

Life Extension Scenarios

This is the result from the Extrobritannia meeting Sunday 13 May 2007 where we discussed scenario planning methods.

We began by formulating the question we wanted to explore: "How might life extension (LE) be introduced in society, and how would it affect the transhumanist movement?" As a timeframe we choose 30-40 years. There was a distinct spread in opinion about the proper timeframe until workable LE, but this range was in the middle.

We then brainstormed about possible influences, stakeholders, interactions and effects in a society where demographic change and life extension is occurring. This resulted in a large number of concepts, which were clustered into groups and finally turned into rough driving forces. See the mindmap in the Appendix for the brainstorm result.

The initial list of driving forces was:

- Speed of progress
- Kind of intervention
- Cost
- Psychology/sociology
- Belief it is possible
- Research environment
- Opposition groups
- Supporting groups
- International issues
- Crises
- Finance
- Technological singularity

Of these the speed of progress and kind of intervention were seen to be closely linked, and the cost would depend on the kind of intervention. Belief that LE is possible is a strong driver for research, funding, social change enabling longevity and the psychological/sociological effects. Opposition, support, international issues and crises were relatively independent of everything else. The chance of a technological singularity happening before LE was considered, but would likely only happen if development of LE were slow.

In the end we settled for speed of progress and amount of public belief in LE as a possibility as the two main driving forces in the scenarios. This generated four scenarios:

| | LE seen as impossible or hard | LE seen as likely |
|----------------------|-------------------------------|-------------------|
| Fast progress | "Tipping Point" | "Star Trek" |
| Slow progress | "Sinking Feeling" | "Hype" |

Scenarios

Tipping Point

Assumptions

Public perceptions of LE are pessimistic, but research makes a breakthrough. Society is suddenly faced with a dramatic shift it was not prepared for.

Story

While demographic change was a real issue and a major concern in politics, life extension was regarded as unlikely to work. Despite promising initial results and promotion from some groups it had failed to deliver any tangible benefits: the complexity of intervening in metabolism and development was high. Instead normal biomedical progress was occurring, producing enough challenges to policymakers in terms of demographics, biopolitics and ethical challenges.

In 2029-2030 a series of research papers appeared demonstrating successful interventions against ageing in rats and soon after monkeys. Over the years researchers had solved each of the sub-problems of ageing. Burgeoning computer power allowed complete biochemical simulations, brute force exploration of possible chemical candidates and increasingly smart AI support for the research. A treatment for each sub-problem was useless on its own, but when put together in the right way they halted the ageing process and could even reverse some of the damage.

The demonstration of anti-ageing caused sensation, surprise and worry. While some world leaders immediately denounced it as disruptive and a waste of resources, others welcomed it. Public opinion was equally polarized. Over the coming years major political battles would play out as different stakeholder groups tried to influence policy. The previous struggles of pensions, healthcare and employment intensified as the old sides now had stronger incentives.

The first impact was economical. The surprise was felt in insurance, banking and government planning. Insurance companies with large pension holdings were in trouble, causing economic turmoil. Meanwhile patent-holders on key technologies involved in the treatment were both eager to exploit them and afraid of compulsory licensing. The treatment itself was relatively simple once it was discovered, making it potentially relatively cheap – and impossible to effectively control. Issues of access, intellectual property and how to manufacture treatments came to the forefront.

As treatments began to be used polarization began to abate slightly. Instead numerous practical problems began to crop up: whether life extension was doping in sports, whether there should be compulsory leave-taking after a certain time in some offices, the rise of infertile older people willing to have children and whether to allow related enhancement technologies.

Transhumanism

Transhumanists in this scenario have been claiming the possibility of life extension a long time with no success. Now they find themselves in a “told you so” situation. If they play their

cards right they can gain influence and importance, but it is also a risk that they end up on one side of a heavily polarized debate.

Star Trek

LE is progressing, and the public is aware of it.

Story

Biogerontological research had produced a steady stream of demonstrations of anti-ageing interventions, treatments for particular aspects of ageing and eventually ways of limiting or reversing the accumulation of damage. Public interest had been kept steadily high by these demonstrations, early applications and policy debates about their implications. As interest increased and more and more authorities agreed that life extension was in the making funding for the research increased proportionally. Pharmaceutical companies joined the field, especially after the EU declared ageing a disease in 2015.

India, leading the world in diabetes and metabolic disease, became one of the main clusters for testing new treatments. However, research was global and highly networked. One after another of the mechanisms causing ageing related pathology were understood and more or less successfully managed. Even a partial treatment would improve health and lifespan somewhat in the recipients, although some also led to unusual new ageing states where some aspects of the body were youthful while others aged. Treatments for reducing frailty became popular as “stopgap measures” and also helped keep the rapidly expanding healthcare costs down.

The uncertainties of different approaches created a dynamic market for longevity and mortality bonds. New ways of managing healthcare, work and funding emerged as more and more institutions reacted to the clearly changing state of longevity. While some were dismal failures other succeeded. Rising healthcare costs and pensions were met by sometimes painful reforms that were accepted by the public as necessary. Increases in productivity helped pay for some of the rising costs, producing a society where a far greater part of the GDP than ever was in the health sector. Campaigns against ageism became commonplace. Meanwhile the vital old were increasingly doing lifestyle experimentation to find a new role in society. Rather than see the greying of society as a problem it became seen as trendy.

The treatments that are emerging require relatively complex and individualized treatments to fine-tune metabolism, fix aged mitochondria and repair DNA damage. They are costly, but the consensus in most democratic nations is that they are worth it. Hence various forms of funding, including life extension loans and longevity mortgages have been developed. Charities are experimenting with using simpler treatments to help underdeveloped countries and poor so that they will be able to reap the full benefits of future advances. There are also massive ongoing projects in finding ways of automating medical treatment to bring down costs; should current AI research succeed in what it promises the treatments may become an order of magnitude cheaper.

Transhumanism

Transhumanists in this scenario have essentially become mainstream. There was a great deal of interest in life extension in the middle years as LE was looking promising but yet still a bit

away, but now transhumanists are looking at the Next Big Thing or involved as entrepreneurs.

Sinking Feeling

LE turns out to be a problematic research goal and gets little support from the public.

Story

Despite high initial hopes genomics, proteomics and ever more advanced methods of affecting cells and metabolism were not enough to find a workable life extension treatment. The messiness of the mammalian body again and again blocked promising interventions due to side effects, compensatory effects, multiple pathways and sheer complexity. Genetic interventions against ageing appeared possible, but germline modification of humans remained controversial and few parents were willing to take the risk. Researchers blamed lack of funding, and claimed many of the problems could be solved if they had money for e.g. long-running primate ageing experiments. However, the public (and hence funding bodies) were sceptical and preferred to put their money in other, more promising fields.

The general view of life extension is somewhat negative, as it both would make the current demographic shifts worse and as it seems to be “unnatural”.

Transhumanism

Transhumanists are increasingly looking at other areas to hope for, such as nanotechnology, cognition enhancement, AI or quantum technology. Many expect that real life extension will occur only thanks to uploading. Cryonics is a popular option. Overall the transhumanist movement has a credibility problem for having promoted a technology that so clearly is not taking off.

Hype

Assumption

LE is widely believed to be imminent and worthwhile, but the actual research is progressing slower than expected.

Story

After a few early impressive successes and support from a few celebrities life extension became increasingly accepted as inevitable. In 2021 president Clinton III of the US declared “a war on ageing”, adding significant funding to the biogerontology area (but also to studies of the economic, social and ethical impact). Other countries soon followed in the “ageing race”, which was seen as not only as a means to better public health or an economic opportunity, but also as holding great strategic importance as more and more of the richer countries were suffering from underpopulation. Many nations introduced extra “longevity taxes” to fund further research.

The already big projects in preventative medicine and dealing with chronic disorders were complemented by projects attacking ageing directly. Pharmaceutical companies began partnerships with research institutions to find life extension treatment. Longevity studies departments grew up on every university campus and gerontotechnology became the new buzzword.

Futurists and investors discussed the consequences of imminent radical lifespan increases or immortality, while lobbyists for various research approaches attempted to promote their clients. The public increasingly accepted the inevitable longevity future, investing accordingly. The idea of calm retirement was increasingly replaced by a vision of an active future.

The scandal when it was found that the 2031 Methuselah Mouse rejuvenation prizewinner had committed scientific fraud did not deter support or interest, as it was just seen as a symptom of the race for immortality and the general trend in research towards fraud and “publication by press conference”. Rumours about unethical experiments being conducted in countries with unscrupulous governments for Chinese, Indian and western pharmaceutical companies also cropped up with worrying regularity.

However, in the background sceptical voices are steadily rising. *The Economist* has warned that the “longevity bubble” will burst any time now. Other critics think that the life extension institutes have become bloated, inefficient and mostly concerned with producing ever more refinements of past techniques rather than groundbreaking new research.

Transhumanism

Transhumanists are partially to blame in this scenario: they have been promoting life extension to the extent that it has become irrational. Cryonics is doing well among people worried that they will die before the “inevitable” life extension.

Conclusions

Although these three scenarios are fairly brief and simple, they show that it is important to have appropriate expectations. A society surprised by life extension may be as bad off as a society with unrealistic expectations.

This suggests that it is important to find metrics to estimate the progress of LE and the likelihood that it will happen. Life expectancy is itself not a good predictor since it just shows the effects of already applied technology, integrated over many years. What is needed is a forward-looking indicator. Some possibilities:

- The records of mouse lifespan from the Methuselah Mouse Prize. The number of donations to the prize and similar anti-ageing foundations may measure public interest to some extent.
- Total number of researchers and papers in biogerontology might be a weak indicator, but cannot distinguish actual progress from mere churning.
- Mortality bonds and longevity bonds in financial markets may act as an information market, aggregating a consensus.
- Information markets among researchers might be a direct means of aggregating their knowledge.

Appendix: Brainstorming Mindmap

