

Akkure

Singularity Alpha

Whitepaper

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WELCOME & FOUNDER'S LETTER

Singularity Alpha, a Fintech SME, is excited to be launching AKKURE's MSX - the world's first 'Medical Stock Exchange', allowing individuals to be rewarded for shar-ing their digitalised health and wellness data in the form of AI powered non-fungible tokens (NFTs) via precision matching for shared health services, clinical trials and personalised medical products.

Control of medical records is challenging. Data is held by others, which is hard to access, or secured by third parties to monetise.

We live in an age when data is the new gold, collective medical data is invaluable, dy-namic, live AI powered precision medical data is priceless. Our Cryptosomes represent a global chance for citizens to create their own intelligent medical collectibles in the form of the worlds first wellness and medical NFTs.

At Singularity we are focusing on genomic, phenotypic, biomarker and other data that can drive precision health and assist in fine-tuning and digitising clinical trials - yet in a patient-centric model. It is the fusion of this non-fungible patient data into a single unit of value that creates a truly disruptive global marketplace.

The result is a converging Singularity of innovations in marketplace, financial mod-elling, business models and technology - the MSX.

Patients create their individual Biosome from the trifecta of genomic, physiological, and clinical data.

The fusion of an individual's clinical, wellness, wearable and genomic data allows creation of a single non-fungible digital asset ('Biosome') that facilitates trading and matching on a hybrid blockchain digital asset exchange in the form of collectivised bundles of dynamically updated and AI powered 'Cryptosomes'. Virtual blockchain permissioned world ownership is programmable and Intelligent, this is turn allows bilat-eral information exchange and creation of medical NFT 'Oracles' for smart user recom-mendations.

This is a Fintech-based, blockchain-powered medical data exchange - a global trad-ing platform where individuals unlock the value of their data to access clinical trials and precision medical services. MSX will allow users to trade their medical data in a specifically designed medical stock exchange whereby payers, providers or product companies are then able to purchase or rent access to that data in volumes of units.

This is an opportunity to be at the forefront of the next generation of precision med-icine, where medicine and fintech fuse to create a solution that will fundamentally disrupt the Pharma-Medtech and Medical wellness economy. I warmly welcome you to join us on what will be a truly transformative journey.

EXECUTIVE SUMMARY

Individuals need to be incentivised to share, enrich & control their own health and wellness data.

Live clinical data, at scale and, especially, cohorted (eg by medical condition) is valuable to big pharma and other clinical trial companies seeking cohorts, whilst equally having value for clinical service providers offering personalised services & products (hospitals, insurers).

Akkure puts individuals back in control of their data by creating a platform where they can share that data to leverage the value, both for monetary gain and access to more precision and personalised medical care and therapeutics in the form of clinical trials.

AKKURE's Next Gen Medical NFTs represent Dynamic & Intelligent collectibles with on-chain ownership. DIGITAL on-Chain World ownership is Programmable, Composable & Intelligent. We are creating a medical stock exchange where a user's fused health data unlocks economic benefits for the individual & reduces the potential for large corporations to trade that health data for their own economic benefit without the individual's consent.

The convergence of macro trends in society, technology and economics has provided a singular opportunity to offer citizens the digital infrastructure to unlock this potential. Fusion of an individual's clinical, wellness, wearable and genomic data into a single AI powered non fungible digital asset or 'Biosome' that facilitates intelligent digital ownership & monetisation via 'Cryptosomes' is truly transformative on a global scale.

Taking control and ownership of one's own personal data records is at the forefront of GDPR concerns. This is a core principle of Singularity, where we have developed a novel hybrid blockchain architecture that allows GDPR-compliant patient-centric control of data. No comparable solution exists today for patient populations to exchange and monetise their health and wellness data for either access to personalised medicine, or to share or trade their data for financial reward.

When people (users) understand the value of this data at a personal & economic level, it will allow them to open up new sources of personal income & medical insights, and to access more precision targeted medical services in the future.

BACKGROUND & PROBLEM

Fintech has a reputation for moving swiftly towards innovative solutions and for constant iterations. Blockchain technology was developed within the Fintech space for these reasons. Conversely, the rise of digital health applications has not yet delivered on the promise of empowering individuals to access new medical discoveries and individual targeted care. Electronic medical records remain a challenging space, and progress is slow.

Data is at the core of AI applications. It is constantly being generated and is a virtual goldmine; however it is held by others, is hard to access, or is secured by third parties to monetise.

The younger generations are increasingly recognising the value of data but do not yet have ways in which to access and harness that value. In the 20 to 39 year old age bracket, people are motivated by seeking to secure rewards for data sharing whilst investing in their medical insurance and need for future services. Additionally, those with existing chronic conditions are looking beyond their geographic location for access to potentially novel treatment options for their medical condition.

Live clinical data at scale and especially, cohorted (eg by medical condition) is valuable to big pharma and other clinical trial companies seeking cohorts, whilst equally having value for clinical service providers offering personalised services & products (hospitals, insurers). In order to access the full potential of the medical database that exists, patients need to be incentivised to control, enrich, and share their own data.

SOLUTION

We believe that millions of individuals understand the value of their data. They care about a healthy lifestyle and recognise that by taking control and ownership, they can use that data so as they are not the product of that data but the owner of that data; thus they can extract the value and benefits that has for both themselves and the common good.

We put individuals back in control of their data by creating a platform where they can share that data to leverage the value, both for monetary gain and access to more precision and personalised medical care and therapeutics in the form of clinical trials.

By sharing their own data and contributing to the collective database, individuals will gain insights into the potential for having an illness and its potential impact/severity based on clinical data and genomics risk scores.

For patients, they will obtain insights into the availability of clinical trials offering cures/relief suitable for their illness. However, equally, well individuals can earn remuneration for sharing of their clinical/medical data, whilst having ownership, awareness, and control of updated personal wellness and medical data.

Pharmaceutical corporations & hospitals (government & private) can have transparent easy access to this data, facilitating the matching of patients to trials and medical services.

Creating the virtual infrastructure for the next generation of patient-centric clinical data ownership and use creates incentives for democratising and dynamically updating health status at a population health scale. This fundamentally transforms the use and ownership of data creating informed, empowered citizens, encouraging active contributions to a healthy society via a 'selfish altruism' model.

Automated teleconsults and telegenomics lower costs so population level Biosome (clinical NFT) creation, matching of collectives, and trading of same can occur. This globally impacts the clinical trials ecosystem, medical insurance & the clinical services ecosystem by ensuring all citizens are informed and matched to relevant personalised services irrespective of location.

Equally it will offer a community level genomic & clinical distribution infrastructure that can bypass existing silos of data incentivising citizens directly to participate on an ongoing basis.

The key elements of NFTs include ownership representation, transfer, and automation. Fusing AI capabilities into NFTs facilitates intelligent ownership.

The MSX allows:

- Ownership and control of personal wellness and medical data for individuals.
- The opportunity to be rewarded via incentivised marketing and sharing of health data via trading of clinical NFTs.
- Precision matching of clinical data cohorts to medical conditions and clinical trials, benefiting big pharma, hospitals and patient groups.
- Precision matching of patients with medical service and insurance providers.

The data that is funnelled into the medical patient exchange allows patients to provide consent for the use of the data to be used. Access to the data is controlled by a consent module which leverages consent through a private permissioned block-chain.

The TrialBOT matches patients to clinical trials using natural language processing of electronic medical records and sequential asynchronous robotic telemedicine consults that are matched and personalised for a patient's condition based on both their clinical presentation and their underlying genetic profile.

Akkure represents cohorts of patients at a precision level, rewarding them for sharing their data in trials, thereby increasing their leverage in engaging with pharmaceutical companies seeking to trial new therapeutic products or 'cures'. Ultimately providing a patient centric virtual hybrid solution fusing blockchain permissions with GDPR compliant cloud hosted data.

We provide home based genomic testing kits for positively identified user sampling along with dynamically updated multi-omic sampling to ensure ongoing accuracy of patient status. Equally our subscription automated clinical consultation process enables medical profile updates to ensure ongoing accurate matching.

The Akkure Health ecosystem - what is the MSX?

HomeGenie home testing kit

We have developed the world's first home testing telemedicine kit (HomeGenie) - a patented, secure DNA-capturing product allowing sampling directly from home whilst also enabling confirmation of the identity of the user.

TrialBOTS

Our TrialBOTS comprise a web-based clinical trials system, integrated onto partner websites (charities, customer-facing community pharmacies), allowing patients to find trials matched to their clinical condition at a precision level.

The TrialBOTS leverage NLP and automated robotic asynchronous telemedicine consultations, ensuring dynamic live updates of patients condition & relevant trials at a precision medicine level.

TrialBOTS, integrated onto partner websites, funnel clients into data sharing and creation of Biosome onto a native App - Akkure, leveraging off our tech partnership with Microsoft, and integrating their Healthbot dev framework. The TrialBOT is used as a funnel for targeted member acquisition on partner websites (with minimal tech or brand disruption).

The Akkure App

The Akkure App ingests health and wellness data from wearables. We have built in-tegrations for both Apple Health kit and Google Health app at the consumer level. We are also examining wearables that track neurological incidents (such as epilep-sy) at a clinical level.

The Akkure App matches and enhances wearable physiological data to clinical and genomic data. This creates a holistic 'Biosome' which we translate into a digital as-set in the form of a medical NFT.

Q Consults

The patented Telemedicine Q Consult leverages NLP/Speech To Text to provide the 'Always on Doctor'. This automated asynchronous robotic Quantum Consult pro-vides recurrent dynamically updated clinical data capture to the MSX.

Quantum Consult is an asynchronous robotic process automation of clinical con-sults, providing:

- Secure data transfer to Cloud
- Speech to text Artificial Intelligence - transforming data input via video and voice to free text allowing application of NLP
- Natural language processing - provides context and insights from free text con-sults/conversations into disease, clinical status, and medical severity.
- AI-driven transformation of qualitative data ('I feel unwell') into quantitative data (score of 8 on wellness index)

The Biosome

The Biosome is a dynamically updated DNA profile, allowing scaling of 3rd generation DNA sequencing and identification of microbiome commensals in the human body utilising next generation DNA sequencing.

The Biosome is graded in quality (Bronze, Silver, Gold) based on granularity of data, completeness, recency & frequency. This is then matched to an index & precision clinical trials (eg a diabetes index, a breast cancer index) allowing for collective in-sights and trading of data cohorts.

The Cryptosome

The medical NFT or 'Cryptosome' is created from:

1. Genetic data (uploaded or captured using our patented home testing kit)
2. Physiological data (from wearables such as Apple Watch)
3. Clinical (from existing electronic health records)

THE MSX

Finally all this converges to the Medical Stock Exchange (MSX), which allows patients to trade their data in an open marketplace along with providing new market-places for precision medical services and care.

The MSX allows for creation of an individual's medical Biosome fusing collective genomic, physiological & clinical data into a single digital asset. The MSX matches the personalised Cryptosomes into collective cohorts (eg. disease, health status, quality) allowing for trading of this data with prospective buyers (Big pharma, health insurers, hospitals). The trades are consented by the patients, who own the data, with quality of their NFT influencing value & price on the free market exchange.

Buyers request access to the patient's NFTs paying a free market rate, the value of which goes to patients with resell tracking ensuring shared value with carers & MSX.

A hybrid Blockchain digital asset exchange (DAX) allows data to be GDPR compliant and hence deleted yet secured in a manner that maintains an unalterable audit.

Gamification via behavioural nudges & rewards encourages people to maintain recency of data ensuring dynamic updated population level insights for health care trends, whilst at an individual level aligns with personal wellness ownership. This model has been shown to be highly successful with Apple Fitness, Strava, Peloton.

IMPACT

Our initial target is young individuals, aged between 20 and 39, who are interested in health and wellness and track their fitness, diet and sleep statistics using wearables. Their motivation to adopt the technology on offer is twofold:

1. Seeking to secure rewards for data sharing whilst investing in their medical insurance and need for future services
2. Those with existing chronic conditions looking for treatments for their condition beyond what is available at a regional/local level.

Our goal is to return the value of the population-level data to the individual, thus unlocking its true potential.

Creating the virtual infrastructure for the next generation of patient-centric clinical data ownership and use creates incentives for democratising and dynamically updating health status at a population health scale. This fundamentally transforms the use and ownership of data, creating informed, empowered citizens, and encouraging active contributions to a healthy society via a 'selfish altruism' model.

Automated teleconsults and telegenomics lower costs so population level Biosome (clinical NFT) creation, matching of collectives and trading of same can occur.

This globally impacts both the clinical trials ecosystem, medical insurance and clinical services ecosystem by ensuring all citizens are informed and matched to relevant personalised services irrespective of location.

Equally it will offer a community level genomic and clinical distribution infrastructure that can bypass existing silos of data incentivising citizens directly to participate on an ongoing basis.

Our vision is bold and blue sky. We believe we can disrupt the healthtech space in a manner that benefits not only the individual but also the healthcare organisations and pharmaceutical companies that are not currently able to easily access that data for their purposes. This degree of innovation requires investment and a belief in the power of collective change in order to threaten the existing data capture market.

NFTs are becoming digital ownership primitives. Unlike the current physical world, in the digital on-chain world ownership has the capacity to become programmable, composable - and intelligent. Intelligent digital ownership is possible with the current AI and NFT technology.

The value unlocked with the intersection of AI and NFTs impacts many dimensions of the NFT ecosystem.

The next generation of NFTs could be developed utilising intelligence capabilities within image generation, object recognition and scene understanding to enable genomic pattern recognition of dark matter introns within DNA. We foresee bots that can chat in natural language with potential buyers, explaining the value of their properties. NFT wallets could be programmed to decide which ownership rights to present so as to improve the user experience.

The advancements in language, vision and speech intelligence have expanded the possibilities for NFTs. Natively embedding AI capabilities into NFT offers another market dimension, enabling a dialogue to be established with users, and answering questions about meaning or interacting with a specific environment. Natural language understanding can be utilised to formulate questions to find data on the MSX (for example, looking for “active males with cancer”).

NFTs can evolve from basic ownership primitives to intelligent, self-evolving forms, where ownership that allows richer digital experiences and higher utility for both NFT creators and consumers.

STRATEGIC PARTNERSHIPS

Academic Partners - Royal College of Surgeons Ireland University of Medicine. Singularity Alpha is part of the consortium which was awarded US\$8m project in funding as part of the Disruptive Technology Innovation Fund (DTIF) whereby Singularity Alpha have sole rights to commercialise.

Technology Partners - Microsoft are one of our industry partners building our blockchain powered marketplace and part of our DTIF consortium project listed above. Microsoft also engage Singularity Alpha as one of Microsoft's High Potential Startups. This partnership will open our solution to their One Commercial Partner Network for CoSell into their Healthcare vertical as this is an Azure based software solution.

Our solution leverages the Microsoft Azure Platform and in addition we are one of the first partners working with Microsoft on their Microsoft Genomics service. We also have access to their Clinical Trial AI platform, their Health chatbot engines and early access to a number of other health-related AI services which are integrated into the Singularity Alpha offerings.

Given our solution ingests health and wellness data from wearables we have built integrations for both Apple Health kit and Google Health app at the consumer level and are also examining wearables that track neurological incidents like epilepsy at a clinical level.

Finally, as a direct to consumer business we have a mobile first approach to the consumer with native apps for both Apple and Google Android.

Hospitals Partners - St James University Hospital, Dublin, Ireland. Our first clinical trial matching test case, leveraging wearables, genomics and our Quantum Consult technologies. Ethics approval has been granted for the first clinical trial roll out leveraging TrialBOTS and Quantum Consult to match patients to clinical trials using a fusion of clinical data with genomic data and physiological data.

As Ireland's first digital hospital, this presents a tech sandbox to use our SMRT on FHIR interface with CERNERS electronic health records software. The clinical director (and second most senior executive after the group CEO) Prof Sharon Sheehan is the Chair of our Board.

Retail Partners - Boots Walgreens Alliance, Uniphar Pharmacy Group, Haven Pharmacy Group.

Our Commercial and Channel partners have been focused on retail pharmacy where we have coverage of 90% of all Irish based pharmacy chains, along with Walgreens Boots Alliance in the United Kingdom.

We partnered with them in 2020 to carry out over 150,000 Covid consultations through their online assets, and they now want to offer clinical trial matching to their client base. We have commercial commitment from Boots Walgreens Alliance in the United Kingdom (2,500 stores in the UK and 9,000 stores in the US). The CTO of Boots has agreed to launch our Clinical Trialbot.

Uniphar Alliance utilised our Covid Medbots and have distribution to over 250 community pharmacies. They are our distribution partner for Europe, offering a pharmacogenomic and clinical trials service to their clients.

TEAM

PROF ORAN RIGBY MD

- Senior attending physician and surgeon
- Professor of Robotics and autonomous systems QUT.
- Australian Churchill scholar for telemedicine & virtual health.
- Former CEO OneView Health ANZ.
- Former Medical director NSW & Sydney Trauma medical system of 200 hospitals.
- Founder, CEO and exit for medetourism.com
- Founder CEO of PLEXA.ai, medical social network
- Founder CEO and exit Criticare.com (virtual medical services).
- Part of medical research which has raised over 10 million in grant funding and 6 million in equity investment.

CMO: PROFESSOR AMY HOLLINGWORTH MD

- Professor of clinical medicine.
- Senior attending Physician.
- Founder and CEO Femcair Medical Ltd.
- Youngest medical lung transplant specialist and researcher Sydney.
- Part of the digital health team securing over 6 million in funding.

CTO: MR CONALL FLOOD

- A veteran financial software markets engineer.
- Has developed a strong understanding of financial products including Foreign Exchange, Money Markets, Fixed Income, Equity Markets, Derivatives and Order management/execution.
- Designed fintech exchanges for JP Morgan, Banco Santander and Royal bank of Canada.

CHIEF COMMERCIAL OFFICER: MR MICHAEL MEAGHER

- Former Microsoft lead for enterprise startups for Western Europe.
- Director of business development for Nearform (technology software services de-sign company)
- Forefront of technology-based change which has happened with cloud-based technologies.
- Led Microsoft Startup & Scaleup team for Microsoft Western Europe

CHIEF GENOMICS OFFICER: DR ELAINE KENNY

- Former Managing director of Trinseq, Ireland's original next generation sequenc-ing technology laboratory and leading university.
- Founder and MD of Elda biotech - DNA sequencing service provider.

OPPORTUNITY

We see our company as the global leader in providing access to a medical exchange to buy and sell large quantities of medical data, yet under the charter of personal data protection rights.

We envision the opportunity to offer all citizens the ability to profile their personal health via constant dynamic genomic, physiological and clinical personal updates. We see this digital infrastructure as critical to empowering the next generation of health care. It offers a disruptive health economic model whereby healthy young users lend their data in return for rewards that equally can be exchanged for services when older and sicker. This therefore represents a new model for health insurance and equitable access to limited health resources.

Allowing an individual to take control and ownership of their own personal data records is at the forefront of GDPR concerns. This is a core principle of Singularity, where we put the individual in control of their collective fused health data, who accesses it, and how the value of that data is unlocked.

Building user confidence and responsibility is key to economic development and a more comprehensive policy on the core right to personal data protection.

We have seen the convergence of macro trends in society, technology and economics into a Singular opportunity to offer citizens the digital infrastructure to unlock this potential. Now is the time to take this to the next evolutionary stage by creating an open medical exchange to allow for such sharing but with the user control built by design to ensure ownership and the rights of others to access that data.

General Data Protection Regulation (GDPR) puts data protection and privacy to the forefront of individual rights which is quickly becoming a global standard. Our hybrid blockchain architecture uniquely addresses the paradox of GDPR compliance with blockchain infinite immutability. Creating a medical stock exchange where an individual can share fused health data in a compliant manner unlocks huge economic benefits for the individual and removes capacity for large corporations to trade this health data for their own economic benefit without consent.

For our users to get paid for the sharing of their data unlocks new economic value for citizens worldwide - whilst simultaneously creating a new platform to revolutionise access to precision medical services as an accelerant to advanced medicine.

Opportunities exist at multiple levels:

- Transaction-based commission (via re-sell tracking) from trading of Cryptosomes (combined dynamically updated patient clinical data) to purchasers (eg. Roche pharma). (10-15% of value of trade.)
- License based fee for purchasers (corporations, businesses) to access exchange and to trade/access Cryptosomes. (Purchasers are screened and must be awarded license to trade.)
- Sponsorship/advertising fee, whereby companies advertise, paying a fee to secure naming rights (sponsor) to various wellness contests that gamify and provide behavioural nudges to encourage clients via incentivised marketing and rewards to optimise the Cryptosome by increasing the data recency, frequency and scope across the trifecta of clinical / genomic / physiological data.

MARKET OPPORTUNITY

Israel estimates the value of their data to be US\$600 billion. This data is valuable to big pharma and other clinical trial companies seeking cohorts, whilst equally having value for clinical service providers offering personalised services and products (hospitals, insurers).

Commercial companies are currently buying other companies to unlock the inherent data in those companies (a good example of this is Pharma giant Roche, who paid US\$1.9 billion in 2018 to acquire Flatiron Health, an oncology data company that captures data from hospitals and health centres). This is an inefficient way of gaining insights or managing data sources in an effective and compliant manner.

Given there is no ecosystem to trade health and wellness data, these organisations have to revert to partnership or acquisition in order to access the data. At present, user data is being traded by commercial companies, governments, and hospitals. With a Medical Stock Exchange, commercial companies will be able to “rent” data access based off their needs and requirements, being able to search and index specific cohorts they require insights from.

With the explosion of wearables and wellness apps, more and more of the population are amassing large volumes of personal health and wellness data with no way of monetising it.

The world’s first Medical Stock Exchange will allow users to unlock the siloed data and trade medical data. Users will be able to create their health data profile by performing an AI-driven medical consult, then upload their data (genomics and health records) along with connecting to their health tracking apps. This data will consist of their Biosome profile and would equal an NFT (Non-Fungible Token). That value will rise as the user adds more health and data insights, thus making their data more attractive.

This is an entirely new value chain to users in the general population. Today there is no mechanism to take one’s own personal medical data and monetise for their benefit or leverage it for precision medical services. Singularity Alpha provides this mechanism.

Total Addressable Market (TAM)

We are targeting citizens aged between 20 and 39, both male and female, interested in health and wellness with a keen interest in their own health; someone who tracks their fitness, diet and sleep statistics using wearables and today’s technology.

The TAM is thus estimated at 2.3 billion - 29.9% of the global population.

Serviceable Available Market (SAM)

We aim to be able to service a market size of 100 million users within 10 years with the same audience demographic described above.

Serviceable Obtainable Market (SOM)

We believe the fastest route to growth is with our focused audience demographic, who own fitness wearables. According to Cisco Systems, the number of connected wearable devices is expected to increase from 592 million in 2018 to 1.1 billion in 2022.

We aim to target 5 million users by year 5 with the same audience demographic described above.

Market Growth Rate

The Compounded Annual Growth Rate of our targeted market is 25% year-over-year.

The Market Annual Growth Rate is that of the Global Smart Wearable Market, fore-cast to grow by 19.48% from 2021-2026. The shipment volume of smart wearables globally stood at 266.3 million units in 2020 and is projected to reach 776.23 million units by 2026, registering a CAGR of 19.48% during the period 2021-2026.

Competitive advantage

Whilst other companies are increasingly focusing on the opportunities to unlock an individual's health data and allow them to gain greater control over how and when this is accessed, no comparable solution exists today for patient populations to exchange their health data for either access to personalised medicine or to share or trade their data for financial reward.

Having an open exchange for health data trading not only provides insights in socioeconomics for governments and corporations but also provides benefits by accelerating commercial opportunities for life sciences companies by recruiting patients to clinical trials & reduced drug development time and the launch of novel therapies. The ease and UX of creating, trading and updating a personalised digital health asset empowers users and democratises access to shared insights and personalised health services. No such solution for this holistic health, global, centralised data repository yet with decentralised patient centric control exists.

Whilst US based high tech Facebook, Microsoft, Google, Apple have all invested billions in clinical data storage, the MSX is positioned to collectivise all.

We have demonstrated significant competitive abilities to partner with Microsoft & the Royal College of Surgeons. Our consortium won the 2020 Irish government DTIF digital technology innovation fund with a €6 million project. Equally we raised Ire-land's largest crowdfunding seed round of over €1 million in one week. To build & scale the MSX to the EU requires EIC help.

FUTURE STRATEGIC DIRECTIONS

Currently significant barriers exist that limit the full access to and potential of an individual's own data bank:

- limited accessibility and knowledge of opportunities
- few incentives for individuals to share their medical information
- lack of trust that sensitive medical information will be kept secure
- lack of digital health record interoperability and ease of aggregating data

The clinical research industry (pharmaceutical firms, research institutions, regulators) has attempted to implement solutions to address several of these issues, but none have fully succeeded. Blockchain is the disruptive technology that has the potential to be the game changer needed to solve these issues. At its core, blockchain provides a specific set of capabilities: transparency, trust, disintermediation, audit, provenance of data and smart contracts.

Hence our downstream partners are amongst those who would gain most from our ongoing project.

- Patient charities and advocacy groups
- Pharmaceutical industry; pharma can save significantly through direct-to-patient targeted and incentivised marketing
- Major hospital and health networks

Data protection is paramount and must embrace both HIPAA and GDPR. Blockchain secured data on a hybrid chain model goes several steps beyond this in terms of consumer protection and access. As a principle data is NOT owned by AKKURE. We merely provide the framework for clinician and patient interaction and data access. Data on our blockchain is secured by a sophisticated cryptographic technique called homomorphic encryption.

This involves zero sum knowledge transfer. The area we see this first is in genomics - where rare variants are valuable and people are particularly concerned about 3rd parties gaining access to their data and profiting off it.

Beyond better data sharing, blockchain offers an opportunity to improve healthcare before the treatment phase - in research and clinical trials. Virtual clinical trials represent a relatively new method of collecting safety and efficacy data. These trials take full advantage of technologies (apps, monitoring devices) and online social engagement platforms which we have integrated for medicine.

One critical way to reduce the cost of new drug development is by improving recruitment in safety trials. The cost is incredibly expensive both from a time and capital perspective, especially for rarer diseases. This is the reverse of the well-known "Moore's Law".

Almost 80% of trials fail to meet initial targets. As many as 40% of Phase III trial subjects become disengaged and drop out. Data is becoming more and more valuable - whether to train algorithms, find better therapeutics, or understand where clinical trials should be set up.

This means patients and institutions have an opportunity to monetise their datasets. The virtual trial design may allow groups who have a vested interest in the success of the trial (including investors, physicians, government agencies, patient advocacy groups and even the patients themselves) to have more opportunities to play an active role in the study, leading to better data quality and shorter timelines.

NEW IDEOLOGY

Patient-centric health, ownership and control

In the world today the new asset class is data - created by us but captured by our digital landlords (social media companies, search engines, governments, banks etc). We need to recover this data - our “digital identity” - and manage it responsibly in our own interests. Healthcare data is ubiquitous, highly sensitive and highly siloed. The biggest single obstacle to new drug development and life-saving new therapeutics is the ability to access enough clinical (patient) data on relevant verticals or medical conditions to facilitate powerful clinical trials and personalised treatments.

Multiple stakeholders ranging from academics, researchers, institutes, governments, health insurers and hospitals hold silos of data which they are reluctant to share or contribute for fear of losing the benefits of this private ‘hoard’. However by clearly attributing ownership and securing ‘rights’ to this data the fear of loss or dilution of this often hard-earned data is removed.

With blockchain, people can possess unique, immutable identities in a “digital black box”. AKKURE will help patients capture data that patients in turn can monetise, and protect their privacy.

Our business model involves building a network-based universal cloud platform, and forming a decentralised autonomous organisation ultimately employing a blockchain-based utility token (the Axon; AXN), integrated into the matrix of the entire ecosystem. Thus ensures ownership of the platform by its members - patients, doctors, and hospitals. Tokens enhance the economic incentives of users of internet products. A token is required to use the platform, but does not give any specialised rights within the network. What it does give is access to the service and ability to enrich and gain value from the data that belongs to the individual - the electronic medical data. Scarce tokens combined with a useful service can create massive value for token holders (doctors and patients).

When we have ownership, we naturally care more about the products we use. Economic incentives are the lowest common denominator that we have as humans and embedding incentives into patient care is powerful. Tokens enable Internet tribes to emerge not in the form of traditional companies as we know them, but instead in a new type of organisation called a decentralised autonomous organisation (DAO). A ~DAO is best described as a group of people bound together not by a legal entity and formal contracts, but instead by cryptographic shares (incentives) and fully transparent rules that are written into the software. In this way, all patients and doctors can benefit from belonging to a genuine community created via network ownership effects.

It is about an entirely new business model that is being created and tried for the first time: a decentralised clinical model for health. In this model there is no central controlling company, government, hospital or insurer, with shared contributions and ownership by all patients and members involved. This model is uniquely enabled by the combination of the internet and cryptocurrency. Instead of a central entity making money by owning and extracting rent from the network they created, a software protocol replaces the central operator, and all of the patients, doctors and contributors to the network mutually own it. Contributors to networks (like drivers for Uber) look less like worker bees and more like mutual owners in the network they are creating value in. True next-generation medical clinical trials.

WHY BLOCKCHAIN TECHNOLOGY?

Blockchain is a borderless, open source, decentralised peer-to-peer network that governments cannot shut down. Blockchain's dual ability to establish the provenance of healthcare data and ownership and hence digital rights and clinical trial participation and reward works to reduce the current reliance on data brokers and other middlemen, who are essentially capturing and selling an individual's genetic and health data.

Once the provenance has been recorded in the blockchain, it never has to be done again, removing significant costs from the system. Blockchain establishes the chain of ownership, preventing anyone from stealing/defrauding or tampering with the health record.

One of the most universally applicable aspects of blockchain technology is that it enables more secure and transparent monitoring of transactions. Provision of health data for clinical trial participation is basically a temporary series of transaction nodes that link to move data from Member A to Member B.

All transactions can be documented in a permanent decentralised record - reducing time delays, added costs, and human error.

Similarly, increased levels of data fraud prevention and theft enabled by the blockchain's unique verification capability also save costs and help prohibit illegitimate users from obtaining sensitive confidential data.

There are 3 compelling reasons why AKKURE have chosen a hybrid blockchain solution to support the technological framework of the cloud-based platform:

1. **Decentralised** - moves beyond any individual government and allows for global access. Prevents fraud and unknown or permission access by third parties to patient data.
2. **Secure & immutable** - allows for secure management and attribution of clinical trial rights ownership. Creates a clear trail and ensures provenance of transactions.
3. **Shares and incentives** - perfect solution to gain traction in a social network and reward patient and doctor engagement whilst creating a suite of creative advertising solutions for the medical and pharmaceutical industry.