EARTH ID - EXECUTIVE SUMMARY

Project Description
This project is to understand the different methods used to identify individuals, analyze the regulatory and ethical gaps regarding personal identity, pinpoint the problems current systems bring to the society, and propose a new global identity solution with the effort to achieve net positive impact on our society, economy and environment.

Current state
The current state of personal identity relies heavily on centralized authority. We have identified two major issues with the existing systems - the security of identity and the lack of identity.

Regulatory/ethical gaps
Having a personal identity is recognized as a human right in international law, yet our current regulations fail to protect and enforce people's right a legal identity, allowing the existing systems to be taken advantage of for unethical behavior such as human trafficking and identity theft, as well as causing economic and social problems with more than a billion people living around the world without an identity.

Humanity
We elaborated on the concept of humanity by redefining the idea of personal identity, providing a trustworthy and robust system through a decentralized network based on Blockchain, and giving the control of personal identity back to the people.

Net Impact
Our proposed solution, EarthID, is a utilitarian concept designed to have a positive impact on our society, economy and environment. EarthID brings legal identity to more people with the goal to maximize human flourishing, provides better security to protect personal identity, balances out the power to control identity between regulators, businesses and individuals, and is accessible from anywhere around the world, without having to carry any identification documents.

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PROJECT NAME: EARTH ID
A trustworthy and robust global identity system

INTRODUCTION:
This project is to understand the different methods used to identify individuals, analyze the regulatory and ethical gaps regarding personal identity, pinpoint the problems current systems bring to the society, and propose a new global identity solution with the effort to achieve net positive impact on our society, economy and environment.

ISSUES/RULES:

- Context of identity
As James D. Fearon, a political science professor at Stanford University puts it, identity is "a social category, defined by membership rules and (alleged) characteristic attributes or expected behaviors".[1] Every human being on this planet is an unique individual, and the purpose of identity is to ensure that this is recognized and enforced. Historically, human used body marks, jewelries or objects to identify individuals. As we become more and more connected in this world, the methods evolved overtime. In today's society, government-validated identity, such as an ID card or passport, is the most widely used method by not just the governments, but also different businesses and institutions.

- Current problems with identity
However, many incidents have proven these methods to be majorly flawed. When an individual's identity is only tied to single or limited sources, such as a government-issued document, ID number or personal certification, it makes the identity vulnerable to stealing, faking or modification. We are witnessing problems such as identity theft, global terrorism and human trafficking becoming more serious day by day.

- Security issue of identity
In this digital age we live in, our personal information, including identity data, is constantly at risk for cyber attacks. The recent Equifax incident is an example of the economic and social impact of a global cyber attack - a victim's financial credit score can potentially be ruined, and if one's identity was used to commit crime, he/she would have to go through complicated and time consuming process to disprove everything, with no guarantee that his/her reputation is not affected. Moreover, this is a problem not just for the people - businesses and organizations pay millions of dollars to ensure every transaction made on their servers is secure. Many organizations keep digital clones of our identity, even though there is only one physical version of us. Clones in the digital world are usually not identical, and these variations can lead to problems such as multiple systems of entry or just a mismatch in identity. The security issue of identity also causes many problems for the government. Cases of identity theft can take place anywhere from the local ATM to the White House Office of Personnel Management. In 2016, according to Javelin Strategy & Research, identity theft cost the U.S. $16 billion and affected more than 15 million Americans. That brings the total amount lost to identity theft in the past six years to $107 billion, and this is just in the United States.[2] Lastly, fake IDs are an important tool for terrorism. For example, during the recent attack in Paris, some of the terrorists possibly used false passports to facilitate travel in Europe and at least one of them posed as a Syrian refugee to enter the EU. This clearly points to the fact that identity theft and fraud are directly tied to both national

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[1] James D. Fearon, "*What is Identity (as we now use the word)?",* (Stanford, CA, 1999)
[2] Shin, Laura. *"The Identity Solution*" Forbes. June 23, 2017. Accessed December 09, 2017.
https://www.forbes.com/sites/laurashin/2017/06/22/the-identity-solution/#788c2f1572ed

and global security. The ability of terrorists to steal or falsify identities is a major weakness to the counterterrorism efforts.

- Issues with lack of identity

On the other hand, even though everyone who has a birth registration certificate and civil documentation enjoys the right to be recognized as an unique individual before the law, those who don't have the documentations are likely to find it highly difficult to assert their rights merely on the basis of the claim "I exist". There is no established and secure digital identity system with a verifiable biometrics component for the 7.5 billion people living on Earth. Consider the countless, tragic incidents of human trafficking. If a birth is never properly recorded in a reliable trusted system, a child can easily disappear without a trace. While everyone in the world is born with a unique identity, not everyone in the world has a proof of their identity. An estimated of 1.1 billion people around the globe currently don't have access to obtain legal identity, with more than half of them living in lower-middle income economies.[3] This number not only includes migrants, but also undocumented children, refugees and more. The most affected are the marginalized groups, including women and children, indigenous people and ethnic, linguistic or sexual minorities. To the world, these people do not exist. "If I die, nobody would even know my name," is a common feeling from undocumented citizens from central China.[4] The lack of official identity has a huge impact on people's lives - ones without a valid identity don't have access to social services, education, health care, not to mention their ability to travel or get married legally. Furthermore, the lack of identity also puts undocumented children at huge risk for human trafficking. This also poses a huge obstacle to the economic growth as it is impossible for these people to open a bank account or find a legal job. A 2017 report from ID 2020 asserts that the financial exclusion that results from lack of identity has created a shadow economy around the world with an estimated GDP of $10 trillion a year, making it the world's second-largest economy.[5]

There have been many instances in the last few years which have proved that the standard methods of identification have failed to treat people as humans. For examples, millions of refugees from countries that were torn apart by wars or political chaos have fled to other countries, where it is extremely difficult for them to prove their identity without a government. The definition of legal identity put forward by UNHCR, UNICEF, UNDP and Plan International, working together on the issue in the Asia-Pacific region: "the recognition of a person's existence before the law, facilitating the realisation of specific rights and corresponding duties."[6] It is an urgent matter to tackle the problem of lack of identity, not only for the world economy, but also for humanity. In 2015, over 150 leaders around the world agreed to "provide legal identity to all, including birth registration, by 2030." as part of the UN Sustainable Development Goals.[7]

- Current solutions and its flaws / problems

For these reasons, the right to a legal identity is fundamental to inclusive development as it is the very basis of social inclusion. In the last few years, different technologies have been

[3] Vyjayanti T Desai, "*Counting the Uncounted*",
http://blogs.worldbank.org/ic4d/counting-uncounted-11-billion-people-without-ids
[4] Matt Sheehan, "*13 Million People in China Don't Have the Document that would Guarantee them Rights*",
https://www.huffingtonpost.com/entry/china-undocumented-residents_us_56692ca3e4b080eddf570d99
[5] Shin, Laura. *"The Identity Solution*" Forbes. June 23, 2017. Accessed December 09, 2017.
https://www.forbes.com/sites/laurashin/2017/06/22/the-identity-solution/#788c2f1572ed
[6] Laura Van Waas, "*The right to a legal identity or the right to a legal ID?*",
https://www.statelessness.eu/blog/right-legal-identity-or-right-legal-id
[7] Ben Schiller, "*The Radical Plan doe a Global Identity System for a World with Shifting Borders*",
https://www.fastcompany.com/3063079/the-radical-plan-for-a-global-identity-system-for-a-world-with-shifting-borders

adapted to various identification methods in an effort to provide a more robust identity system. Estonia is one of the few countries that currently has a digital ID, making the process of getting identified easier for their citizens. However, digital IDs are managed by centralized government authorities and can also be a source of risk: an important security flaw was recently discovered within the Estonian National ID Card.[8] Another popular solution is facial recognition technology. TrendForce expects Apple's adoption of 3D sensing modules for the facial recognition system to have a similar impact on take-up of the tech.[9] The total value of the global market for 3D sensing modules used in mobile devices is estimated to reach US$1.5 billion in 2017, and is forecast to grow at a massive CAGR of 209% to around US$14 billion in 2020.[10] MONI and BitNation are examples of using blockchain system to record data of individuals, and the UN also uses biometric identity system in an effort to solve identity issues for refugees.[11] However, without people adapting to the technology on a global scale, many problems remain unsolved. Co-founder of the global initiative ID2020 John Edge once said, "these are frequently disconnected from one another, making tracking people across borders difficult."[12]

ANALYSIS: LEGAL & ETHICAL ANALYSIS

- Regulations on identity
Identity is at the core of law in many ways. There are many regulations on the security of identity, including Identity Theft and Assumption Deterrence Act of 1998, Identity Theft Penalty Enhancement Act of 2004 and Identity Theft Enforcement and Restitution Act of 2008. However, the current regulations and laws fail to enforce individual's right to have a legal identity, even though international laws recognize personal identity is a basic human right.[13] Identity is the foundation of how the world works, and will become more and more critical with the advancement of AI and other inanimate intelligent technologies.

- Blockchain as a solution to replace some regulations
Decentralized networks based on blockchain system give people the right to access information that are not enforced by the government, but by cryptography. Laws do not need to regulate the use of information as the architecture of the technology will do so instead. According to the Congressional resolution, proposed on July 14, 2016 in the U.S., "blockchain technology with the appropriate protections has the potential to fundamentally change the manner in which trust and security are established in online transactions through various potential applications in sectors including financial services, payments, health care, energy, property management, and intellectual property management."[14] Blockchain is critical to the securitization of intellectual properties because it guarantees the

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[8] Schneier on Security, *"Security Flaw in Estonian National ID Card"*,
https://www.schneier.com/blog/archives/2017/09/security_flaw_i.html
[9] Ben Lovejoy, "*Analysts predicting 227.5M iPhone sales this year en-route to 'the trillion-dollar iPhone*",
https://9to5mac.com/2017/09/12/analysts-predicting-227-5m-iphone-sales-this-year-en-route-to-the-trillion-dollar-iphone/
[10] ibid
[11] Mariama Mary Fall Dia, "*UNHCR distributes biometric ID cards to refugees in Senegal",*
http://www.unhcr.org/en-us/news/makingdifference/2012/10/508536389/unhcr-distributes-biometric-id-cards-refugees-senegal.html
[12] Ben Schiller, "*The Radical Plan For A Global Identity System For A World With Shifting Borders*",
https://www.fastcompany.com/3063079/the-radical-plan-for-a-global-identity-system-for-a-world-with-shifting-borders
[13] Wikipedia, "*Right to Personal Identity*", https://en.wikipedia.org/wiki/Right_to_personal_identity
[14] Divya Joshi, "*How the Laws & Regulation Affecting Blockchain Technology Can Impact Its Adoption*",
http://www.businessinsider.com/blockchain-cryptocurrency-regulations-us-global-2017-10

validity of each transaction by recording it on a main centralized register, as well as a connected publicly distributed system of registers. The fact that data is embedded within a public network and updated with each transaction promotes transparency and prevents modification or corruption.

- Difficulties with different jurisdictions / dispute management
While we believe blockchain provides a self-governed trust system to store and exchange personal data, regulations remain important to ensure it is running properly and ethically. Currently, the major legal issue regarding blockchain is that while regulators need to adapt quickly as it becomes more prevalent, it is difficult to identify an appropriate governing law for the use of the technology. Since the nodes on a blockchain can be located anywhere, not bound by any boundaries of jurisdictions, this can lead to a number of issues related to relevant contractual relationships as the regulations of contracts and titles are not universal. If transactions fell under the jurisdiction on location of each and every node in the network, the blockchain system would need to satisfy the umpteen number of regulatory regimes. Though blockchain provides a complete decentralized network, it is still important to build in some sort of dispute management to reduce uncertainties. According to a DLA Piper publication on blockchain, "The inclusion of an exclusive governing law and jurisdiction clause is therefore essential and should ensure that a customer has legal certainty as to the law to be applied to determine the rights and obligations of the parties to the agreement and which courts will handle any disputes."[15]

- Privacy issues
Another issues is about privacy. Even though blockchain system allows its users to be anonymous, in many cases it is necessary for people to reveal their identity. Whenever users are asked to disclose their personal information, there will be issues around privacy as the use of personal data is heavily regulated in many jurisdictions. One of the biggest features of blockchain is that once data is stored, it cannot be deleted or altered. This can also become a privacy issue, especially in cases of metadata sufficient enough to reveal someone's personal private information. Legal or technology based preventive measures might be required in order to counter this issue and bring a balance between privacy and transparency. For example, a user's passport or other identity information might be securely encrypted, but the proof of validation could be used publicly on a blockchain system for the purpose of a transaction, without revealing the underlying private data. There are no property rights on information itself; however, compilations of data in a database may be protected by intellectual property rights. For example, If a buyer wants to use the personal information of an individual's database for a new purpose, they will have to get consent from that individual in order to comply with the Data Protection act, a regulation designed to protect personal data stored on different systems.[16]

- Liability issues
Liability is also a challenge with transactions done on a blockchain system. Since it is decentralized, if anything goes wrong, it can be very hard to identify who is to blame for the problem and who would take the responsibility of fixing it. Liability can be hard to prove and there is no form of accountability. Thus, the allocation and attribution of risk and liability needs to be well thought through between all the relevant stakeholders.

- Lack of regulations on blockchain & opportunities
Currently, the U.S. federal government doesn't enact specific legislation to regulate

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[15] DLA Piper Global Law Firm, "*Blockchain: Background, Challenges and Legal Issues*", https://www.dlapiper.com/en/oman/insights/publications/2017/06/blockchain-background-challenges-legal-issues/
[16] ibid

blockchain across the nation, and different States are free to introduce their own rules in this area. For example, although New York did not enact statewide legislation recognizing blockchain for record-keeping purposes, in June 2015 it became the first state in the U.S. to regulate virtual currency companies through state agency rulemaking.[17] Some of the most important developments of blockchain regulation and implementation in the U.S. include the recognition of smart contracts in Arizona, blockchain as evidence in Vermont, real estate records in Chicago and the pending initiative to authorize registration of shares of companies using blockchain in Delaware.[18] Many large businesses are hesitant to launch any projects based on blockchain technology because of the lack of regulation in this area. This opens up an opportunity for new and disruptive organizations to gain an advantage over incumbent businesses.

- Regulations on facial recognition as ID method
In regards to facial recognition being the new and trending way to identify individuals, "Missouri, Maine, and New Hampshire laws prevent state agencies from collecting, storing, or using individuals' biometric data in connection with ID cards or driver's licenses."[19] However, according to the American Bar Association, none of these laws nor any other existing laws regulates the use of biometric information for law enforcement, immigration or national security.

ANALYSIS: STAKEHOLDER ANALYSIS

- Managing all stakeholders
It is important to provide secure and authentic identity to everyone around the globe as this is the first step for people to have access to many other human rights, including education and healthcare. Recognizing the vital role identity plays in a globally connected world, there is a need to bring stakeholders together and collaborate to solve key identity management issues, such as preventing identity theft, securing data and transactions, protecting data in laptops and mobile phones and protecting national borders and ports.

We have identified the categories of relevant stakeholders for this project, including core, direct and indirect stakeholders. The core stakeholders, mainly the people, are the ones to receive benefits of having a secure and authentic identity, including public services, jobs, social connections and more. The Direct stakeholders, such as the technology providers, coders, token holders, staff and etc. are directly involved with or responsible for the core stakeholders and offer services directly to them. Lastly, the indirect stakeholders, including the policy makers and the regulatory bodies, are the ones who devise, pass and enforce laws and regulations to govern the system. See Appendix A for the complete stakeholder map.

In order to gain participation and support from all stakeholders, it is important to understand not only the potential stakeholders, but also their interests in the effort to create a new and improved identity system. It is with this level of understanding, they will we be able to invite their involvement, address their concerns and demonstrate how the new system can benefit them, to achieve a true collaboration among all stakeholders.

- Evenly distributed power among stakeholders
While there is some controversy surrounding blockchain technology, it is important to understand that power is meant to be distributed among all the stakeholders. No one

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[17] ibid

[18] ibid

[19] Ted Claypoole and Cameron Stoll, *"Developing Laws Address Flourishing Commercial Use of Biometric Information",* https://www.americanbar.org/publications/blt/2016/05/08_claypoole.html

stakeholder should have any greater influence or power over the others to change the system. All stakeholders are interdependent and incentivized to cooperate in conserving the extant network rules, and any change to the network rules requires coordination and consensus among all. To use a current example of Bitcoin to demonstrate this, according to a Harvard Business Review article, "when the software developers began debating about how to increase network capacity, the discussion devolved into a multi stakeholder melee that was dubbed as a 'governance crisis' by the popular media."[20]

- Difficulties to reach consensus
However, as the blockchain community grows, it is no easy task for all stakeholders to reach a consensus on changing the network rules, especially on a global scale. This is a problem by design to reinforce the original principles of the blockchain creators. Blockchain networks resist political governance because they are governed by everyone who participants in them, and by nobody in particular.

CONCLUSION: DESIGN RECOMMENDATIONS

Without a personal identity, it is difficult to protect people's rights and to offer them equal opportunities as those who are properly documented. Refugees, for example, can be exploited, and undocumented children are more vulnerable to trafficking schemes. Without a secure identity system, It is easy for victims who experienced identity theft to suffer from the negative impact of their reputation, and global crimes can be committed under somebody else's identity.

Centralizing the network of personal identity creates a single point of failure, and builds a repository of high value data that can attract hackers. Proper controls need to be in place to maintain integrity.[21] A solution without a central point of failure or data storage provides a "triple-blind privacy." Simply put, the sender doesn't know where the data is going, the receiver doesn't know where it came from, and the network cannot see the data itself while in motion or at rest. Therefore, users cannot be tracked across relying parties and data is never "in the open" while it is on the network.[22]

We propose a solution called EarthID, a blockchain-based identity management platform that allows users to register and validate their personal identity information through advanced facial recognition technology. For advanced facial recognition systems such as Face ID, Apple claims there is a 1 in 1,000,000 chance that someone would be able to open your phone using Face ID (compared to 1 in 50,000 chance of having the same fingerprint as you).[23] EarthID will allow millions of people to quickly prove who they are through facial recognition verification and blockchain data storage system. Having a single identity system, instead of multiple duplicates, means a person will be able to access the data from where this ID is linked, such as medical or school records. Furthermore, a decentralized network storage system will protect everyone's identity data against theft, fraudulent activity and potential security breaches. When people register themselves on EarthID, they will have the ownership over their personal identity that is free from tampering. Once a piece of data is registered to the blockchain system, that information cannot ever be lost or changed.

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[20] Patrick Murck, *"Who Controls the Blockchain?",* https://hbr.org/2017/04/who-controls-the-blockchain
[21] Stewart Bond, "*It Was Only a Matter of Time: Digital Identity on Blockchain*",
https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=GIL12346USEN&
[22] Ibid
[23] Karen Haslam, *"Face ID v Touch ID: Security & Privacy"*,
https://www.macworld.co.uk/review/iphone/face-id-versus-touch-id-3666345/

This system will provide all people with the dignity of having a secure identity. People will be able to travel securely with an easy way to share who they are, eliminating the need of paper proof, reducing current problems such as human trafficking or intensity loss issues. EarthID is designed for human flourishing, with its goal to create a decentralised system which is transparent based on important values such as empathy, freedom and equal opportunities for all.

EarthID users will be able to see and access all the public and private services that are linked to their identity. Users don't have the ability to modify any data on the system, but they are able to control and grant access to who they agree to see their information, and what part of the information. For example, this could be their date of birth to access a specific site, home address information and credit history when requesting a loan. Other services can include banks, telecommunication providers and even government agencies. These services can share relevant records tied to the user and record it through the blockchain technology, but the users are the ones with the control over who can access the data.

EarthID will be a self-sovereign identity leveraging facial recognition technology, which we believe will go mainstream in the next few years. It ensures privacy and trust as transactions will be secure, authenticated and verifiable. Users will be able to identify themselves by getting their face scanned on the EarthID platform, whether through a mobile phone or an EarthID-ready device. This will remove the need for users to remember ID numbers or passwords making procedures uncomplicated, smooth and easy. The results of a 2016 Intel Security survey showed that "an average person has 27 (different) digital identities and it has become almost impossible for users to remember all the rules for each of their digital identities and credentials"[24] Furthermore, EarthID consolidates all identities, digital or not, used by individuals across multiple systems into one, which will remove the need to reconcile data differences. All data will be integrated within a single, blockchain-based, system, helping users take control of their own information while minimising stress and uncertainty.

Having an identification system which relies on facial recognition means that facial features will be associated with one's identity. This can even be used for some of the complex Know Your Customer (KYC) and Anti-Money Laundering (AML) regulations that banks have to adhere to. KYC and AML are two of the biggest reasons banks and healthcare providers have not adopted blockchain – because there is no reliable way to verify identities.[25] EarthID would solve this issue through a trusted, dynamic, decentralised and autonomous architecture for a new era of identification.

EarthID is a technical solution to solve a human problem, which aims to empower people, communities and society around the world while bringing new economic opportunities through the removal of entry barriers and free-thinking lifestyles. The system will be built with the idea of modification in mind, being able to adapt as people's thinking and behaviour evolves.

CONCLUSION: BUSINESS/STRATEGIC ANALYSIS

Though the right to personal identity is recognized by international law, there are still many challenges with identity today, especially social and economic problems, with the lack of access to one as well as security. We have witnessed how blockchain has empowered

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[24] ibid

[25] Ric Merrifield, *"The Truth about the new iPhone Face ID Feature"*,
https://ricmerrifield.com/2017/09/13/truth-new-iphone-face-id-feature/

consumers financially in the last few year, through digital currencies such as Bitcoin or Litecoin, and it is time to bring that empowerment to people regarding their identity - the most important aspect they own - through EarthID.

- EarthID IP strategies
The success of EarthID relies on being the only one identity system in the world, and every other personal data is connected to it in a secure way to make it more robust than any identity methods exist currently. The value we hold here, is to give the control of personal identity back to the people, build a trusting relationship into this hyper-connected and global community, and bring equality among all individuals. Because of this value, we believe that our IP should also belong the people. Similar to the blockchain system where it is owned by everyone and no one in particular, our IP will be owned by our users as well. The most important action we must take is to implement proper infrastructure that would support and enforce this trust-driven system and relationship. For example, we must ensure that no single group of people can gather 51% of power to have the ability to rewrite the system.[26] On the other hand, with a strategy of not owning the IP of our design, we will be able to encourage innovation. The motivation for us to constantly improve our system will not be driven by incentives, but rather the goal and mission to keep EarthID running as the only one identity system.

- EarthID challenges / obstacles
For EarthID to be successful, there will be many challenges that we need to face. First, scale an adoption will be difficult, as a change of behavior is required for not just the consumers, but also businesses and governments. The success of EarthID depends on a global-wide adoption, yet institutions, such as banks and airports, are some of the most regulated and risk-averse organizations when it comes to new technology. Secondly, we have also identified a social issue to be explored further. EarthID will normalise facial scanning, a technology that can be abused and used for unethical actions. With the introduction of FaceID from the latest Apple iphone release, people are concerned that the technology opens up the potential for users to be spied upon by giving camera permissions, and unknowingly give out private data or domestic context of the device owner. EarthID must enforce that the users have complete control over who can have access over their data, and get notifications when somebody is looking at their information. Lastly, facial recognition is a smart technology that can learn the changes of people's facial features and update your identity accordingly over time. However, in instances where people's facial features undergo structural changes from accidents or surgeries, EarthID must allow users to update their identity easily by verifying other relevant and recent personal data stored on the system, which nobody else has access to. This will also ensure EarthID to be an inclusive system with respect to different cultures and religions. For users who choose not to be identified with their facial features, such as women who wear veils for religious reason, they will have the option to prove their identity with other personal data that are linked to the system.

CONCLUSION: IMPACT ASSESSMENT (POSITIVE IMPACT STATEMENT)

EarthID is an utilitarian concept designed to have a positive impact on our society, economy and environment. The real questions about the future of iden. As users, we are always required to sign the interminable contracts and terms of agreements with companies who provide us services in exchange of our data. However, as Patrick Spens, the blockchain consultant at PwC puts it, "If you have a digital identity, in theory you could ask Apple to sign

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[26] Mohit Mamoria, "*Who owns the Blockchain?*",
https://medium.com/@mohitmamoria/who-owns-the-blockchain-9b3af7a2ab76

your terms and conditions because, as individuals, we would be in charge of our identity."[27] Your identity would be stored securely and privately via facial recognition leveraging blockchain record-storing system, and the users would have the control to grant people access to their data to verify their identity, such as their doctor, employer or a customs official. Users will be able to keep track of who accessed their data and when. Best of all, their identity cannot be deleted or altered from the system to prevent issues such as human trafficking or terrorism. EarthID makes it harder for terrorists to falsify their identities, and prevent them from acquiring valuable identity documents. Providing legal identity to all isn't the endgame for EarthID. It will empower human flourishing by giving people opportunities, bring greater equality, greater inclusion and greater ability to claim rights for each individual living on this planet. EarthID could help reduce avertable crisis, including human trafficking, child labor, and refugee migration.

- Positive impact on individuals
EarthID is a net positive design that considers all stakeholders, which we will divide into three categories, consumers, businesses and governments, to elaborate further. EarthID provides a convenient and seamless experience for all individuals to have access to different services, including ones that fulfill basic human needs. Individuals will have better control over their personal data with the decentralized identity system. "Blockchain is the underlying technology paving the path to self-sovereign identity through decentralized networks."[28] Though without the ability to delete or alter any data stored on the system, people still acquire the right to be forgotten with the ability to choose what information the public can access. Lastly, EarthID offers better security and protection over privacy and personal information to ensure trust. All data exchange and transactions are verified, authorized, and secure by the data owners and the networks.

- Positive impact on businesses
With EarthID, a trusted system, businesses will provide better customer experience more efficiently. The highly secured system will also reduce the risk and cost of data breach. "On average, the cost of a breach has risen to $4 million per incident—up 29% since 2013—according to research sponsored by IBM's security division."[29] According to IBM findings, healthcare has the highest cost per stolen record in various industries. The damage is not only costly to the businesses, but also the people. In traditional identity system, it is hard to monitor and track data breach. EarthID could help businesses effectively monitor and manage customers' data to lower risk and avoid financial loss.

- Positive impact on regulators
Lastly, EarthID brings a positive impact to the regulators by offering a standardized process to provide identity to people. Individuals' identities are no longer attached to their governments, which will increase the regulators' efficiency and quality to monitoring of their people, and achieve transparent surveillance.
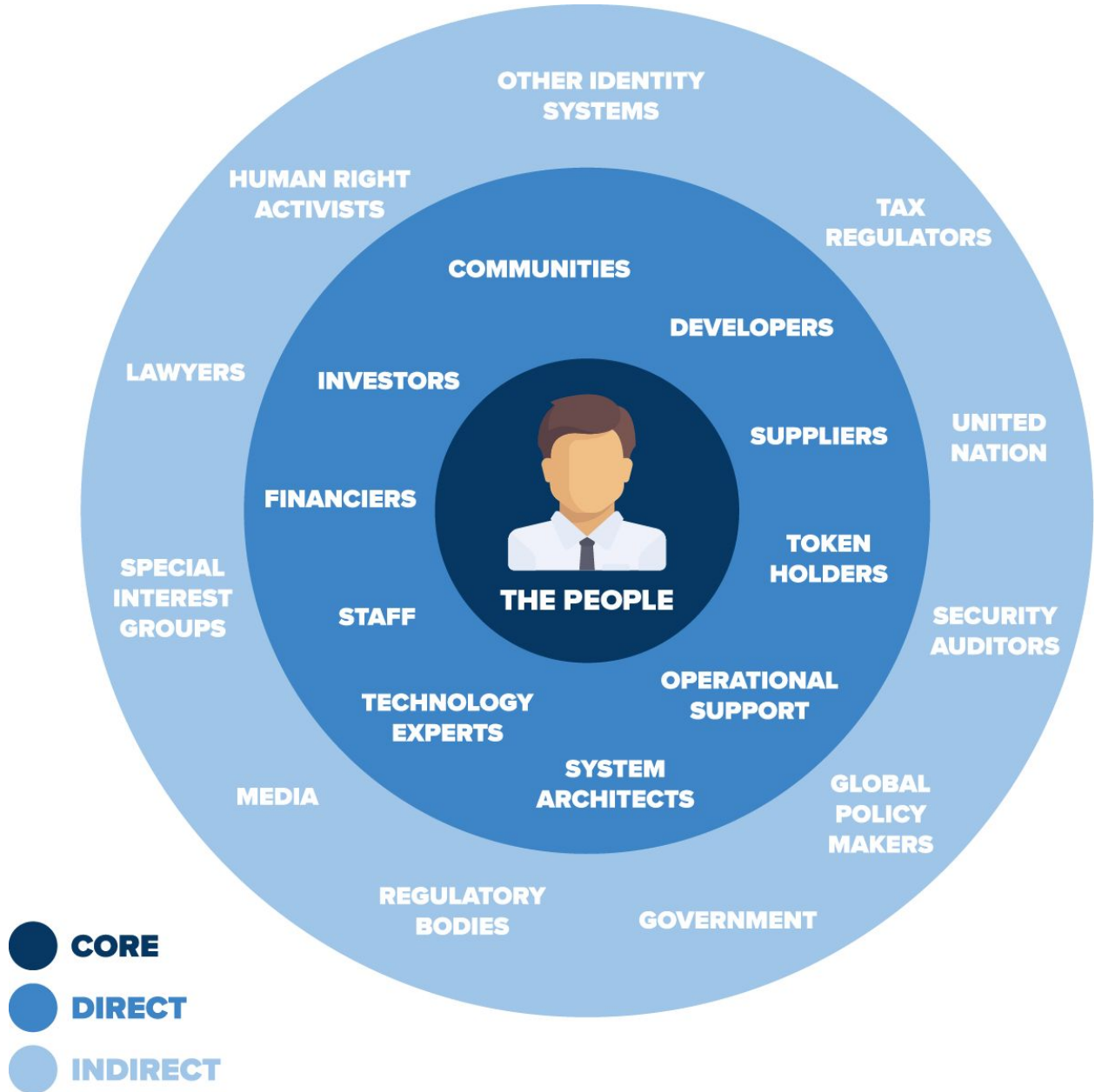
EarthID is an ambitious solution to solve a complex world problem. It will help us overcome the many challenges, especially in this VUCA world in order to achieve our goals. However challenging it may be, we believe it is time for the global identity system to be disrupted for a better future, and it starts with the idea of EarthID.

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[27] Ben Schiller, "*The Radical Plan For A Global Identity System For A World With Shifting Borders*", https://www.fastcompany.com/3063079/the-radical-plan-for-a-global-identity-system-for-a-world-with-shifting-borders

[28] Ron Miller, "*The Promise of Managing Identity on the Blockchain*", https://techcrunch.com/2016/07/15/you-cant-have-financial-inclusion-without-digital-inclusion/?ncid=rss

[29] Robert Hackett, "*Data Breaches Now Cost $4 Million on Average*", http://fortune.com/2016/06/15/data-breach-cost-study-ibm/

OTHER IDENTITY SYSTEMS

HUMAN RIGHT ACTIVISTS

TAX REGULATORS

COMMUNITIES

DEVELOPERS

LAWYERS

INVESTORS

SUPPLIERS

UNITED NATION

FINANCIERS

TOKEN HOLDERS

SPECIAL INTEREST GROUPS

THE PEOPLE

STAFF

SECURITY AUDITORS

OPERATIONAL SUPPORT

TECHNOLOGY EXPERTS

SYSTEM ARCHITECTS

GLOBAL POLICY MAKERS

MEDIA

REGULATORY BODIES

GOVERNMENT

CORE

DIRECT

INDIRECT

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