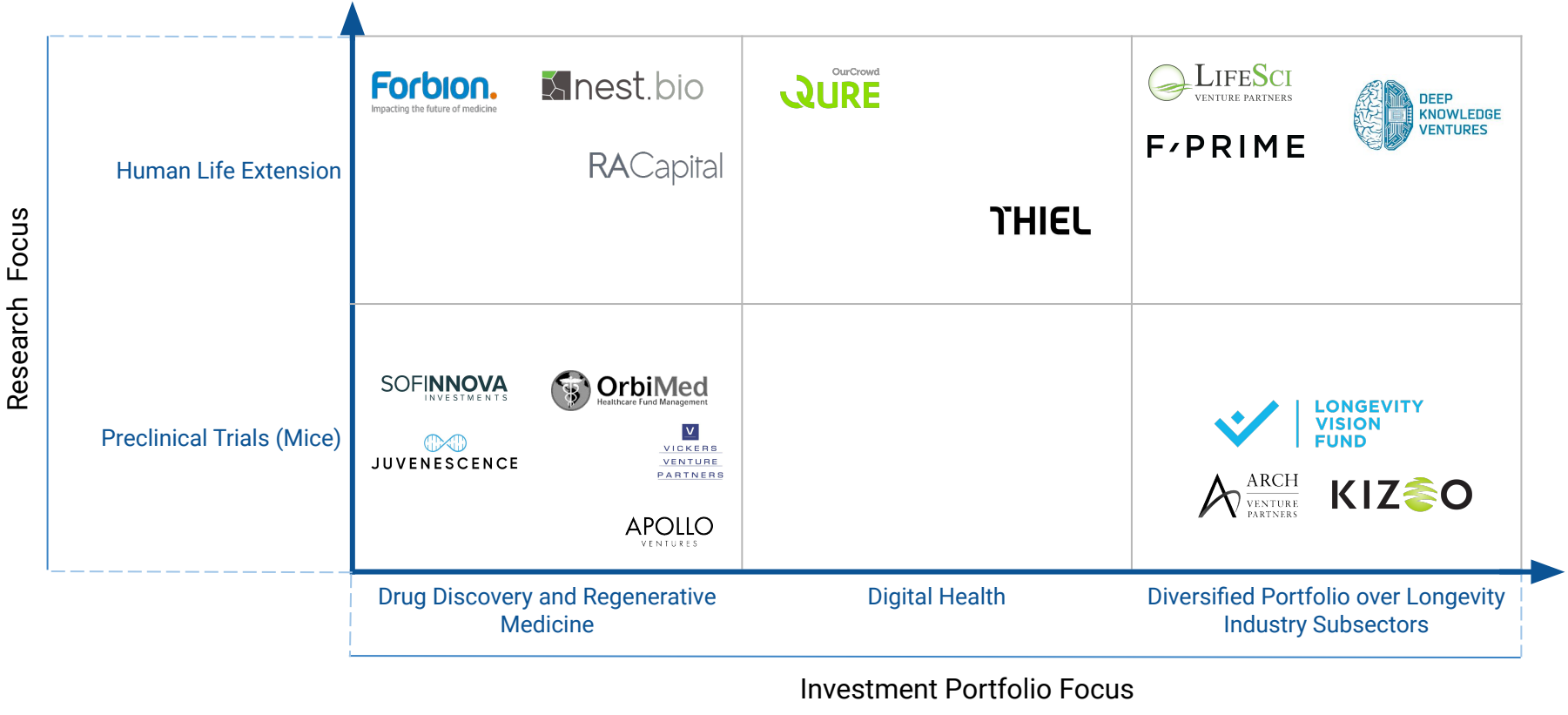

Comparison of Longevity Investment Funds
Investment Specialization / Investment Approach

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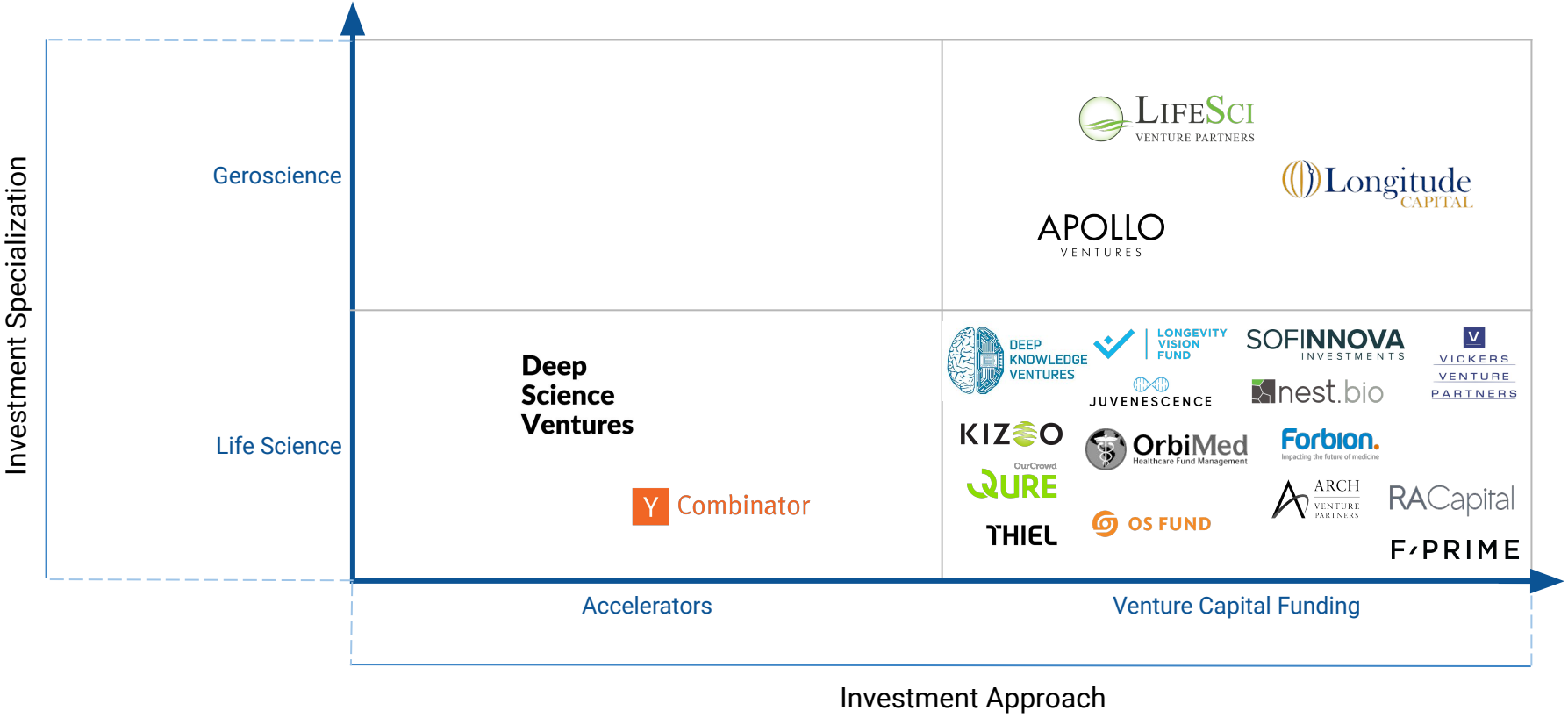

Comparison of Longevity Investment Funds
Number of Investments / Geographical Distribution of Assets

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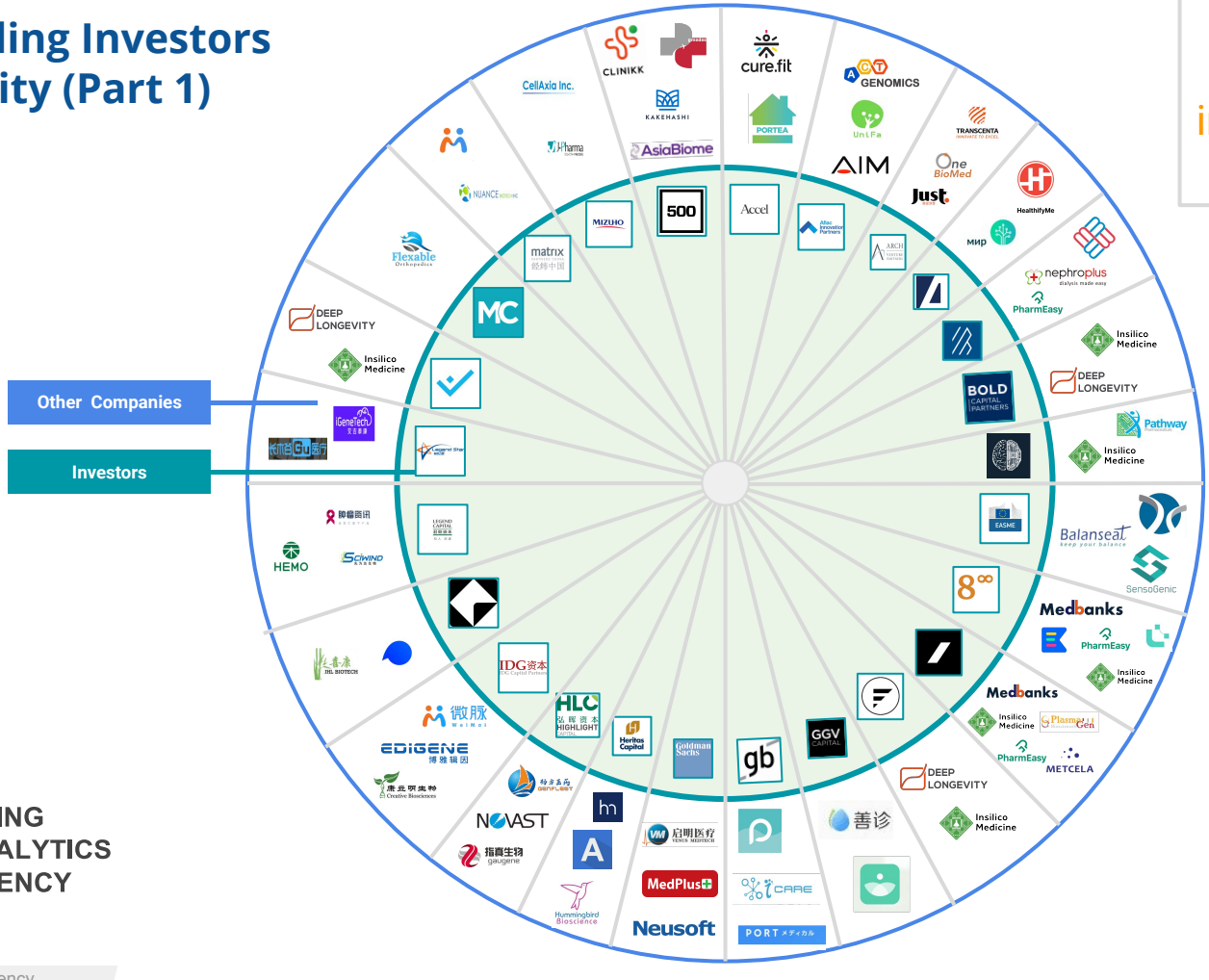
50 Leading Investors Longevity (Part 1)

Portfolios of leading biotech investors include startups from the list of Top-50



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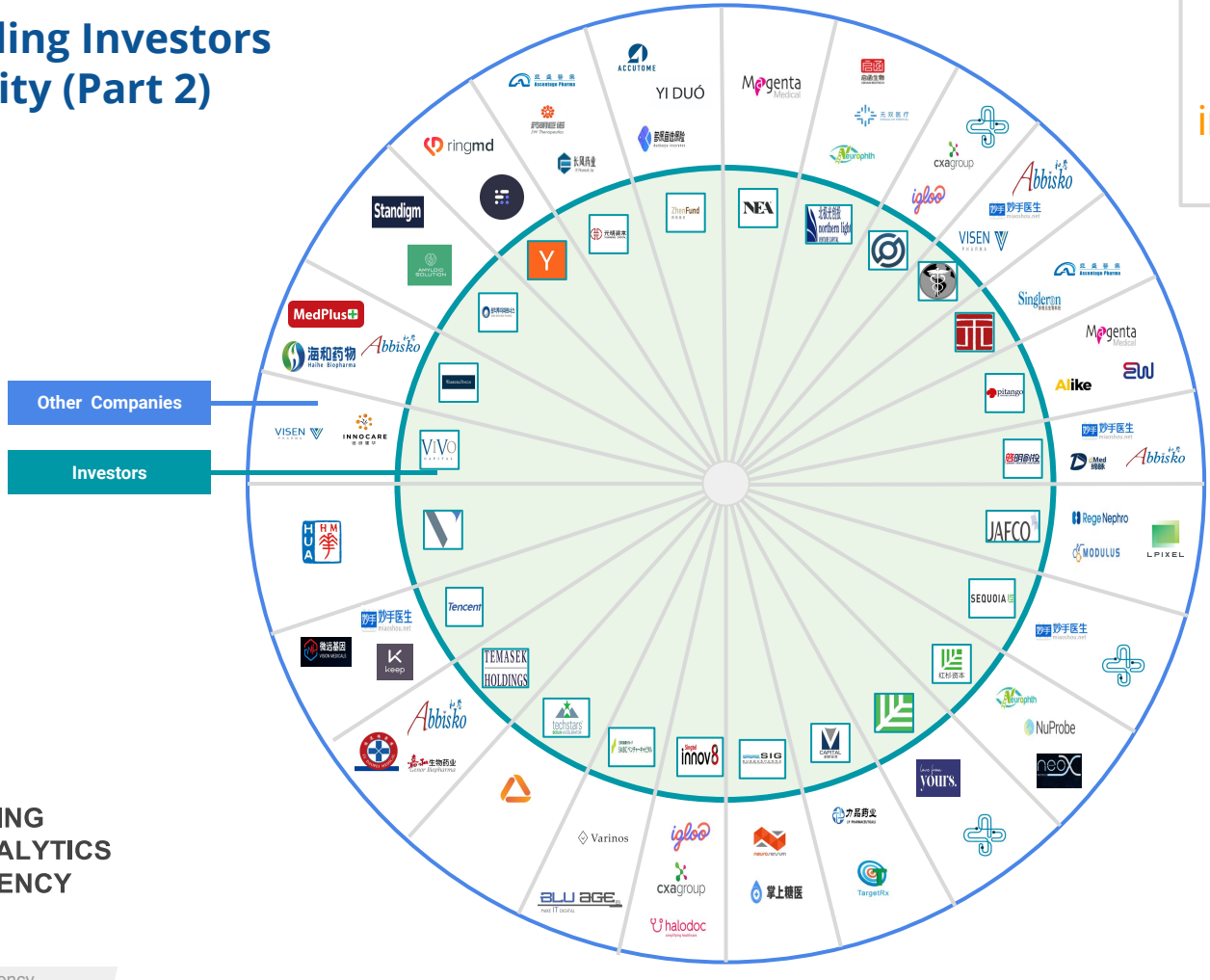
50 Leading Investors Longevity (Part 2)

Portfolios of leading biotech investors include startups from the list of Top-50



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Longevity Industry Market Timeline

The first approaches — 2013-2015

- The first scalable approaches for longevity biomedicine and biomarkers of ageing were developed and several industry players with forward-thinking executives started launching pilot collaborations and making small investments.
- However, only few market players believed in anti-ageing technologies.

Criticism — 2016-2017

- Many pilot projects failed due to the lack of scientific validation and immaturity of the technologies, creating a lot of criticism towards the whole industry.
- Since then the race for the acquisition of the longevity startups began.
- Testing of the technology began.

Industry development — 2018

- Capitalization of the industry was continuously growing.
- Many bets of early investors appeared to be justified.
- Large financial institutions, as well as government agencies, started to express interest in the longevity industry.

Transition from quantity to quality — 2019

- It was an important milestone in transitioning from the quantity of longevity startups,, investments, and M&As to qualitative gains — significant number of practical validations of previously conducted research appeared during this year.
- Competition for the most successful pharma AI companies increased drastically.

Intensive competition — 2020-2021

- Most developed longevity startups are becoming mature companies, large institutional investors are being attracted to the industry, full-fledged longevity infrastructure is being developed.
- Intensive cooperation of longevity companies with corporations, banks, and governments begins.
- Competition among advanced longevity companies booms.

Conclusions

I. Most of longevity investment funds invest in drug discovery and depend on the success of clinical trials

Longevity investment funds follow strategy each other investing in drug discovery and AI pharma companies. Investors are highly exposed to drug failure risk because most of the portfolio drug discovery companies specialize in animal clinical trials. Animal models have limited concordance with human pathology. A molecule that extends healthy lifespan in one species often extends lifespan in other species. To minimize the risk of failed clinical trials and increase the probability of successful commercialization of treatment researchers should determine the effects of the drug on the human body, assess the dose and safety of the drug, and obtain a safe and optimal dose that is likely to be effective for the proposed indication.

II. Lack of portfolio diversification over Longevity industry subsectors

Although venture funds by definition are supposed to prioritize investments into the most disruptive technologies and startups, in reality, most of them prefer to specifically avoid DeepTech sectors or to enter investment rounds at more later stages. **Longitude Capital, F-Prime Capital** and **LifeSci Venture Partners** show enough diversified investment portfolio both by longevity subsectors and by the level of companies maturity, investing into AgeTech, Drug Discovery, and P4 Medicine projects at different funding stages.

III. Lack of effective de-risking investment strategies in terms of “time diversification” and company stage

Most of chosen longevity funds (KIZOO, Apollo Ventures, Juvenescence) are early-stage investors, their investments associate with critical investment risks. They understand that building a new business takes time and ongoing support, so they typically expect to make multiple investments in a single company as it develops. The challenge is to design de-risking strategy that can cost-effectively catalyze private investment and deliver a successful outcome of every portfolio project.

IV. The Longevity industry will inevitably exhibit growth, especially in Asia

It is beneficial for investors, as it accelerates their access to biomedical technology and life extension. It is a great benefit to humanity, creating the products and services that will transport us all to a new era of long, comfortable, and productive lives. Asia is a promising region in the improvement of biomedical technologies, on the one hand, and increasing of potential customer base, on the second hand.

Longevity Publicly Traded Companies

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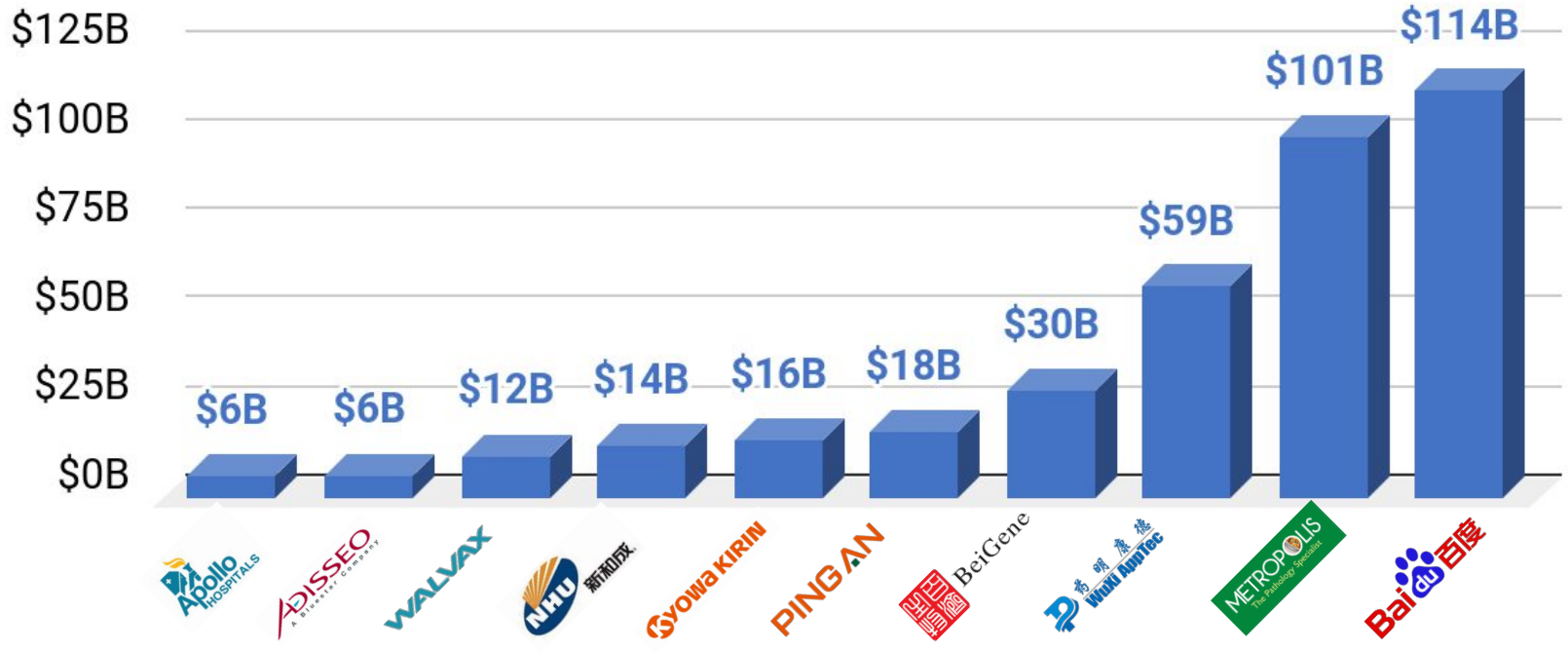
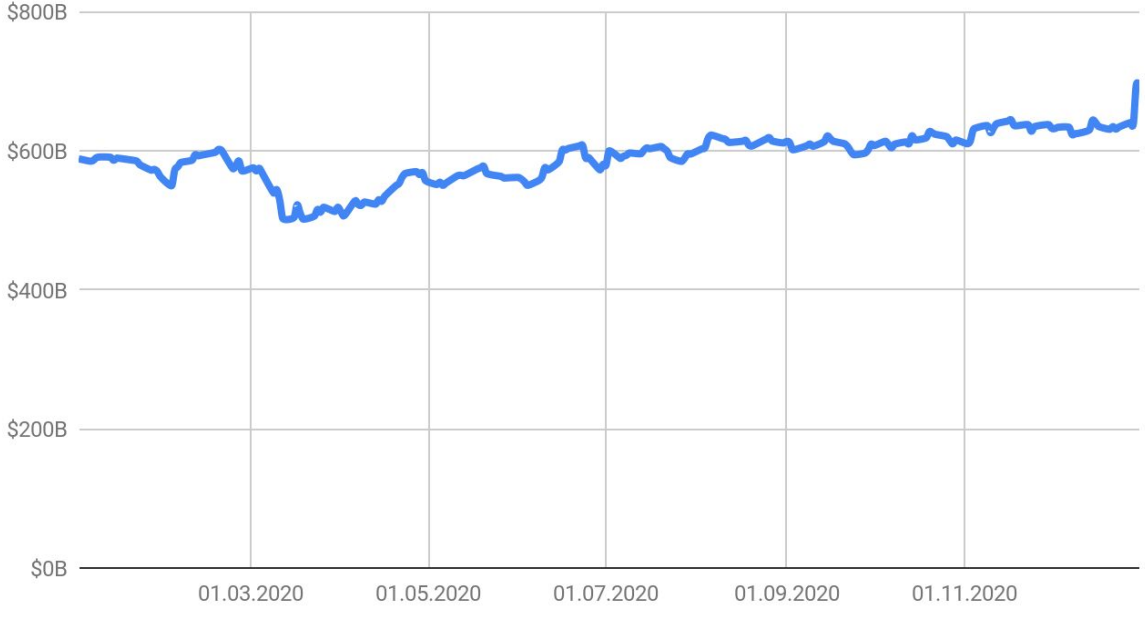
Top-10 Public Asian Companies Involved in the Longevity Industry by Market Capitalization in 2020



The chart represents the top 10 public companies operating in the Longevity sector in Asia. Most of the companies, such as Baidu, BeiGene, and WuXi AppTec, are focused on pharmaceutical and biotechnology. Otherwise, there are FinTech companies in the top tier such as Ping An. Large gaps in the market capitalizations between Asian companies in the Longevity Industry explained by rapid investment activity in the region.

Longevity Publicly Traded Companies in Asia

Cumulative capitalization dynamics, 2020



Recovering after the pandemic strike, 54 publicly traded companies demonstrate steady growth with **$691B** of cumulative capitalization or **18% growth**.

In 2020, **just 1 company** in Asia announced closing of IPO — **Genetron Health**, which is one of the leading precision medicine companies with expertise in cancer treatment.

The largest companies by market capitalization are Baidu, Metropolis Healthcare, WuXi AppTec, Bei Gene, Ping An.

Technologically, publicly traded Longevity companies are similar to other companies in the sector (which reached series B or C funding rounds), which means that their market capitalization growth can be an approximation of the dynamics of the whole sector.

Top-20 Publicly Traded Asian Longevity Companies

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China

Zhejiang

AILV
Huzhou, Zhejiang, China

Guangdong

Ping An
Shenzhen, Guangdong, China

Fujian

Amoy Diagnostic
Xiamen, Fujian, China

Jiangsu

EVERISE
Jiangyin, Jiangsu, China

Beijing

BeiGene
Changping, Beijing, China

Genetron Health
Beijing, Beijing, China

iKang Healthcare Group
Beijing, Beijing, China

Australia

Victoria

Medibio
Melbourne, Victoria, Australia

Phosphagenics
Clayton, Victoria, Australia

AdAlta
Bundoora, Victoria, Australia

Western Australia

Botanix Pharmaceuticals
Perth, Western Australia, Australia

New South Wales

Wisr
Sydney, New South Wales, Australia

Prana Biotechnology
Parkville, New South Wales, Australia

Douugh
Sydney, New South Wales, Australia

India

Tamil Nadu

Apollo Hospitals Enterprise
Chennai, Tamil Nadu, India

Gujarat

Zydus Cadila
Ahmedabad, Gujarat, India

Singapore

Central Region

Health Management International
Singapore, Central Region, Singapore

Japan

Tokyo

BASE
Tokyo, Tokyo, Japan

Hokkaido

Ecomott
Sapporo, Hokkaido, Japan

Hong-Kong

Hong-Kong

Regent Pacific Group
Hong-Kong

Acquired

Deep Longevity
Acquired by $4M

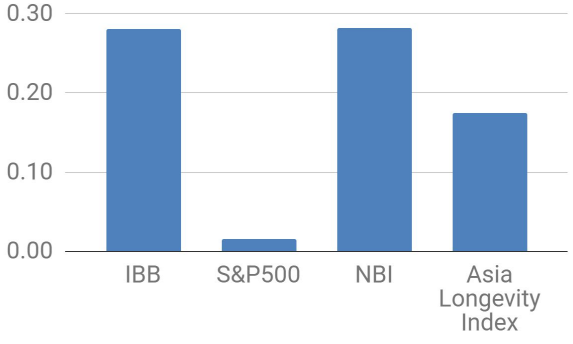
Longevity Asian Market Capitalization

The global longevity economy reached $17 trillion in 2019 and is showing stable growth to achieve $27 trillion in 2026. According to the most conservative estimates, it takes 20% of the global GDP. While the global Longevity Economy is projected to reach $27 trillion in 2026, the Age-Tech segment alone will reach $2.7 trillion by 2025. This would imply a 21% annual growth in the global Age-Tech market. This growth is driven by the general development of the elderly care sector enhanced by advancing IT, FinTech and other digital technologies and solutions.

Longevity corporations market capitalization growth strongly outperforms the market as a whole (represented as S&P500 index), as well as general biotech industry indices (IBB and NBI), although AI in pharma stock market segment is more volatile compared to them (as measured by standard deviation).

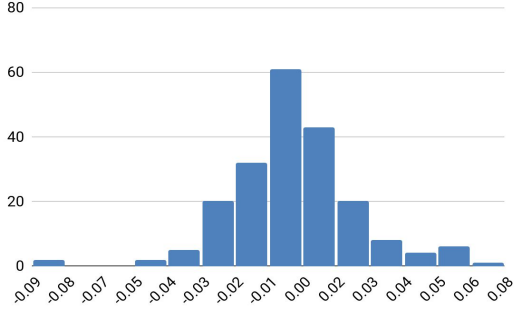
Asian companies are in line with global trends. Average growth is positive and overperforms global tendencies after covid impact on the stock market in March-April 2020 with similar volatility as other stock indexes.

Market capitalization growth

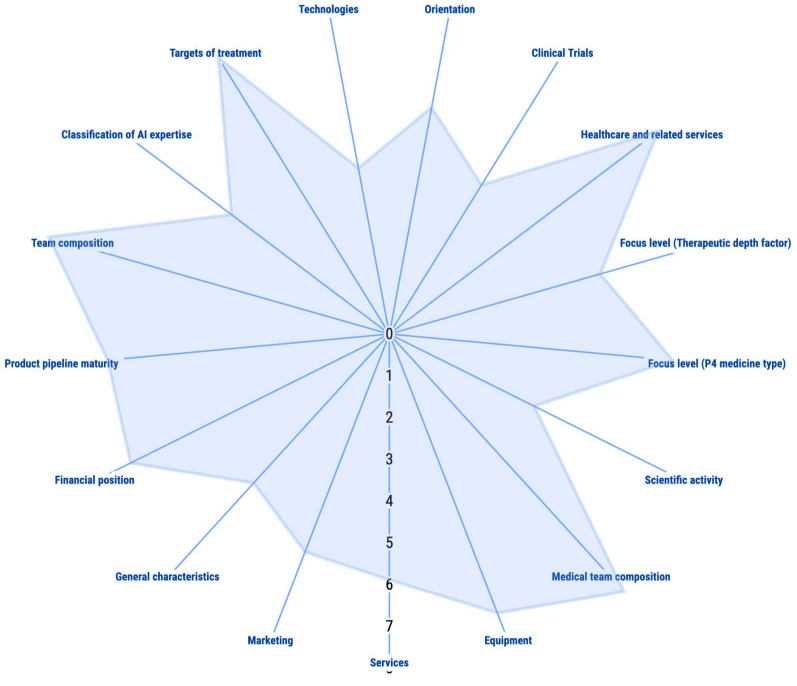


Index	Correlation with AI in Pharma market	Average daily return in 2020	Average daily volatility in 2020	Skewness	Curtosis
Asia Longevity Index	-	0.14	2.19	-0.02	2.48
IBB	0.84	0.12	2.13	-0.15	3.11
S&P500	0.93	0.03	2.31	-0.97	8.56
NBI	0.83	0.12	2.16	-0.19	3.40

Asia Longevity Index stock returns histogram

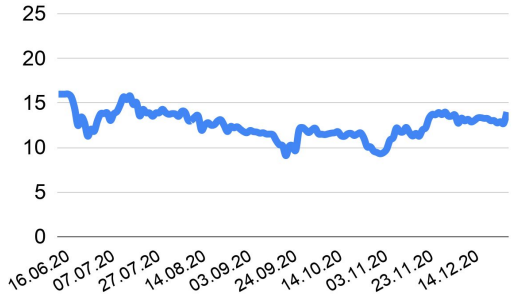


Genetron Health



Genetron Health is a precision oncology company that provides genomic solutions in different areas including early cancer screening, diagnosis, and monitoring as well as biopharmaceutical services.

Stock price

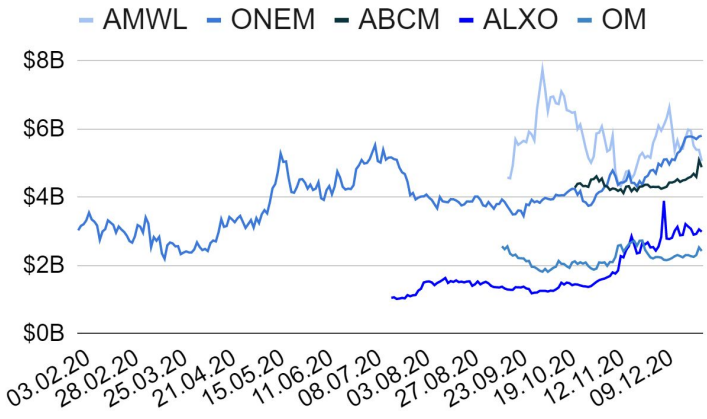


Ticker	Mean daily return	Volatility of daily returns	Growth after IPO	Capitalization (B$)
GTH	0.01	4.81	-0.10	2.06

Biggest Longevity IPOs in 2020

Despite the crisis, all new public companies announced successful closing of the IPO. They show volatile but steady growth, although net income of all corporations remains negative. Most IPOs took place in the USA in the second half. All companies have beta smaller than 1 (although positive) which means that AI in pharma stock prices move in accordance with general market movements, yet the degree of these movements is lower (although volatility as measured by standard deviation can be relatively high).

Capitalization change in 2020, $B



Name	Country	Funding Amount. M$	Investments in 2020 (M$)	IPO Date	Capitalization (M$)	ROA	ROE	Profit margin	Operating margin	EV/EBITDA	Net income
Amwell	USA	1553	1036	17.09.2020	7036	N/A	N/A	-85.5%	-87.4%	-30.1	-197
One Medical	USA	777	245	30.01.2020	6152	-7.5%	-26.2%	-29.8%	-26.1%	-93.3	-100
Abcam	UK	492	157	21.10.2020	5372	4.4%	2.8%	4.8%	0	121.9	13
ALX Oncology	USA	328	267	16.07.2020	3092	N/A	N/A	0	-1401.7%	-84.3	-35
Outset Medical	USA	689	367	14.09.2020	2094	N/A	N/A	-273.8%	-262.6%	-17.3	-109

Key Takeaways

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Major Observations for 2020: **Key Business Takeaways**

1. As a result of populations aging and the upcoming Silver Tsunami, **interest in the Longevity industry has been growing.** Currently, the **size of the whole market** is estimated to amount to **$34 trillion.** The main players in the market are **national healthcare companies** and **longevity financial companies.** Longevity biomedicine companies, which take the smaller market share, have been the main focus of longevity venture investments.
2. Asia market is less developed than American or European but presents higher growth rates of both private and public companies.
3. In the regional proportion, **India is a leader** in the Asian longevity industry. **Together with China and Israel**, they **share 75%** of all Asian longevity companies.
4. Despite the smaller number of companies, **China had the largest total amount of investments — $20 billion.**
5. The Phenomenon of the Silver Tsunami poses high risks for financial institutions, such as pension funds, insurance companies, etc. Two scenarios are possible: optimistic and pessimistic. In a positive case, most of the institutions will adapt to the new reality and transform their business models. In the negative case, they will not manage to adapt to aging populations' challenges due to a lack of will and technological capability.
6. **COVID-19 pandemic appears to be a positive catalyst for the Longevity Industry growth bringing more than 30% of growth compared to the previous year, worldwide.**
7. One of the **largest deals** of 2020 was made by **Bei Gene**. Bei Gene, a NASDAQ-listed Chinese company, announced the pricing of a registered direct offering and raised **$2.1 billion** of fundings.

Major Observations for 2020: **Key Financial and Investment Takeaways**

1. Due to global COVID19 pandemics, **the overall biotech and longevity sectors are on the rise**. During 2020 we have observed multiple medium and large funding rounds for biotech and longevity companies at the global market, and small and medium rounds in Asia.

2. More than 500 successful **longevity companies closed large-sum late-stage venture capital rounds (B, C, and D)** over 2019-2020 and several of them are now developing clinical-stage drug candidates. We expect some of them to go public in 2021-2022.

3. 2020 was marked by **19 IPOs** in the Longevity sector, **one of which** was made by China-based company **Genetron Health**.

4. The year 2020 is marked by **a general "biotech IPO boom"**, catalyzed in part by the coronavirus pandemics — directly and indirectly, impacting the longevity industry enormously.

5. When some of the companies complete IPOs in the nearest future, **it will attract a significant number of non-biotech investors to enter the Longevity sector**.

6. Despite the crisis, publicly traded companies in Asia present steady growth with reached $691B of cumulative capitalization or an 18% growth rate in 2020,

7. At present, VC funds categorize longevity companies according to seed, series A, series B, etc., the stage of a company's development moving forward will become less important while **TRL levels and the level of the technology accordingly to other tangible metrics will become much more important** because they will provide data-driven analysis allowing to perform certain mathematical calculations of how valuable a portfolio company is.

Key Technology Takeaways

1. Over the recent years, **significant progress has been achieved in aging research** (mainly, animal studies). As a result, longevity has matured to become a complex and multidimensional science. Its diverse technological strands — geroscience, geriatrics, regenerative medicine, precision medicine — are all advancing simultaneously. This serves as a foundation for the global Longevity Industry which will probably be humanity's largest industry by the year 2040.

2. **Artificial intelligence-driven biomedical research and development efforts are now getting technologically mature enough to become instrumental and practical in the aging research.** The key power of AI lies in its ability to accelerate real-world implementations of longevity science, such as drug discovery, biomarkers discovery, new longevity genes identification, and bring personalized medicine to the clinic based on a patient's records.

3. Currently, main focus of global public health efforts to increase human healthspan lies in **treating and prevention of age-related diseases**, such as cancer, neurodegeneration and cardiovascular diseases.

Obstacles That Still Remain

1. Application of discoveries in animal aging to humans requires **better biomarkers** of disease risk and responses to interventions, and **increased use of electronic health records, biobank resources and cohort studies**. Absence of validated biomarkers of risk of age-related diseases poses challenges for development of anti-aging drugs. There is still no consensus on biomarkers of biological age.

2. **The ability of AI to make accurate predictions depends on data availability.** A major concern in the application of AI technologies within healthcare is related to the acquisition, generation, and use of health data. Regulatory efforts are needed to ensure proper flow and use of healthcare records.

3. There is a **shortage of resources allocated to develop public health programs** to reduce the risk of age-related diseases. Many health promotion strategies lack scientific and clinical evidence of their efficacy.

4. It is crucial to shift focus from treating individual diseases more on developing medical interventions that are able to **extend lifespan generally**.

Longevity in the Global Context

1. **Driven by declines in fertility and improvements in health and longevity, populations are aging globally.** The world is likely to have 1 billion older people by year 2030. The most rapid increases in the proportion of people aged 65 and older are taking place in developing countries, with the most dramatic changes having occurred in East Asia, where life expectancy at birth increased from less than 45 years in 1950 to more than 72 years today. In the nearest future, the number of older population is expected to grow fastest in Northern Africa. In contrast, the projected increase is relatively small in Australia, New Zealand, Europe and Northern America.

2. **Among the developed countries, Hong Kong and Japan have the highest level of life expectancy at birth — 84.7 and 84.5 years, respectively.** Despite Hong Kong is spending less on both health and social care comparing to other developed economies, it demonstrates superior performance in social indicators — adolescent birth rate, youth involvement in education or employment, homicide rate and incarceration rate — and health indicators — life expectancy and infant mortality rate, which may be considered as key longevity-related factors.

3. **United States is leading longevity industry** in terms of investments and number of aging research institutions (almost 50% of the total number worldwide). The majority of leading longevity companies are based in the US. This longevity progressiveness contrasts with health disparities related to large socioeconomic differences across individuals in the United States.

4. **Among the EU countries**, Italy (22.8 %), Greece (22.0 %), Portugal and Finland (both 21.8 %) had the highest shares of persons aged 65 or older in the total population in 2019, while Ireland (14.1 %) and Luxembourg (14.4 %) had the lowest shares. In 2060, the share of people aged 65 and over will rise from to 29% of the population.

5. **The shifting age demography is influencing every aspect of social life**, from health system pressures to economic impact on public finances. It presents opportunities to individuals and society, but it also presents challenges which have to be addressed in government policies. In many countries, the redesign of pension systems has become a priority.

About Aging Analytics Agency

Aging Analytics Agency is primarily interested in strategic collaboration with international corporations, organisations and governments of progressive countries on projects and initiatives related to Longevity.

Aging Analytics Agency is open to engage with strategic clients via a variety of approaches, including:

- Conducting customised case studies, research and analytics for internal (organizational) use, tailored to the precise needs of specific clients;
- Producing open-access analytical reports;
- Offering customised analysis using specialised interactive industry and technology databases and IT-platforms.

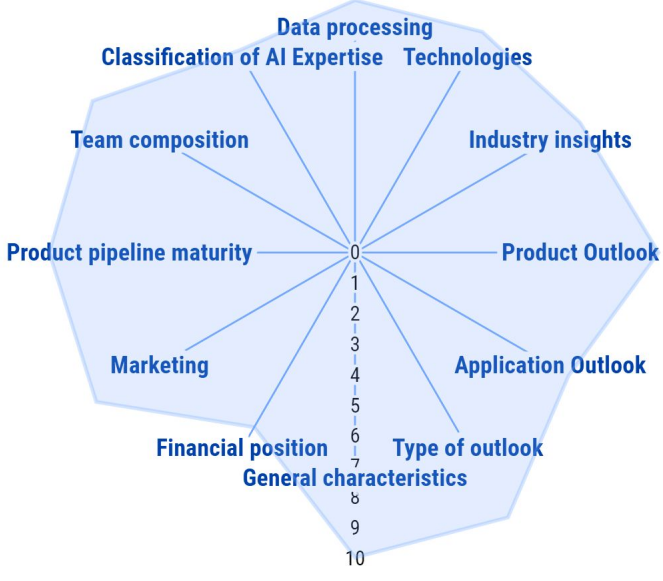
In certain specific cases, if it fits our interests, Aging Analytics Agency is open to co-sponsoring research and analytics for the production of both internal and openly-access industry reports and special case studies for a variety of governmental, international and corporate clients on the topics of Longevity, the Longevity Financial Industry, Longevity Policy and Governance, and the development and execution of full-integrated National Healthy Longevity Development Plans tuned to the specifics of national governments and economies.

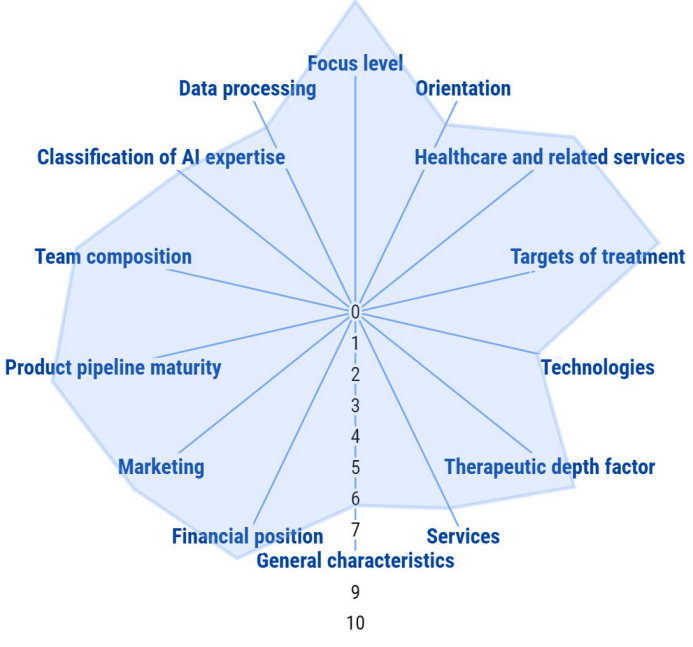
www.aginganalytics.com info@aginganalytics.com

Multiparametric Assessment Analysis (Using Big Data Analytics Platform)

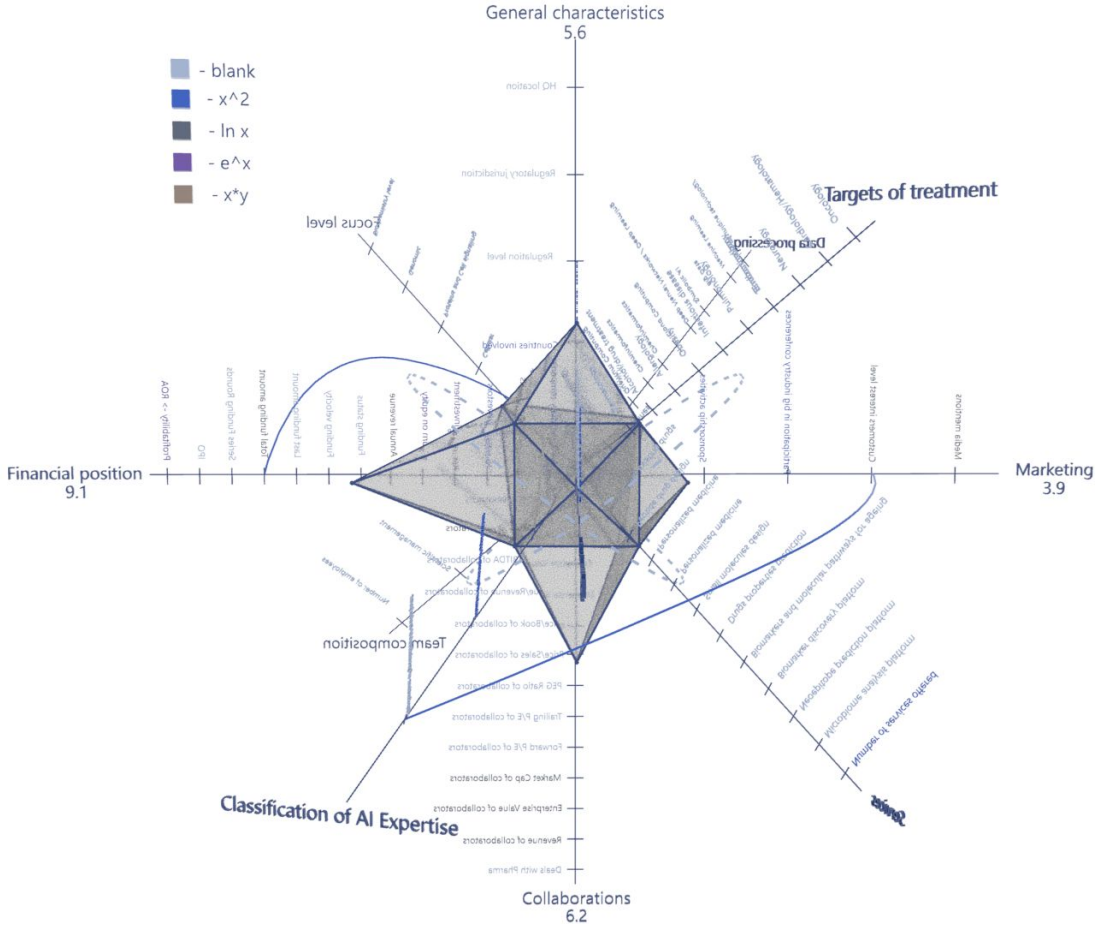
Aging Analytics Agency offers state-of-the-art interactive online AI-based **SWOT analysis system** covering 6000+ companies in the industry divided into 12 categories.

The product allows to conduct initial data-driven due diligence of the companies **instantly, automatically, and holistically** by comparing multiple parameters for each company combined in the 12 vectors of business development. The results of the analysis are represented in easily perceived form of 2-dimensional and 3-dimensional radar charts.

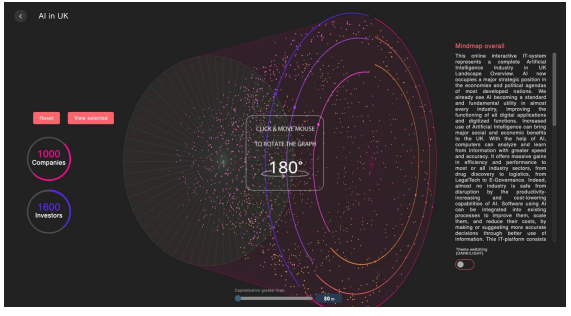


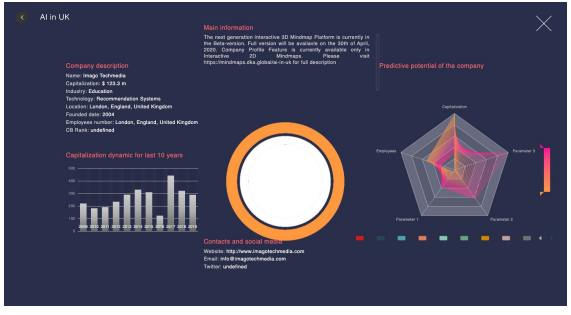


Multiparametric Assessment Analysis (Using Big Data Analytics Platform)



Aging Analytics Agency:
Upcoming Projects and Analytical Tools





3D Visualisation Prototypes

Longevity Investment Big Data Analytics Dashboard

Longevity Investment Big Data Analytics Dashboard

www.aginganalytics.com/longevity-investment-dashboard

Longevity Finance Big Data Analytics Dashboard

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Longevity Finance Big Data Analytics Dashboard

Market Intelligence

Longevity Finance Market Intelligence

- SWOT Analysis
- Interactive Mindmaps
- Market Intelligence

Interactive Mindmaps

View More

Dashboard Parameters

DATA POINTS	PERSONALITIES	CORPORATIONS
100019	2000	1000
STARTUPS	**INDUSTRIES**	**SECTORS**
5000	15	50

SWOT Analysis

View More

Longevity Finance Market Intelligence

- Pre-Subscribe for Beta
- Sponsorship Opporrtunities
- Request Custom Analytics

Search Engine

Longevity Finance Search Engine

- Interactive Database
- Dynamic Network Diagrams
- Competitor Search

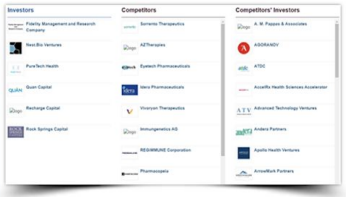
Interactive Database

FinTech | WealthTech | InsurTech

Interactive Network Diagrams

FinTech | WealthTech | InsurTech

Competitor & Investor Search



FinTech | WealthTech | InsurTech

Longevity Finance Search Engine

- Personalities
- Corporations
- Startups
- Investors

Longevity Governance Big Data Analytics Dashboard

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Longevity Governance Big Data Analytics Dashboard

Market Intelligence

Longevity Governance Market Intelligence

- Full Analysis
- Interactive Mindmaps
- SWOT Analysis
- Dynamic Charts

Full Big Data Analysis

View More

Dashboard Parameters

DATA POINTS	PARAMETERS	REGIONS
12000	240	50
LAYERS OF FRAMEWORK	**DYNAMIC CHARTS**	**SWOT ANALYSIS PROFILES**
6	100	50

SWOT Analysis

View More

Longevity Governance Market Intelligence

- Pre-Subscribe for Beta
- COVID-19 Dashboard
- 3D Visualization

Search Engine

Longevity Governance Search Engine

- Benchmarking Charts
- Major Trends
- Practical Recommendations
- Big Data Framework

National Healthy Longevity Interactive MindMaps

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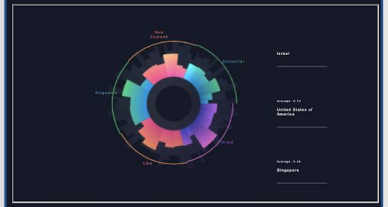
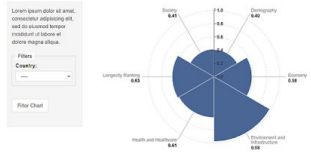
Longevity Progressivness 3D Visualization



Longevity Progressiveness Benchmarking Charts



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Longevity Governance Search Engine

- Health-Adjusted Life Expectancy (HALE) Gap and Life Expectancy
- Health-Adjusted Life Expectancy (HALE) Benchmarking

Artificial Intelligence in Pharma Big Data Analytics Dashboard

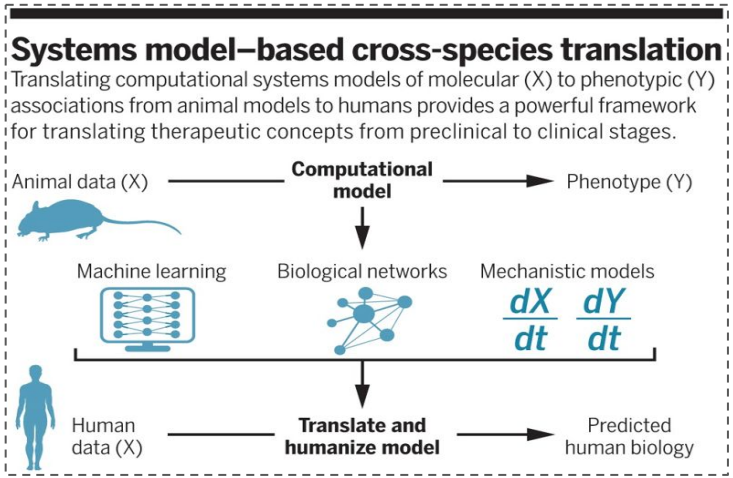
Tangible Metrics to De-Risk Investments in Longevity Startups

Investment decisions practices in the longevity industry can be essentially enhanced through the application of the biomarkers of aging. Concrete and precise metrics of human aging can assist investors in differentiating between overvalued hype-driven startups without any proofs of success in fighting human aging and promising businesses which are producing tangible anti-aging results applicable for humans.

Given the enormous differences between the biology of humans and the biology of common model organisms like mice, combined with the higher degree of biological complexity as it pertains to ageing vs. single diseases, we can expect the clinical translation failure rate in the Longevity Industry to be much higher than the already-enormous failure rate in traditional BioTech.

New approaches to scientific due diligence and the validation of results for Longevity companies are needed to protect against company and industry devaluation. However, there are a number of existing approaches that can be used by investors to de-risk Longevity investments.

The use of biomarkers of aging and longevity constitute the most market-ready and validated means of proving efficacy in humans, and can serve as the basis for demonstrating human-validated results by Longevity companies and startups. A wide array of single biomarkers and panels of biomarkers of Longevity exist in market-ready form, and should be adopted into due-diligence practice by Longevity investors in order to create a more modern, sophisticated and robust method of preliminary validation of therapeutic safety and efficacy.



Besides biomarkers, a number of other modern approaches exist, capable of providing preliminary indications of human validation, which can be used to create a coordinated framework to provide investors with greater confidence in the likelihood of clinical translatability. These include:

- In silico human modeling
- In vitro tests using human cells and tissues
- Human-animal chimeras (e.g., human-mouse chimeras) for safety, toxicity and efficacy testing. This approach is already common in immuno-oncology research, and a wide array of validated approaches can be applied for testing of ageing-focused interventions.
- In vivo administration of sub-therapeutic doses using microfluidic chips (i.e., in vitro “skin-on-a-chip” testing).

Biomarkers of Longevity

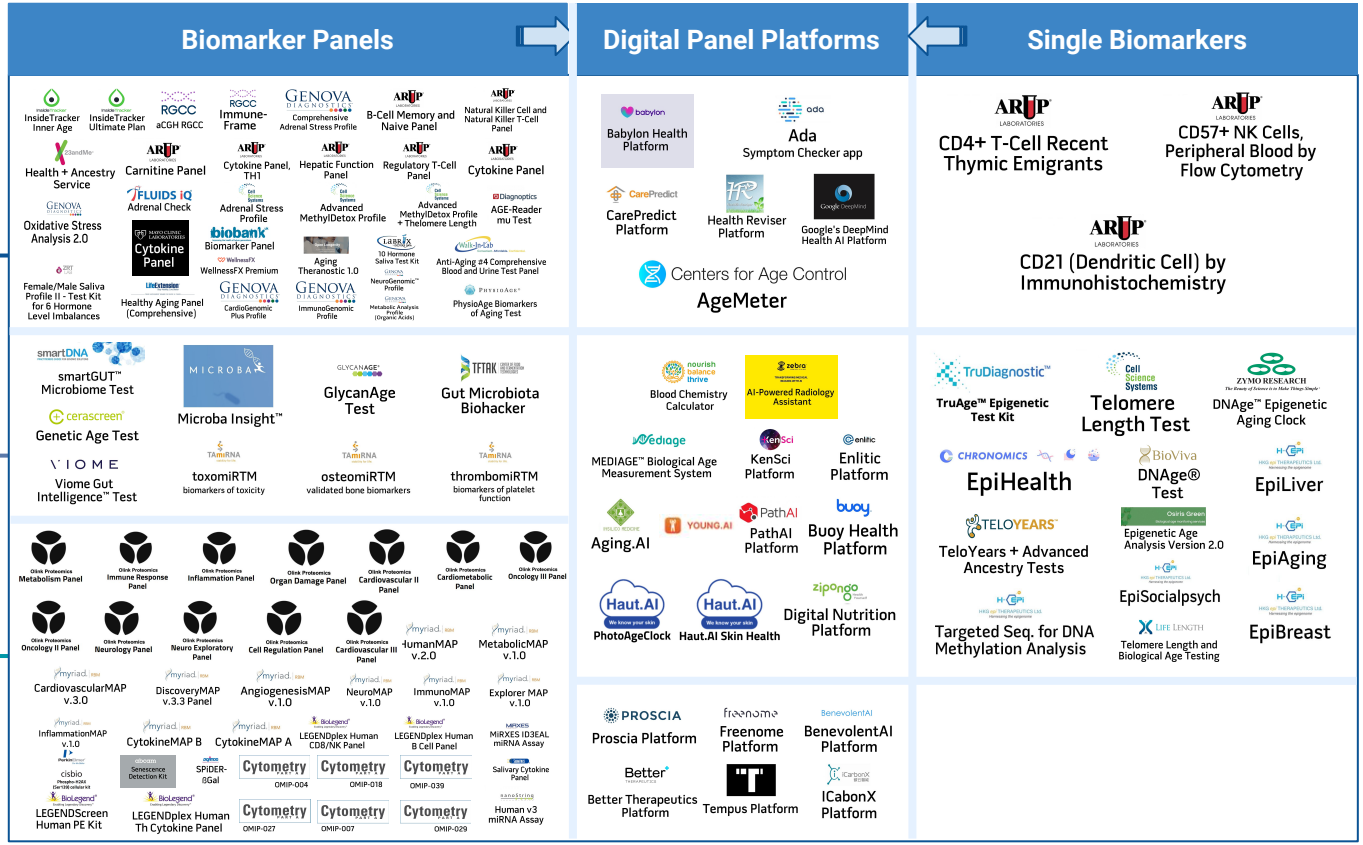
Approved for Clinical Use - 41
Research Use Only - 45
Healthcare-Ready - 33

2nd edition. Selection and Current Status, 2021

Approved for Clinical Use

Healthcare-Ready
(waiting for clinical approval)

Research Use Only



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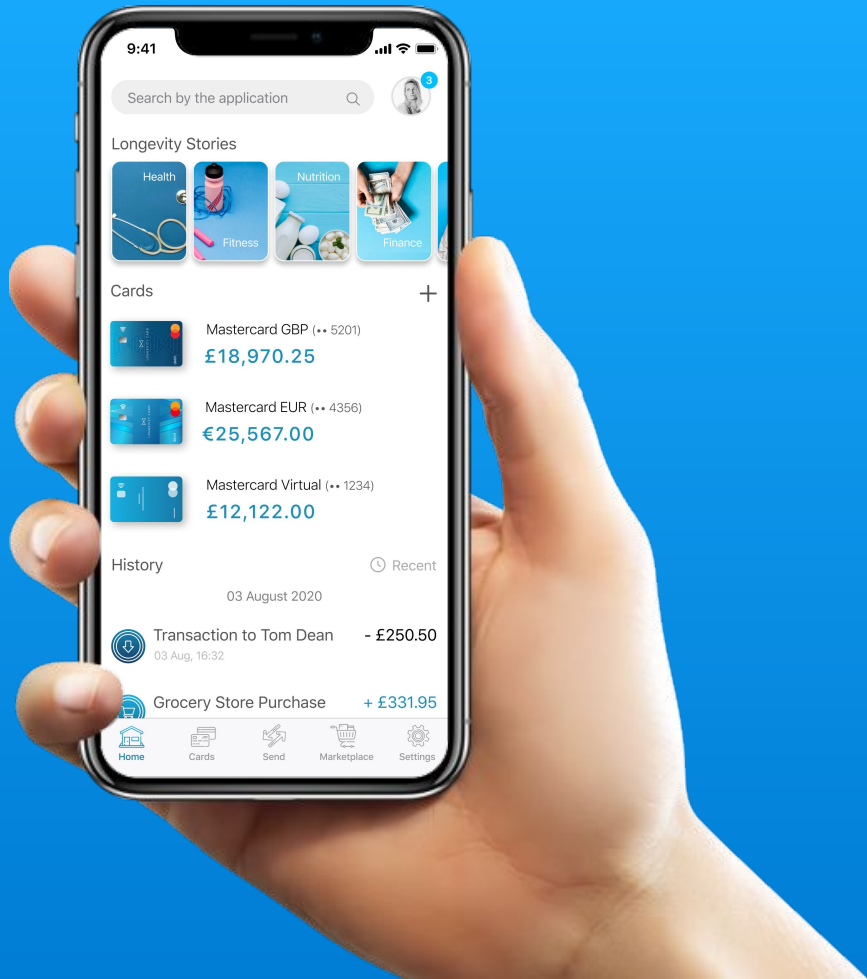
LONGEVITY CARD®

HEALTH IS THE NEW WEALTH



ACCOUNT FEATURES

UK IBAN

MULTI CURRENCY ACCOUNTS

DEBIT CARD

MONEY TRANSFERS

CASH LOAD

LONGEVITY MARKETPLACE

PERKS

FAST SIGN UP

REAL-TIME NOTIFICATIONS

TRAVEL INSURANCE

BUSINESS ACCOUNTS

24/7 SUPPORT

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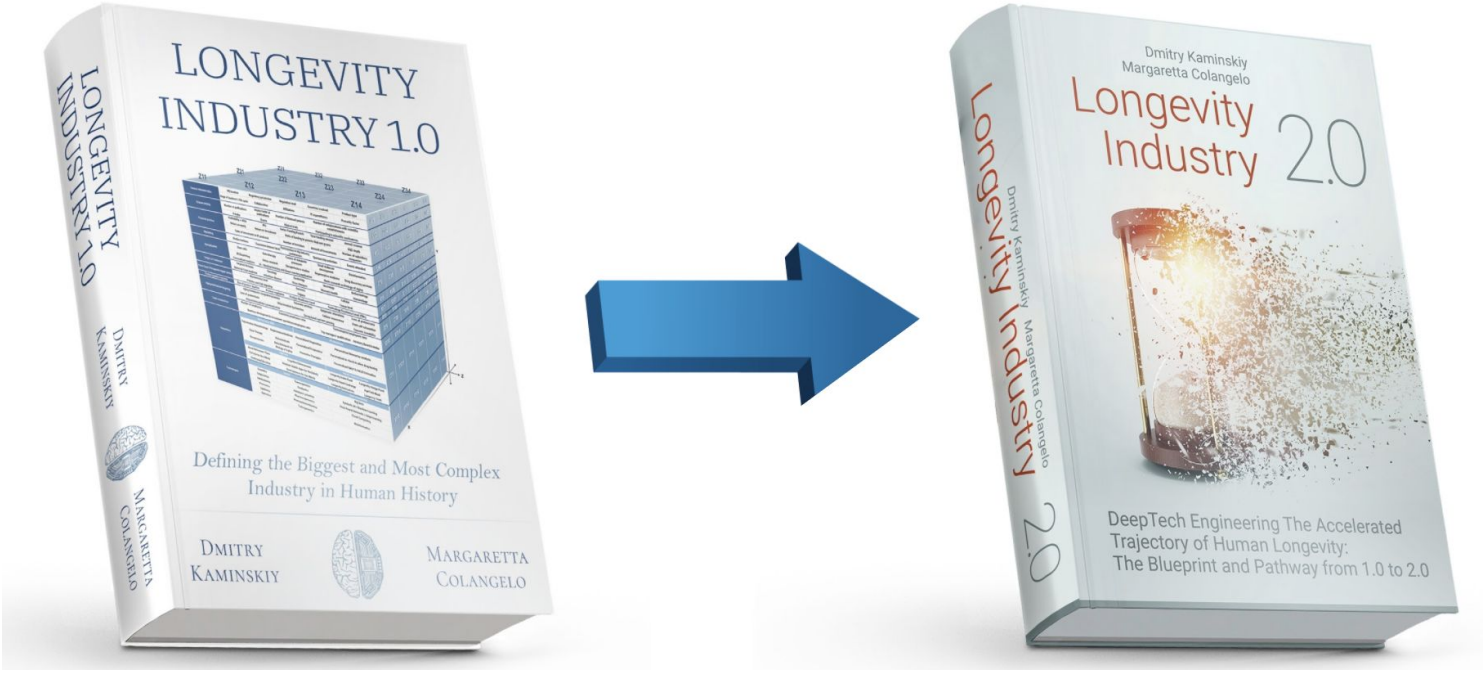

Longevity Industry 1.0
Defining the Biggest and Most Complex Industry in Human History

Longevity Industry 2.0
DeepTech Engineering The Accelerated Trajectory of Human Longevity
The Blueprint and Pathway from 1.0 to 2.0

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