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Research Paper

ETHEREUM BLOCKCHAIN FRAMEWORK ENABLING BANKS TO KNOW THEIR CUSTOMERS

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ABSTRACT— The Know Your Customer (KYC) process is a fundamental prerequisite for any financial institution's compliance with the regulatory framework. Blockchain technology has emerged as a revolutionary solution to enhance the effectiveness of the KYC procedure. It ensures that the KYC process is transparent, secure, and immutable, thereby offering a robust solution to combat fraudulent activities. The potential of blockchain technology in revolutionizing the KYC process has been acknowledged globally. Blockchain technology provides a decentralized platform for storing customer data, enabling financial institutions to access the information seamlessly. Using ethereum blockchain technology in KYC procedures can enhance the efficiency of financial institutions, significantly reducing the time and cost associated with the process. This work aims to provide a viable and sustainable solution to the challenges that banks experience in implementing KYC procedures and onboarding new customers. The proposed solution involves the central bank maintaining a comprehensive register of all registered banks while closely monitoring their adherence to the existing regulations governing KYC and customer acquisition.

Index Terms – Ethereum Blockchain, KYC, Banking Security, Smart Contracts, Identity Management, Blockchain-Based Verification, Financial Technology, Data Privacy, Distributed Ledger Technology, Regulatory Compliance.

I. INTRODUCTION

The central banks and other governmental financial institutions face significant challenges in effectively tracking money laundering activities, particularly those that are linked to terrorism and other criminal activities. Money laundering (ML) has become a global issue, and it is estimated that approximately $2 trillion is laundered each year. The failure to tackle this issue poses a serious threat to national security. It can harm the economy and undermine the financial system's integrity. The methods used by money launderers have become increasingly sophisticated, making it difficult for regulators and financial institutions to detect them. Criminals often use complex financial structures and multiple transactions to conceal their activities. Moreover, money laundering is often linked to other criminal activities, such as drug trafficking, human trafficking, and corruption. Given the complexities involved in detecting and preventing money laundering, it is imperative that regulators and financial institutions collaborate closely to implement effective measures to combat this issue. Such measures may include increased transparency and reporting requirements, enhanced due diligence procedures, and improved information sharing. Financial institutions must also ensure that their staff are adequately trained to identify and report suspicious activity. Failure to tackle the issue of money laundering could result in significant reputational and financial damage to businesses and countries alike. Hence, it is vital that all stakeholders work together to combat this global menace and safeguard the integrity of the global financial system. The International Monetary Fund (IMF) recommends allocating resources in a targeted manner to prevent money laundering and terrorist financing effectively. To achieve this, focusing on areas where resources will be most impactful is essential. Figure 1 provides a visual representation of such areas. By prioritizing these areas, organizations can ensure that their resources are used effectively and efficiently to combat financial crimes. This necessitates a thorough analysis and understanding of the risks associated with ML and terrorist financing (TF) in the country. This analysis should consider a wide range of factors, such as the types of financial services and products available, the vulnerabilities of different sectors and industries to ML/TF, and the prevalence of different ML/TF methods and techniques. Armed with this information, authorities can devise and implement targeted measures to address these risks, such as enhanced due diligence requirements,

increased monitoring and reporting obligations, and stricter enforcement measures. A risk-based approach focusing on the most significant threats is crucial for effective ML/TF prevention. To safeguard the financial system's integrity and prevent its exploitation for illicit purposes, countries must also stay ahead of the evolving tactics and techniques of those who engage in ML/TF. This requires ongoing analysis and adjustment of strategies to address new threats. Additionally, inappropriate land-based funds (LBF) and low net monthly income (NMI) can also lead to rejection. Another common reason for rejection is inadequate credit history. Banks may also decline financing proposals if the business has weak cash flow or profitability, suggesting it may struggle to meet its financial obligations. A risky business model or a subpar business plan can also contribute to a proposal being rejected. In addition to these factors, banks may also consider external elements such as economic conditions or industry trends before approving or rejecting financing proposals. For instance, if the economy is experiencing a downturn, banks may be more cautious about extending credit to businesses. Similarly, they may be less likely to approve financing for businesses operating in sectors that are experiencing a decline. However, businesses can take several measures to improve their chances of securing financing from banks. By building a strong credit history, businesses can demonstrate their financial stability and credibility to banks. Optimizing cash flow and developing a sound business plan can also help businesses present themselves as viable and attractive candidates for financing. Furthermore, businesses must stay informed about economic conditions and industry trends, allowing them to tailor their financing proposals to align with market realities. By addressing these factors proactively, businesses can overcome obstacles, increase their chances of securing bank financing, and ultimately achieve their financial objectives.

II. RELATED WORK

A. A systematic literature review of blockchain-based e-KYC systems

The know your customer (KYC) guidelines in financial services require that institutions make an effort to verify the identity, suitability, and assess risks involved while maintaining a business relationship. The procedures fit within the broader scope of any financial institution's Anti-Money Laundering (AML) policy. Governments around the world have digitalised this process

to make it more convenient and transparent by introducing the notion of e-KYC (Electronic KYC). e-KYC provides a flexibility for the users as they might even quickly complete the on-boarding process from the comfort of their homes. However, there are a few outstanding issues, such as the lack of any global standardisation, possible fraudulent activities during the e-KYC process and other privacy concerns, that must be addressed before its full benefits can be achieved. Recently, blockchain technology (or blockchain in short) has emerged as a foundational technology with possibilities to disrupt a wide range of application domains. Understandably, it is increasingly being investigated how blockchain can be a useful tool to address these outstanding issues. Towards this aim, a number of research works have emerged in the recent years. In this article, we present a systematic literature review (SLR) of these works using the PRISMA model in order to identify and critically analyse the existing researches at the intersection of e-KYC and blockchain. Based on our study we have also identified the limitations of the existing solutions and provided future directions.

B. An examination of distributed and decentralized systems for trustworthy control of supply chains.

Establishing a well-functioning Supply Chain Management (SCM) system is paramount during challenging times such as pandemics, natural disasters, and international conflicts. The complexity of global supply chains necessitates efficient systems, procedures, and personnel to ensure optimal results. Poor coordination among entities can lead to increased counterfeit products, increased ocean transportation costs, more expensive freight brokerage, bottlenecks in cargo flow, congestion, and complications in product accountability. To ensure a smooth and hassle-free operation, it's essential to maintain unambiguity and accuracy throughout every process. Therefore, it is vital to have effective systems, procedures, and personnel in place for SCM. The challenges encountered in SCM can be effectively tackled by utilizing blockchain technology. The architecture of blockchain technology is characterized by its distributed, decentralized and robust safety measures, which guarantee the integrity of data storage and its distribution across a meticulously organized ledger. Users can confidently rely on this innovative design's transparency, reliability, and safety. Implementing blockchain technology carries immense potential in bolstering safety and privacy measures in diverse sectors,

including agriculture, healthcare, Goods and Services Tax (GST), academics, e-voting and automobile. This investigation delves into the practical applications of blockchain technology for SCM. It thoroughly analyses existing research and literature to uncover the latest advancements and potential future breakthroughs in this area.

C. *A decentralized KYCbased approach for microfinance using blockchain technology.*

Financial inclusion is seen as a dynamic tool for achieving multifaceted microeconomic stability, (and) sustainable economic growth, job creation, poverty reduction, and income equality for both developed and developing nations. The needy segments of the population must be provided with financial services to accomplish this inclusion. Still, the traditional financial market is unavailable due to its lack of collateral and shallow income. Thus, they go to local moneylenders, also known as "loan sharks," who charge exorbitant interest rates. Introduction to microfinance came as a new and refreshing light to these needy segments of the population as it provides small valued loans (micro-credit) to support their micro-scale businesses and engage in productive activities. As emerging technology started to be incorporated into every aspect of society, thus microfinance also needed to be incorporated into the technology. An application is required to protect data integrity and smoothly influence the microfinance sector. As the databases are vulnerable to data manipulation, this can affect the transaction history of the loan. Blockchain technology can be used to solve this problem, as data in the Blockchain is stored immutably. So, we designed a microfinance application that uses blockchain technology with decentralised KYC architecture to reduce multiple KYC verification and easy access to micro-credit.

III. PROPOSED METHODOLOGY

Customers create a digital identity on a blockchain platform, allowing them to securely store and manage their KYC information. They control access to their data, sharing only necessary details with financial institutions. Smart contracts can automate various KYC checks (e.g., validating ID documents, verifying addresses) based on predefined criteria. This reduces manual intervention and speeds up the verification process. Customer data is encrypted and anonymized, ensuring privacy and security. Only authorized parties can access the relevant information based on customer consent.

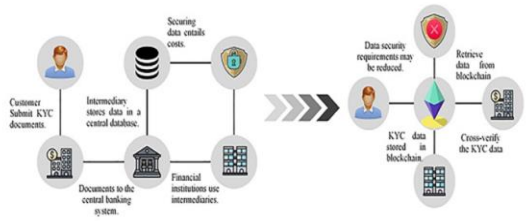
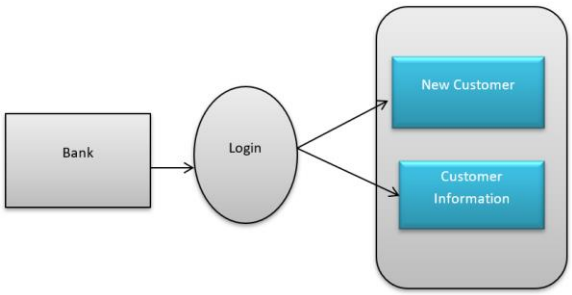


Fig. 1: System Overview

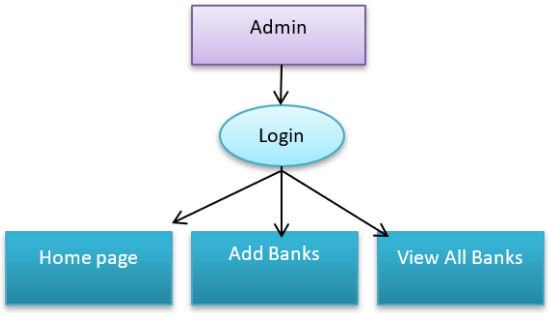
1. Bank

Banks play a vital role in the financial system by providing essential services that facilitate economic activity and personal financial management. They offer a secure place for individuals and businesses to deposit and manage their money, ensuring the safekeeping of funds against theft or loss.



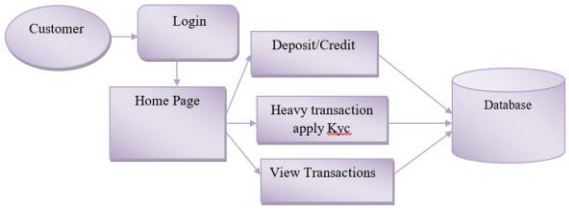
2. Admin

This is the third module in our project is Admin. Here admin will login with his password and Id who has created by the bc operator. After admin login directely will navigate into admin home page. The purpose of an administrator is to oversee and manage the operations and functionality of an organization, system, or project. Administrators are responsible for coordinating tasks, enforcing policies, and ensuring that processes run smoothly and efficiently.



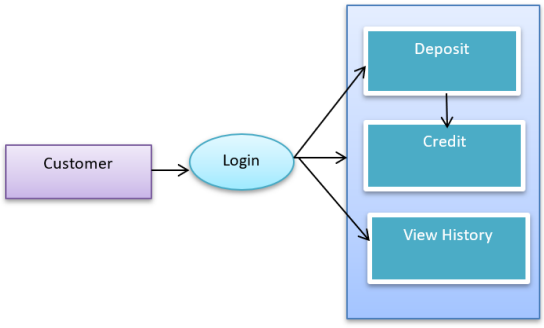
3. Customer

This is the fourth module in our project is Customer. Customers must provide accurate, complete, and up-to-date personal information, address, as requested by the bank. They are also required to submit the necessary documentation promptly and update their details if there are any changes, such as a new address or a name change. Customer bank transactions encompass a range of financial activities performed by account holders through their banking institution. These transactions include deposits, where customers add funds to their accounts; withdrawals, where they remove money; transfers, where they move funds between accounts or to other individuals or institutions. Each transaction is recorded and monitored by the bank to ensure accuracy and to maintain a comprehensive account history.



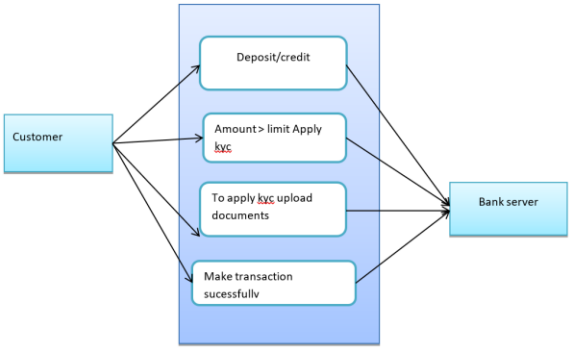
4. Transactions

This is the Fifth module in our project is Transactions. Credit and deposit transactions are fundamental activities in banking where customers interact with their accounts. A credit occurs when funds are added to a customer's account, such as through a paycheck deposit, loan disbursement, or a transfer from another account. Deposits, on the other hand, involve customers placing money into their accounts, which can be done through various methods including cash deposits, checks, or electronic transfers. Banks record these transactions meticulously to ensure account balances are accurately updated and to provide customers with a clear and detailed account of their financial activity.



5. KYC

Know Your Customer (KYC) is a crucial process employed by financial institutions to verify the identity of their clients and assess potential risks of illegal activities, such as money laundering or fraud. Through KYC procedures, banks and other financial entities collect and analyze personal information from customers, including identity documents, proof of address, and financial history.



IV. EXPERIMENTAL RESULTS AND ANALYSIS

Experimental results demonstrated that integrating Ethereum with customer identity management significantly reduced the time required for customer verification and eliminated redundant KYC procedures across multiple banking institutions. The use of smart contracts ensured secure, transparent, and tamper-resistant storage of customer information while maintaining privacy and regulatory compliance.

The analysis indicates that the blockchain-based approach improved operational efficiency, reduced administrative costs, and enhanced trust among participating banks. Overall, the proposed framework provides a scalable, secure, and efficient solution for modern digital banking and customer identity verification systems.



Fig. 2: Home Page

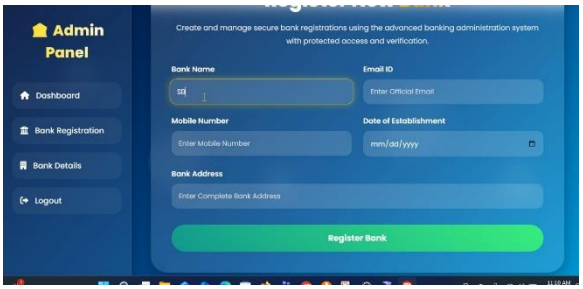


Fig. 3: Register



Fig. 4: Login



Fig. 5: Create Bank Account

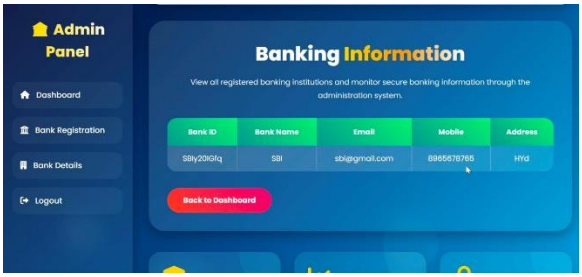


Fig. 6: Banking Information

V. CONCLUSION

In this paper, we have presented a revolutionary solution to the long-standing problem of KYC using blockchain technology. The proposed KYC process is designed to meet the requirements of modern businesses. Utilizing the strengths of blockchain, such as distributed ledger and immutability, we have created a solution far superior to existing ones. Therefore, this blockchain-based solution ensures that unauthorized entities cannot modify sensitive KYC data, which is an advantage over existing solutions. Moreover, it is cost-effective for the companies, significantly reducing infrastructure costs. Our solution also eliminates the need for users to repeat the

KYC process once they have entered the system, saving valuable time and effort. The decentralized peer-to-peer network of the proposed system offers several advantages over centralized ones, making it more secure against vulnerability attacks.

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