NOMIX

Litepaper

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MISSION STATEMENT

Longevity As A Service

When cancer in a patient is suspected, the first line of investigation in most cases is to perform a biopsy, sticking a long needle into the area in question again and again, or punching through the patient's hip bone in order to extract material for testing. In endoscopic biopsies, a tube is inserted into the body of a patient under anesthesia, to extract material for testing. Analysis of the results takes up to several days and costs thousands of Euros to complete. And, although these are relatively routine procedures, complications take place in as many as 30% of conventional biopsies.

The respective diagnostic procedure for cardiovascular disease isn't much more appealing. If the patient is lucky, she'll have a chest X-Ray, CT, MRI, echocardiogram, or ECG in the hospital. But she might require a cardiac catheter, i.e. a tube inserted into an artery in her groin and navigated up toward her heart, in order to flush in a dye that allows X-Ray technicians to get a better look at her heart valves and arteries. This procedure again will cost several thousand Euros.

Unfortunately, for many other common causes of death like stroke and Alzheimer's disease, there is simply no effective means of accurate early diagnosis. But a range of new diagnostic methods is beginning to challenge these invasive, expensive, or even non-existent methods. When they are fully developed to scale, these methods will be highly effective and highly affordable.

DIY Health Diagnostics

All the data you need to achieve your optimal healthspan is already inside us - in our blood, in our DNA, and in our habits - or, in our epigenome. Unlike our DNA, which reveals our body's predispositions, but doesn't change, our blood is dynamic: it reveals how our body changes over time, in response to our diet, exercise, or lifestyle. Your daily habits reveal how you live.

Most of us have a digital thermometer, a (body-fat) scale, or a blood pressure gauge at home – those of us already own some basic household diagnostic technology. You are probably familiar with so-called wearables; i.e. wearable health devices like chest strap heart monitors for jogging enthusiasts, smartwatches, s.a. Apple Watch, or Fitbit, or the Oura ring, which monitors your heart rate, sleep quality, and other personal health metrics.

There are home blood tests that monitor your cholesterol and blood glucose, and even home tests that help diagnose STDs, allergies, and food intolerances.

Numerous apps leverage your phone's camera, gyroscope, GPS, and other sensors to provide you with real-time monitoring of relevant organism-related data. Do-It-Yourself DIY health diagnostic devices like these are becoming increasingly wearable, portable, even implantable, ingestible, and – most relevant affordable for individuals. Similar to the development in computer hardware, the latest wearables are equipped with much more computing power than many giant medical devices in hospitals. Besides their general computing performance, they are also adding more and more functionality: Apple Watch now includes blood oxygen level readings and an electrocardiogram (ECG) monitoring function, to help detect atrial fibrillation, the most common heart rhythm disorder.

DIY health diagnostic devices are – like small portable computers in the 1990s – on their way to replace incumbent medical technology that requires trained experts and maintenance. In 2022, companies like Apple will launch their Augmented Reality (AR) devices that might be transformed into de facto Brain-Computer Interfaces (BCI), running a real-time computation on brain signals.

Another kind of wearables that is available in basic versions is the so-called ‚smart clothing'. More elaborate products with improved functionality, s.a. artificial skin, should become available soon.

A Continuous, Personalised, Realtime Data Flow

Working with data collected by DIY health diagnostic devices will prove to be the ultimate way for health diagnostics in general. As soon as the collected data are of the same or similar quality as data collected with medical technology devices in hospitals or medical offices, the health sector, and overall individuals' health, will experience a paradigm shift: having personalized health data at hand, real-time, allows for much better early diagnosis.

And what's good for early diagnosis adds perfectly to an individual's personal omics, i.e. the holistic molecular, physiological, and environmental profile over time. The analysis of a combination of our blood, DNA, and habitual data is the basis to achieve longevity. Bridging genome and dynamic physiology, detecting diseases at an early stage, and uncovering lifestyles and environmental patterns associated with a (potential / future) disease, is the goal of the NOMIX team.

Validated personal omics and biomarkers of aging would allow for testing medical interventions to extend lifespan and healthspan because changes in the biomarkers would be observable throughout the lifespan of the organism. The uses for personal omics and biomarkers of aging are ubiquitous and identifying a physical parameter of biological aging would allow humans to determine our true age, mortality, and morbidity.

Since the change in the physical biomarkers should be proportional to the change in the age of the species, humans will be able to dive into research on extending life- and health spans and finding timelines for the arise of potential genetic disease, based on an AI-powered system that allows for a continuous flow of real-life personal omics data.

By creating an incentive scheme for CODIS, the Collective Digital Immune System for Longevity, NOMIX will allow for an unprecedented leap in research and applied biotechnology, improving the overall quality of life, bringing us a much faster good deal closer to longevity, and a 4P-medicine approach that is not limited to the more prosperous parts of the population. NOMIX delivers Longevity as a Service.

ABSTRACT

Longevity Science That Works For You

The immune system is a network of biological processes that protects an organism from diseases. It detects and responds to a wide variety of pathogens, from viruses to parasitic worms, as well as cancer cells and objects such as wood splinters, distinguishing them from the organism's own healthy tissue.

In the same way as a biological immune system, the Collective Digital Immune System (CODIS) adapts over time, by being a dynamic decentralized data base for observing the microbial landscape, detecting potential threats, and neutralizing them before they spread beyond control.

This simple strategy – effectively tested over millions of years – can now start to be replicated with the combination of distributed sensor sequencing and applied tools of computation and analysis to the capture and interpretation of biological data (i.e. bioinformatics, or: biomarkers) where a network of autonomous agents acting as sequencing devices serves a real-time stream of microbial personal omics to a collective network for analysis.

Driven by a shift from single-reference genomics to more quantitative, population-wide analyses of personal omics, biology has moved beyond developing a qualitative understanding of cellular and evolutionary processes towards base-pair resolution and predictive models of biological systems and disease. A combination of improved biotechnology, machine learning algorithms, statistical models, and autonomous agents has been the key driver of this development.

The integration of other technological advances in the fields of decentralization and cryptography provides scientists and entrepreneurs with the tools for transforming a hitherto conceptual approach into a practical application – the Collective Digital Immune System for Longevity.

At NOMIX, we have been working on this intersection of biotechnology and computer technology and are looking forward to presenting the first version of CODIS in 2022.

State-of-the-Art Web3 Technologies

NOMIX uses decentralized artificial intelligence to build a framework for applications to search, discover, and computation on personal omics and biomarker data.

By leveraging machine learning, advanced cryptography, and autonomous agents based on a Self-Sovereign Identity (SSI) infrastructure, our blockchain-mediated collective learning system enables individuals and multiple stakeholders in the health sector to build a shared machine learning model without needing to rely on a central authority, and without revealing any datasets to other stakeholders.

The NOMIX team consists of experts in the fields of AI/ML, blockchain technologies, cryptography, bioinformatics, biotechnology, and company building. Our work is based on the core principles of eco-responsibility, sustainability, transparency, and regulatory compliance.

OVERVIEW

Longevity

The word "longevity" is sometimes used as a synonym for "life expectancy" in demography. At NOMIX, the term longevity refers only to especially long-lived members of a population, whereas life expectancy is defined statistically as the average number of years remaining at a given age. Longevity is best thought of as meaning 'typical length of life'.

Since most theories in this field, s.a. the disrepair accumulation theory of aging, postulate that the potential for longevity of an organism is positively correlated to its structural complexity, and we human beings belong to the most complex mammals, we are widely considered to have a naturally limited longevity due to aging, which results in a life expectancy of 80-85 years for millennials in developed countries.

The United Nations has made projections up to 2300, at which point it projects that life expectancies in most developed countries will be between 100 and 106 years and still rising, though more and more slowly than before. Gaps in life expectancy between rich and poor countries may well not exist in the future, due to the exchange of technology and the industrialization and development of poor countries, similarly to the way life expectancies between rich and poor countries have already been converging over the last 60 years as better medicine, technology, and living conditions became accessible to most people.

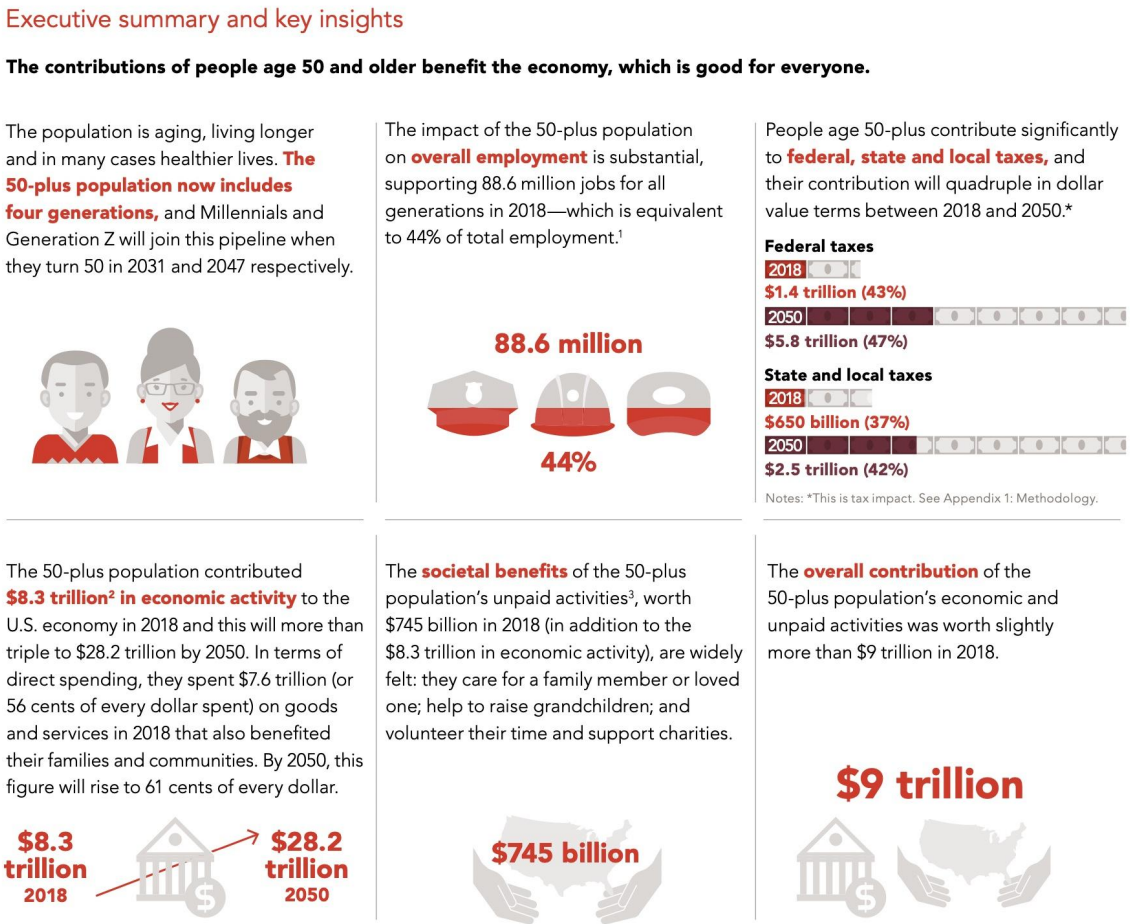
“The possible existence of a hard upper limit, a cap, on human lifetimes is hotly debated,” write Léo Belzile and coauthors in a paper to appear in Annual Review of Statistics and Its Application. “It is sustained and widespread interest in understanding the limit, if there is any, to the human lifespan.” Their own re-analysis of previously incorrectly analyzed data on extreme lifetimes indicates that any longevity cap would be at least 130 years and possibly exceed 180. And some datasets, the authors report, “put no limit on the human lifespan.” These analyses “suggest that the human lifespan lies well beyond any individual lifetime yet observed or that could be observed in the absence of major medical advances.”

However, recent increases in the rates of lifestyle diseases, such as obesity, diabetes, hypertension, and heart disease, may eventually slow or reverse this trend toward increasing life expectancy in the developed world.

The Longevity Market

People are on average living healthier, longer lives than previously. This development has a hugely positive potential for the economy, offsetting the otherwise negative economic effects of an aging society. Both health and education sectors will expand further and new financial products will arise, resulting in gross domestic product growth through employment and human capital.

People in their later years are the leading edge of a new demographic order. they are part of the world's fastest-growing age segment: the 60-plus cohort, on track to double by mid-century to more than 2 billion globally, up from nearly 1 billion today, and jumping to an estimated 3.1 billion in 2100. By 2050, the over 60s will be about equal in number to those 15 and younger; that younger group numbers about twice as many as today's 60-plus count globally.



The Longevity Economy Outlook, AARP

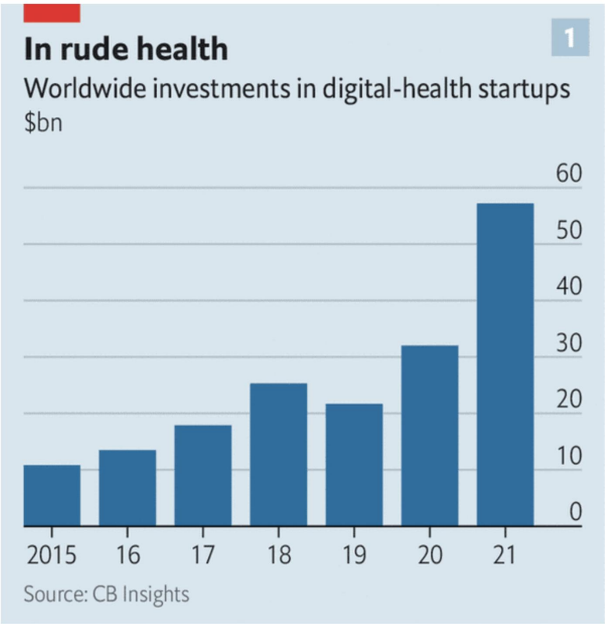
Estimated at $25 trillion in 2021, the global longevity economy, defined as a combination of

- aging,
- predictive , preventive personalized, participative (4P) medicine,
- age-tech, and relevant parts of
- relevant parts of healthcare budgets and
- the finance industry's related services,

is growing steadily and expected to be worth $35 trillion by 2026. By the most conservative estimates, it accounts for 20% of the global GDP. While the global longevity economy is projected to reach $35 trillion by 2026, the age-tech-related segment alone is projected to reach $2.7 trillion by 2025.

This, in turn, implies an annual growth rate of 21% in the global age-tech market, which is attributable to the development of the elderly care sector enhanced by IT, FinTech, and other digital technologies.

Longevity Industry 2021/Q2, Aging Analytics Agency



The Economist

In most countries, health care consumes 10% of GDP, in the USA its share is even higher, at 18%. Since the pandemic has people made more comfortable with online services, including digitally-mediated care, and consumers are increasingly using DIY health diagnostic devices to measure their body and activity data, money has been pouring into the digital health sector - investments in digital-health startups nearly doubled in 2021, to $57bn.

According to CB Insights, Alphabet, Amazon, Apple, Meta, and Microsoft collectively poured some $3.6bn into health-related deals last year. Their most common uses have historically been to help people get fit, lose weight, and beat their personal best in their next race.

The Economist

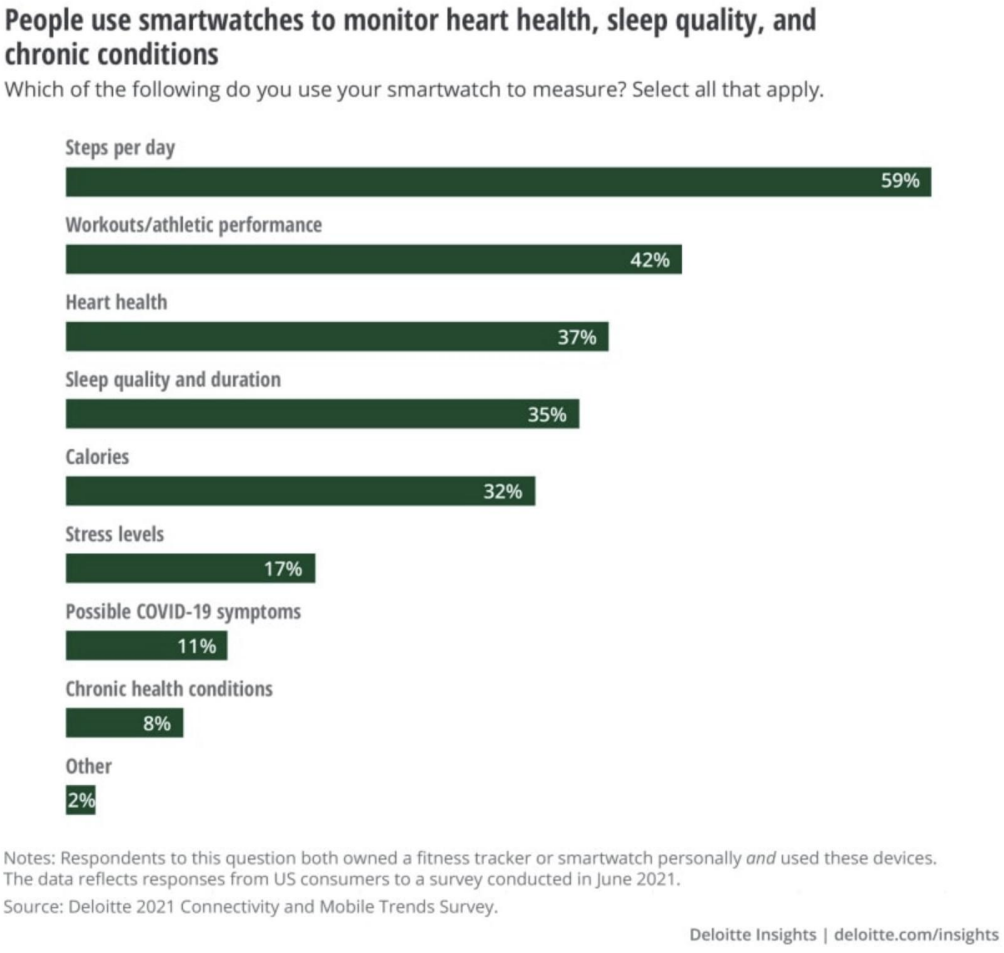
One area experiencing rapid growth is at-home - or: DIY - health diagnostics. Whereas the quality of DIY sensor data had been quite bad at the beginning, hardware and software have significantly improved. Now, better technology and greater realism about what it can achieve are rehabilitating the field, just as the pandemic has accustomed people to the idea of home-testing and self-measurement.

Increasingly, people are using smartwatches and other devices to monitor their health, not just their running pace, as new hardware, software, and apps have turned them into personalized health clinics.

As these devices get more sophisticated, the percentage of consumers using them to manage chronic conditions and detect symptoms of serious diseases will likely increase.

Measuring blood pressure with a cuff is inconvenient and uncomfortable. Most importantly, periodic blood pressure measurements can miss signs of chronic hypertension, which can cause heart disease, heart attacks, and strokes. Accurate, continuous, unobtrusive blood pressure measurement could expand the smartwatch market: 1.3 billion adults worldwide suffer from hypertension.

Of course, there are limits to what current smartwatch sensor technology can do without attaching to—or getting under—a person's skin. That's where other DIY health diagnostics, s.a. smart skins, or smart patches come in.



Aging

In general, aging is the process of becoming older. The term refers mainly to humans, most other animals, and fungi. As a biological and social construct, aging is usually associated with dynamic changes in the biological, psychological, physiological, environmental, behavioral, and social processes. In this Litepaper, aging refers to single cells within a human organism which has ceased dividing, a process called cellular senescence.

In humans, aging increases the risk of diseases; of the roughly 150,000 people who die each day across the globe, about two-thirds die from age-related causes. Most current aging theories are assigned to the damage concept, whereby the accumulation of damage (such as DNA oxidation) may cause biological systems to fail, or to the programmed aging concept, whereby problems with the internal processes (epigenetic maintenance such as DNA methylation) may cause aging. Additionally, there can be other aging accelerators, e.g. lifestyle diseases, s.a. obesity and diabetes, and a compromised immune system.

Hallmarks of Aging

Aging research has experienced an unprecedented advance over recent years, particularly with the discovery that the rate of aging is mainly controlled by genetic pathways and biochemical processes conserved in evolution. Nine so-called 'hallmarks of aging' represent common denominators of aging in human aging. These hallmarks are

Genomic instability	Telomere attrition	Epigenetic alterations
Deregulated nutrient-sensing	Altered intercellular communication	Loss of proteostasis
Cellular senescence	Stem cell exhaustion	Mitochondrial dysfunction

Although the hallmarks of aging marked a relevant step in the fight against aging, critics have pointed out that work on aging has been following a wrong, slow, and expensive path for a couple of decades. Only deciphering the mechanisms of calorie restriction and altering genes and metabolism to slightly slow down aging, probably won't result in large gains in life expectancy and long-term health, let alone in therapies that would greatly help people who are already old.

Instead of focusing on slowing down the accumulation of the damage of aging, we could and should focus on rejuvenation and repair of cell damage in order to add decades or more to our healthy life spans and restore youthful function.

The Information Theory of Aging

Our work at NOMIX isn't based on or limited to one specific theory of aging, although one of the latest approaches seems to provide a good general framework to understand aging: The Information Theory of Aging, by Harvard Professor of Genetics, David Sinclair.

In essence, David Sinclair postulates that aging is a result of the deterioration of differentiated stem cells' epigenetic information over time. In other words, during continuous cell repair cycles, errors preventing cells from performing their original functions inevitably will accumulate. As if the cell has forgotten how to correctly function - it has lost information: aging is a loss of information, the information that keeps our cells healthy, the information that tells the cells which genes to read throughout our lives.

The Information Theory of Aging has had a great impact on our work at NOMIX - although, notwithstanding its scientific brilliance, it comes with an inherent major weakness: David Sinclair, as most other aging researchers, has based his work on scientific trials with animals (e.g. mice) and even simpler organisms, s.a. yeast. In times of a strong focus on ethically sound behavior, human trials are no longer possible and researchers have to focus on simple organisms which are not entirely comparable with more complex human beings. Only recently, first studies have been initiated to evaluate the utility of mouse models for studying different aspects of aging, both in terms of interpreting prior findings and designing and implementing future studies. And, as promising longevity-related findings with yeast are, there is a huge difference in yeast and human beings' organism structures.

AI In Aging and Longevity Research

Thanks to huge advances in the development of Artificial Intelligence (AI), the applications of modern AI algorithms within the field of aging research offer tremendous opportunities. Modern deep learning techniques used to develop age predictors offer new possibilities for formerly incompatible dynamic and static data types. AI biomarkers of aging enable a holistic view of biological processes and allow for novel methods for building causal models - extracting the most important features and identifying biological targets and mechanisms.

Recent developments in generative adversarial networks (GANs) and reinforcement learning (RL) permit the generation of diverse synthetic molecular and patient personal omics data, identification of novel biological targets, and generation of novel molecular compounds with desired properties and geroprotectors. These novel techniques can be combined into a unified, seamless end-to-end biomarker research and development, target identification, drug discovery, and continuous real-world evidence that may help accelerate and improve pharmaceutical research and development practices.

Personal Omics and Biomarkers

Personal omics (or: multiomics) comprise the holistic molecular, physiological, and environmental profiling of an individual over time. This combines measures of the genome,

epigenome, transcriptome, proteome, metabolome, and other omes. DIY health diagnostic devices enable the required physiological, contextual, and environmental measurements.

Biomarkers are biological measures of a biological state, observed from outside the individual - characteristics that can and are objectively, accurately, and reproducibly measured and evaluated as an indicator of normal biological processes, pathogenic processes, or pharmacological responses to an exposure or intervention, including a therapeutic intervention. Below you find a categorization of biomarkers:

Energy / Metabolism

Glucose	Hemoglobin A1c (HbA1c)	Total Cholesterol
Low-density Lipoprotein (LDL)	High-density Lipoprotein (HDL)	Triglycerides

Strength / Endurance

Creatine Kinase	Testosterone	Free Testosterone
DHEAS	Cortisol	Sex-Hormone Binding Globulin
Albumin		

Bones / Muscles

Calcium	Vitamin D

Brain / Body

Magnesium	RBC Magnesium	Folate
Vitamin B12(LDL)	High-density Lipoprotein (HDL)	Triglycerides

Oxygene / Performance

Hemoglobin	Ferritin	Total Iron Binding Capacity
Iron	Transferrin Saturation	

Inflammation

White Blood Cell Count	High Sensitivity C-Reactive Protein

Minerals

Potassium	Sodium

Liver

Alanine Aminotransferase (ALT)	Aspartate Aminotransferase (AST)	Gamma-glutamyl Transpeptidase (GGT)

A Privacy-Preserving Compute-to-Data Approach

At NOMIX, we leverage AI, and adjacent technologies, s.a. Blockchain, Self-Sovereign Identity (SSI), and Compute-to-Data, to contribute to the credibility and prominence of longevity research. Based on many years of experience in the field of big (sensitive) data analytics, the NOMIX approach differs from the conventional way of trying to integrate deeply with existing healthcare systems.

The goal of NOMIX is to build the Collective Digital Immune System for Longevity (CODIS) by incentivizing individuals to provide their personal omics and biomarker data. Making use of Blockchain and SSI technologies, the decentralized CODIS data base is easier to use and much more secure than conventional, centralized databases provided by healthcare companies, or even by public entities.

Whereas sensitive personal omics and biomarker data are conventionally shared with public or private health care providers, no data is being shared in the NOMIX system. All data stay with their owners, the individual. Computation on the user data takes place in a Compute-to-Data approach that brings the AI algorithms to the data in order to compute them and deliver results. This privacy-preserving data management approach is supervised by Autonomous Privacy Agents (APA) that act on behalf of their users, monitoring and controlling all computational processes with personal omics and biomarker data.

These advanced technologies allow for a fully privacy-preserving use of AI algorithms in longevity research with human personal omics and biomarker data. Although this combination of AI and Web3 technologies is the world's first in aging research, it has been implemented in other domains, s.a. mobility, before. Datarella, the parent company of NOMIX, has built and deployed a proof-of-concept, together with its partners, Bosch, Fetch.ai, and Ocean Protocol.

Decentralized Sustainable Incentives

Each individual who provides their health data will be rewarded with NOMIX OMs, i.e. reward points depending on the quantity and frequency of providing data. NOMIX OM's can be swapped with NOMIX Tokens afterwards. By incentivizing the individual who is

typically very much interested in maximizing her healthspan, to actively participate in the system by continuously providing their personal omics and biomarker data for computation, NOMIX provides the foundation for sustainable growth of a decentralized social health system.

Healthcare companies can build their research models and applications, and develop 4P-medication (predictive, preventive, personalized, participative medication) on CODIS. Fetch. ai-powered Autonomous Economic Agents (AEAs) search and discover for new personal omics and biomarker data, make them available for compute-to-data, and match the algorithms output with respective research requirements, while Autonomous Privacy Agents (APA) monitor, control and ensure a fully privacy-preserving data management.

By allowing public and private health care providers to train their algorithms on CODIS and streamline their health service and product portfolios based on an ongoing stream of personal omics and biomarker data, NOMIX allows for a well-balanced, efficient, and sustainable health market. The reciprocity and the decentralization of incentives ensure sustainable mechanics and equilibrium of supply and demand in the NOMIX ecosystem.

USERS

Individuals / Patients

Key Benefits: Economic rewards for providing personal omics and biomarker data, and optimized health spans

Individuals receive economic rewards for providing their personal omics and biomarker data for longevity research, together with a real 4P-medication, and they subsequently can expect to live longer while staying healthy.

Healthcare Companies

Key Benefit: Streamlined drug research

NOMIX allows for training health care providers' algorithms on CODIS, thus streamlining their health service and product portfolios based on an ongoing stream of personal omics and biomarker data..

Longevity Research Institutes

Key Benefit: Easy real time-access to a continuous flow of personal omics and biomarker data

NOMIX provides an unprecedented opportunity for a unified, seamless end-to-end personal omics and biomarker research and development, target identification, drug discovery and continuous real-world evidence that may help accelerate and improve pharmaceutical research.

DIY Health Diagnostics Providers

Key Benefit: Provide the low-cost, democratized alternative solution to collect personal omics and biomarker data

DIY health devices will become competitors that traditional medical devices have to be reckoned with. Thanks to their low costs, and their continuous supply of individual personal omics and biomarker data, DIY Health Diagnostic Providers can leverage the NOMIX community to create and expand their market.

Health & Wellbeing Product & Service Providers

Key Benefit: Easy real time-access to a continuous flow of personal omics and biomarker data

Providers of health and wellbeing products, services, and contents, such as fitness and wellness apps, dieting guides, etc., can base their contents, products, and services on the wealth of CODIS data which significantly improves their offerings and provide huge benefits to their clients. By leveraging the NOMIX API, longevity app providers can expand their communities.

COMPONENTS

NOMIX App & Wallet

The NOMIX app allows for searching & discovering, collecting, and providing personal omics and biomarker data for longevity research and development. It comes with a fully-fledged Self-Sovereign Identity (SSI) functionality: users can verifiably authenticate themselves digitally while being in full control of their data.

This unique privacy feature makes the NOMIX app fully compliant with EU laws and regulations. The unique integrated 'everKEY' mechanism allows for the recovery of a lost keyphrase (e.g. password) even in completely decentralized storage.

The NOMIX app's wallet functionality allows for sending and receiving NOMX, the NOMIX reward token. Before the launch of the NOMIX system, first users receive NOMX tokens in their NOMIX Wallet (via airdrop) as rewards for their active participation as beta users on the marketplace. This mechanism helps to maintain sustainable overall market growth.

NOMIX Dashboard

The NOMIX dashboard allows for managing personal omics and biomarker data and provides an overview on how and by whom these data are used for computation.. Healthcare, DIY health diagnostic providers, and other corporate users can manage their service offerings and have access to detailed reporting.

Autonomous Economic Agents (AEAs)

Autonomous Economic Agents (AEAs) allow for search and discovery of personal omics and biomarker data, as well as for matching of these data with longevity research and development requirements. Each user runs her own AEA, on her desktop computer, and/or on her mobile device. The AEAs autonomously search and discover contextual data and allow computation if the Autonomous Privacy Agents have released the process.

AEAs improve automated personal omics and biomarker data management to a degree that healthcare companies themselves get a better understanding of individual states of health and how to streamline their drug research for a true 4P-medicine pipeline. In the long-term, AEA will help to establish a privacy-preserving health data management environment, allowing users to pro-actively opt-in to receiving personalized health recommendations, other than being targeted by unsolicited push-marketing by traditional healthcare companies.

Autonomous Privacy Agents (APAs)

Autonomous Privacy Agents (APAs) use the same technology as Autonomous Economic Agents (AEAs). Their functionality is to ensure the full privacy of their owners (individual users) by monitoring and controlling all compute-to-data processes in NOMIX, and allowing computation if the owner has confirmed it.

NOMIX OMs

As soon as users start contributing their personal omics and biomarker data to CODIS, they'll earn NOMIX OMs as reward points. They can contribute generally, and to specific scientific studies as well as post-marketing surveillance. The more biodata users provide and the more frequently they contribute their biodata, the more extensive and complete CODIS becomes, and the better the NOMIX Longevity movement achieves its goal: an optimized healthspan.

NOMIX Tokens

NOMIX tokens (NOMX) are used to incentivize individual users and patients to provide their personal omics and biomarker data for applied machine learning and analytics by healthcare companies. Professional NOMIX users (healthcare companies, DIY health diagnostic providers, health & wellbeing product & service providers) must own and pay with NOMX tokens to connect to CODIS to run their algorithms in order to improve their drug R&D.

NOMX tokens are based on the Fetch.ai network, making them perfectly suited for large user groups with many transactions.

Minted tokens are distributed in proportion to the amount of data supplied to the market. Some fraction of the NOMIX fees and Autonomous Economic Agents fees are used to buy back NOMX and burn.

TECHNOLOGY

A Web3 Technology Bundle

NOMIX is based on a set of technologies, leveraging:

- Blockchain / Distributed Ledger Technologies (DLT),
- Artificial Intelligence (AI),
- Multi-agent System with Autonomous Economic Agents (AEA),
- Compute-to-Data, and
- Self-Sovereign Identity (SSI).

The combination of these technologies results in multiple benefits for individual users, healthcare companies, health and wellbeing product & service providers, as well as for longevity research entities and overall health, healthspan, and life expectancy in general.

Benefits for Individuals

- Daily health & wellbeing coach
- Improved health, healthspan and life expectancy
- Financial rewards for providing access to personal omics and biomarker data

Benefits for Healthcare Companies

- Access to CODIS, an ongoing influx of personal omics and biomarker data
- Streamlined drug reasearch for a true 4P-medicine pipeline portfolio
- Optimized R&D spendings

Benefits for Longevity Research Institutes

- Access to CODIS, an ongoing influx of personal omics and biomarker data
- Unprecedented research capabilities

Benefits for DIY Health Diagnostic Providers

- Access and interface to CODIS
- Opportunity to create and expand position in medical devices market

Benefits for Health & Wellbeing Service Providers

- Access and interface to CODIS
- Imprióved service offerings provide huge benefits to the existing user base and attract new users

Autonomous Agents

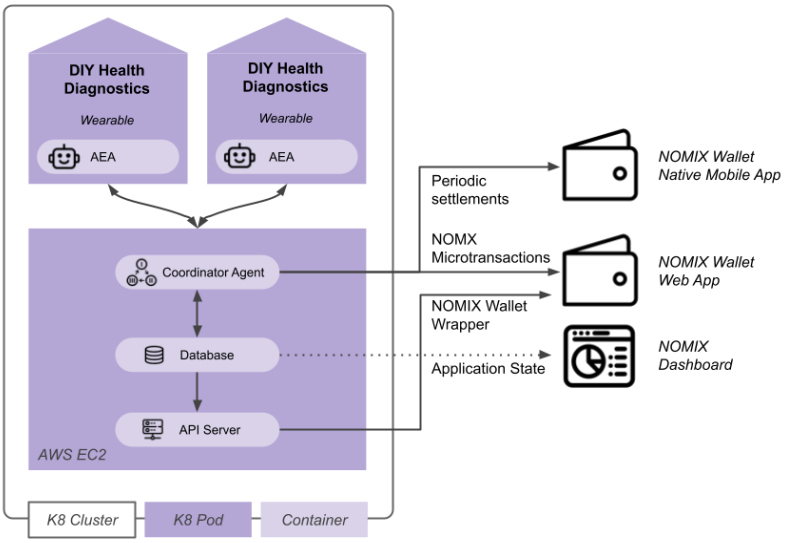
Autonomous Economic Agents (AEAs) are used for different purposes:

1. Autonomous Economic Agents use sensor-based DIY health diagnostic device information, such as personal omics and biomarker data, to search and discover the information matching individual users' states of health. The AEA manages all relevant information a user needs to provide her personal omics and biomarker data in the best possible way, on behalf of her owner.

   Example: Anne provides her basic health data together with her activity and exercise data in order to allow compute-to-data. AI-powered algorithms compute Anne's data and match the results with other individuals to allow for predictions regarding Anne's actual and future state of health.

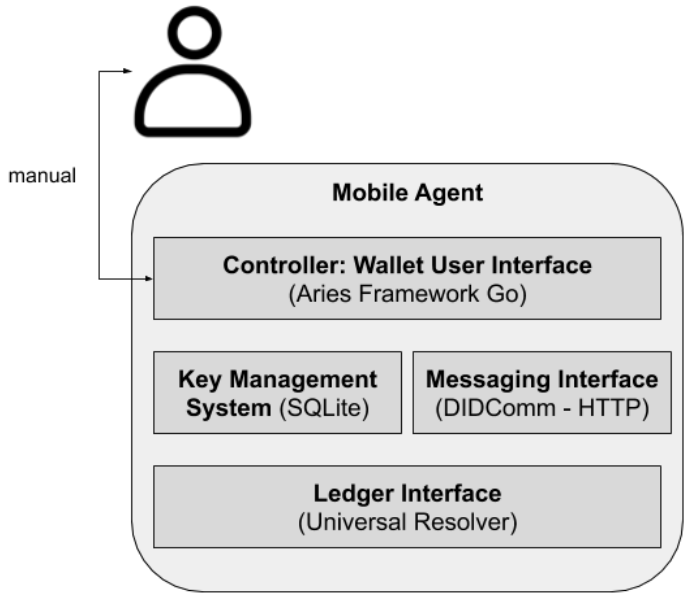
2. AEAs manage the compute-to-data use of algorithms searching CODIS by Longevity Research Institutes and Healthcare Companies.
3. Autonomous Privacy Agents (APA) are used to monitor, control, and manage the compute-to-data processes with an individual's personal omics and biomarker data in order to ensure complete privacy-preserving data management.

Autonomous Economic Agents Diagram



Self-Sovereign Identity (SSI)

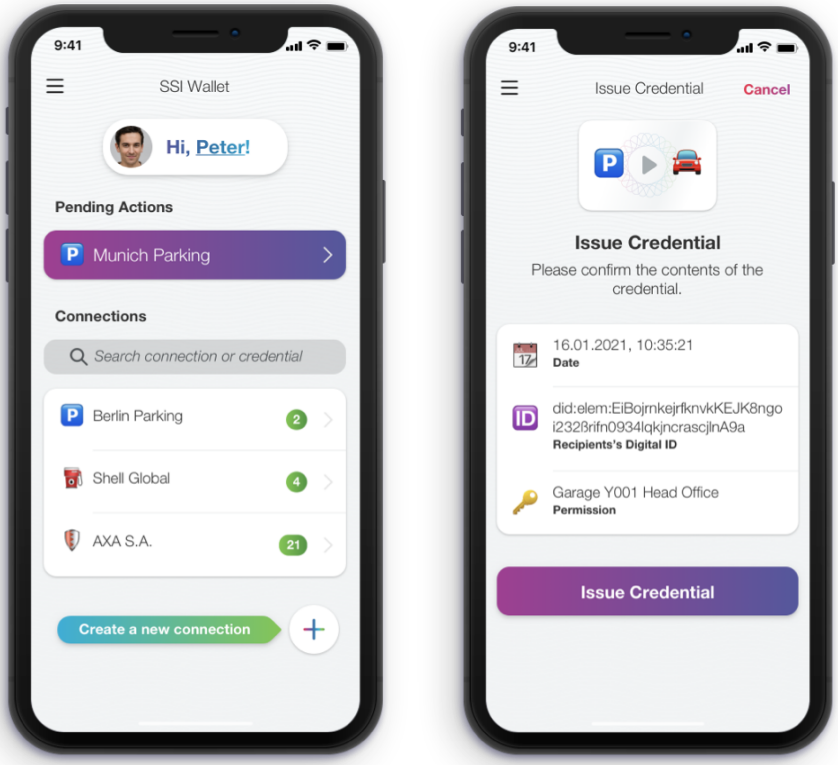
In a digitized world with all its advantages of leveraging information to benefit everybody, data sovereignty is one of - if not the - most important aspect(s) for individuals to preserve their privacy. The more data the Autonomous Economic Agents used by NOMIX can compute, the better the results and the more beneficial NOMIX will prove for individuals, healthcare companies longevity research institutes, and DIY health diagnostic providers.
NOMIX SSI Wallet Architecture



Since NOMIX fully respects the privacy of its users, a Self-Sovereign Identity (SSI) architecture is integrated to preserve privacy by design. With the NOMIX app, users are in full control of their identity and decide what part of their identity information they share with whom. Users can pro-actively opt-in to receive personalized health recommendations.

Autonomous Privacy Agents (APAs) monitor and control all data management processes on behalf of their owners (i.e. individuals). This approach allows for secure use of CODIS for scientific research, as well as for economic purposes, s.a. improved development of 4P-Medicine.

NOMIX SSI Wallet UI



A unique element of the NOMIX app is its integrated key recovery mechanism: Provided by NOMIX partner Datarella, its 'everKEY' module allows users to recover their keys (e.g. password) which had exclusively been stored on their devices; i.e. not on a NOMIX server, but only decentrally.

In most existing applications, users would not be able to recover their keys if stored decentrally only: they would be lost forever and all information could not be accessed anymore. With everKEY, a NOMIX app user is safe - she can relax since she benefits from the highest possible security when storing her keys while knowing that she could recover these if needed.

Both Autonomous Economic Agents and the Self-Sovereign Identity architecture are built on top of the Fetch.ai blockchain that ensures fast, reliable data processing.

LAUNCH PARTNERS

From the start, NOMIX worked with a group of Web3 technology, solutions, and biotechnology partners in order to provide a sound technical and organizational system, combined with a smooth user experience for all ecosystem participants.

Fetch.ai

Fetch.ai is building an open access, tokenized, decentralized machine learning network. For NOMIX, Fetch.ai provides the foundational blockchain, as well as Autonomous Economic Agents (AEA) that are also deployed as Autonomous Privacy Agents (APA), enabling NOMIX participants to build on CODIS in a completely privacy-preserving and secure way.

Datarella

Datarella provides and operates Web3 Solutions and products. For NOMIX, Datarella provides their SSI-Wallet, including their everKEY solution as the user's secure hub for managing their identities. Datarella also creates and operates the NOMIX ecosystem dashboard, and supports market participants with onboarding, and the management of Autonomous Economic and Privacy Agents.

MIBE Munich Institute of Biomedical Engineering

The Munich Institute of Biomedical Engineering (MIBE) is an Integrative Research Institute within the Technical University of Munich (TUM) in Germany. For NOMIX, MIBE provides the study of basic scientific principles and ends with their application in new medical devices, medicines, and software programs

Cosinuss

Cosinuss is a DIY health diagnostic provider offering sensor technology for mobile vital signs monitoring in the ear. For NOMIX, Cosinuss provides the interface of its in-ear products to allow its users to provide their personal omics and biomarker data, s.a. Blood Oxygen Saturation, Core Body Temperature, Heart Rate, Heart Rate Variability, Respiratory Rate, and Position/Acceleration, to CODIS.

ROADMAP

Market Entry

NOMIX follows a 5-Step Go-to-Market strategy: first, NOMIX users will be rewarded with NOMX tokens for generally agreeing to provide their personal omics and biomarker data to build the Collective Digital Immune System CODIS.

The first NOMIX user group will consist of a sufficiently large number of people with a high affinity to the Quantified Self movement, who are used to utilizing data collected by wearables to continuously measure their activity data in order to improve their states of health.

Then, the NOMIX system is being developed and tested within a closed beta group.

Third, individual users will be onboarded and get familiar with the NOMIX app and wallet by having first experiences with sending and receiving NOMX tokens.

In the fourth phase, DIY health diagnostic providers will be onboarded and start using the Autonomous Economic Agents (AEAs) to allow users to connect their devices to CODIS. In the fourth step, healthcare companies will be onboarded, in order to search and discover and compute on relevant personal omics and biomarker data.

In the fifth phase, public and private healthcare service providers will be onboarded. By actively engaging with CODIS, they start learning, enriching, and expanding their longevity research and service offerings, while value-added service providers will be onboarded and additional marketplace tools will be provided.

In preparation for the NOMIX launch, its technical components will be developed. Before, the first NOMX token distribution took place. Owners of FET, the token of Fetch.ai, will receive the first batch of NOMX tokens, by staking their FET on the Fetch.ai mainnet; a procedure also known as ‘stakedrop’. After this initial stakedrop, more distributions of NOMX tokens will follow.

Phase 1

MAY 2022

NOMIX Stakedrop

- Genesis NOMX token distribution to FET token holders staking their FET on the Fetch.ai mainnet

Phase 2

JUN-AUG 2022

Development & Closed Beta

- NOMIX components and APIs are developed and integrated
- NOMIX ecosystem is being tested In a closed beta user group

Phase 3

Starting SEP 2022

User Onboarding & Basic Incentivization

- Users register via the NOMIX app
- Users connect NOMIX app with their existing DIY health diagnostics
- AEA airdrop NOMIX tokens when a personal omics and biomarker data set has been provided

Phase 4

Starting NOV 2022

DIY Health Diagnostic Partner Onboarding & Full Incentivisation

- Partners register via the NOMIX dashboard
- Partners set-up AEAs to supply their services
- AEAs start compute-to-data
- Users receive NOMIX tokens based on amount of consumed compute-to-data

Phase 5

Starting JAN 2023

Healthcare Companies Onboarding

- Healthcare companies register via the NOMIX dashboard
- Healthcare companies set-up AEAs and start compute-to-data on personal omics and biomarker data

CONTACT

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