

Reaching the Underserved:

A White Paper on Circular Financial
Identity and Circular Digital KYC

by **defy**

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Abstract:

In an increasingly digital world, Know Your Customer ("KYC") and Identity Verification ("IDV") processes are fundamental pillars in various industries, ensuring compliance, security, and trust. However, traditional KYC/IDV methods often suffer from inefficiencies, redundancies, and privacy concerns, leading to delays, higher costs, and customer frustration.

Existing solutions in emerging markets often miss the mark, neglecting to truly understand and address the unique challenges and varied needs in particular, of underserved communities. This results in a critical gap in financial inclusion.



Low financial literacy



Cash-based economies



Regulatory hurdles in some countries



Poor financial infrastructure and access to financial services



High transaction costs

Financial crime is a complex phenomenon, and poverty may increase vulnerability among the underserved communities.

Supporting financial inclusion and combating financial crime are not just ethical imperatives; they are integral to contributing to global sustainability goals and fostering a more equitable and sustainable future.

With the advent of digital technologies, there is an unprecedented opportunity to streamline KYC processes and enhance compliance while improving user experience.

Circular Digital Identity ("CDI") emerges as a promising solution to address these challenges, offering a streamlined, secure, and user-centric approach to identity verification to enhance financial access for underserved communities, creating more opportunities for those often overlooked.

Meanwhile, Circular Financial Identity ("CFI") encompasses a holistic and self-sovereign view of an individual's financial life, going beyond just credit scores and payment histories maintained by third-party institutions

By leveraging advanced technologies such as artificial intelligence, blockchain, and biometrics, financial institutions can not only meet regulatory requirements more effectively but also unlock new levels of convenience, security, and trust for their customers.

This white paper explores the concepts of CDI, CFI and their potential to optimize KYC/IDV processes, enhancing efficiency, effectiveness, and privacy in the digital ecosystem

chapter 1 **INTRODUCTION**

Imagine a world where your very existence is questioned simply because you lack the means to prove who you are — no birth certificate, no passport, no driver's license, not even a national identity card.

Having proof of legal identity or other officially recognized identification ("ID") is not a matter of convenience. It stands as a fundamental right, often serving as the gateway to essential services and opportunities. From securing employment to accessing banking facilities or receiving vital social assistance, official identification forms the cornerstone of inclusion in modern society.

As our world becomes increasingly digitized, the demand for secure and efficient methods of verifying identities online and from afar has surged.

In recent years, the proliferation of digital transactions and the rise of fintech innovations have reshaped the financial services industry. However, along with the opportunities presented by digitization come new challenges, particularly in the realm of compliance and regulatory oversight. KYC, the process of verifying the identity of customers, has emerged as a critical component of financial compliance, mandated by regulatory authorities worldwide.

But what exactly is identity, and how does it differ from identification?

Identity encompasses the essence and characteristics of an individual or entity, while identification involves the process of recognizing or confirming that identity through various means. It's the distinction between who we are and how we prove it — a nuanced yet critical differentiation in understanding the complexities of legal identity.

The World Bank's Identification for Development Initiative ("ID4D") in collaboration with the Global Findex has obtained comprehensive data on adult ID ownership and usage. With this new individual-level data, as well as a significantly expanded set of administrative data provided by ID authorities, estimates released at the end of 2022 indicate that just under 850 million people around the world do not have an official ID.

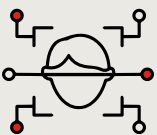
Traditional KYC processes involve manual document submissions, in-person verification, and cumbersome paperwork, leading to long onboarding times and increased operational costs for financial institutions. Moreover, the rise of digital fraud and identity theft has underscored the need for more robust identity verification mechanisms.

chapter 2

THE NEED FOR DIGITAL KYC SOLUTIONS

a. Defining identification and identity

Identity: A person's identity refers to the unique set of characteristics, traits, and attributes that define who they are as an individual. It encompasses various aspects such as:



Physical characteristics
appearance, biometrics
like fingerprints, facial
features, etc.



Personal traits
personality, beliefs,
values, interests, etc.



**Social roles and
relationships**
family, profession,
community, etc.



Legal status
name, date of birth,
citizenship, etc.

A person's identity is a complex amalgamation of these elements that make them distinct from others. It is an intrinsic and multifaceted concept that shapes an individual's sense of self and how they perceive themselves and are perceived by others.

[THE NEED FOR DIGITAL KYC SOLUTIONS]

Identification: Identification, on the other hand, is the process of establishing or verifying a person's identity. It involves using various methods and credentials to confirm that an individual is who they claim to be.

The identification process is crucial for various purposes, such as accessing services, conducting transactions, or ensuring security and privacy. It helps establish trust and prevent identity fraud or impersonation. Common methods of identification include:



i. Government-issued photo identification

This involves verifying a person's identity by examining a valid government-issued document like a passport, driver's license, or national ID card. The document's authenticity, validity, and the match between the photo and the person's appearance are checked.



ii. Biometric identification

This relies on unique physical or behavioral characteristics like fingerprints, iris scans, facial recognition, or voice recognition to identify an individual.



iii. Knowledge-based identification

This method verifies identity by asking questions only the person would know the answers to, such as a password, PIN, or personal information like their mother's maiden name.



iv. Possession-based identification

This involves using something only the person would have, like a key, access card, or mobile device, to confirm their identity.

In summary, while identity is the unique set of characteristics that define a person, identification is the process of verifying that identity through various methods and credentials.

[THE NEED FOR DIGITAL KYC SOLUTIONS]

b. Defining Digital KYC

Digital KYC refers to the process of verifying the identity of customers remotely using digital means, such as online platforms and electronic documents, to ensure compliance with regulatory requirements and mitigate risks associated with identity fraud and money laundering.

The components include:

- IDV ● Name screening ● Ongoing screening & monitoring ● Data update/maintenance

Digital KYC solutions offer a compelling alternative to traditional methods, harnessing the power of technology to streamline identity verification processes.

By digitizing customer information and leveraging automation, financial institutions can significantly reduce onboarding times, enhance accuracy, and improve compliance with regulatory requirements.

Key benefits of digital KYC solutions include facilitating streamlined and more efficient onboarding processes. Automated document verification and digital identity checks will enable rapid onboarding of customers, reducing the time and resources required for the process, eliminating the need for physical paperwork and in-person visits to branches.

Other benefits include:

- Enhanced Security and fraud prevention leveraging biometric technology: Advanced encryption techniques and biometric authentication methods bolster security, reducing the risk of identity theft and fraudulent activities
- Vulnerability risk assessment (through user profile and spending/money behavior analytics)
- Improved Compliance: By integrating regulatory checks directly into the onboarding process, digital KYC solutions ensure adherence to Anti-Money Laundering (AML) and Counter-Terrorist Financing ("CTF") regulations
- Facilitates collaboration with regulatory authorities and law enforcement agencies
- Utilizing blockchain for secure verification
- Seamless integration with existing financial systems and government digital ID platform

chapter 3

INTRODUCING CIRCULAR FINANCIAL IDENTITY—CFI

The concept of circular digital identity ("CDI") refers to a **unified and interoperable approach** to digital identity management across different sectors and platforms.

It aims to address the fragmentation of digital identities, where individuals have multiple usernames, passwords, and profiles for various services. In essence, it emerged as a holistic approach to creating a unified, user-centric, and efficient digital identity ecosystem that transcends individual sectors or platforms, facilitated by cutting-edge technologies.

Building on this approach, we propose to introduce the notion of **CFI**, which

encompasses a holistic and self-sovereign view of an individual's financial life, going beyond just credit scores and payment histories maintained by third-party institutions.

[INTRODUCING CIRCULAR FINANCIAL IDENTITY– CFI]



Comprehensive Financial Footprint

It aims to capture a comprehensive picture of an individual's financial values, interests, behaviors, and transactions across various domains like spending, investing, donating etc. This paints a more holistic picture than just credit histories.

Integration Across Financial Domains

A circular financial identity acts as an interoperable digital identity that is recognized and integrated across different financial sectors like banking, lending, investments, insurance etc. This avoids fragmentation of identities, enabling enhanced customer due diligence.

Enhanced Privacy and Consent

Leveraging technologies like blockchain, decentralized identifiers, zero-knowledge proof ("ZKP") and multi-party computing ("MPC"), a circular financial identity would enable enhanced privacy, data minimization and granular consent over what financial data is shared with which parties.

Circularity of Data

This refers to the process or systems with reinforcing (positive feedback) or balancing (negative feedback) to minimize redundancy and obsolescence, maximize resource efficiency, and promote reuse, recycling, and enrichment of personal and financial data.

〔 **INTRODUCING CIRCULAR FINANCIAL IDENTITY– CFI** 〕

In essence, a circular financial identity puts individuals truly in control of their comprehensive financial footprint across sectors in an ethical, integrated and privacy-preserving manner, transcending the current definition centered around third-party institutions. It therefore represents a paradigm shift in how identities are managed and verified.

At its core, CFI is based on the principles of self-sovereign identity, privacy, data decentralization, data minimization and consent.



Key features of CFI include:

● **SELF-SOVEREIGNTY** ●

Individuals have control over their own financial identity, deciding what information to share and with whom.

● **DECENTRALIZATION** ●

CFI leverages distributed ledger technology (“DLT”) to store and manage financial identity data in a decentralized manner, reducing the risk of single points of failure and enhancing security.

● **INTEROPERABILITY** ●

CFI enables seamless interoperability between different service providers and organizations, facilitating streamlined KYC/IDV processes.

● **PRIVACY BY DESIGN** ●

Leveraging cryptography technology such as ZKP and MPC, CFI minimizes the collection and sharing of personal data, enhancing privacy and reducing the risk of unauthorized access or misuse.

PRODUCT INTEGRATION AND REAL LIFE USE CASES

In addition to revolutionizing the KYC process, digital technologies also offer opportunities to enhance the functionality of Multi-users Smart Wallets ("MuSW"). Digital wallets, which enable users to store, manage, and transact various forms of digital assets, have gained popularity as consumers increasingly embrace cashless payments and digital currencies.

Integrating digital KYC solutions with digital wallet platforms can unlock several synergistic benefits, including CFI:



Instant Account Activation: Seamless integration between CFI verification, i.e. decentralized KYC ("d.KYC") and wallet registration enables instant account activation, allowing users to start using the wallet immediately.



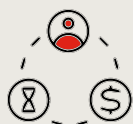
Decentralized Know Your Transactions – d.KYT: MuSW can leverage decentralized financial data and data minimization to streamlined transaction monitoring, enabling complex transaction between parties.



Expanded Services: MuSW can offer a broader range of financial services, including peer-to-peer transfers, bill payments, investment opportunities, and access to digital asset exchanges.



Decentralized cross-border payment: MuSW can facilitate secure and efficient cross-border transactions, enabling users to send and receive funds internationally with ease.



Trustless Asset Management: MuSW can be used to create multi-signature wallets managed by smart contracts, enabling trustless joint custody of assets without a single point of failure, enabling communities to pool resources securely for collective investment or lending purposes.



Nano and micro financial services: bolstered by the utilization of alternative credit modeling tools that process interests, behaviors, and transactions data, MuSW can democratize access to financial services to the underserved populations.

chapter 5

REGULATORY CONSIDERATIONS

While digital KYC and wallet solutions offer significant benefits, they must operate within the framework of existing regulatory guidelines. Regulatory compliance remains a top priority for financial institutions, and adherence to KYC and AML regulations is non-negotiable.

Key regulatory considerations include:

Data Privacy:

Compliance with data privacy regulations such as GDPR is essential to protect customer data and ensure confidentiality

Customer Due Diligence – CDD :

KYC processes must adhere to CDD requirements, including the verification of customer identities and the monitoring of transaction activities for suspicious behavior

Reporting Obligations:

Financial institutions must report suspicious transactions to regulatory authorities and maintain comprehensive audit trails to demonstrate compliance

chapter 6

IMPLEMENTATION OF CFI IN PRACTICE

To realize the full potential of CFI for KYC/IDV optimization, several key considerations must be addressed:

Regulatory Compliance:

Organizations must ensure that CFI solutions comply with relevant regulations and standards, such as GDPR, PSD2, and AML/KYC requirements.

Stakeholder Collaboration:

Successful implementation of CFI requires collaboration between various stakeholders, including government agencies, industry consortia, and technology providers.

Technology Integration:

Integrating CFI into existing systems and processes may require investments in interoperable identity protocols, DLT infrastructure, and identity verification services.

User Education:

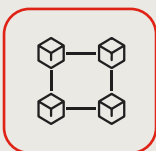
Educating users about the benefits and best practices of CFI is essential for fostering adoption and trust in the new identity ecosystem.

TECHNOLOGY INFRASTRUCTURE

To have real world applications, the concept of CFI and Digital KYC requires a secure, blockchain-based system designed to streamline financial transactions while adhering to regulatory standards and enhancing user privacy.

The success of our CFI and wallet solutions hinges on the effective utilization of emerging technologies which include:

Decentralized Private Chain



Offers the benefits of distributed ledger technology (DLT); immutable records of transactions, enhancing transparency and traceability in financial transactions, while maintaining a permissioned network for enhanced control and regulatory compliance.

Multi-Party Computation ("MPC") Technology



This technology allows for collaborative computations on encrypted data without revealing the underlying information. This ensures data privacy while enabling KYC/KYT verification and cross-border payment processing through multiple parties.

Zero-Knowledge Proof ("ZKPs")



ZKPs allow parties to prove they possess certain information without revealing the information itself. This empowers users to demonstrate their compliance with KYC/KYT requirements while maintaining data confidentiality.

Fully Homomorphic Encryption ("FHE")



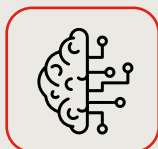
This advanced encryption technique allows computations to be performed directly on encrypted data. This unlocks possibilities for complex financial transactions without compromising user privacy, enabling our vision of decentralized vostro/nostro accounts or in other word a decentralized correspondent banking solution.

[**TECHNOLOGY INFRASTRUCTURE**]



Smart contract

Smart contracts offers a secure and reliable platform for executing the logic behind CFI and Digital KYC solutions, offering the creation of tamper-proof and auditable code that governs data interactions within the KYC/KYT and cross-border payment protocols.



Artificial Intelligence ("AI")

AI-powered algorithms can analyze vast amounts of data to detect suspicious patterns and identify potential instances of fraud or non-compliance.



Graph technology

To understand and analyze complex networks and relationships



Biometrics

Biometric authentication methods such as facial recognition and fingerprint scanning provide robust identity verification, reducing the risk of impersonation and fraud.

By integrating these technologies, our goal is to establish a system that fosters collaboration among various stakeholders, including individual wallets on our private chain, financial institutions, and regulators.

This system provides a robust framework for financial entities to provide efficient KYC/KYT processes and seamless cross-border payments while aiming to balance stringent regulatory demands with the need for user privacy and transaction flexibility.

chapter 8

RESEARCH & DEVELOPMENT

We recognize the need for continuous advancement in these critical technologies to achieve our vision. Through applied research initiatives, we aim to contribute to the state-of-the-art in these technological domains. Yet, this would not be possible without partnering with leading organizations and prestigious research institutions. This is why we have already starting discussion with the Ph.d program of the polytechnics of Bahrain.



FUTURE OUTLOOK

The adoption of CFI and digital KYC is poised for exponential growth, especially in the Asia-Pacific ("APAC") region. With increasing smartphone penetration and a growing tech-savvy population, APAC offers a fertile ground for the expansion of these services.

The convenience and accessibility provided by digital KYC and digital wallets align well with the region's dynamic economic landscape.

Alternative credit modelling tools that leverage innovative algorithms and data analytics to assess creditworthiness beyond traditional metrics will open up access to financial services for underserved populations and stimulate economic activities.

Rapid advancements in emerging technologies are reshaping the financial landscape.

Technologies such as blockchain and decentralized identifiers ("DIDs") are poised to revolutionize KYC processes and enhance security, transparency, and efficiency across the financial sector.

The integration of these advancements bears profound implications for the financial ecosystem and the global economy, aligning closely with Sustainable Development Goals ("SDGs"). By promoting financial inclusion and economic empowerment, reducing fraud, and facilitating cross-border transactions, these technologies can foster economic growth and empower marginalized communities.

CFI holds immense promise beyond its traditional applications in KYC processes. Its potential spans various sectors including digital voting, healthcare, and Internet of Things ("IoT"). As emerging technologies like blockchain continue to evolve, they offer unprecedented opportunities to leverage CFI for secure, decentralized identity management in these domains.

Regulatory trends play a crucial role in shaping the adoption and standardization of CFI solutions. As governments around the world prioritize data privacy and security, compliance requirements are evolving, necessitating robust frameworks for CFI and Digital KYC adoption. Collaborative efforts between regulators, industry stakeholders, and technology providers are essential to ensure interoperability and adherence to regulatory standards.

chapter 10

CONCLUSION

In conclusion, CFI and Digital KYC represent a paradigm shift in the way financial institutions onboard customers, manage identities, and facilitate digital transactions. By harnessing the power of advanced technologies, financial institutions can enhance compliance, improve security, and deliver superior user experiences.

Circular Digital Identity (CDI) holds tremendous promise for optimizing KYC/IDV processes, offering a more efficient, secure, and privacy-preserving approach to identity management and verification. By embracing CDI principles and leveraging decentralized technologies, organizations can enhance compliance, reduce fraud, and improve the overall customer experience in the digital era. As the digital economy continues to evolve, CDI is poised to become a cornerstone of the next-generation identity ecosystem

Circular Financial Identity, on the other hand captures a comprehensive picture of an individual's financial values, interests, behaviors, and transactions across various domains like spending, investing, donating etc, thereby painting a more holistic picture about who is this person financially speaking.

Successful implementation requires collaboration between regulators, industry stakeholders, and technology providers to develop standards and best practices that promote innovation while safeguarding the integrity of the financial system. With the right approach, digital KYC and wallet solutions have the potential to drive financial inclusion, foster trust, and unlock new opportunities for economic growth in the digital age - a future empowered by digital KYC and wallet.

To learn more about the CFI initiative or express interest to participate in the ecosystem

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