|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Traditional System** | **Narayannan’s System** | **Our Proposed System** |
| Traceability | Limited to traditional tracking methods | Enhanced with blockchain, ensuring full traceability | Enhanced with blockchain and IPFS, ensuring full traceability and cost saving |
| Security | Basic security measures | Multi-layered security with RFID tags, NFTs, and holographic labels | Multi-layered security with NFTs, Dynamic-Encrypted QR code, Federated Learning |
| Transparency | Limited transparency in product journey | Full transparency with blockchain records | Full transparency with blockchain and IPFS records |
| Cost Efficiency | Higher cost due to inefficiencies | Reduced costs with efficient consensus and batching | Reduced costs with efficient consesus, batching, data storage and limited expensive physical equipment |
| Scalability | Limited scalability | Enhanced scalability with batched transactions | Enhanced scalability with batched transactions |
| Dispute Resolution | Manual resolution methods | Automated and transparent resolution with voting mechanism | Automated and transparent resolution with voting mechanism |
| Consensus Mechanism | Not applicable or basic consensus | Customized consensus tailored for supply chain. | Customized 5 supply chain consensus algorithms |

TABLE II

Comparison between existing, paper’s system and our proposed circulation system.