# E-waste Management Using Digital Ledger And Cryptographic Transactions

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## ABSTRACT

With the rapid urbanization and continuous economic progress, the dependency on technology are increasing day by day in developing countries like Bangladesh. Thus, the amount of e-waste generated after their life cycle is increasing at an unprecedented pace. Therefore, in this study we have proposed to design a system using digital ledger and cryptographic transactions for e-waste management purposes.

## INTRODUCTION

Electronic waste (E-waste) is the fastest growing category of solid hazardous waste. Without knowing the harmful effect of the e-waste, these has been dumped in to the open landfills, farming land and in the open sources of water bodies. We create too much e-waste and reuse or recycle way too little. So, it is necessary to introduce a proper e-waste management system. Thus, we have proposed a system to solve this problem in Bangladesh using Digital Ledger and Cryptographic Transactions. The system will regulate e-waste collection and recycling with an increased transparency as well as security throughout the process.

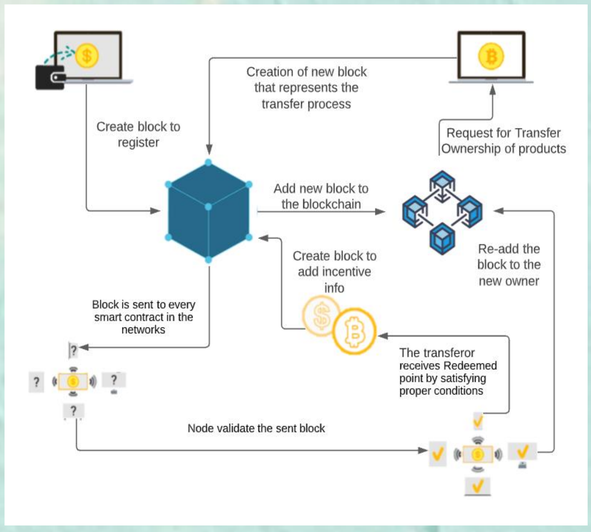
## OBJECTIVE

- To create a secured solution in e-waste management system.
- Capable of recording every stage of e-waste management and every vital information of every electronic.
- The system will ensure proper transparency.
- To bring more coordination among producers, importers, retailers and recyclers without the help of any middle man.

## FEATURES

- Adding product details by the manufacturers.
- Logging the transfer in ownership from manufacturer to the supplier.
- Storing the information of distributing the products from the suppliers to the retailers.
- Inserting sales from the retailers to the customers into the block chain network.
- Disposing E-waste in to the e-waste centre by the customers in exchange of digital token.

## SYSTEM ARCHITECTURE



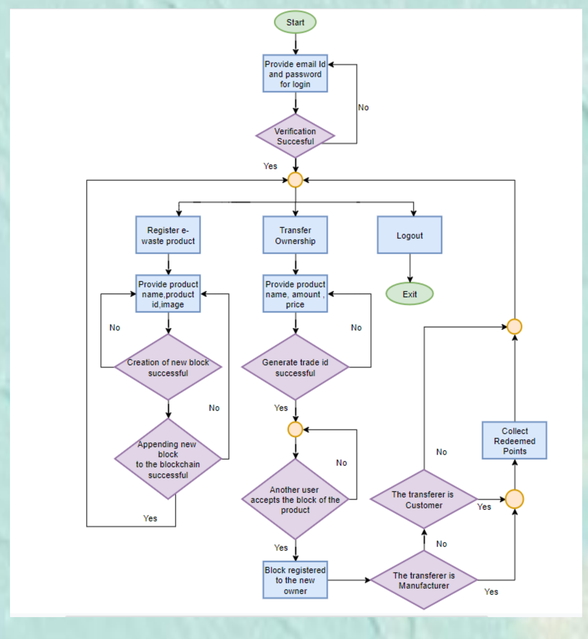

## PROTOTYPE


## COMPARATIVE ANALYSIS

| Characteristics | E-waste management using digital ledger and cryptographic transaction (C1) | E-waste management using ERP (Enterprise resource planning) (C2) | E-waste collection system using IOT (C3) |
|---|---|---|---|
| Decentralized database | Data is stored in the blockchain in a distributed fashion ensuring no centralized database. | Data stored in a centralized database of the recycler enterprise. | Data is stored in a centralized database of smart receptacle operator. |
| Smart contract usage | Smart contract is used for automating transactions. | No smart contract is used. | No smart contract is used. |
| Digital token usage | Digital token system is present for increased user incentive. | No digital token system. | No digital token system. |
| Automated traceability | Automated traceability of product is ensured using smart contract. | Traceability can be ensured manually. | No raceability is done. |
| Intermediate authority independency | Blockchain essentially removes the need for an intermediate authority. | Intermediate authority is needed for accountability. | Intermediate authority is needed for accountability. |
| Smart waste receptacle | No smart waste receptacle is used. | No smart waste receptacle is used. | Integral part of this system. |

Table 2: Comparative analysis.

## WORK FLOW




## COST ANALYSIS

| Ser no | Items | Cost |
|---|---|---|
| 1. | Cost of software | 5000 |
| 2. | Field work | 500 |
| 3. | Typing, paper and binding | 1000 |
| | Total cost | 6500 |

Table 1: Cost analysis.

## DISCUSSION & CONCLUSION

Waste management is usually focused on managing waste that has already been created. The direct impact of applying block chain in this domain is therefore to ensure its proper management and processing. E-waste management using digital ledger and cryptographic transaction offers the combination of better characteristics, better performance and more information accuracy. It also has the highest score in the weighted evaluation matrix which makes it more suitable.

## FUTURE WORK

- A decentralized application related to this system can be built for increased user accessibility
- Smart barcodes specialized for the proposed system can be developed. When scanned by authorized personnel using the mobile application, product details will be automatically fed and tracked into the block chain.

## REFERENCES

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