The Market Opportunity for Reusable Identity and How to Get There
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Preface & Executive Summary
The Market Opportunity for Reusable Identity and How to Get There

Preface

**We are at the beginning of a paradigm shift.** As we continue to progress through digital transformation initiatives, more users create higher assurance digital identities by establishing new bank accounts online, interacting on sharing economy platforms, and exploring more ways to engage with the gig economy. Eventually, we will move beyond solving onboarding problems and focus on better and safer experiences within platforms and ecosystems. To get there, we need to begin working together to explore ways to be more efficient while improving all aspects of the consumer's digital identity. We need to prepare for a shift from digital identity to reusable identity.

This report represents an early POV based on hundreds of engagements with leading identity vendors and identity-forward enterprises on what reusable identity is, what the market opportunity can be, and how to get there. We do not have a clear path defined nor business models validated, but that's the fun part for those who want to attempt to capture the holy grail of identity.

The research was led by Travis Jarae, CEO of Liminal, Jennifer Berry, Managing Director, and Cameron D'Ambrosi, Managing Director. The project team was led by Will Charnley, Director, and Yifan Li, Manager, with support from Victor Appelqvist, Renee Cai, Tiana Lau, and Vatsal Jhawar.

Travis Jarae,
CEO
The Market Opportunity for Reusable Identity and How to Get There

Executive Summary

The market is driving demand for reusable identity. Digital identity is undergoing rapid transformation; as consumer-centric solutions go mainstream, we see a demand for interoperable identity credentials that can be integrated across different use cases in the digital and physical world.

Catalyzing events have increased the viability of reusable identity. The internet was built without a foundational identity layer. As companies came online in the dot com boom, they were forced to build 1:1 relationships. In the 2000s, single-sign on (SSO) enabled federated identity and the evolution of 1:N relationships. Reusable digital identity paves a path forward for building N:N relationships that eliminate the fundamental risks created by its predecessor models.

Reusable identity relies on network effects enabled by Personal Identity Ecosystems (PIEs): To facilitate reusable identities, the current paradigm needs to shift to one that supports interoperable networks, public private partnerships, and fully fledged ecosystems – with supporting standards, policies, and trust frameworks – that provide consumers with data mobility.

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.

Public-led schemes will initially dominate the market TAM, but private reusable identity will account for 60% of the market by 2027. As public and private initiatives expand, they will create a need for public-private partnerships (PPPs).

Three key milestones will unlock the full TAM potential for the reusable market. Personal Identity Ecosystems (PIEs), vertical and use case interoperability, and public-private partnerships (PPPs).
Reusable Identity
Market Overview
We are in the early days of digital identity adoption

The digital identity space is going through a rapid transformation; a shift is currently underway that focuses on customer-centric solutions that enable consumer services well beyond initial onboarding.

The digital identity market must evolve to provide services beyond onboarding.

The current digital identity market is indexed to the rate of adoption.

We are here.
The market is shifting focus to consumer-centric digital identity solutions

Rising consumer UX expectations, ongoing data breaches and global regulatory scrutiny are driving the need for privacy-preserving reusable digital identities, anchored increasingly on the needs of the consumer, and not the enterprise.

There is a rising need for reusable digital identities that grant consumers better control over their personal information.
Reusable digital identities must be rooted in the consumer digital identity lifecycle

In order to succeed, reusable digital identities must meet the needs of enterprise and consumer stakeholders across a fragmented landscape that currently forces users to manage separate iterations of this lifecycle for each account they maintain.

Fragmented Credential Issuers / Relying Parties

- Utility Providers
- Hospitals
- Banks
- Employers
- Universities
- Airlines
- Governments
- Online Marketplaces
- Gaming Platforms
Why do we need reusable digital identity?

The internet was built without a foundational identity layer. As companies came online in the dot com boom, they were forced to build 1:1 relationships. In the 2000s, single-sign on (SSO) enabled federated identity and the evolution of 1:N relationships.

Previous Digital Identity Solutions (1:1)

Individual consumers onboard separately with each entity to complete a transaction. Consumers manage hundreds of individual accounts and passwords, and companies are required to build a unique, non-interoperable identity stack.

Credential issuers and relying parties use different backend identity solutions.

Both relying parties and solution providers store PII.

Backend data aggregator and identity solutions store PII and pass it back to relying parties.

Today's Digital Identity Solutions (1:N)

Digital companies adopt social logins to federate identities to cloud applications. Consumers are accustomed to social logins, where available, as a means of performing transactions across multiple online entities.

SSO enables federated identity.

Federated identities enable 1:N relationships.

1:N relationships introduce efficiencies in data sharing and security.

Many consumer relationships remain 1:1.
Today’s digital identity solutions are inefficient for consumers and enterprises alike

The transition away from 1:N digital identity solutions and towards N:N reusable digital identities eliminates the fundamental risks created by repeating onboarding processes separately and leading to centralized databases filled with personal data.

### Today’s Digital Identity Solutions (1:N)

Consumers rely on 1:1 and 1:N relationships, where available. Applications for federated identity remain limited, so consumers must individually maintain a potentially infinite number of digital identities, each wholly separate from the next.

### Tomorrow’s Reusable Digital Identity Solutions (N:N)

Reusable digital identity is easily federated when transacting with a new entity. A “many to many” relationship provide consumers with unique identities tailored with the minimum required personal information necessary for a given use case.

- User onboards with reusable identity and can control where their data is stored
- Governance layer validates completion and coherence of data
- Enterprises only see and store data permissioned by user
- Backend providers give PII to user-controlled credential

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N:N relationships rely on network effects enabled by Personal Identity Ecosystems (PIEs)

To facilitate reusable identities, the current paradigm needs to shift to one that supports interoperable networks and fully fledged ecosystems – with supporting standards, policies, and trust frameworks – that provide consumers with data mobility.

Consumers engage with identity wallets and personal data stores to have autonomy of identity credentials.

Enablement of reusable identities

Personal Identity Ecosystems (PIEs)

Personal Identity Ecosystems (PIEs) are user-centric networks that connect multi-sided platforms and are designed to provide users with control over their digital identities and enable privacy, personal reputation management, commercial transactions, and data protection.

Market Shifts Driving PIE Adoption

- In the 1990s, companies built 1:1 relationships with the consumers they serve.
- In the 2000s-2010s, companies transitioned from 1:1 relationship to 1:N relationships by adopting single-sign on and social logins in order to federate identities to cloud applications.
- Consumers demand privacy centric solutions. Over 75% of consumers are interested or very interested in the ability to control or revoke access to their digital identity at any time.¹
- More governments provide citizens access to services online. Civic identity apps in which government-issued identities are held will account for almost 90% of digital identity apps installed globally in 2025.²


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## Existing digital identity infrastructure cannot meet rising consumer expectations

As online transaction volumes continue to grow, and mobile internet market share increases, current approaches to identity verification and authentication will fail to meet the expectations of digital-native consumers.

### Notable Growth Drivers

1. As of 2020, there are 4 billion mobile internet users, representing 51% of the global population.

2. Civic identity apps, in which government-issued identities are held, will account for almost 90% of digital identity apps installed globally in 2025.

3. Trust in digital identities to authenticate both service providers and their customers is going to be an imperative for the continued success of this sector, with a cost burden for reputational protection already measuring in the tens of millions for some organizations.

4. Globally, eID initiatives are growing roots. The Scandinavian BankID system has 8 million+ users and was used 5 billion+ times in 2020.

### Consumer Sentiment Snapshot

- **88%** of consumers reported that security is their greatest priority when onboarding.
- **39%** of consumers appreciate the extra security layer from biometrics.
- **75%** of Apple users that opt out of third-party app tracking.
- **42%** of consumers have abandoned an account application due to friction.

### Consumer Solutions Positioning and Adoption

- Holistic identity approaches drive efficiencies and mitigate risk.
- Need for digital account opening cements the importance of mobile oriented solutions.
- Vendors filling void created by nascent government digital identity solutions.

### Common Consumer Journey Issues

- Time consuming multi-step onboarding flows.
- Frustrating and insecure password-based authentication.
- Repeated requests for the same set of personal identity data attributes.

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The social, political, and technological environment is ripe for reusable identity

Eroding public trust, rising regulations, public and private credential growth, and record investment in backend identity solutions, have created the underlying conditions necessary for the emergence of reusable digital identities

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Catalyzing Event</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>2019</td>
<td>eIDs gain global momentum: 40+ active eID initiatives with 120 planned for deployment by 2030¹</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>Record investment in backend solutions: Investment has created mature vendors who provide necessary infrastructure</td>
<td></td>
</tr>
<tr>
<td>2010s</td>
<td>Social media platforms launch SSO initiatives</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>EU’s GDPR and eIDAS take effect: eID and privacy regulations set the framework for user-centric identity credentials</td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>Global pandemic drives digital transformation: Growth in digital consumers exposes issues with legacy systems; new solutions needed</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>Private-led initiatives gain viability: Entry by major player like Apple with large user bases</td>
<td></td>
</tr>
</tbody>
</table>

Consumers, relying parties, backend solutions players, and identity providers all stand to benefit from reusable identity, creating a growth opportunity

¹. Thales, National ID Cards 2016-2021.
Several key drivers underpin the growth opportunity for reusable identity
The shift away from fragmented and expensive siloed infrastructure will be pushed forward by investment in individual components of reusable digital identity, in combination with macro-environment trends

1. Consumers
2. Relying Parties (Enterprises)
3. Backend Identity Solutions
4. Private
5. Public
6. Personal Identity Ecosystems (PIEs)

Drivers for Reusable Identity Components

1. Growth in digital commerce creates additional CNP fraud; the average ticket size for CNP fraud increased 9.7% in 2021, increasing the need for reusable identity.¹
2. Global, public-led eID initiatives have increased by 16% YoY since 2017; strong historical and future growth will fuel demand for reusable identity.
3. Record investment of $34.3B in 2021 into backend identity solutions will establish infrastructure that can support reusable identity initiatives.
4. Private-led initiatives are gaining momentum as larger, recognized brands with consumer scale create reusable identity solutions.
5. As consumers, enterprises, credential providers, and backend solutions mature, there is a greater demand for a PIE to connect parties.

Macro-Environment Drivers

6. Smartphone users are projected to reach $7.5B by 2026.² Technological advancements across verticals create mature solutions and drive the need for reusable identity.
7. Global pandemic further propels digital transformation with rapid growth of new and existing online consumers looking for enhanced solutions and positive CX.
8. The rise of device-to-device communication opens market appetite for reusable identity that enables adaption to the evolving identity ecosystem.

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Consumers and enterprises were forced to navigate disparate identity systems. Consumers manage 100+ credentials and cannot protect themselves from fraud. Consumers call for control over their data, driving demand for privacy-centric solutions.

Regulations like eIDAS drove governments to create public-led identity credential solutions. In the last 4 years, there have been 15+ new eID programs launched globally. The rise of global eID schemes leads to wide scale adoption across government use cases.

Vendors built disparate solutions that create friction for consumers and enterprises. $34.3B+ of investments in 2021 created platform solutions that can support complex identity schemes. Vendors create solutions that support the entire customer journey.

Small community-based initiatives lacked the consumer bases to increase adoption. Brand names like Apple and Google are introducing scalability via large user bases. Private-led solutions that build trust and customer adoption offer cross-border viability.

Companies built 1:1 relationships and incorporated single-sign on to enable 1:N relationships. PIEs can establish a bridge between 1:N identity systems and into N:N schemes. Reusable identity needs network effects to transition from 1:N to N:N, necessitating demand for PIEs.

As PIEs continue to gain market traction, they will connect reusable identity into the existing digital identity landscape and leverage existing solutions to reach scale.
Governments, personal data stores, Big Tech, consumer digital identity companies, and backend identity solutions will be major players in the future of reusable identities

<table>
<thead>
<tr>
<th>Government</th>
<th>Personal Data Stores</th>
<th>Big Tech</th>
<th>Consumer Digital ID</th>
<th>Backend Identity Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-estonia</td>
<td>Dataswift</td>
<td>Apple</td>
<td>Allstate</td>
<td>jumio</td>
</tr>
<tr>
<td>singpass</td>
<td>digi.me</td>
<td>Google</td>
<td>Avast</td>
<td>ID.me</td>
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<tr>
<td>myGovID</td>
<td>meeco</td>
<td>Microsoft</td>
<td>1Password</td>
<td>onfido</td>
</tr>
</tbody>
</table>

Government-led initiatives are already underway, with 40 eID schemes globally with more launching in the next few years.

Personal data stores are in market; more entrants will increase consumer familiarity and lead to greater adoption.

Big Tech have invested heavily in consumer-facing identity solutions and bring large consumer bases.

Consumer identity companies are leveraging their customer bases to expand and create identity wallet solutions.

Major backend players already create reusable identities and have begun to expand across the customer journey.

While major identity solutions have matured to create the conditions for reusable identities, market shifts require catalyzing events to create large-scale change

Notes: Logos are illustrative, not a full list of market solutions
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Existing solution providers will form the backbone of the new reusable identity market
There are opportunities across the breadth of the digital identity landscape for solution segment providers to participate in both initial consumer onboarding and ongoing use cases throughout the digital identity lifecycle

<table>
<thead>
<tr>
<th>Core Capabilities of Reusable Identity</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onboarding: Consumers will first need to onboard with what will act as a reusable identity; this process will leverage existing digital identity technology that focuses on customer registration.</td>
<td></td>
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<tr>
<td><strong>Key solution segments include:</strong></td>
<td></td>
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<tr>
<td>- Identity proofing</td>
<td></td>
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<tr>
<td>- Identity verification &amp; KYC</td>
<td></td>
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<tr>
<td>- Document verification</td>
<td></td>
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<tr>
<td>- Biometrics</td>
<td></td>
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<tr>
<td>- Mobile identity &amp; device intelligence</td>
<td></td>
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<tr>
<td>- eIDs, civil IDs, &amp; identity networks</td>
<td></td>
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<tr>
<td>- Data privacy &amp; consent management</td>
<td></td>
</tr>
<tr>
<td>Recurring: Once onboarded, consumers need the ability to manage their identity on an ongoing basis for use cases like login, transaction assurance, and to prevent fraud.</td>
<td></td>
</tr>
<tr>
<td><strong>Key solution segments include:</strong></td>
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<tr>
<td>- Authentication</td>
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<tr>
<td>- Customer identity access management (CIAM)</td>
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<tr>
<td>- Fraud detection and prevention</td>
<td></td>
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<tr>
<td>- Biometrics</td>
<td></td>
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<tr>
<td>- Mobile identity &amp; device intelligence</td>
<td></td>
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<tr>
<td>- eIDs, civil IDs, &amp; identity networks</td>
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<tr>
<td>- Identity wallets</td>
<td></td>
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<tr>
<td>- Regulatory compliance transaction monitoring</td>
<td></td>
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<tr>
<td>- eSignature</td>
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</table>
Technological developments across solution segments open more opportunities
Technological advancements in segments such as biometrics, identity proofing, and identity wallets have helped set the stage for reusable identity’s success

### Core Capabilities of Reusable Identity

#### Biometrics:
The adoption of fingerprint technology on smartphones is increasing biometrics usage, transforming biometrics into a common method of authentication. Different biometric modalities will become more common across verticals, where consumers can use their biometrics to identify themselves.

#### Identity proofing:
Identity proofing is higher assurance than IDV and document verification. This results in greater friction, making reusable identity more valuable as consumers only must identify themselves once.

#### Fraud detection and prevention:
As fraud attacks grow more sophisticated, identifying risky individuals and legitimate consumers across platforms will become more important.

#### Mobile identity & device intelligence:
Consumers are becoming increasingly trustworthy of mobile apps and services for high value interactions, such as with financial institutions and healthcare providers. Reusable identity demonstrates the ability to improve consumer UX across platforms and apps.

#### Identity wallets:
The entry of Big Tech players (e.g., Google, Apple) into the digital wallet space will aid the adoption of identity wallets, especially as these players build partnerships that extend additional services to their large user base.

#### eDs, civil IDs, & identity networks:
Public agencies around the world are implementing digital ID initiatives. Even in countries with established eIDs, governments are continuing to innovate. e.g., Estonia is in the process of procuring a new Mobile ID solution by 2022.
The impact of reusable digital identity will expand across the full landscape

The initial set of core capabilities that enable market viability for reusable digital identities will grow as increased consumer adoption drives expansion to encompass an increasing amount of features.

**Core Capabilities of Reusable Identity**

- Onboarding
- Recurring
- Both

**Future Consolidation Points from Reusable Identity**

- Onboarding
- Recurring
- Both

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A reusable identity must support consumers beyond the onboarding moment

Solution capabilities must solve across the customer journey and cover key use cases in new engagement, registration, login, transactions, and ongoing engagement.

Notes: Solutions are not comprehensive

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As reusable identity builds capabilities across the customer journey, they will meet the rising demand for identity solutions that focus on the needs of the consumer.
03

Market Demand Drivers
Broken digital identity infrastructure is driving demand for change beyond the status quo

Evolving consumer demands, growth in government-led initiatives, support across the capital markets, expressed interest from consumer platforms, and the introduction of PIEs are several of the market demand drivers paving the way for reusable identity

### Market Demand Drivers for Reusable Identity

- **Evolving Customer Demands**: Rising UX expectations, ongoing data breaches and global regulatory scrutiny are driving the need for privacy-preserving solutions, anchored on the needs of the consumer, and not the enterprise.

- **Growth in Government-Led Initiatives**: The introduction of electronic ID (eID) initiatives around the globe are going well beyond proof of civilian identity, unlocking access to benefits and services across the public and private sectors.

- **Support Across the Capital Markets**: There has been a record amount of investment into backend identity solutions in 2021, with 123 deals accounting for $34.3B of capital.

- **Interest from Consumer Platforms**: Large-scale consumer platforms offer customer reach and ubiquity that can propel identity solutions at scale across industries and borders.

- **Introduction of PIEs**: Many organizations are capable of building, launching, and maintaining a personal identity ecosystem of their own; however, cross-industry participation and collaboration will be requisite for meaningful adoption.
The need for reusable identity can be attributed to improved focus on consumer demands

As consumer behavior continues to influence product development, the drivers of commerce, privacy, reputation, and data protection are paramount; for enterprises, this indicates a calibration across compliance, UX, risk management, and trust & safety

### Consumer shifts

<table>
<thead>
<tr>
<th>Privacy</th>
<th>Consumers are focusing more on data privacy as 86% of consumers indicate they care about data privacy.¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commerce</td>
<td>A sharp rise in global eCommerce sales realized a 38% YoY growth in Q1 of 2021.²</td>
</tr>
<tr>
<td>Data Protection</td>
<td>79% of consumers are willing to invest time or money to better protect their privacy demonstrating increased importance consumers are placing on their consumer identity.¹</td>
</tr>
<tr>
<td>Reputation</td>
<td>Interoperable reputation scores can streamline onboarding for ‘good’ users, improving trust and safety across businesses.</td>
</tr>
</tbody>
</table>

### Enterprise shifts

| Compliance | Enterprises are focusing on improving their compliance capabilities to support evolving regulations, with a 5-year CAGR of 12.5%.³ |
| Risk Management | Enterprise risk management boomed since the pandemic; prioritizing strong data protection policies create competitive advantage. |
| UX | 52% of consumers say they are willing to pay more for better CX, highlighting its importance in the product development lifecycle.⁴ |
| Trust & Safety | Enterprises invest heavily to build trust and safety with their consumers. e.g., Airbnb spends $50MM a year in payouts to its guests and hosts who have bad experiences.⁵ |

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Globally, government-backed eIDs have been gaining traction in the last five years

The number of eID schemes identified and tracked by Liminal has almost doubled from 2017 to 2021. With more private sector players joining forces with government agencies, we anticipate future reliance on reusable identity to further consumer adoption.

### Types of Initiatives

**Government agencies driving eID schemes.** Responsible agencies are often specialized public entities such as the Digital Transformation Agency (Australia) and the Government Digital Service (UK).

**Private sector companies driving eIDs.** Heavily regulated industries such as finance, telcos, and healthcare have become natural sandboxes for experimenting with eID initiatives (e.g., Sweden’s BankID).

**Public-private partnerships (PPPs).** Governments are entering into collaborative partnerships with the private-sector to meet the growing need for digital identity amongst their constituents (e.g., Singapore’s SingPass).

### Market Trends

**eIDs propelling reusable identity schemes:** eIDs have been gaining momentum over the last five years, growing at 15.7% CAGR by scheme count.¹ With more private sector players creating partnerships with governments globally, the market is expected to gain further traction.

**A growing number of PPPs.** The line between public and private models is becoming blurry. Successful eIDs typically require input from both parties. Public-led schemes can use private vendors to run parts of projects, while private schemes benefit from government support (e.g., access to registries).

**PPP – an attractive model.** Public initiatives often face efficiency issue. For instance, Gov.UK Verify intended to verify 25mm users by 2020; in reality, it only had ~7mm registered users in May 2020.² PPPs bring potential benefits like increased efficiency and continued tech enhancement.

---

¹ Liminal proprietary research
² Public Technology, What’s Next for GOV.UK Verify? (Projected)
Record financial investment have propelled the market to build supporting capabilities

There has been a record amount of investment into backend identity solutions in 2021, with 122 deals accounting for $32.2B of capital; this capital has been used to create robust identity platforms capable of supporting the reusable identity market.

Total Invested in Backed Identity Solutions¹ (USD $ Billions)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Invested (USD $ Billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>10.0</td>
</tr>
<tr>
<td>2018</td>
<td>8.7</td>
</tr>
<tr>
<td>2019</td>
<td>25.6</td>
</tr>
<tr>
<td>2020</td>
<td>17.0</td>
</tr>
<tr>
<td>2021</td>
<td>32.2</td>
</tr>
</tbody>
</table>

Key Market Platform Consolidation

- **May 3:** Okta Acquires Auth0 for $6.5B
- **June 1:** Mitek acquires ID R&D for $49mm
- **June 9:** Mastercard acquires Ekata for $861mm
- **Nov 19:** GBG acquires Acuant for $736m
- **Dec 9:** Avast acquires Evernym

Notes: 1. Liminal proprietary research

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Strong consumer brand platforms with scale are priming the market opportunity

Early entrants have the necessary technology but have struggled with user adoption; as recognized consumer brands like Apple and Google enter the space, they will unlock additional market opportunity for meaningful adoption and at scale.
The success of PIEs will span across industries, with no single vertical as a frontrunner

The future of PIEs requires trusted networks within an integrated ecosystem; no single vertical is uniquely positioned to capture the market opportunity alone.

### PIE Market Opportunity

- **Personal data stores (PDSs):** PDSs could have a pivotal role as decentralized points of PII aggregation, but this would be dependent on their ability to connect into PIEs in order to scale and create value.

- **Financial institutions:** Competing banks and credit unions are adept at building collaborative relationships. However, financial institutions may lack the ubiquity needed to truly add value to the enablement of PIEs.

- **Payment networks:** The potential lack of interoperability between the largest card brands may throttle ubiquity.

- **Governments:** Governments have a high degree of ubiquity and have been demonstrated to work collaboratively, e.g., eIDAS, but suffer from low trust, and weak defenses against cyberattacks.

- **Telcos / ISPs:** Telcos may have the ubiquity needed for access to consumers; however, these organizations have generally done a poor job in building consumer respect and gaining trust.

- **Big tech:** While some Big Tech companies have been trying to cultivate public personas around privacy, the actions of a few may have proved disqualifying in terms of how little trust the public has in the use their PII.
Reusable Identity
Total Addressable Market Size
Methodology for Market Sizing

We used a bottom-up approach to size the global market and validated our findings with top-down analysis; we focused on use cases across the entire customer journey and analyzed twelve unique adoption and pricing scenarios.

### Key criteria | Description
--- | ---
**Scope** | We conducted a detailed 5-year market sizing for the reusable identity market. The opportunities were assessed across eight key verticals, and in alignment with Trust-over-IP Layer 4.  
**Methodology** | The Liminal team built the model from a bottom-up approach.  
- First, the team mapped key use cases for each of the eight identified verticals, looking across geographic and sub-vertical focus areas.  
- Second, the team evaluated the assurance levels for each vertical across three identified use cases.  
- Through vendor research, the team also developed pricing assumptions for each assurance level and geographic region.  
- Third, the team calculated the annual customer volume (count), the addressable market size (in dollars), and a 5-year forecast of all addressable markets.  
- Fourth, the team analyzed twelve different adoption and pricing scenarios; based on the current market dynamics  
- Finally, the team validated the model using a top-down approach  
**Use Cases** | The model focuses on use cases across the customer journey including segments like biometrics, identity verification (IDV), document verification, identity proofing, user and entity behavior, fraud detection, mobile identity, customer access management, and authentication.  
**Geography** | The model encompasses the entire global market. Specifically, the geographies can be broken down into North America, Europe, APAC, LATAM, and MEA. There is a more detailed breakdown of North America into Canada, U.S., and Rest of North America for Avast’s purposes.  
**Verticals** | The model assessed eight key verticals: financial services, healthcare, travel, government, digital commerce, entertainment, sharing economy, social media. They were further broken down into 19 sub-verticals for a more comprehensive analysis.  
**Results** | At moderate adoption and moderate pricing, the reusable identity market TAM sits at $20.4B in 2021, growing at a 68.9% CAGR to reach $266.5B by 2026. Separately, the 2021 onboarding TAM is $5.6B and ongoing is $14.8B.
Our scenarios found the 2026 TAM to be between $133B and $533B globally. Liminal analyzed twelve scenarios of different adoption and pricing growth combinations; based on our analysis, the reusable identity market will reach a TAM of $133B – $533B in 2026, and will grow at a CAGR between 50% – 91% from 2022 – 2026.
The global market size for reusable identity will reach $266.5B by 2027
This nascent market is poised for strong growth by 2027 with a 68.9% CAGR, driven by the predicted expansion from high assurance verticals into all verticals

Reactive Identity TAM (2022 - 2026)\(^1\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Onboarding</th>
<th>Recurring</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>32.8</td>
<td>0</td>
<td>32.8</td>
</tr>
<tr>
<td>2023</td>
<td>53.8</td>
<td>0</td>
<td>53.8</td>
</tr>
<tr>
<td>2024</td>
<td>89.8</td>
<td>0</td>
<td>89.8</td>
</tr>
<tr>
<td>2025</td>
<td>153.0</td>
<td>0</td>
<td>153.0</td>
</tr>
<tr>
<td>2026</td>
<td>266.5</td>
<td>0</td>
<td>266.5</td>
</tr>
</tbody>
</table>

TAM Scope

- TAM represents the size of the global reusable identity market and analyzes the market opportunity onboarding and ongoing support across eight core verticals: financial services, travel, digital commerce, entertainment, sharing economy, healthcare, social media, and government.

- Onboarding use cases include identity verification & KYC, document verification, identity proofing, biometrics, and fraud prevention.

- Ongoing use cases include authentication, fraud prevention, account monitoring, compliance and transaction monitoring, customer IAM, eSignature, and data privacy and consent management.

TAM Analysis

- TAM is $32.8B in 2022 and projected to grow at a CAGR of 68.9% to exceed $1T by 2029. Strong growth is projected beyond 2026, driven by network effects from the increased adoption.

- Onboarding initially accounts for 27.2% of TAM but its percentage slowly decreases over time, creating a shift towards ongoing support.

- Ongoing support will reach $193.8B by 2027. This covers use cases such as re-authentication, transaction verification, and account recovery.

Notes: 1. Model is built on moderate adoption and moderate pricing
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**eIDs are dominant today, but private-led identity schemes have a larger 2026 TAM**

With 40+ global schemes, public-led reusable identity schemes account for 72% of the TAM in 2022. Eventually, private initiatives will surpass public schemes by 2024 and consumers will need solutions that can create public-private partnerships (PPPs).

### TAM Breakdown: Government- vs Private-led

<table>
<thead>
<tr>
<th>Year</th>
<th>Government-Led</th>
<th>Private-Led</th>
<th>Total TAM in USD ($) billions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>32.8 (28%)</td>
<td>72%</td>
<td>105.5</td>
</tr>
<tr>
<td>2023</td>
<td>53.8 (38%)</td>
<td>62%</td>
<td>116.6</td>
</tr>
<tr>
<td>2024</td>
<td>89.8 (54%)</td>
<td>46%</td>
<td>153.0</td>
</tr>
<tr>
<td>2025</td>
<td>153.0 (54%)</td>
<td>46%</td>
<td>266.5</td>
</tr>
<tr>
<td>2026</td>
<td>266.5 (40%)</td>
<td>60%</td>
<td></td>
</tr>
</tbody>
</table>

### Public and Private Market Explanation

- **Initially, government-led initiatives dominate the 2022 market TAM.** Public-led schemes and current eID programs have the highest market viability due to adoption rates and public registry access.

- **The market is shifting in 2023.** The predicted rise of PIEs alongside the entry of large commercial brands (Apple, Google) drive the growth of reusable identities.

- **Private-led reusable identities will grow in commercially-focused verticals.** Enterprises in commercial verticals like e-commerce and marketplaces will increase the demand for private-led reusable identity.

- **By 2024 there will be rising demand for Public-Private Partnerships (PPPs).** PPPs will gain traction because they unlock cross border commerce and intergovernmental networks.

**Notes:** 1. Model is built on moderate adoption and moderate pricing.
Private-led opportunities will exceed those of government-led from 2025 onwards

Government-led initiatives are estimated at $24 billion in 2022, with a 45.8% CAGR through 2026; the private-led market is only at $9.2 billion in 2022 but is expected to rise rapidly to $160 billion by 2027, particularly driven by growth in APAC and North America.
Europe has the largest TAM in 2022, but is surpassed by APAC and North America

In 2022, Europe has the largest potential market TAM due to the relative success of public led eID schemes across the region; however, with strong growth projected in both North America and APAC, those regions will surpass Europe in TAM by 2027

<table>
<thead>
<tr>
<th>Total TAM by Geography¹</th>
<th>Regional Breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Europe:</strong> $15.2B in 2022, 49% CAGR through 2026. Currently, has the highest potential adoption based on existence of 22 eID schemes across the region.</td>
<td></td>
</tr>
<tr>
<td><strong>North America:</strong> $10.8B in 2022, 68% CAGR through 2026. Lower initial penetration due to nascency of mDLs and challenges of previous initiatives (SecureKey).</td>
<td></td>
</tr>
<tr>
<td><strong>APAC:</strong> $5.3B in 2022, 106% CAGR through 2026. Success in Singapore, Pakistan, and Australia, but the largest countries have not had success yet.</td>
<td></td>
</tr>
<tr>
<td><strong>LATAM:</strong> $1.1B in 2022, 58% CAGR through 2026. Initiatives in Peru, Argentina, Brazil, and Columbia have had initial success, but growth has slowed.</td>
<td></td>
</tr>
<tr>
<td><strong>ME&amp;A:</strong> $0.5B in 2022, 71% CAGR through 2026. Government-led initiatives in Nigeria, UAE, and Kuwait have had strong growth adoption rates to date.</td>
<td></td>
</tr>
</tbody>
</table>

Notes: 1. Model is built on moderate adoption and moderate pricing
Financial services, digital commerce, and government are the largest markets

The top three verticals of financial services, digital commerce, and government collectively make up 78% of the 2022 TAM; however, strong growth will create multi-billion market TAMs in all the verticals analyzed by 2027.

### Total TAM by Vertical

<table>
<thead>
<tr>
<th>Vertical</th>
<th>2022 TAM ($Bn)</th>
<th>2026 TAM ($Bn)</th>
<th>CAGR (2022-2026)</th>
<th>Key Use Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial services</td>
<td>$13.8</td>
<td>$266.5</td>
<td>72%</td>
<td>Digital banking, payments, remittance, lending, BNPL, investments, and crypto.</td>
</tr>
<tr>
<td>Digital commerce</td>
<td>$8.04</td>
<td>$153.0</td>
<td>58%</td>
<td>eCommerce and P2P marketplaces.</td>
</tr>
<tr>
<td>Government</td>
<td>$3.8</td>
<td>$89.8</td>
<td>71%</td>
<td>Identity renewal, online services, and payment distribution.</td>
</tr>
<tr>
<td>Entertainment</td>
<td>$3.6</td>
<td>$53.8</td>
<td>77%</td>
<td>Online and physical gambling, gaming, and streaming services.</td>
</tr>
<tr>
<td>Social media</td>
<td>$2.3</td>
<td>$32.8</td>
<td>66%</td>
<td>Fraud prevention and age assurance.</td>
</tr>
<tr>
<td>Travel</td>
<td>$0.7</td>
<td>$10.0</td>
<td>62%</td>
<td>Digital booking and curb-to-gate security.</td>
</tr>
<tr>
<td>Sharing Economy</td>
<td>$0.3</td>
<td>$5.3</td>
<td>74%</td>
<td>User and ‘worker’ onboarding, authentication, and fraud prevention.</td>
</tr>
<tr>
<td>Healthcare</td>
<td>$0.2</td>
<td>$3.8</td>
<td>83%</td>
<td>Digital and telehealth, with physical use cases still unproven.</td>
</tr>
</tbody>
</table>

Notes: 1. Model is built on moderate adoption and moderate pricing.
A $769MM serviceable obtainable market of reusable identity today
The current SOM is estimated at $769MM, which represents 3.9% of TAM or 22.6% of private-led TAM. As the reusable identity market gains traction and network effects take hold, the SOM is expected to grow rapidly.

**TAM Analysis**
- TAM aligns with the combined revenue of the core solution segments. The combined revenue of the core solution segments that reusable identity can replace is estimated at $19.7B in 2021, which aligns with the TAM of $20.4B.¹,²
- Market is nascent: The reusable identity market is currently dominated by public-led initiatives, with 83% of the addressable TAM led by the public sector.

**SOM Analysis**
- 2021 obtainable makes up 22.6% of private-led TAM. Based on the combined relevant revenue of 44 identity wallet / eID vendors globally, SOM is estimated at $769MM, or 22.6% of private-led TAM.²
- Reusable identity opens market opportunities limited by friction tolerance: Today, solutions come from various segments like identity proofing, authentication, mobile ID; however, with reusable identity streamlining UX, SOM is expected to fill market white-space and expand to private-led TAM.
- Network effect will further boost growth: While current opportunity is limited to $769mm, as participation from a growing number of private and public sector players increases, network effect is expected to exponentially boost adoption of community-based identity wallets / eIDs.

---

Notes: 1. Identity proofing, IDV, DocV, auth, CIAM, mobile identity, identity wallet, and eID 2. Liminal proprietary research
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Explaining the gap between today’s identity wallets and the total TAM

The two biggest factors that contribute to the wide gap between the total TAM at $20.3B and the current penetration of reusable identity today at $769MM are the nascency of public eID initiatives and the market dominance of legacy identity vendors.

<table>
<thead>
<tr>
<th>Reusable TAM to Today’s Market Penetration</th>
<th>Waterfall Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>(in $USD Billions)</td>
<td></td>
</tr>
<tr>
<td><strong>1. TAM, $20.3B</strong>: The TAM identified by Liminal for the reusable market in 2021.</td>
<td></td>
</tr>
<tr>
<td><strong>2. TAM – Current Vendors Gap, $1.7B</strong>: The gap between replacement technology/solutions today and the reusable identity TAM.</td>
<td></td>
</tr>
<tr>
<td><strong>3. Current Vendors, $18.7B</strong>: The total estimated 2021 revenue for solutions that a reusable identity would supplement (e.g., proofing, biometrics, etc.).</td>
<td></td>
</tr>
<tr>
<td><strong>4. Current Vendors – Private – Led, $15.1B</strong>: Liminal’s market sizing estimates only 17% of the $20.3B TAM is accessible to private-led wallets in 2021.</td>
<td></td>
</tr>
<tr>
<td><strong>5. Private – Led, $3.5B</strong>: The potential market for private-led reusable identity in 2021 based on Liminal’s market sizing findings.</td>
<td></td>
</tr>
<tr>
<td><strong>6. Private – Wallets Today, $2.7B</strong>: The gap between the total TAM for private-led reusable identity and solutions in market today.</td>
<td></td>
</tr>
<tr>
<td><strong>7. Wallets Today, $0.8B</strong>: The estimated revenue of the 44 vendors Liminal analyzed across private-led wallets today.</td>
<td></td>
</tr>
</tbody>
</table>
05

Key Milestones for Growth
There are three key milestones to reach the full market potential
To realize the potential of a $266.5B reusable identity market by 2027, three milestones are critical to facilitate the transition – the maturity of private identity ecosystems, enhanced interoperability, and public-private partnerships.

**Maturity of Private Identity Ecosystems (PIEs):** To unlock the $11.3B private-led market, PIEs provide the foundation to bridge past 1:N identity systems with future N:N schemes.

**Today:** Analyzing the 30+ private-led reusable credentials in circulation today, the estimated market penetration is $769MM.

**2021**

**Mature PIEs**
- Private-led TAM $11.3B

**2026**

**Rise of Public-Private Partnerships (PPPs):** PPPs unlock additional market TAM through cross-border travel, government use cases, and access to public registries.

**Full market adoption driven by PPPs**
- TAM $266.5B

**Comprehensive Use Case Coverage**
- Private-led TAM $159.5B

**Enhanced Interoperability:** A mature reusable identity market requires solutions that are omnichannel, serve various use-cases, and cover cross-border scenarios.
Mature PIEs require a focus on privacy, commerce, reputation, and data protection

Mature PIEs will allow consumers to manage their identity and corresponding credentials online, creating an opportunity for companies to disrupt the status quo by simplifying the relationship between consumers and their digital identities.

**Landscape Overview**

**Privacy:** Privacy is the consumer’s ability and right to own, control, restrict, remove and protect their digital identity. As Apple’s iOS 14 demonstrated, there is a growing demand for solutions who can provide transparency and privacy control directly to end consumers, which creates an opportunity for PIEs. 65% of consumers agree that data privacy is one of the biggest issues faced by society. ¹

**Commerce:** The ability for organizations to offer solutions that can facilitate commerce will be fundamental to enabling PIEs since many of the components enabling commerce today are also likely to be used in trusting identity credentials within a PIE. In 2021 there were 2.14B digital buyers, offering a massive opportunity for organizations to service a growing market.²

**Reputation:** In today’s world, people must build their reputation on a site-by-site basis and lack portability across like-minded platforms. PIEs that can build portability and federation into a wide range of identity credentials that can be used to infer or create a reputation. As the global gig economy grows, the introduction of a portable form of identity that could be federated across multiple platforms would be imperative for continued success in this sector.

**Data protection:** PIEs offer the ability to mitigate the risk of third-party fraud and large-scale data breaches. For businesses, the broader adoption of integrated fraud and identity networks leverages data, signals, and verified credentials across an ecosystem of shared providers. For consumers, the ability to self-manage their data reduces the liability of organizations to collect, process, and safeguard PII that is lost to cyberattacks and data breaches.

---

**Market Overview**

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Notes: 1. Morning Consult, Most Voters Say… 2. Oberlo, How Many People Shop…

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PIEs are necessary to unlock the large market opportunity for reusable identity

To evolve today’s fragmented frameworks to one that supports many-to-many relationships between consumers and service providers, PIEs must take an orchestrated approach across ecosystem participants to unlock market potential.

**2010s: 1:N**

- Adoption of social logins to federate identities to applications; supports 1:N relationships
- Federated identities enable 1:N relationships

**The shift to N:N**

- PIEs require network effects to bridge the divide between 1:N relationships and N:N relationships
- Consumers engage with identity wallets and personal data stores to have autonomy of identity credentials
- Connect with Relying Parties
- Create Network Effects
- Build Trust and Ubiquity

**2020 & Beyond: N:N**

- N:N relationships allow users to store and manage their identity across many providers
- Back-end data aggregators and identity solutions

Note: The diagram illustrates the evolution of identity management from 1:N to N:N relationships, highlighting the role of PIEs in facilitating network effects and trust.

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Increasing interoperability will expand the market into low assurance use cases

Reusuable identity is currently present in high assurance use cases such as banking, but increasing interoperability will help reusable identity expand into low assurance use cases such as social media.

<table>
<thead>
<tr>
<th>Digital - Physical Use Cases</th>
<th>Customer Experience Focused</th>
<th>Cross-border</th>
</tr>
</thead>
<tbody>
<tr>
<td>As consumer adoption increases, digital reusable identities will unlock physical use cases in verticals like gambling, asset sharing, and ride sharing.</td>
<td>As more consumers onboard into reusable identities, the lower friction provided by these solutions will unlock viability in verticals like digital commerce.</td>
<td>Given the complexity of leveraging identity solutions cross-border, reusable credentials will provide increase assurance without adding additional friction layers.</td>
</tr>
</tbody>
</table>
Public-private partnerships will unlock full market potential

Private-led initiatives with government involvement, such as access to government data bases, accreditation, and / or access to government portals, are best positioned to unlock full market potential

**Public-led**
- Access to government registries
- Government accreditations
- Regulatory and policy support
- Provides access to government services with the reusable identity
- Government initiatives may face efficiency issues, e.g., Gov.UK Verify intended to verify 25MM users in 2020 but only achieved ~5MM¹

**Private-led**
- Technology development / innovation
- Infrastructure design
- System maintenance
- Introducing alternative data / signals
- Industry partnerships
- Facilitating cross-border partnerships
- Scandinavian BankID system has >8MM users and was used >5B times in 2020²

**Public-Private Partnerships (PPPs)**
- A one-stop-shop solution facilitates access to both public and private services
- A high assurance solution backed by both government data and alternative signals
- A reliable system with ongoing innovations / competitions among service providers
- ID.me built a strong network through government partnerships, holding contracts with 22+ U.S. states, reaching a $1.5 billion valuation in March 2021³

**Notes:**

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Key milestones unlock 20 – 40% of TAM

As percentages of 2026 TAM, private-only milestones like the maturity of PIEs and enhanced interoperability will unlock 60% or $159.5B of TAM; PPPs will connect public and private schemes to create market attainability for 100% of the TAM.

<table>
<thead>
<tr>
<th>Precent Unlocked</th>
<th>Reusable Market Today</th>
<th>Maturity of PIEs</th>
<th>Enhanced Interoperability</th>
<th>Rise of PPPs</th>
<th>100% TAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>5%</td>
<td>20%</td>
<td>35%</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>Amt. of TAM (2026)</td>
<td>$13.3B</td>
<td>$53.3B</td>
<td>$93.3B</td>
<td>$106.6B</td>
<td></td>
</tr>
<tr>
<td>Explanation</td>
<td>Without PIEs, adoption is limited to small community-based identity initiatives.</td>
<td>PIEs enable reusable identity to cover high-assurance use cases.</td>
<td>Interoperability to low assurance verticals, e.g., physical use cases, unlocks more TAM.</td>
<td>PPPs bridge public and private schemes and ensure adoption through public registries.</td>
<td></td>
</tr>
<tr>
<td>Key Use Cases</td>
<td>Community focused (e.g., students)</td>
<td>High assurance credential (e.g., financial services)</td>
<td>Lower assurance verticals (e.g., eCommerce)</td>
<td>Cross-border &amp; government access (e.g., border entry)</td>
<td></td>
</tr>
</tbody>
</table>
Overview of Liminal Strategy Partners
The digital future is Liminal. We're guiding the way.

Liminal is a boutique strategy advisory firm serving digital identity, fintech, and cybersecurity clients, and the private equity and venture capital community.

We see the solution to complex digital challenges not only as ‘what’, but ‘how.’ We don’t just tell you about the destination, we show you how to get there.
Advisory Services
We advise the world’s most innovative leaders on building, buying, and investing in the next generation of integrated digital identity platforms and technologies.

- Market Intelligence
- Go-to-Market
- Growth Strategy
- Transaction Services

Research
Through our proprietary database, Link, we monitor thousands of companies across digital identity. Our insights allow us to predict and understand trends before they happen.

- Market Sizing
- Tailored Research
- Published Research

Industry Engagement
Our community consists of influential individuals redefining the digital identity ecosystem. We are conveners – connecting people, initiatives, and projects defining this evolving space.

- Executive Summits
- Private Events
- Webinars
- Podcasts
By the numbers

Since 2016, we’ve supported hundreds of companies with launching new products, breaking into new markets, and realizing max value at exit.

- Advised on $5.5B+ in client M&A activity since 2019
- Supported 40+ product launches in 65+ countries
- Generated $200M+ in new portfolio company revenues since 2018
- Published 100+ webinars, whitepapers, and research reports in 2020
- Access to 300+ SMEs in our executive network
- Hosts 100 industry executives and investors at the Liminal Summit in May 2022
- Recorded 250+ State of Identity podcast episodes
- Manage a proprietary database of 1,000+ companies across 30 solution segments
- Generated $200M+ in new portfolio company revenues since 2018
We work with amazing companies

We are well-versed in the evolving operational, financial, technological, and regulatory environment we serve.

We provide private equity firms, strategic, and investors with independent and actionable advisory to uncover hidden value pools across the digital identity ecosystem.

* Select list of recent clients
Our proprietary tools track the microtrends that help inform strategy

Our market intelligence platform, Link, was built specifically to monitor the market for new entrants and potentially disruptive trends.
As a result, we see the world a bit differently – not as a “what” but as a “how”

To make sense of an industry landscape dominated by platforms and enablers, we analyze how each company and product in each market segment interacts with and influences other market segments based on dominant data sources.
Liminal Leadership

TRAVIS JARAE
Founder / CEO
Travis.Jarae@liminal.co
- 15+ years experience leading teams across focused on go-to-market strategy and product management
- Currently CEO of Liminal and MD at Ginkgo Ventures
- 3x founder - Power Mailers Direct (direct mail automation for financial advisors), Power Auto (direct-to-consumer auto auction access), and Canon (private company ratings platform)
- Previously digital identity @ Google, strategy @ Deloitte, and analyst @ Citi
- B.A., Finance, University of South Florida

JENNIE BERRY
Managing Director
Jennie.Berry@liminal.co
- 15+ years experience in financial services and technology, leading teams through digital transformation and organizational effectiveness initiatives
- Previously Chief of Staff to the CEO of Deloitte LLP and management consulting Manager at Deloitte
- Previously Senior Analytics Manager at Bloomberg in equities and equity derivatives
- B.A., Economics, Columbia University
- M.B.A., Stern School of Business, NYU

CAMERON D’AMBROSI
Managing Director
Cameron.Dambrosi@liminal.co
- Specializations include market intelligence and transaction services, full lifecycle product development, user experience and design thinking, fraud prevention, and mobile intelligence
- Previously Engagement Manager at Deloitte Consulting, focused on risk and compliance and digital transformation for financial institutions
- B.A., History, Fordham University

WILL CHARNLEY
Director
Will.Charnley@liminal.co
- Director at Liminal focused on transaction services and growth strategy
- Previously worked as the Director of Systems and Growth at Learning by Giving Foundation, as well as a Director of Program Services at Big Brothers Big Sisters
- B.A., History, Boston College
- MBA, Babson University
<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Experience/Highlights</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ERIC WOODWARD</strong></td>
<td>Principal Advisor</td>
<td>25+ years experience leading, advising, investing, and partnering with financial technology companies including the creation of Early Warning Services, and the launch of Zelle’s real-time fraud &amp; risk detection platform</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Current Advisory Board member at Jumio, Sentilink, and ID Experts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Previously served as President of Early Warning Services, Managing Director at Bank of America Merrill Lynch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B.S., Accounting &amp; Finance, University of Colorado; MBA, Haas School of Business, UC Berkeley</td>
</tr>
<tr>
<td><strong>FILIP VERLEY</strong></td>
<td>Principal Advisor</td>
<td>Group Product Manager of Identity at Google</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Previously led Airbnb’s Identity team, Director of Risk and Fraud at TxVia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B.A. Criminology, Florida Atlantic University; M.S., Criminal Justice, Florida State University</td>
</tr>
<tr>
<td><strong>ANDREW SHIKIAR</strong></td>
<td>Principal Advisor</td>
<td>Executive Director and CMO at FIDO Alliance, a global consortium to create open standards and an interoperable ecosystem for strong user authentication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Previously led market development for Tizen Association, LiMo Foundation, and Liberty Alliance Project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Previously group manager for Sun Microsystems’ identity management products and services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Structured launch groups including the Smart TV Alliance and Open Visual Communications Consortia</td>
</tr>
<tr>
<td><strong>DR. GILAD ROSNER</strong></td>
<td>Principal Advisor</td>
<td>Privacy and information policy researcher with focus areas on IoT, identity management, US &amp; EU privacy and data protection regimes, and online trust</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Founder of the Internet of Things Privacy Forum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20+ years experience in IT, identity management technology, digital media, automation, and telecommunications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Member of the UK Cabinet Office Privacy and Consumer Advisory Group</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Visiting Scholar at the Information School at UC Berkeley</td>
</tr>
<tr>
<td><strong>ANDREW KASS</strong></td>
<td>Investment Banking Partner</td>
<td>Managing Director and CEO of BlackWatch Advisors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20+ years of technology investment banking experience across corporate finance and M&amp;A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Previously at Deutsche Bank and Credit Suisse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Licensed broker-dealer registered with the SEC and FINRA/SIPC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B.A., Business Economics, Brown University</td>
</tr>
</tbody>
</table>
Sources
Appendix

Sources

17. “ID.me Raises $100 Million in Funding at $1.5 Billion Valuation.” ID.me, 2021. https://insights.id.me/press-releases/id-me-raises-100-million-in-funding-at-1-5-billion-valuation/