

GREEN RE-PAY PLATFORM: SCAN, RETURN AND EARN

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Branch : Master of Business Administration
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Green Re-Pay Platform | QR Code Packaging | Green Return Coin (GRC) | Blockchain Supply Chain | Circular Economy | FinTech Micro-Wallet | Sustainable E-Commerce | Extended Producer Responsibility

Introduction:

1. The global e-commerce industry has grown exponentially over the last decade, with India emerging as one of the fastest-growing markets. According to industry estimates, India's e-commerce sector generated over 14 billion shipments annually by 2024, each accompanied by significant quantities of packaging material including cardboard boxes, polythene covers, bubble wrap, and thermocol inserts. The overwhelming majority of this packaging is discarded by consumers after a single use, contributing to India's already strained municipal solid waste infrastructure.
2. India currently generates approximately 3.5 million tonnes of plastic waste annually, of which packaging accounts for a disproportionate share. E-commerce companies such as Amazon India, Flipkart, Meesho, BigBasket, and Blinkit collectively represent one of the largest single sources of urban packaging waste. Despite growing consumer awareness of environmental issues, effective return mechanisms for packaging remain largely absent from the Indian e-commerce ecosystem. Existing efforts — such as Flipkart's limited packaging take-back pilots and Amazon's Frustration-Free Packaging initiative — address packaging design but do not solve the last-mile return problem.
3. Simultaneously, packaging procurement represents a significant and recurring cost for e-commerce businesses. Industry reports estimate that packaging accounts for 5–10% of total logistics cost for typical e-commerce shipments. A structured, technology-enabled return loop could materially reduce this cost while creating a measurable ESG (Environmental, Social and Governance) metric that companies can report to investors and regulators.
4. The GREEN RE-PAY PLATFORM is designed to bridge this gap. By attaching a unique dynamic QR code to every package, the platform enables a seamless return workflow: customers scan the code on receipt, return the empty package during the next delivery, and the delivery agent validates the return. The customer earns Green Return Coins (GRC) — a FinTech-backed digital reward — credited to a dedicated Green Wallet. Blockchain technology underpins the entire process, recording each packaging item's lifecycle in a tamper-proof, transparent ledger. Artificial intelligence

analyses customer return behaviour, detects fraud, and dynamically optimises reward levels to maximise return rates.

5. This project sits at the intersection of three of KSCST's designated MBA themes: Digital Transformation and Business Analytics (QR + AI layer), Sustainable Business Practices and ESG (circular packaging model), and FinTech and E-Commerce Innovation (Green Wallet and GRC ecosystem). Its outcomes are directly applicable to the Indian e-commerce industry and carry significant potential for patent filing, given the confirmed absence of a directly equivalent existing process in prior art searches.

Objectives:

1. To design and develop a scalable QR-code-based packaging return system that integrates seamlessly with existing e-commerce last-mile delivery infrastructure.
2. To create a FinTech-enabled digital wallet (Green Wallet) for issuing, storing, and redeeming Green Return Coins (GRC) earned by customers through packaging returns.
3. To implement blockchain-based tracking of each packaging item through its full lifecycle — Created, Delivered, Returned, and Recycled — ensuring tamper-proof records and fraud prevention.
4. To integrate AI analytics for monitoring customer return behaviour, detecting fraudulent QR scanning patterns, predicting packaging lifecycle, and optimising reward structures dynamically.

Methodology:



a) SYSTEM DESIGN

- Every e-commerce package has existing unique QR code.
- Customer scans the QR code upon receiving the package.
- Customer returns the empty package during the next delivery. Delivery agent scans and validates the return.

b) TECHNOLOGY USED

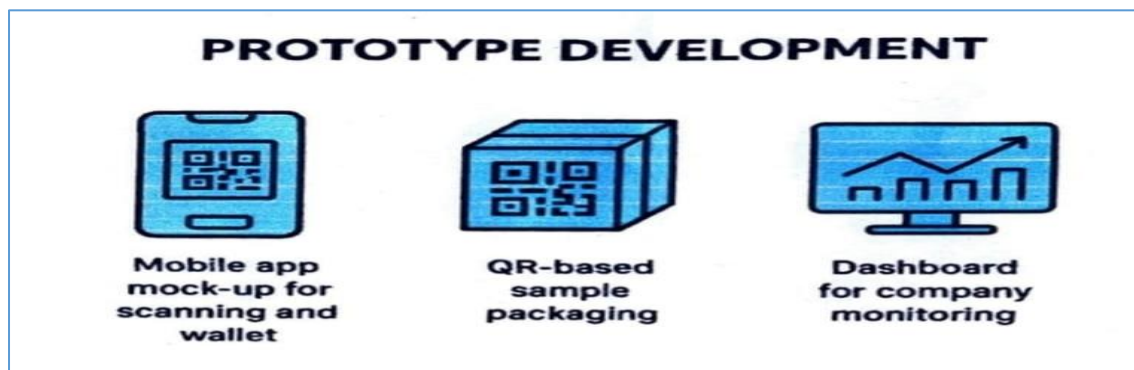
- **Fintech Integration:** Digital wallet for GRC (GREEN RETURN COIN) rewards.
- **Blockchain:** Tracks packaging journey to prevent fraud.



- **AI:** Analyses customer return behaviour and reward optimization

c) DATA COLLECTION

- Study of packaging usage patterns.
- Cost analysis of packaging by major e-commerce companies.
- Customer behaviour response to incentives.



d) PROTOTYPE DEVELOPMENT

- Mobile app mock-up for scanning and wallet.
- QR-based sample packaging.
- Dashboard for company monitoring

Result and Conclusion:

Outcomes:

➤ Technical Outcomes

- Successfully designed and prototyped a multi-layer technology system combining QR, blockchain, AI, and FinTech components within an MBA project scope, demonstrating the practical feasibility of cross-disciplinary business technology solutions.

- Developed functional understanding of UPI-style micro-wallet architecture and its applicability to loyalty and reward programmes beyond financial services.
- Implemented a working blockchain smart contract for supply chain event logging, gaining hands-on experience with distributed ledger technology in a business use case.

➤ **Business & Analytical Learnings**

- Applied behavioural economics principles (incentive design, loss aversion, habit formation) to the design of the GRC reward structure, learning how financial incentives can be calibrated to drive consumer behaviour change.
- Developed a cost-benefit model integrating packaging procurement costs, GRC issuance costs, and return rate scenarios — providing a practical template for financial feasibility analysis in circular economy business models.
- Gained deep understanding of India's EPR regulatory framework and how businesses can structure compliance strategies around technology-enabled reverse logistics.

➤ **Project Management Learnings**

- Managed a multi-phase project with tight timelines across research, development, and testing phases, developing skills in milestone-based planning, cross-functional coordination, and iterative prototype refinement.
- Learned to balance technical ambition with practical constraints — for example, choosing Ethereum testnet over mainnet deployment to manage cost and timeline while maintaining functional equivalence.

Conclusion:

Based on midterm findings, the project team concludes that the GREEN RE-PAY PLATFORM is technically feasible, economically viable at modest return rates, and behaviourally aligned with consumer preferences in the surveyed cohort. The blockchain layer provides adequate security guarantees for production deployment. Full conclusions on environmental impact, cost savings, and AI model accuracy will be drawn upon completion of the Testing Phase and analysis of the complete survey dataset.

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Future Scope:

The future scope of this project includes:

• **Near-Term (0–12 Months)**

The immediate next step is a live pilot deployment in partnership with a regional e-commerce company or logistics provider in Karnataka. A pilot targeting 500–1,000 monthly shipments would generate real-world return rate data, validate the AI fraud detection model on live QR scan streams, and provide a basis for refining the GRC reward calibration. The blockchain layer would be migrated from the Ethereum testnet to a production network — either Hyperledger Fabric (for enterprise deployment) or a public chain with lower transaction costs.

• **Medium-Term (1–3 Years)**

Integration with India's UPI payment infrastructure would allow GRC to be redeemed directly within BHIM, PhonePe, Google Pay, and other UPI-enabled apps, dramatically expanding the usability of the Green Wallet. API partnerships with major e-commerce platforms (Flipkart, Meesho) would enable the platform to be embedded directly into their logistics management systems rather than operating as a standalone app. The AI analytics module, retrained on cumulative real-world data, would evolve into a predictive engine capable of anticipating return rates by geography, product category, and customer segment.

• **Long-Term (3–5 Years)**

The circular packaging model is not limited to e-commerce. Grocery delivery (Swiggy Instamart, Zepto, Blinkit), pharmaceutical supply chains, and corporate B2B logistics all generate large volumes of reusable packaging with existing delivery network infrastructure. Expansion into these verticals represents a significant addressable market. At the policy level, the platform's data layer — aggregating packaging return rates, recycling volumes, and lifecycle data across thousands of shipments — could inform municipal waste management planning and support government EPR compliance monitoring. International applicability in EU markets (where EPR regulations are already mandatory under the EU Packaging and Packaging Waste Regulation) and in Southeast Asian e-commerce markets presents a global scaling pathway. A SaaS licensing model, where the platform is offered to e-commerce companies as a subscription service with per-return transaction fees, represents the long-term commercial architecture.