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Blockchain Based Solution For Government Funding Process

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ABSTRACT

Corruption is a major issue between government entities. Several governments have struggled with corruption, which may result in money being wasted, favoritism, and the abuse of authority. Furthermore, corruption can lead to a lack of confidence in both the public and the administration. In order to reduce corruption and increase transparency in government, this research paper explores the deployment and efficacy of an e-funding government system.

The E-funding system is designed to create a transparent and efficient framework for the allocation and management of government finances, with the purpose of minimizing potential for corruption at all levels of government. This essay addresses the system's advantages and drawbacks, as well as how it affects the transparency and accountability of government. Case studies, interviews with stakeholders, and a review of pertinent literature are all included in the research technique. According to the findings, the E-funding system has the potential to drastically reduce corruption and increase government openness.

The study finishes with suggestions for anti-corruption measures, such as improved funding system transparency, accountability, and supervision. The report concludes by highlighting the significance of tackling corruption in the financial system to guarantee equitable resource distribution and enhance the quality of life for people at all levels of government.

Keywords: blockchain, transparency, decentralized, finance, government, immutable, funding, ledger

1) INTRODUCTION

The credibility and accountability of governments throughout the world have been harmed by ongoing problems such as corruption and transparency in government financing procedures. Due to these issues, public monies are mismanaged and used inappropriately, which results in inadequate public services and infrastructure, political instability, and even societal unrest.

The goal of this study is to investigate how blockchain technology may be used to solve the issue of corruption and opacity in government financing procedures. The study is specifically designed to look at the viability, benefits, and difficulties of using blockchain-based solutions to improve openness and accountability in government financing processes.

Blockchain technology provides a secure, decentralized, and immutable platform for real-time financial transaction tracking and recording, assuring transparency and decreasing the risk of fraud and corruption. The suggested solution is utilizing blockchain technology to generate a tamper-proof, transparent, and auditable record of all government financing transactions, from source to beneficiary. The system's openness and security aspects can aid in the elimination of middlemen, the reduction of transaction costs, and the improvement of efficiency in government financing procedures.

Ultimately, the research aims to give insights on how blockchain technology might be used to improve government accountability, transparency, and trust in the public sector.

Using blockchain technology to construct an E-Funding Government system has a number of benefits. The following are a few of the main benefits:

1.1) Transparency:

One of the biggest advantages of implementing blockchain technology in the public financing system is transparency. All parties can access the same information because of blockchain's decentralized structure, which increases transparency in the distribution and administration of public monies and lowers the likelihood of corruption.

1.2) Security:

Cryptography, on which blockchain technology is founded, makes it incredibly secure. It is challenging for hackers to get illegal access to the system because of the decentralized structure of the blockchain, which makes sure that no single party has authority over the system.

1.3) Efficiency:

Blockchain-based e-funding systems may automate and simplify a lot of the procedures associated with the distribution and administration of public monies. Transactions become quicker and more effective as a consequence, and the possibility of mistakes that might happen during manual processing is decreased.

1.4) Accountability:

Smart contracts are used in blockchain-based e-funding systems to create a transparent and auditable record of all transactions. The possibility of fraud or corruption is decreased and accountability is increased as a result.

1.5) Cost Savings:

Using blockchain technology to implement an e-funding system can drastically save expenses related to manually processing and reconciling transactions. As a result, the government and eventually the taxpayer can save money.

1.6) Trust:

The decentralized structure of blockchain and its transparency aid in fostering trust between the populace and the government. This may result in more people having faith in the government's capacity to administer public finances efficiently and fairly.

In general, creating an electronic financing system based on blockchain technology has the potential to change how public monies are managed and distributed, resulting in more openness, accountability, efficiency, and confidence.
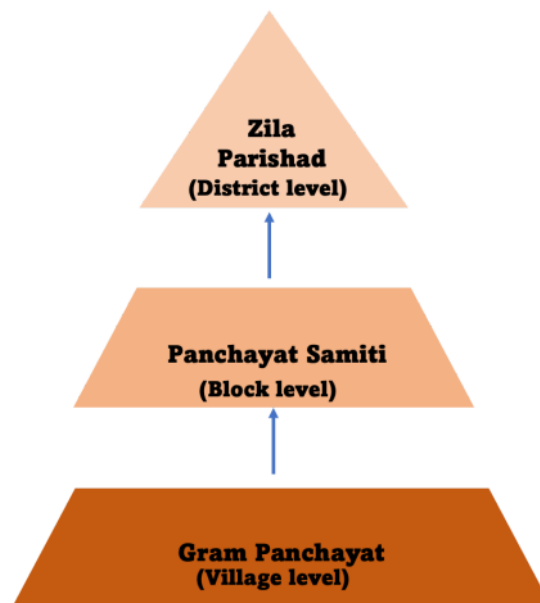

Figure 1: Government Low-Level Hierarchy

2) **LITERATURE SURVEY:**

Ref Number	Title	Description

[1]	Automating Governance Through Decentralised Autonomous Organisation	In this study, we introduce the concept of the Decentralized Autonomous Organization (DAO) code as a groundbreaking solution for automating organizational governance and decision-making processes. This innovative approach enables individuals to collaborate seamlessly outside the constraints of traditional business structures. Moreover, registered corporate entities can leverage the DAO code to automate formal governance regulations mandated by the law or outlined in their corporate bylaws.
[2]	A Comparison Of Decentralised Autonomous Organisation Platforms on the Ethereum Blockchain	Blockchain technology has paved the way for a revolutionary class of distributed systems, extending beyond its conventional applications in finance. This advancement has ushered in the emergence of innovative models of coordination and governance, prominently exemplified by Decentralized Autonomous Organizations (DAOs). DAOs play a pivotal role by integrating robust decision-making mechanisms that empower online communities to collectively reach consensus and make informed choices."
[3]	Using Blockchain To Combat Corruption	The utilization of blockchain technology holds immense potential in revolutionizing anti-corruption initiatives. However, the success or failure of these endeavors relies not solely on the technology itself, but rather on a combination of contextual elements such as infrastructures, legal frameworks, social norms, and political environments. To comprehensively assess the impact of accountability and transparency on combating corruption, empirical investigations play a vital role in shedding light on the intricate dynamics at play.
[4]	Blockchain Technology as E-Government Support Infrastructure.	In recent times, there has been a surge in the adoption of blockchain technology, encompassing cryptocurrencies like Bitcoin and others. However, the focus has predominantly been on the monetary aspect rather than the underlying blockchain technology itself. This study emphasizes the need to explore beyond currency-related applications and delve into the potential applications of blockchain technology in governmental functions. Specifically, it highlights the promising prospects of utilizing blockchain for secure document handling and efficient digital ID management.

[5]	Governance and the Use of Blockchain: A Systematic Literature Review	Blockchain technology, powered by cryptographic proof techniques, offers a decentralized ledger system. Its capabilities extend to the creation of self-executing digital contracts known as smart contracts. This technology has paved the way for collaborations across various critical research domains such as governance, the Internet of Things (IoT), healthcare, banking, and education. Within these domains, blockchain has emerged as a transformative force, introducing breakthrough methods to address governance challenges encompassing voting systems, mitigating human error, enhancing data privacy and security, and ensuring food safety.
[6]	Blockchain In Finance	The decentralized and replicated ledger technology, commonly known as blockchain, has emerged as an intriguing alternative for structuring modern finance alongside traditional systems. Presently, the financial landscape heavily relies on centralized trusted intermediaries. Central counter parties (CCPs) facilitate trade guarantees in exchanges, central securities depositories (CSDs) handle securities settlement, the Society for Worldwide Interbank Financial Telecommunication (SWIFT) facilitates global money transfers, CLS Bank manages foreign exchange transaction settlements, a few banks dominate correspondent banking, and decentralized alternative finance involves only a handful of institutions.
[7]	Overview, Evaluation, Opportunities, and Challenges of Non-Fungible Tokens (NFT)	In recent years, the Non-Fungible Token (NFT) industry has experienced unprecedented surge in popularity. NFTs were inspired by an Ethereum token standard that aimed to provide unique identification for each token through distinctive symbols. These tokens are associated with virtual or digital properties, and their distinct identifiers enable free trading with customizable values based on factors such as rarity, age, liquidity, and more. The emergence of NFTs has significantly contributed to the growth of decentralized applications (DApps) in the market. As of May 2021, the completed NFT sales have reached a staggering total of 34,530,649,86 USD
[8]	A Decentralised Voting Mechanism: Involving Owners of ERC-20 Tokens in the Decision-Making Process.	This study unveils an innovative voting methodology leveraging the potential of Blockchain technology, poised to revolutionize existing electoral procedures and propel the advancement of decentralized governance. The research focuses on the development and deployment of a Solidity smart contract, meticulously designed to interface with Ethereum-based tokens (ERC-20) and facilitate decentralized organizations in conducting transparent public voting campaigns. By actively engaging token owners in decision-making processes, this groundbreaking approach establishes a seamless connection between

		governance and token holders. The effectiveness of the proposed methodology is demonstrated through a series of meticulously crafted use case scenarios detailed in the research article.
[9]	A Study on Hegemonic and Dangerous ERC-20 Tokens and the Decentralisation Paradox.	This research paper delves into the examination of Ethereum smart contracts belonging to the ERC20 administered tokens category. The study sheds light on the inherent security vulnerabilities and increased owner control associated with these contracts compared to the traditional institutions they aspire to replace, such as banks and centralized internet payment systems. To address this concern, the study develops a binary classifier capable of identifying administrated ERC20 tokens. Through meticulous data analysis, the research reveals that nearly ninety percent of ERC20 tokens on the Ethereum network fall under the administrated category, posing risks even when trust is placed in their owners. To mitigate these risks, the study introduces SafelyAdministrated, a Solidity abstract class that safeguards users of administrated ERC20 tokens against malicious attacks and irresponsible actions perpetrated by token owners.
[10]	Using blockchain technology to track vehicles	The automotive industry's value chain comprises a complex manufacturing network that extends across multiple sectors, businesses, and even countries. With the advent of electrification and autonomous driving, the industry is witnessing a heightened emphasis on quality and transparency standards, particularly in relation to electric and electronic components that play a crucial role in ensuring safety. This study delves into the examination of traceability requirements and liability implications within the automotive manufacturing network. The research scrutinizes the evolving landscape of the industry, highlighting the significance of traceability and the potential consequences for stakeholders involved.

3) DISCUSSION AND IMPLICATIONS:

Corruption and a lack of transparency have recently emerged as serious problems in the government's funding of development projects. Critical projects may be hampered by these issues and suffer considerable losses in public cash. A blockchain-based solution that offers transparency, immutability, security, and decentralization has been suggested as a way to solve these problems.

A blockchain portal that acts as a platform for transferring government funds is the suggested answer. A financial transfer is first proposed by the government, and before it can be carried out, the receiving party must agree. This mechanism makes sure that everyone is aware of the transfer, and the approval procedure makes it harder for fraud to take place.

For this application, blockchain technology offers a number of benefits. First off, the system is decentralised, which means that no single entity is in charge of running it. Because of this decentralisation, no one or organization can

take use of the system to their advantage. Second, the blockchain cannot be altered or deleted after a transaction has been added to it. This property is known as immutability. The fundraising process is made more secure by this feature, which makes sure that every transaction is clear and traceable.

Transparency is a key benefit of the suggested solution. Anyone can access the blockchain records of all transactions to confirm their legitimacy. When it becomes more difficult for individuals to misappropriate public monies without being discovered, this characteristic can aid in the elimination of corruption.

In conclusion, the suggested blockchain-based system offers a secure and effective means to oversee the allocation of public funds for construction projects. The approach solves the challenges of corruption and lack of transparency, and gives an added layer of protection to the process. We can develop a system that is more effective and transparent while also benefiting all parties involved by utilising blockchain technology.
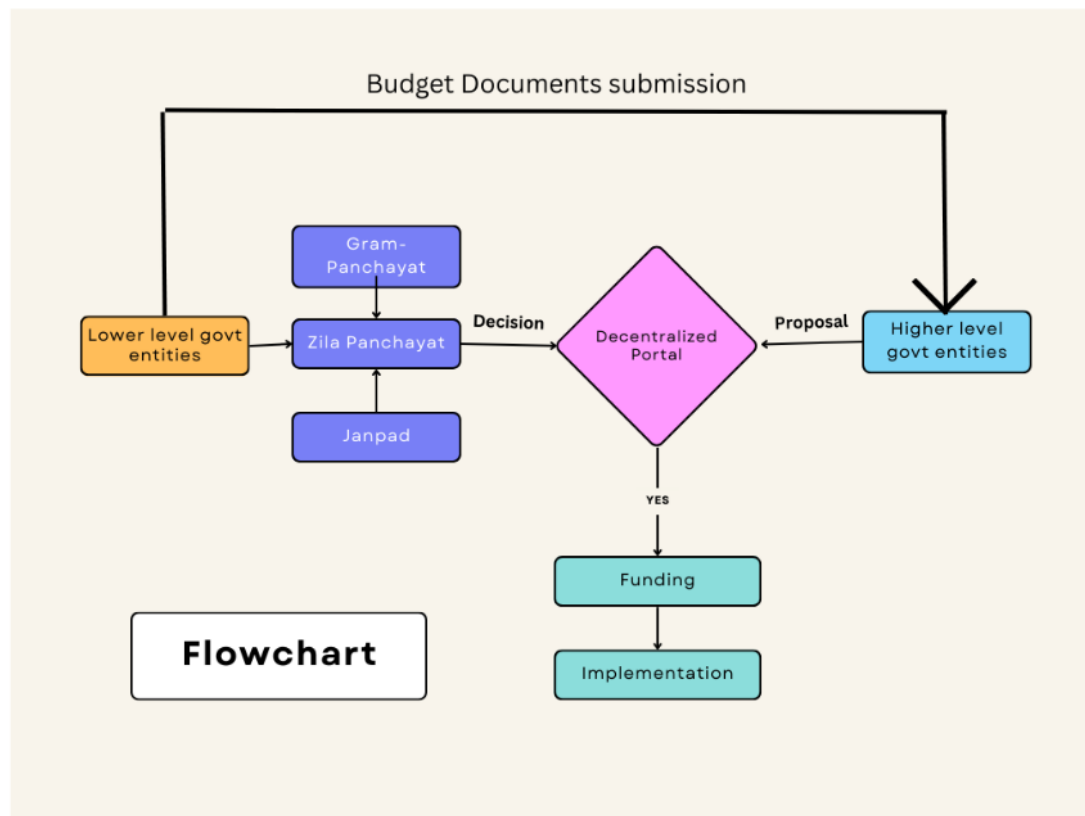

Figure 2: Funding Process Demonstration Using Blockchain

4) FINDINGS AND RESULTS:

Transfer of Funding in lower levels of Government:

In India, the distribution of funds among lower tiers of government is a crucial problem since it has an effect on the provision of public services and the general growth of neighbourhood communities. In India, monies are often transferred through a number of procedures, such as grants, allocations, and devolution of powers, from higher levels of government, such as the state or national government, to lower levels of government, such as municipalities or panchayats.

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Making sure the money is spent properly and efficiently in the transfer of financing between lower levels of government in India is one of the major difficulties. In India, local governments frequently lack the institutional capability to efficiently manage finances and carry out projects, which can cause delays, cost overruns, and other inefficiencies.

Moreover, the funding process frequently lacks transparency and accountability, which can result in corruption and poor financial management. Money may occasionally be syphoned off or diverted from its intended use by middlemen or local officials.

To overcome these obstacles, it's crucial to make sure that the transfer of cash is accompanied by proper institutional assistance and capacity building for local governments. For local officials to properly manage finances and carry out projects, this may include training initiatives, technical support, and other sorts of aid.

More accountability and transparency are also required in the funding process. This might be accomplished by utilising technology to create a more transparent and secure method for handling and tracking cash at the local level, such as blockchain or other digital platforms.

In India, the distribution of funds among lower tiers of government is a complicated problem that calls for a multifaceted solution. It is possible to make sure that funds are used effectively and efficiently to satisfy the requirements of local communities by addressing institutional capacity, transparency, and accountability.

India's local governments at the panchayat and municipal levels frequently struggle with funding issues. Among the major issues are:

4.1. Restricted sources of finance: In India, local governments are mainly dependent on grants and funding from central or state governments. These resources, however, are frequently constrained and might not be enough to meet the demands of nearby populations.

4.2. Insufficient ability to produce revenue from local sources, such as property taxes or user fees. This is a problem for local governments in India. They become incredibly reliant on donations and funding from upper echelons of government as a result.

4.3. Lack of financial independence: Local governments in India have little financial independence and frequently depend on higher governmental levels for funding approval and disbursement. This might result in financing delays and make it challenging for local governments to quickly respond to the demands of their people.

4.4. Inadequate institutional capacity: In India, local administrations frequently lack the institutional strength necessary to successfully manage funds. This may cause the funding process to be inefficient, slow, or even corrupt.

4.5. Inadequate accountability: Local administrations in India frequently lack openness and accountability in the allocation and utilisation of funding. Money may be mismanaged or diverted from its intended use as a result of this.

These issues might result in a lack of funding for crucial local initiatives and services as well as a lack of faith and confidence in the local administration. A multifaceted strategy will be needed to address these problems, including strengthening revenue production, institutional capacity building, and transparency and accountability in the funding

process. By offering a more open and secure platform for managing and tracking funds at the local level, blockchain technology may be able to assist in resolving some of these issues.

Corruption with middleman:

India's lower levels of government frequently struggle with corruption through middlemen, especially when money must be transferred between them. Middlemen frequently operate as go-betweens for contractors and suppliers, and they could use shady tactics to obtain contracts or rig the bidding process.

The theft of money from its intended uses is one of the key methods through which corruption through middlemen takes place. For instance, a middleman could be able to persuade a government official to award a contract to a specific supplier, who then pays the middleman a bribe. After deducting their personal profit from a portion of the kickback, the intermediary will then transfer the remaining monies to the government official.

Inflating the cost of projects or services is another way middlemen can contribute to corruption. For instance, a middleman could be able to influence the bidding process by offering fraudulent quotations or collaborating with other bidders to boost the cost of a project unnecessarily. This could result in the government shelling out more money than necessary for a project or service, with the extra cash going to the middleman instead.

The quantity of financing and corruption at lower levels of government in India, as well as the function of middlemen in supporting corrupt activities, are well-established relationships. Due to a lack of financing, local leaders and middlemen may engage in dishonest activities to divert funds from their intended uses or demand kickbacks in exchange for issuing contracts.

The use of middlemen is one of the primary means through which corruption in the funding process takes place. These middlemen frequently operate as go-betweens for contractors or suppliers and municipal officials, and they could collect fees or use other shady tactics to obtain contracts or rig the bidding process. Furthermore, it may be challenging to identify and stop corrupt practices due to the lack of accountability and transparency in the funding process. As a result, there may be a vicious cycle whereby local government credibility is further eroded, which in turn encourages corruption.

Increasing openness and accountability in the funding process is crucial to addressing the issue of corruption caused by middlemen in the movement of cash between lower levels of government in India. This can be done by utilising technology to create a more transparent and secure method for handling and tracking funds at the local level, such as blockchain or other digital platforms.

Ultimately, tackling corruption through middlemen in the transfer of cash between lower levels of government in India is a difficult issue that requires a multi-pronged strategy. It is feasible to lessen the influence of corruption on the transfer of funds and guarantee that funds are used effectively and efficiently for the benefit of local populations by enhancing transparency and accountability, as well as through boosting awareness and training.

Solution using Blockchain:

By offering a more open and safe platform for administering and tracking funds at the local level, blockchain technology has the potential to help alleviate some of these issues. Blockchain technology has the potential to lessen

the role of middlemen and promote transparency in the financing process by offering a safe and decentralised platform for storing and managing data linked to funding.

Additionally, blockchain technology can automate some steps in the funding process by using smart contracts, such confirming applicants' eligibility or monitoring the money's disbursement. This may lessen the administrative load placed on government entities and increase process efficiency, both of which may lessen potential for corruption.

Yet, it's crucial to remember that blockchain technology is not a magic bullet and that there are still issues to be solved when implementing it for public funding systems. Scalability, interoperability, and regulatory compliance are a few of these concerns. Consequently, before incorporating blockchain technology into a government funding system, it is crucial to thoroughly weigh its advantages and disadvantages.

5) Training Data:

    5.1) Historical Data:
- Data on budgetary allotments and spending taken from official documents,   such as annual budget reports or financial statements.
- Data from government financial records, including receipts, invoices, and transaction logs, about revenue collections and fund transfers.

    5.2) Corruption cases:
- Government funding corruption cases that have been specifically documented, such as through court documents or investigative journalism articles that detail the parties involved, the money embezzled, the techniques employed, and the results of the cases.
- Reports, including conclusions, investigations, and sanctions, from anti-corruption organizations or watchdog groups describing instances of corruption in government funding.

    5.3) Stakeholder interviews:
- Interviews with government employees in charge of managing finances, such as finance ministers, budget directors, or accountants, to acquire their opinions on the risks and difficulties associated with corruption in the funding process.
- Interviews with auditors, financial professionals, or anti-corruption experts to learn more about the weaknesses, best practises, and gaps in government funding systems.

    5.4) User feedback:
- Users of the current government funding systems, such as government employees, beneficiaries, or citizens, are surveyed or given questionnaires in order to learn about their experiences, level of satisfaction, and suggestions for change.
- On government websites or online platforms, there are comment areas or feedback forms where individuals can express their opinions about how transparent, accountable, and honest the procedures for allocating funds are.

    5.5) Comparative data:
- Case studies or academic works from other nations or regions that have implemented e-funding systems in government and offer insights into their conception, characteristics, results, and lessons learned.

- Comparative data on corruption perceptions, rankings, or indices from reputable sources such as Transparency International or World Bank, to benchmark the performance of the e-funding system against other countries or regions.

5.6) Ethical considerations:
- Documentation of the ethical approval received from the appropriate institutional review boards or research ethics committees, if applicable.
- Records of measures taken to ensure data privacy and confidentiality, such as anonymization or aggregation of data, encryption of sensitive information, or secure storage of data in compliance with relevant data protection laws or regulations.

6) RESEARCH METHODOLOGY:

This study used online recordings of pre-recorded interviews with government officials with online research to examine the possibilities of a blockchain-based solution to combat corruption and opaqueness in government funding processes. The internet recordings of the pre-recorded interviews were chosen because they offered insightful information about how government workers perceived the problems of corruption and opacity in the funding procedures. In order to compile pertinent data about blockchain technology and its prospective applications in government funding procedures, internet research was also carried out.

Thematic analysis was used to examine the information obtained from the interviews and web research. Based on the recognised themes, the data were coded, and patterns and relationships between the codes were looked at. Key findings and conclusions about the viability of a blockchain-based solution to combat corruption and opaqueness in government funding procedures were identified using the analysis's findings.

The findings from the pre-recorded interviews show that government employees are aware of the issues with corruption and transparency in government funding systems, and they are aware that solutions are needed. Unfortunately, without a transparent and secure infrastructure, it is difficult to tackle these issues efficiently. The use of blockchain technology is one suggested remedy that could improve the transparency, security, and efficiency of government funding processes.

The potential advantages of blockchain technology in government funding processes were proven by online study. Blockchain technology's decentralised, unchangeable, and transparent features can help lower the risk of fraud and guarantee the right use of public monies.

The combination of online videos of pre-recorded interviews and internet research, in conclusion, gave important insights into the problems of corruption and opacity in government funding procedures, as well as the potential of blockchain technology to solve these problems. The identification of important results and conclusions that can direct future research and policy decisions was made possible through the use of thematic analysis.
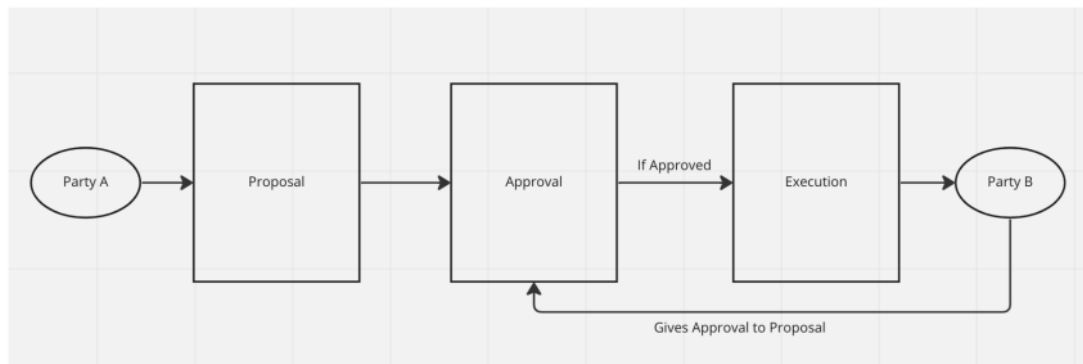
Figure 3: Workflow

7) CONCLUSION:

Corruption and a lack of transparency in the government's funding procedures for development projects are urgent issues. These problems can have severe repercussions, such as major public money losses, delays in project execution, and a lack of confidence in governmental institutions. The potential of blockchain technology to solve these issues has been investigated in this context.

The main conclusions of this discussion point to a major improvement in efficiency, security, and openness of government funding procedures through the implementation of blockchain technology. Decentralization, immutability, and transparency of blockchain technology can make it more difficult for fraud to take place and guarantee that all parties are aware of the transactions.

It is also obvious that tackling corruption and opaqueness in government fundings is of highest importance. These problems have an adverse effect on the speed and calibre of development projects, which has long-term detrimental effects on the economy and society. Thus, it is crucial to identify strategies to improve openness, lower corruption, and guarantee the right use of public monies.

In general, the problems caused by corruption and opacity in government funding procedures have a lot of room for improvement. Yet it's important to understand that technology cannot resolve these problems on its own. All parties involved in the implementation of blockchain solutions must be committed to openness, responsibility, and moral behaviour. It is also critical to understand that blockchain is not a universally applicable solution and might not be appropriate in every circumstance.

In conclusion, it is impossible to dismiss the potential advantages of blockchain technology in combating corruption and opaqueness in government funding systems. This technology can increase productivity, security, and transparency, which will ultimately result in better outcomes for all parties. Yet, it is crucial to keep in mind that technology alone is insufficient, and that success depends on all stakeholders' commitment to openness, responsibility, and ethical behavior.

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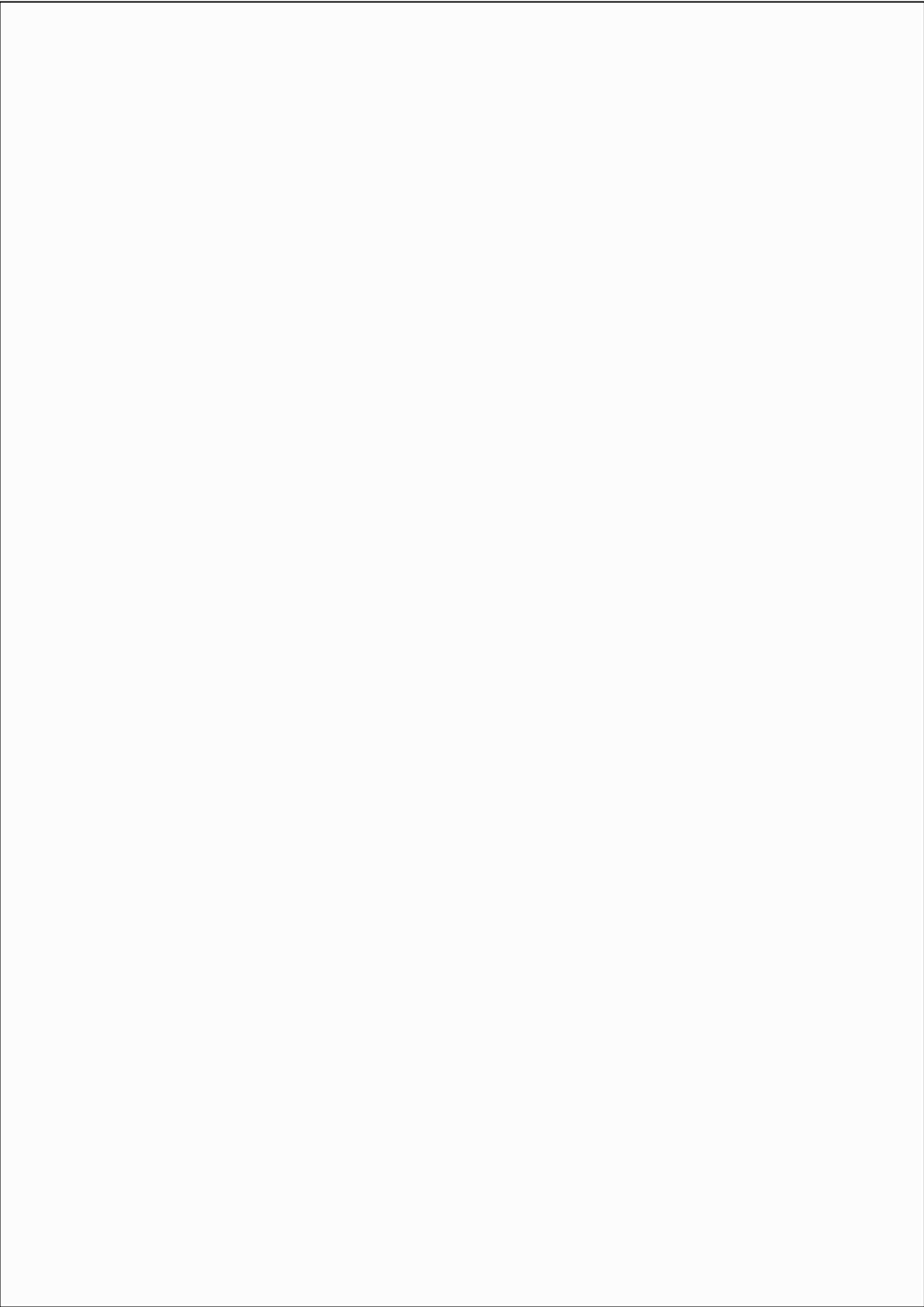
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