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SELF-SOVEREIGN IDENTITY

How big is the market opportunity?

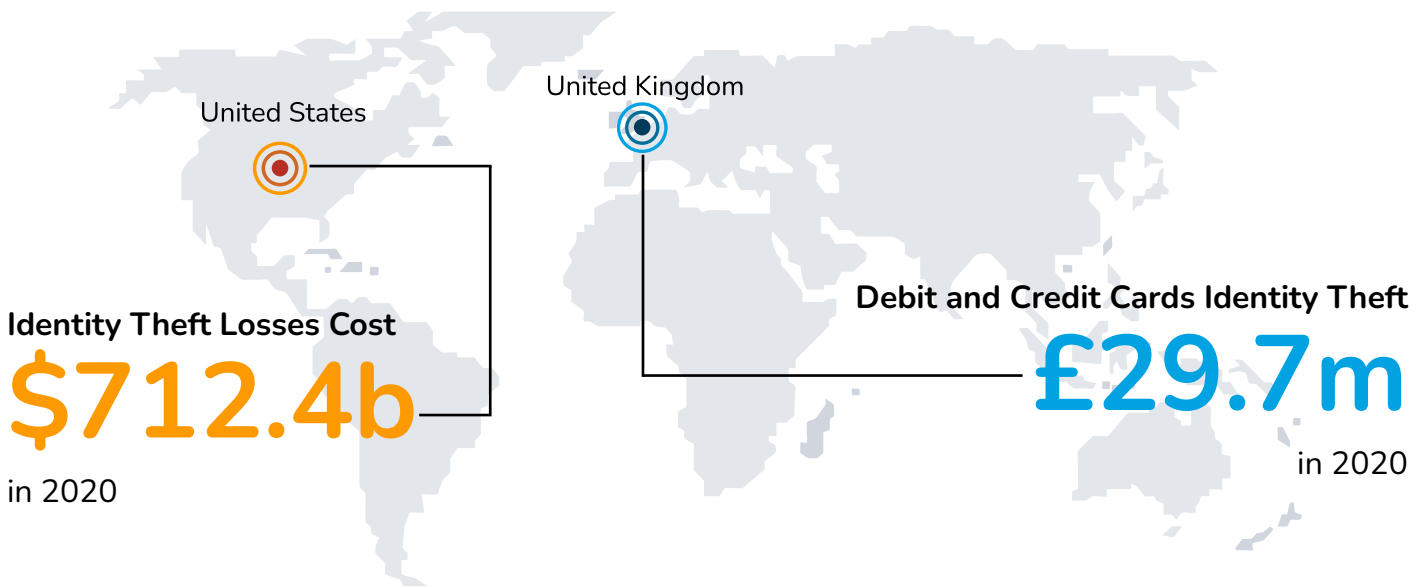# Table of Contents
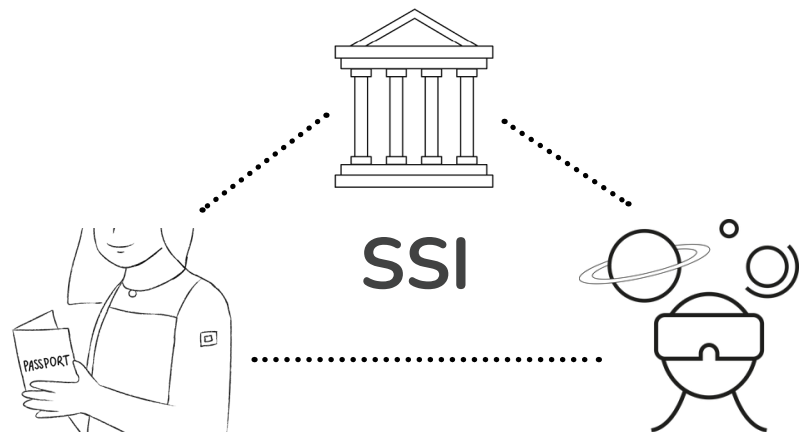
Self-Sovereign Identity

cheqd

The popularity of self-sovereign identity (SSI) solutions has surged over the recent years, powered by the unforeseen urgencies of the pandemic, increasing decentralisation and transition towards Web 3.0, to name a few.

United States

United Kingdom

Identity Theft Losses Cost

$712.4b

in 2020

Debit and Credit Cards Identity Theft

£29.7m

in 2020

Implementation of SSI

SSI pilots include the UK Financial Conduct Authority's KYC trial, the UK's National Healthcare Service Staff Passport and the IATA Travel Pass.

The disrupting technology will be used everywhere from banking to metaverse, travel to healthcare. SSI has no limits in its application across sectors.

SSI

Significant Gap in Qualifying the Total Addressable Market (TAM)

This whitepaper aims to establish a baseline TAM for self-sovereign identity specifically, which can then be iterated upon by the community.

Our estimates suggest that the potential of the SSI market totals ~$0.55Tr; this figure is solely based on the areas of opportunity we have focused on in this whitepaper. There are certain to be more areas of opportunity as the scale of SSI impacts are yet to be understood and determined.

$0.55Tr

Executive Summary

The popularity of self-sovereign identity (SSI) solutions has surged over the recent years, powered by the unforeseen urgencies of the pandemic, increasing decentralisation and transition towards Web 3.0, to name a few. In addition to earlier SSI applications by the United Kingdom's (UK) Financial Conduct Authority's[1] know your customers (KYC) trial, the technology has been used to implement the UK's National Healthcare Service Staff Passport[2] and the IATA Travel Pass[3]. Both governments and companies are looking to integrate SSI – Twitter, Salesforce, Avast are just a few to mention. SSI has become one of the future-proof go tos.

Whether public or private, centralised or decentralised, there is a common denominator for all – a need for digital trust. However, current identity models are inefficient and built around organisations. In the United States alone, identity theft losses cost $502.5 billion in 2019 and increased to $712.4 billion in 2020[4]. In the UK, annual UK-issued debit and credit cards identity thefts reached a value of £29.7 million in 2020[5]. Digital trust is currently predicated on constant check-ups. In order to prove an attribute or claim, a third party is needed to certify or verify that claim.

Unlike the existing system, SSI is a user-centric and user-controlled approach to exchange information much more safely.

The disrupting technology will be used everywhere from banking to metaverse, travel to healthcare. SSI has no limits in its application across sectors.

How does one quantify the impact of a paradigm, which will completely transform how we interact with identity and, more broadly, authentic or trusted data?

While there have been a few attempts to understand the value of the digital identity space, there is a significant gap in qualifying the total addressable market (TAM) for SSI. Therefore, this whitepaper aims to establish a baseline TAM for self-sovereign identity specifically, which can then be iterated upon by the community.

Our estimates suggest that the potential of the SSI market totals **~$0.55Tr**; this figure is solely based on the areas of opportunity we have focused on in this whitepaper. There are certain to be more areas of opportunity as the scale of SSI impacts are yet to be understood and determined.

~$0.55Tr

The potential of the SSI market

[1] Andrade-Walz, A., 2019. Evernym accepted into Cohort 5 of the FCA's Regulatory Sandbox - Evernym. [online] Evernym. Available at: <https://www.evernym.com/blog/evernym-accepted-into-fca-regulatory-sandbox/> [Accessed 14 February 2022].
[2] NHS Transformation Directorate. 2022. Digital staff passport. [online] Available at: <https://www.nhsx.nhs.uk/information-governance/guidance/digital-staff-passport/> [Accessed 14 February 2022].
[3] IATA.org. 2020. IATA Unveils Key Design Elements of IATA Travel Pass. [online] Available at: <https://www.iata.org/en/pressroom/pr/2020-12-16-01/> [Accessed 14 February 2022].
[4] GIACT. 2022. U.S. Identity Theft: The Stark Reality. [online] Available at: <https://giact.com/identity/us-identity-theft-the-stark-reality-report/> [Accessed 14 February 2022].
[5] Statista. 2021. Value of annual card ID theft losses on UK-issued debit and credit cards in the United Kingdom (UK) from 2002 to 2020. [online] Available at: <https://www.statista.com/statistics/286263/united-kingdom-uk-card-id-theft-losses-on-plastic-cards/#:~:text=Data%20on%20the%20annual%20value,value%20of%2029.7%20million%20British> [Accessed 14 February 2022].

Introduction

The unforeseen urgencies of the pandemic have accelerated the acceptance of digital identity, particularly self-sovereign identity (SSI), by both private and public sectors. Despite SSI's unfamiliarity, its use cases surged in 2021. In addition to earlier SSI applications by the United Kingdom's (UK) Financial Conduct Authority's[6] know your customers (KYC) trial, the technology has been used for the implementation of the UK's National Healthcare Service Staff Passport[7] and the IATA Travel Pass[8] – the first verifiable digital credential capable of providing proof of COVID-19 testing and vaccination status.

Avast's[9] recent acquisition of Evernym – the world leader in SSI – indicates the extent to which big businesses will increasingly adopt the technology. Salesforce is expanding into verifiable credential management with their recent acquisition of Credential Master[10]. With Twitter's recent moves to launch Bluesky[11], their decentralised social networking effort, a dedicated crypto team, and the hiring of Vice President of Engineering at the Cosmos Network[12], Tess Rinearson – an ever-expanding ecosystem of interoperable and sovereign blockchain apps and services, Twitter seems quite keen to explore identity solutions. The company has a long term goal of exploring how ideas from crypto can help us push the boundaries of what's possible with identity, community and more.[13]

"Since Evernym was founded, we have worked with hundreds of companies in multiple industries around the world, which is testament to the borderless, cross-industry impact that SSI will have. Our acquisition by Avast (who protect nearly 0.5b devices) and the advent of new markets like web 3.0 and the metaverse, are evidence that this market sizing is well overdue and shows the unmatched scale of the opportunity for any company helping make SSI a reality."

Steve Havas, Vice President, Avast

From a state adoption perspective, a number of governments have led, or intend to lead, initiatives to actively promote the use of SSI, including the European Commission[14], United States[15], Canadian[16], and Australian[17] governments.

At the opposite end of the spectrum, increasing decentralisation and transition towards Web 3.0 powered by the growth of cryptocurrencies, blockchain and augment or virtual reality technology certainly play an important role in looking for future-proof solutions.

Whether public or private, centralised or decentralised, there is a common denominator for all – a need for digital trust. The image below shows how quickly public and private interests in SSI are growing around the world.

6 Andrade-Walz, A., 2019. Evernym accepted into Cohort 5 of the FCA's Regulatory Sandbox - Evernym. [online] Evernym. Available at: <https://www.evernym.com/blog/evernym-accepted-into-fca-regulatory-sandbox/> [Accessed 14 February 2022].
7 NHS Transformation Directorate. 2022. Digital staff passport. [online] Available at: <https://www.nhsx.nhs.uk/information-governance/guidance/digital-staff-passport/> [Accessed 14 February 2022].
8 IATA.org. 2020. IATA Unveils Key Design Elements of IATA Travel Pass. [online] Available at: <https://www.iata.org/en/pressroom/pr/2020-12-16-01/> [Accessed 14 February 2022].
9 Avast. 2022. Avast to Acquire Evernym. [online] Available at: <https://press.avast.com/avast-to-acquire-evernym> [Accessed 14 February 2022].
10 Salesforce. 2021. Salesforce Unveils the Next Phase of Dreampass and New Health and Safety Innovations to Navigate In-Person Events. [online] Available at: <https://www.salesforce.com/news/stories/salesforce-unveils-health-and-safety-innovations/> [Accessed 14 February 2022].
11 The Verge. 2022. Twitter's decentralized social network project takes a baby step forward. [online] Available at: <https://www.theverge.com/2021/1/21/22242718/twitter-bluesky-decentralized-social-media-team-project-update> [Accessed 14 February 2022].
12 The Verge. 2022. Twitter is launching a dedicated crypto team, part of its push toward decentralization. [online] Available at: <https://www.theverge.com/2021/11/10/22774501/twitter-crypto-dedicated-team-dorsey-square-decentralization> [Accessed 14 February 2022].
13 The Verge. 2022. Twitter is launching a dedicated crypto team, part of its push toward decentralization. [online] Available at: <https://www.theverge.com/2021/11/10/22774501/twitter-crypto-dedicated-team-dorsey-square-decentralization> [Accessed 14 February 2022].
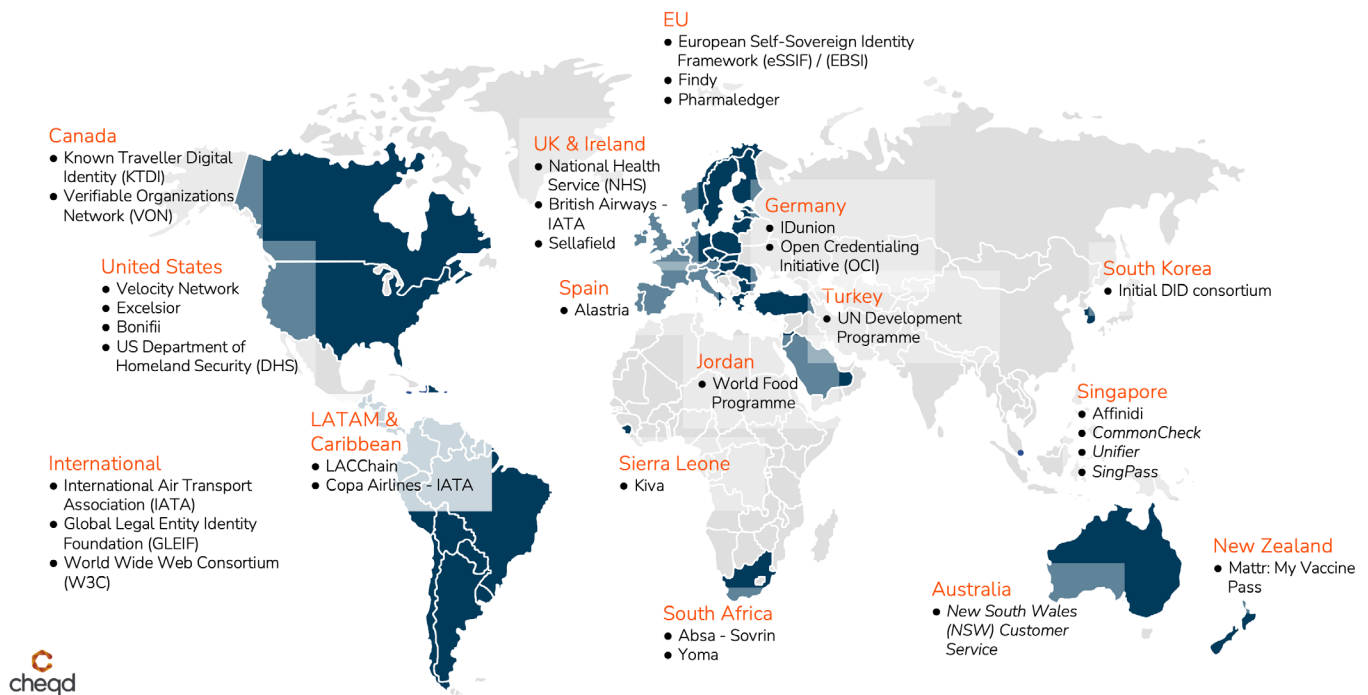14 European Self-sovereign Identity Framework Lab. 2022. eSSIF-Lab | eSSIF-Lab: Help Shape a Safe and Secure Next Generation InternetT GENERATION INTERNET. [online] Available at: <https://essif-lab.eu/> [Accessed 14 February 2022].
15 U.S. Department of Homeland Security Science and Technology Directorate. 2019. [online] Available at: <https://www.dhs.gov/science-and-technology/news/2019/11/14/news-release-dhs-awards-181k-verify-digital-credentials> [Accessed 14 February 2022].
16 Verifiable Organizations Network. 2022. An open source collaboration initiated by the Governments of British Columbia, Ontario and Canada. [online] Verifiable Organizations Network. Available at: <https://vonx.io/> [Accessed 14 February 2022].
17 New South Wales Government. 2022. NSW Government Identity Strategy. [online] Available at: <https://www.nsw.gov.au/strategy/nsw-government-identity-strategy> [Accessed 14 February 2022].

Self-Sovereign Identity Adoption

EU
- European Self-Sovereign Identity Framework (eSSIF) / (EBSI)
- Findy
- Pharmaledger

Canada
- Known Traveller Digital Identity (KTDI)
- Verifiable Organizations Network (VON)

UK & Ireland
- National Health Service (NHS)
- British Airways - IATA
- Sellafield

Germany
- IDunion
- Open Credentialing Initiative (OCI)

South Korea
- Initial DID consortium

United States
- Velocity Network
- Excelsior
- Bonifii
- US Department of Homeland Security (DHS)

Spain
- Alastria

Turkey
- UN Development Programme

Singapore
- Affinidi
- *CommonCheck*
- *Unifier*
- *SingPass*

Jordan
- World Food Programme

LATAM & Caribbean
- LACChain
- Copa Airlines - IATA

Sierra Leone
- Kiva

International
- International Air Transport Association (IATA)
- Global Legal Entity Identity Foundation (GLEIF)
- World Wide Web Consortium (W3C)

New Zealand
- Mattr: My Vaccine Pass

South Africa
- Absa - Sovrin
- Yoma

Australia
- *New South Wales (NSW) Customer Service*

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McKinsey Global Institute found a 3-13% of GDP increase in economic value in 2030 through the adoption of digital identity[18]. However, current approaches to identity verification have been anything but perfect, creating an urge for alternative methods of identification, such as self-sovereign identity (SSI).

While there are plenty of attempts to understand the value of the digital identity space, there is a significant gap in qualifying the total addressable market (TAM) for self-sovereign identity. Juniper Research estimates that the SSI market will reach annual revenue of $1.1 billion by 2024[19]. Liminal Strategy Partners suggest that the reusable identity market could achieve a TAM of $133b – $533b in 2026[20], though the latter is focusing exclusively on identity, while SSI has wider applications than just identity.

Therefore, this whitepaper aims to evaluate the total addressable market (TAM) for self-sovereign identity specifically.

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[18] McKinsey Global Institute. 2022. Digital identification: A key to inclusive growth. [online] Available at: <https://www.mckinsey.com/~/media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/digital%20identification%20a%20key%20to%20inclusive%20growth/mgi-digital-identification-executive-summary.pdf> [Accessed 18 February 2022].

[19] Juniper Research. 2022. Self-Sovereign Identity to be a Billion-Dollar Industry by 2024, but Monetisation will Remain a Stru. [online] Available at: <https://www.juniperresearch.com/press/self-sovereign-identity-to-be-a-billion-dollar> [Accessed 18 February 2022].

[20] Liminal.co. 2022. The Market Opportunity for Reusable Identity - Liminal.co. [online] Available at: <https://liminal.co/reports/market-opportunity-for-reusable-identity/> [Accessed 18 February 2022].

The Drivers Behind
Self-Sovereign Identity

Self-sovereign identity (SSI) is a method of identity that centres the control of information around the user. It safeguards privacy by reducing the need to store personal information entirely on a central database and gives individuals greater control over what information they share. Unlike the existing system, it is a user-centric and user-controlled approach to exchange authentic and digitally signed information in a much safer way.

> *"A digital identity is information on an entity used by computer systems to represent an external agent. That agent may be a person, organization, application, or device."* [21]

"The utility and relevance of SSI and digital identity have become increasingly apparent as data leaks and hacks have exposed the vulnerability of individuals' data, while the increased attention on the profits that social media giants generate by monetising such data has helped to make people more aware of the value of their personal information," says Fraser Edwards, CEO and co-founder at cheqd. [22]

Cybercrime, data leaking, hacking or selling data without consent and identity theft are defining features of the current state of the internet. Identity theft losses in the United States alone cost $502.5 billion in 2019 and increased to $712.4 billion in 2020 [23]. In the UK, the annual UK-issued debit and credit card identity theft reached a value of 29.7 million GBP in 2020 [24].

Digital trust is currently predicated on constant checks before access is provided to centralised walled gardens. Often, in order to prove an attribute or claim, a third party is needed to certify or verify that claim. For example, when an individual wants to open a bank account, the bank will outsource the know your customer verification process to a vendor. Practically, this means personal data is being shared with a third party, and the individual has limited knowledge of how this will be used and stored. This results in potentially compromised security.

Two models are prevalent for data, split by the category the data falls into
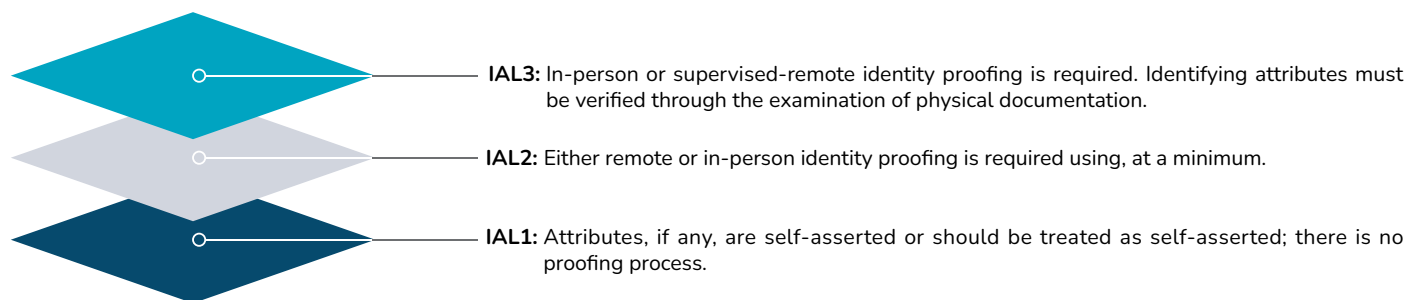
High Assurance Data:
- Data subjects (individuals or companies) often directly pay for information, e.g., a passport, driving license
- Any recipient of that data then pays a service provider to verify said data

Low-to-medium Assurance Data:
- Data subjects either provide or generate this data which is then monetised by companies. Recently this has been termed surveillance capitalism

Levels of Assurance

IAL3: In-person or supervised-remote identity proofing is required. Identifying attributes must be verified through the examination of physical documentation.

IAL2: Either remote or in-person identity proofing is required using, at a minimum.

IAL1: Attributes, if any, are self-asserted or should be treated as self-asserted; there is no proofing process.

[21] Rannenberg, K. (2011). "ISO/IEC 24760-1: A framework for identity management - Part 1: Terminology and concepts". ISO. [Accessed 18 February 2022].
[22] Palmer M., Harte A. BTIG. 2022. BTIG Cryptoasset Currents. [Accessed 14 February 2022].
[23] GIACT. 2022. U.S. Identity Theft: The Stark Reality. [online] Available at: <https://giact.com/identity/us-identity-theft-the-stark-reality-report/> [Accessed 14 February 2022].
[24] Statista. 2021. Value of annual card ID theft losses on UK-issued debit and credit cards in the United Kingdom (UK) from 2002 to 2020. [online] Available at: <https://www.statista.com/statistics/286263/united-kingdom-uk-card-id-theft-losses-on-plastic-cards/#:~:text=Data%20on%20the%20annual%20value,val-ue%20of%2029.7%20million%20British> [Accessed 14 February 2022].

This identity model, built and controlled by companies rather than individuals, is fundamentally broken and it is in many ways a paradise for threat actors, as they can target organisations' data silos and individuals. Over time, data subjects can easily lose track of what data is being stored and by who, or which data has been compromised, as there is no notification of this event. The website "have I been pwned?"[25] attempts to fill this gap but still required the data subject to be proactively checked.

Oversharing information can also raise concerns — what verifiers usually need is proof that "you are who you're claiming to be". They don't need to know any additional details, but in the current system, verifiers get access to additional (and unrequired) information. The most clear-cut example of this is using a utility bill or bank statement to prove a person's address. These documents, especially the former, may contain huge quantities of sensitive data that is completely unnecessary to prove an address.

Finally, it does not protect from forgery, which is becoming easier and more common. As new rules have come into play over the past year due to COVID-19 and a new wave of attestations has been required to travel abroad, attend events or visit loved ones, more sophisticated forgery and scams have occurred. These include fake COVID-19 results and proof of vaccination.

[25] have I been pwned. 2022. [online] Available at: <https://haveibeenpwned.com/> [Accessed 18 February 2022].

Self-Sovereign Identity
Market Size

How does one quantify the impact of a paradigm, which will completely transform how we interact with identity and, more broadly, authentic or trusted data? We stumbled upon this question while fundraising last year and realised there wasn't actually a number yet, which we made a mental note to change once we had some time and space.

While a total addressable market (TAM) approach is usually used to reference the revenue opportunity available for a product or service, due to the lack of available information, instead, we settled on a narrative:

- The US credit bureau market is worth $13.4b per year[26]. It's an industry that is entirely built on using people's data without their permission.
- There are 100-1000s of these ecosystems. They won't all be as big as the US credit bureau market, but with thousands of these ecosystems (even smaller ones), the potential is astronomical.

$14.4b
US credit bureau market 2021

x100 - 1000s
of these ecosystem
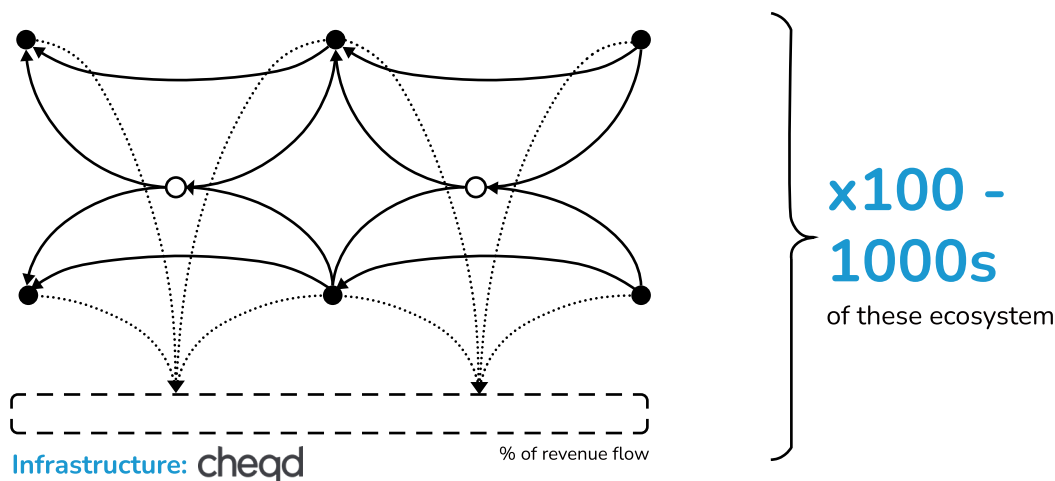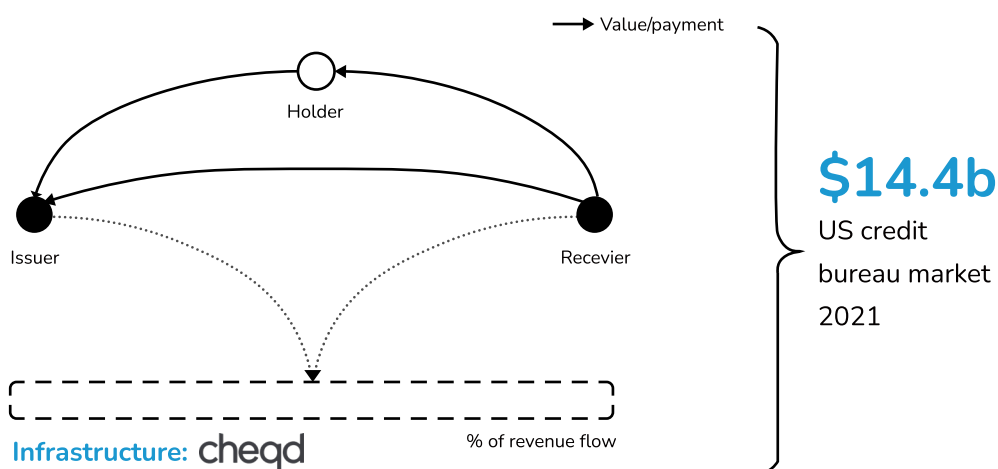
[26] IBIS World. 2021. Credit Bureaus & Rating Agencies in the US - Market Size 2005–2027. [online] Available at: <https://www.ibisworld.com/industry-statistics/market-size/credit-bureaus-rating-agencies-united-states/> [Accessed 18 February 2022].

Whilst the narrative was successful, it's no substitute for TAM.

We certainly won't reach an accurate number here but we can reach a figure that can be used as a benchmark and act as a catalyst for more detailed analysis/ discussions.

One of the main problems when trying to formulate these numbers is that even the headline numbers are usually behind the paywalls of research firms, an approach that is antithetical to the open nature of the SSI community.

Let's start with some published numbers:

- $1.1 billion [in annual revenue] by 2024 according to Juniper Research[27].
- 3-13% of GDP increase in economic value in 2030 through the adoption of digital identity across countries analysed[28].
  - Calculated from seven focus countries which account for 49% of global gross domestic product (GDP) and 48% of the world's population.
- 65% of the potential value could accrue to individuals on average in emerging economies in our focus group, making it a powerful tool for inclusive growth[29].
- Just in the UK alone it is estimated that the cost of identity assurance processes exceeds £3.3b a year[30].
- 25 people in the US fall victim to identity theft every minute - leading to $15 billion in losses from 13.1 million consumers in 2015[31].
- By 2025, 20% of total digital ID will be built using DLT/Blockchain technology, increasing from 5% in 2020[32].
- Market factors have created a $32.8b market TAM for reusable identity in 2022, growing at a 68.9% CAGR by 2027. With a large market for public-and private-led schemes, this market TAM will reach $266.5b by 2027[33].

[27] Juniper Research. 2022. Self-Sovereign Identity to be a Billion-Dollar Industry by 2024, but Monetisation will Remain a Stru. [online] Available at: <https://www.juniperresearch.com/press/self-sovereign-identity-to-be-a-billion-dollar> [Accessed 18 February 2022].
[28] McKinsey Global institute. 2022. Digital identification: A key to inclusive growth. [online] Available at: <https://www.mckinsey.com/~/media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/digital%20identification%20a%20key%20to%20inclusive%20growth/mgi-digital-identification-executive-summary.pdf> [Accessed 18 February 2022].
[29] McKinsey Global institute. 2022. Digital identification: A key to inclusive growth. [online] Available at: <https://www.mckinsey.com/~/media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/digital%20identification%20a%20key%20to%20inclusive%20growth/mgi-digital-identification-executive-summary.pdf> [Accessed 18 February 2022].
[30] Ctrl Shift. 2015. The size and potential of the UK market for identity assurance [online] Available at: <https://www.ctrl-shift.co.uk/wp-content/uploads/2014/06/Ctrl-Shift-and-OIX-Economics-of-Identity.pdf> [Accessed 18 February 2022].
[31] Javelin. 2022. Identity Fraud Hits Record High with 15.4 Million U.S. Victims in 2016, Up 16 Percent According to New Javelin Strategy & Research Study. [online] Available at: <https://www.javelinstrategy.com/press-release/identity-fraud-hits-record-high-154-million-us-victims-2016-16-percent-according-new> [Accessed 3 March 2022].
[32] Goode Intelligence. 2022. The Digital Identity Report – The Global Opportunities for Verified Citizen & Consumer Digital ID: Market & Technology Analysis and Forecasts 2020-2025. [online] Available at: <https://www.goodeintelligence.com/report/the-digital-identity-report-the-global-opportunities-for-verified-citizen-consumer-digital-id-market-technology-analysis-and-forecasts-2020-2025/> [Accessed 3 March 2022].
[33] Liminal.co. 2022. The Market Opportunity for Reusable Identity - Liminal.co. [online] Available at: <https://liminal.co/reports/market-opportunity-for-reusable-identity/> [Accessed 18 February 2022].

Using the Mckinsey figure of 3% increase in economic value and applying this to global GDP of $80,934,771,028,340 [34] would give a figure of $2.42Tr[35].

However, "digital identity", as McKinsey describes it below, includes a wide range of technologies, most of which are centralised (passwords, PINs or security tokens), so SSI certainly cannot lay claim to that entire value.

Unlike a paper-based ID such as most driver's licenses and passports, a digital ID can be authenticated remotely over digital channels. We adopt this outcome-based definition of digital ID, regardless of the ID-issuing entity. For example, a digital ID could be issued by a national or local government, by a consortium of private or nonprofit organizations, or by an individual entity. Our definition also applies regardless of the specific technology used to perform digital authentication, which could range from the use of biometric data to passwords, PINs, or smart devices and security tokens.

Even if we conservatively estimate that just 1% of this overall economic value will be the market value of SSI, we still have a figure of $24b. Given the cost of identity assurance processes in the UK alone is estimated at £3.3b ($4.45b) [36]1% feels like a drastic underestimation. Using Goode Intelligence's statement that "20% of total digital ID will be built using DLT/Blockchain technology by 2025"[37], this becomes $486b. We would however argue that a more sizable chunk should be allocated to SSI, especially as countries begin the adoption of SSI and those moving from physical to digital identity have the opportunity to skip wholly centralised solutions altogether.

[34] Worldometers.info. 2022. GDP by Country - Worldometer. [online] Available at: <https://www.worldometers.info/gdp/gdp-by-country/> [Accessed 3 March 2022].
[35] Whether GDP is the appropriate measure for human progress is debatable but it suffices for the analysis here.
[36] Ctrl Shift. 2015. The size and potential of the UK market for identity assurance [online] Available at: <https://www.ctrl-shift.co.uk/wp-content/uploads/2014/06/Ctrl-Shift-and-OIX-Economics-of-Identity.pdf> [Accessed 18 February 2022].
[37] Goode Intelligence. 2022. The Digital Identity Report – The Global Opportunities for Verified Citizen & Consumer Digital ID: Market & Technology Analysis and Forecasts 2020-2025. [online] Available at: <https://www.goodeintelligence.com/report/the-digital-identity-report-the-global-opportunities-for-verified-citizen-consumer-digital-id-market-technology-analysis-and-forecasts-2020-2025/> [Accessed 3 March 2022].

Self-Sovereign Identity
is Bigger than Identity

Although SSI started as a movement centred around individuals/people, the technology has much broader use/potential. This broader use is the reason the SSI community is considering using "authentic data" as the default terminology.

Authentic data widens the SSI umbrella to include:

Digital Corporate Identity

Example
GLEIFs virtual Legal Entity Identifiers (vLEI)[38]

Proxy Market Size
Business intelligence market revenues expected to hit $42.95b by 2028[39]
Dun & Bradstreet's revenue for 2017 was $1.74b alone[40]

SSI Potential Notes
SSI has the potential to revolutionise the Due Diligence industry which forms part of the business intelligence market

SSI Impact

10%

SSI Market Potential

$4.30b

Certified Readings from IoT Devices

Example
Shipping container certifying when and where its doors were opened

Proxy Market Size
IoT Data Management Market predicted to be USD 66.44 Billion by 2022[41]

SSI Potential Notes
Only some data will be worth of certifying, however, the value of this may be outsized

SSI Impact

1%

SSI Market Potential

$664m

Lower Assurance Personal Data

Example
Receipts/boarding passes/test results being issued to customers instead of paper or emails

Proxy Market Size
Business intelligence market revenues expected to hit $42.95b by 2028.
Dun & Bradstreet's revenue for 2017 was $1.74b alone.

SSI Potential Notes
The global big data & business analytics market size is projected to reach $684.12 Billion by 2030[42]

SSI Impact

5%

SSI Market Potential

$34.2b

Supply Chain Tracking

Example
Certification of laboratories who make up a pharmaceutical supply chain

Proxy Market Size
The global blockchain supply chain market is predicted to be $9.85b by 2025[43]

SSI Potential Notes
Whilst the majority of the volume in the market will be through non-SSI solutions, high value use cases such as pharmaceuticals are already being tackled

SSI Impact

5%

SSI Market Potential

$493m

Metaverse

Example
Porting avatars and gaming experience between

Proxy Market Size
Metaverse may be a $800b according to Bloomberg[44]

SSI Potential Notes
Whilst SSI will be a core component of the infrastructure for web 3.0 it will only capture a percentage of the value being transacted across these use cases, similar to the payments industry

SSI Impact

3%

SSI Market Potential

$24b

Combinations of All of the Above Into New Use-cases

Example
Combining receipts from retail with insurers so that policies become more dynamic and less susceptible to fraud

Proxy Market Size
These are known unknowns and unknown unknowns so the market size is... unknown

SSI Potential Notes
This may have the greatest potential of all Just as microwaves were created after the World War II from radar technology, SSI will birth unknown opportunities

SSI Impact

100%

SSI Market Potential

Undefined

38 GLEIF. 2022. Introducing the Verifiable LEI (vLEI) - GLEIF's Digital Strategy for the LEI - LEI Solutions – GLEIF. [online] Available at: <https://www.gleif.org/en/lei-solutions/gleifs-digital-strategy-for-the-lei/introducing-the-verifiable-lei-vlei> [Accessed 3 March 2022].
39 Yahoo Finance. 2021. Global Business Intelligence Market to Witness Magnificent Growth, Revenue to Hit USD 42.95 Billion by 2028 - Zion Market Research [online] Available at: <https://finance.yahoo.com/news/global-business-intelligence-market-witness-160000871.html> [Accessed 3 March 2022].
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The potential of the SSI markets above totals $64b; this figure is solely based on the areas of opportunity we have focused on in this whitepaper. There are certain to be more areas of opportunity, i.e. the classic unknown unknowns challenge[45]. For example, NASA space missions improving artificial limb technology[46].

Adding this to the figure derived for purely personal self-sovereign identity results in $550b / $0.55Tr or 0.62% of global GDP. For reference, this is 30% of the global telecommunications market ($1.74Tr) or 6% of the Life & Health Insurance Industry ($8.45Tr)[47] which could be the right ballpark given the technology has the potential to impact every individual, every company and a subset of devices and the data they generate. This also compares well with the $266.5b TAM for re-usable identity by 2027 estimated by Liminal[48].

Another way of looking at this is if we take the market value of $0.55Tr and divide just by the global population of 7,930,897,100[49] at the time of writing (3 March 2022), we reach a value of ~$69.3 whilst completely ignoring the identity of corporations, things, or even virtual things. Note, this isn't the value of the individual's data but both the data and all the services involved in recording that data, marketing it, transacting it and consuming it. Given the costs associated with manually creating a digital identity can be as high as £30 ($40.5)[50] for a single individual, this value doesn't feel unreasonable.

The big flashy number at the top has been calculated using maths and logic, which can only be described as an approximation. This is mainly due to the lack of understanding about the scope and scale of SSI impact, the dearth of data points, but also that so many of these data points are behind paywalls. However, when checked against other metrics or calculations, it appears to be in the right ballpark.

We would love to work with the community to collate these into a more rigorous analysis of the market potential. So if you have these data points or are simply interested in fleshing this out, please get in touch using the contact details.

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Self-Sovereign Identity
Use Cases

The disrupting technology could be used everywhere from banking to metaverse, travel to healthcare. SSI has no limits in its application across sectors, and it is equally welcome in centralised and decentralised worlds. Below is just a selection of the top industries that we believe are going to pick up the technology first.
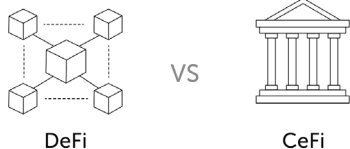
Finance and KYC

Identity verification remains equally required within both Decentralised Finance (DeFi) and Centralised Finance (CeFi), with unsatisfactory know your customers (KYC) practices – the need for an efficient and privacy-preserving solution is pressing. SSI creates a perfect identity layer, a bridge between traditional data-heavy interactions and an anonymous DeFi approach. "In short, current KYC is single-use whilst KYCed SSI makes the information re-usable." SSI also provides traceable and auditable personally identifiable information (PII).

DeFi   vs   CeFi

"Decentralised finance has paved the way for a fully-fledged decentralised capital markets union orchestrated by distributed coordination mechanisms in the form of decentralised autonomous organisations (DAO). Such a system will be built on the seamless off-chain to on-chain data flows but most importantly, on a flawless decentralised reputation system. In order to achieve the latter, self-sovereign identity is a vital component and arguably the most relevant element in this new paradigm."

Ioana Surpateanu, Web 3.0 Investor
Strategic Adviser, Swash, Poolz Finance, Cryptowalkers
Executive Board, Multichain Asset Managers Association

Travel

The travel industry probably shows one of the most relatable SSI applications enforced by the pandemic developments. In the age of COVID-19, this has been made even more complex as another layer of health certification has been added. There is a huge potential in using global credentials to verify health passports using SSI and digital identity. One can store encrypted data, such as verified test and/or vaccination results on the traveller's mobile device, meaning it's fully decentralised as there is no central repository for this information.

NFTs

Within the Non-fungible Tokens (NFT) space, SSI helps to prove who created, owned and/or currently owns NFTs across their lifecycle as well as providing ownership of fractions. Regardless of the ledger NFTs are hosted on, SSI also solves the provenance issue. It also enables the consumption of media/content directly from the creator without a distribution channel, which makes a fully decentralised content consumption a reality.

Gaming

SSI is perfect for storing and updating characteristics, especially when those characteristics are specific to the player. Porting progress/experience and items between games could become possible. SSI can then bridge achievements and experience, so progress is no longer lost once one stops playing a particular game and move on to the next in the genre.

Metaverse

Verified and interoperable data will be paramountly important in the metaverse. This applies on many levels – from original identity verification, when one creates a user profile, to countless transactions within the metaverse, such as the ability to create, buy, and move an avatar or digital objects/assets from one dimension of a metaverse to another.
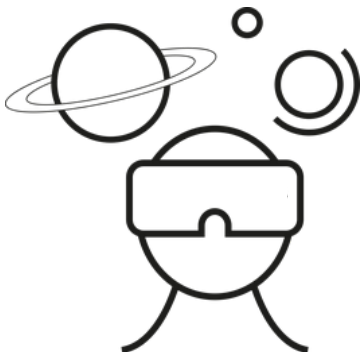
"A way to look at the metaverse is as a point in time: the moment where the digital and physical worlds are indistinguishable from each other. Many teams are working hard to let that be an open, inclusive, user-owned metaverse. We're now witnessing the first glimpses of an open metaverse appearing, but it's missing a crucial enabler: when everything becomes digital-first, we need a digital-first identity.

From virtual goods in the form of NFTs to the open financial instruments of decentralised finance, to open, user-owned virtual worlds and experiences - verified and interoperable data and data ownership are crucial to ensuring the viability of the open metaverse.

The transition to the open metaverse is a paradigm shift, and it is happening right now. Though it's hard to put a number on it, it's going to be a big part of our economy. And open, digital-first identity will be an essential part of its fabric."

Aron van Ammers, CTO and Founding Partner, Outlier Ventures
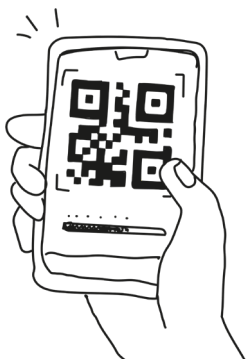
Payments

Within the Crypto and DeFi space, SSI enables peer-to-peer (P2P) transactions. One can share a small piece of identity information, i.e. a Telegram handle, to prove who they are without disclosing their identity publicly. This means no more test payments to check wallets. Another option is doing KYC'ed loan pools without storing the data — instead, only keeping 'yes' or 'no' answers.

Official ID

From a legal perspective, many government and public bodies are already considering the use of SSI technology for electronic identity verification. The European Commission[51], United States[52] and Canadian[53], and Australian[54] governments, have led, or intend to lead, initiatives to actively promote the use of SSI to streamline their e-government services or national data processes.
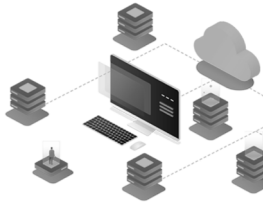
Decentralised Storage

Decentralised storage is getting more traction as SSI can be implemented to manage participants' data and store distributed files with decentralised access control.

E-commerce

Besides increasing transactional security and preventing potential e-commerce fraud, it reduces onboarding and payment frictions. A few examples of existing projects include Barclaycard and OpenBazaar.

Corporate or Organisational Identity

Making it easier to trust companies one is interacting with, especially over the internet. For instance, Bosch is participating in The ID union network's project that develops an internationally deployable SSI application for corporate identity and master data management.
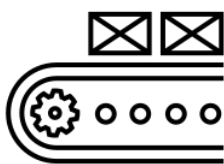
Product or package identity

Enabling more efficient and effective track and trace for real world supply chains. The global blockchain supply chain market size is projected to reach circa $9,852 million by 2025, with a growth of more than 80% from 2018 to 2025.

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Final Remarks

As mentioned above, how does one quantify the impact of a paradigm, which will completely transform how we interact with identity and more broadly, authentic or trusted data? Despite the lack of available data points, we attempted to put a number on SSI's TAM using the information available so far. However, the scale of SSI impacts is yet to be understood and determined.

If you're interested in improving this research or have access to relevant data, please get in touch. We'd love to collaborate with you. It is an important subject that is going to impact our economy across many levels and understanding its impacts most certainly deserves further research.

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About cheqd

From travel and gaming to cyber-security and finance, cheqd enables individuals and organisations to have full ownership and control of their data. First of its kind, cheqd's network offers payment rails helping the commercialisation of digital identity credentials and building a trusted data economy. Based on blockchain technology, cheqd is built upon a public permissionless network with a dedicated token - $CHEQ. Key investors include Outlier Ventures, Evernym (recently acquired by Avast), Tendermint Ventures (the venture arm of Ignite, a core contributor to the Cosmos Network).

cheqd