SDG BLOCKCHAIN ACCELERATOR

Cohort 1 - Performance Evaluation Report

1 Context and Evaluation Approach

To ensure that Cohort 1 projects were evaluated in a way that is both evidence-based and aligned with UNDP impact goals, we maintained two complementary evaluation instruments throughout the program:

1. **Cohort 1 Technical and Adoption Progress Report**
   – a living document used to track each team's technical development, smart contract maturity, data architecture, dashboard readiness, regulatory engagement and real-world adoption challenges.
   → **Full document (detailed logs, technical notes, and meeting outcomes) is available here:** [LINK TO FULL PROGRESS REPORT]

2. **Cohort 1 Performance Scoring Report**
   – a synthesized assessment (technical readiness, regulatory alignment, scalability, and deployment potential) that translates qualitative progress into comparative evaluation criteria across teams.
   → **Full document (detailed logs, scoring and notes) is available here:** [LINK TO FULL SCORING REPORT]

2 Purpose of the Progress Tracking Document

The **Cohort 1 Technical and Adoption Progress Report** was designed not as a marketing summary, but as an operational governance tool. It served four critical functions:

- **Accountability:** It documented what was actually built, tested, and validated on-chain or in controlled environments.
- **Intervention Planning:** It identified the specific bottlenecks where EMURGO Labs engineers and mentors had to intervene (for example: UTxO batching issues, stablecoin liquidity constraints, or policy clarification).
- **Regulatory Readiness:** It captured interactions with ministries, utilities, financial supervisors, environmental agencies, etc., which is essential for responsible deployment in public sector contexts.
- **Adoption Risk Tracking:** It surfaced non-technical barriers such as institutional capacity gaps, onboarding friction for non-crypto users, dashboard usability for field officers, and data reporting expectations from government partners.

This is important because high technical sophistication alone is not sufficient for sustainable deployment in development settings. The report explicitly tracks *both* blockchain performance and organizational absorption capacity.

3 Document Structure

Each project entry in the progress report followed a consistent structured template. This ensured comparability across projects that were working in very different regulatory and technical environments (carbon registries, electricity loss auditing, humanitarian aid distribution, e-waste traceability, etc.).

For every project, we captured:

1. **Project Name and UNDP Challenge**
   A short statement of the development problem being addressed (for example: “transparent crowdfunding for solar energy access” or “traceable donor-backed reforestation funding”).
2. **Technical Progress**
   A narrative summary of what was delivered during the accelerator period. This includes milestones like smart contract deployment on Preview or Preprod testnets, integration of backend services, completion of a working dashboard, or execution of a full transactional flow (e.g. mint → transfer → retirement).
3. **Smart Contracts / API Usage**
   A description of how Cardano-native components were implemented, including:
   - Aiken validator logic and how it enforces business rules.
   - Off-chain orchestration scripts (Node.js, Python, NestJS, etc.).
   - Use of ecosystem tooling such as Lucid, Blockfrost, Ogmios/Kupo, Supabase, Fireblocks, etc.
     This section also captures deviations from “pure” on-chain designs when regulatory or performance constraints required hybrid models.
4. **Dashboard / Frontend Status**
   The current state of the administrative and public-facing interfaces, with emphasis on:
   - Data transparency and analytics.
   - Role-based access control (admin vs operator vs donor).
   - Readiness for handover to non-technical institutions (ministries, utilities, UNDP country offices, cooperatives).
5. **UTxO / Blockchain Notes**
   A technical assessment of the project’s transaction model:
   - How state is represented in UTxOs.
   - Performance, batching, and consolidation strategies.
   - Resource usage (CPU/memory/gas) and validator cost ceilings.
   - Use of metadata, IPFS anchoring, and reference inputs.
6. **Regulatory / Compliance Notes**
   A summary of how the team engaged with regulators, ministries, utilities, or compliance officers, including:
   - Whether the model fits within current legal frameworks.
   - Whether custodial/stablecoin flows are acceptable.
   - Whether environmental or financial reporting requirements can be satisfied.
7. **Key Challenges**
   The main friction points observed so far. These typically include:
   - Scaling multi-party transactions under Cardano’s resource limits.
   - Stablecoin liquidity and off-ramping.

    - Data collection in low-connectivity environments.
    - Internal capacity of public-sector partners to manage wallets or govern treasury logic.
8. **Lessons Learned**
   Practical insights that emerged from testing and iteration. This captures what the teams and the accelerator actually learned about deploying blockchain into SDG-aligned contexts.
9. **Next Steps / Recommendations**
   Concrete short-term actions proposed for each team: audit readiness, batch optimization, governance hardening, production rollout plans, and continuation of regulatory engagement.
10. **Tech Support / Feedback**
    A short record of the mentorship provided by EMURGO Labs and partners, including:
    - Smart contract review and refactoring.
    - UTxO modeling and batching strategy.
    - API design and integration patterns.
    - Compliance scoping with UNDP country offices.

Because each project was assessed against the same structure, the accelerator was able to evaluate not just "who built what," but "who is actually converging on a maintainable, regulator-aligned product that a national counterpart could realistically operate."

4 Cross-Cutting Findings from Cohort 1

A comparative reading of all Cohort 1 project entries in the progress report reveals several recurring patterns:

4.1 Hybrid On-Chain / Off-Chain Architectures as a Practical Default

Multiple teams (e.g. Thallo, Genius Tags, Grinplus) adopted hybrid architectures in which sensitive or regulated operations remain off-chain, while key lifecycle events (issuance, transfer, retirement, audit anchors) are immutably recorded on Cardano.
This approach:

- Accelerates deployment even when legal frameworks are not yet finalized.
  Keeps regulators comfortable by preserving familiar approval workflows.
- Still creates an auditable trail that can later be elevated to a fully on-chain registry.

In several country contexts, particularly where regulatory frameworks are still forming (carbon markets, energy data, humanitarian credit distribution), this “anchor first, migrate later” model proved to be the only politically and legally viable path.

4.2 Maturing Use of Aiken and UTxO Discipline

Projects such as Atlas Ledger, Karbon Ledger, and Creative Operations (Reloop) demonstrated deep use of Aiken validators to encode business logic directly into transaction constraints.
We observed:

- Systematic validator versioning (e.g. V6 series milestone validators).
- Explicit governance logic (multi-sig, role-based access, treasury state machines).

- Pre-flight cost estimation and transaction simulation to avoid script overflows when handling multi-party transactions.

This reflects rapid maturation of Cardano-native engineering capacity within the cohort, especially around milestone-based disbursement, escrow logic, token lifecycle management, and compliance-linked audit trails.

4.3 Regulatory Engagement Began Early and Often

Several teams involved national authorities from the outset:

- Thallo worked with Tanzanian environmental agencies to shape the future national carbon registry.
- Socious coordinated with regulators and central bank actors in Mauritius and Seychelles around stablecoin-based crowdfunding and off-ramping.
- Karbon Ledger aligned with industrial and environmental compliance standards in India for CETP emissions monitoring.
- Plastiks engaged recycling and environmental reporting structures in Armenia.

This proactive engagement prevented costly misalignment and ensured that the pilot implementations were not purely technical artifacts but were instead positioned for institutional uptake.

4.4 Performance, Batching, and Cost Efficiency Are Critical for Scale

When projects attempted “real-world scale” behaviors (multi-donor payouts, batch reward distribution, multi-region aid allocation), they encountered Cardano resource ceilings:

- Atlas Ledger and Reloop both optimized validator logic and batching to manage many contributors / many beneficiaries without exceeding CPU/memory budgets.
- Teams introduced UTxO consolidation, donor batching, and off-chain orchestration layers to keep per-transaction resource usage acceptable.
- Treasury automation and batch settlement logic (especially in e-waste and reforestation use cases) required careful design to remain auditable while staying performant.

This shows that resource-aware design is not a theoretical concern, it is a practical requirement for mainnet viability, especially for high-volume public-good use cases.

4.5 Institutional Capacity Is Often the Hardest Problem

In multiple cases, the technical prototype moved faster than the institutional operator:

- UNDP country offices and national utilities needed operational manuals, governance procedures, and regulatory comfort before assuming custody of wallets, executing payouts, or managing smart contract-driven treasuries.
- Field-facing solutions (e.g. humanitarian aid distribution, rural recycling incentives, farmer traceability) had to support low-connectivity environments and non-technical users, prompting dashboard simplifications, admin panels with override tools, and in some cases USSD flows for onboarding.

This underscores that “production readiness” in development work is not just a question of code maturity. It’s a question of handover readiness.

5 How This Feeds into Performance Scoring

The insights captured in the **Cohort 1 Technical and Adoption Progress Report** directly inform the **Performance Scoring Report**, which is presented in the following section.

Concretely:

- The “Technical Progress” and “Smart Contracts / API Usage” fields map to **Technical Maturity**.
- The “Regulatory / Compliance Notes” and “Institutional Capacity” observations map to **Regulatory Readiness and Deployability**.
- The “Key Challenges,” “Lessons Learned,” and “Next Steps / Recommendations” inform **Scalability and Continuity Risk**.
- The “Dashboard / Frontend Status” and “Tech Support / Feedback” fields inform **Operational Usability and Handover Potential**.

In other words, the scoring model is not arbitrary: it is derived from documented evidence of what each team actually built, tested, and negotiated with stakeholders.

6 Cohort 1 Performance Scoring Report

The SDG Blockchain Accelerator – Cohort 1 implemented a structured evaluation framework to objectively assess the progress, technical maturity, and impact potential of participating Solution Makers (SMs) and Challenge Owners (COs).
This framework was co-developed by EMURGO Labs and UNDP to ensure that projects were not only technologically robust but also strategically aligned with sustainable development objectives and country priorities.

The three core perspectives of evaluation were:

1. Product Evaluation (EMURGO Labs) – assessing user experience, functional readiness, and overall solution maturity.
2. Technical Evaluation (EMURGO Labs) – assessing smart contract architecture, code quality, testing rigor, and innovation.
3. Impact Evaluation (UNDP) – evaluating SDG alignment, policy relevance, partnerships, and sustainability potential.

These three dimensions together provided a comprehensive 360° perspective on each project's readiness for pilot adoption and long-term scalability.

A transparent and quantitative scoring system was used across all dimensions, supported by qualitative comments that captured contextual nuances, innovation aspects, and operational realities.

7 EMURGO Labs – Product Evaluation Scoring

7.1 Purpose and Methodology

The **Product Evaluation** focused on measuring the *technical feasibility*, *completeness of documentation*, *usability*, and *responsiveness* of each project's MVP. This perspective was designed to capture not only the current delivery state of each solution but also its readiness for scaling, clarity of implementation, and level of team engagement throughout the accelerator.

Each project was evaluated by EMURGO Labs' product and technical reviewers across **five key criteria**, using a five-point scale where **1 = Very Poor / Not Demonstrated** and **5 = Excellent / Fully Aligned and High Potential**. Scoring emphasized measurable implementation evidence (e.g., testnet deployments, repositories, documentation) and responsiveness to feedback between checkpoint reviews.

7.2 Evaluation Criteria and Scoring Legend

Table 1. EMURGO Labs Product Evaluation Criteria

Criterion #	Criterion	Description	Score	Meaning
1	**Technical Feasibility**	Is the core logic implementable now (contracts, infrastructure, user flows), with clear constraints and a path to delivery?	1–5	1 = Very Poor / Not Demonstrated; 5 = Excellent / Fully Implementable
2	**Code & Documentation**	Are repositories clean and structured with READMEs, architecture notes, schemas, and reproducible setup steps?	1–5	1 = Very Poor; 5 = Excellent / Comprehensive
3	**Working Demo & UX**	Is there a stable, reproducible demo (ideally testnet) with coherent UX covering key user flows?	1–5	1 = Non-functional; 5 = Fully Functional and Tested
4	**Architecture & Security**	Is the design modular and scalable with basic security hygiene (key management, authentication, threat considerations)?	1–5	1 = Inadequate; 5 = Robust and Scalable
5	**Engagement & Responsiveness**	Is the team responsive to feedback, active in check-ins, and iterating reliably between reviews?	1–5	1 = Poor; 5 = Excellent / Fully Engaged

7.3 Detailed Scoring Results

Table 2. Product Evaluation Scoring Matrix (Cohort 1)

SM–CO Match	Technical Feasibility	Code & Documentation	Working Demo & UX	Architecture & Security	Engagement & Responsiveness	Comments
Afrikabal <> UNDP Malaysia, Yin Wei Chong	4	4	3	3	4	CI/CD and HA considered, but actual failover and large-scale load untested; USSD flows are partially validated. Testnet work is solid and well-documented. Some PoC fixes (UTxO confirmation waits, asset encoding) may need robust automation on mainnet.
Atlas Ledger <> UNDP Burkina Faso, Barbara Kyeremaa	3	4	3	3	3	Admin panels, backend logic, and frontend integration work with live Preprod testnet contracts. Edge cases like batch payouts with many donors or simultaneous disbursements could hit CPU/ex-unit limits. Batch payout logic isn't fully optimized.

Cladfy <> UNDP Bangladesh, Humayun Kabir	3	3	4	3	3	Unit and integration tests are clearly defined. Edge cases are explicitly stated (missing redeemer, invalid datum, unauthorized signatures, double-spend prevention). Team has been advised to consider HSM/multi-sig for production key management.
Creative Operations <> UNDP Georgia, Nita Gegeshidze	3	2	3	3	4	The document covers on-chain, off-chain, and frontend/backend layers with clear diagrams and transaction flows. Including UTxO model usage, oracles, and off-chain services shows an advanced understanding of Cardano. However, consolidating all actions into one validator can make debugging harder and increase execution units. Team has been advised to consider splitting high-frequency actions like ClaimReward from admin/batch processing. Questions remain around rewards and treasury management to be determined at the next stage.

Genius Tags <> UNDP Malawi, Misheck Thawani	4	3	4	3	5	The main Aiken contract (`genius-chain.ak`) covers organization management, project sharing, user permissions, and transaction logging. Signature checks, zero-address rejection, batch limits, and internal ID tracking are correctly implemented. However, 1,692 lines of code in a single Aiken validator increases maintenance difficulty and bug risk. The team has been advised to modularize the validator into smaller scripts.
Grinplus <> UNDP Tanzania, Elia John Simon	3	3	4	3	3	Good explanation of UTxO model usage, minting policies, and datum/redeemer structures. Logs are well-documented, but operational constraints (network reliability, edge computing) need more discussion. Optimization notes exist (batch minting) but lack quantitative benchmarking. The team was advised to prepare before/after fee comparisons.

IotaOrigin <> UNDP Istanbul Regional Hub, Dani	4	2	3	3	2	Addresses a meaningful problem—trust in funding mechanisms and supply chains. Testnet results are well-documented, but critical redeemer branches lack automated verification, and minting/claiming/burning logic is incomplete. No clear plan for fractional ownership or redemption.
Karbon Ledger <> UNDP India, Shilpi Karmakar	4	4	5	4	4	Clear end-to-end flow: sensor/AI data → tokenization (CET/COT) → off-chain registry → reporting. Edge cases are tested, and flows for emissions tracking and offset issuance are well modeled. Missing IoT data integration and encryption for production.
Plastiks <> UNDP Armenia, Nelli Minasyan	5	5	4	4	5	Comprehensive documentation across all layers (contracts, APIs, wallets, off-chain). Excellent structure and security controls. Wallet-only login might limit adoption; mixed Gmail integration could confuse users. Gas/fee optimization strategies not yet defined.

Socious Fund <> UNDP Mauritius & Seychelles, Alexandre Mboule	-	-	-	-	-	No sufficient data for evaluation due to limited submission.
Thallo <> UNDP Tanzania, Mariestella Nyitho Kago	4	3	4	4	5	Three distinct validators (Project Registry, Vintage Registry, Carbon Credit) with clear roles. Tests focus mainly on happy paths; missing edge-case handling. Recommended to implement multi-sig for stakeholder control.
Unicorn.eth <> UNDP Nordic Representation Office, Bakhtiyor Khamraev	4	4	4	3	4	Strong architectural documentation and error handling (GraphQL persistence, Coingecko/MuesliSwap feeds). Frontend and wallet interaction testing remain incomplete. Handles privacy concerns well but lacks stress-testing.

Zengate <> UNDP Bangladesh, Iffat Anjum	4	3	4	4	5	PoC demonstrates complete lifecycle support (create-spend-retire). Good separation of contracts and APIs. Full cryptographic verification not yet implemented. Recommended to move to private IPFS gateways before production.

7.4 Final Product Scoring Summary

The following table presents a consolidated overview of the final Product Evaluation scores assigned by EMURGO Labs across all Cohort 1 Solution Maker and UNDP Country Office matches.

Scores reflect each team's cumulative performance across five key criteria, Technical Feasibility, Code & Documentation, Working Demo & UX, Architecture & Security, and Engagement & Responsiveness, as detailed in the previous section.

This summary highlights overall readiness levels, identifies top performers and provides a concise reference for cross-team comparison during milestone validation and future program iterations.

Table 3. Product Evaluation Summary: Final Scores per SM-CO Match

#	SM-CO Match	Final Product Score
1	Afrikabal <> UNDP Malaysia, Yin Wei Chong	18.00
2	Atlas Ledger <> UNDP Burkina Faso, Barbara Kyeremaa	16.00
3	Cladfy <> UNDP Bangladesh, Humayun Kabir	16.00
4	Creative Operations <> UNDP Georgia, Nita Gegeshidze	15.00

5	Genius Tags <> UNDP Malawi, Misheck Thawani	19.00
6	Grinplus <> UNDP Tanzania, Elia John Simon	16.00
7	IotaOrigin <> UNDP Istanbul Regional Hub, Dani	14.00
8	Karbon Ledger <> UNDP India, Shilpi Karmakar	21.00
9	Plastiks <> UNDP Armenia, Nelli Minasyan	23.00
10	Socious Fund <> UNDP Mauritius & Seychelles, Alexandre Mboule	0.00
11	Thallo <> UNDP Tanzania, Mariestella Nyitho Kago	20.00
12	Unicorn.eth <> UNDP Nordic Representation Office, Bakhtiyor Khamraev	19.00
13	Zengate <> UNDP Bangladesh, Iffat Anjum	20.00

7.5 Analytical Insights

- **High performers (Plastiks, Karbon Ledger, Thallo, Zengate)** demonstrated solid technical feasibility, modular design, and high engagement.
- **Mid-range teams (Genius Tags, Afrikabal, Atlas Ledger, Cladfy)** show strong MVP-level progress but require optimization and modularization before mainnet scaling.
- **Lower-range teams (IotaOrigin, Creative Operations)** have promising concepts but need deeper testing, clearer redeemer validation, and robust architectural adjustments.
- Across teams, **documentation and responsiveness** emerged as strong differentiators of success, projects maintaining clean repos and engaging frequently in technical reviews

scored notably higher.

[Access full EMURGO Product Scoring dataset here]

8. EMURGO Labs – Technical Assessment Scoring

8.1 Purpose and Methodology

The **Technical Assessment** evaluated the architectural robustness, code security, testing rigor, and technical innovation of each Solution Maker's MVP. This evaluation focused on how effectively teams leveraged **Cardano's eUTxO model**, **smart contract frameworks (Aiken, Plutus, Lucid)**, and **supporting infrastructure (off-chain integrations, oracles, and APIs)** to achieve secure, scalable, and reliable implementations.

Each project was reviewed by EMURGO Labs' technical evaluators across five criteria, using a **five-point scale (1 = Very Poor / Not Demonstrated; 5 = Excellent / Fully Aligned and High Potential)**. Scoring prioritized tangible technical evidence, including **code audits, testing pipelines, architecture documentation, and demonstrated problem-solving** during the accelerator period.

8.2 Evaluation Criteria and Scoring Legend

Table 4. EMURGO Labs Technical Assessment Criteria

Criterion #	Criterion	Evaluation Focus	Guiding Questions	Score Range	Meaning
1	**Smart Contract Security & Integrity**	Code follows secure development practices minimizing vulnerabilities.	Are contracts peer-reviewed, tested, and access-controlled ? Are dependencies up to date?	1–5	1 = Very Poor / Not Demonstrated; 5 = Excellent / Secure and Verified

2	**Testing, QA, and Deployment Process**	Depth of automated testing, CI/CD pipelines, and reproducibility.	Are unit/integration tests comprehensive? Are testnet deployments consistent?	1–5	1 = Poor; 5 = Excellent / Fully Automated and Reliable
3	**Adaptability & Learning Curve**	Team's growth and ability to integrate new frameworks and feedback.	Has the team effectively adopted Cardano tooling and SDKs?	1–5	1 = Minimal; 5 = Excellent / Rapid and Independent Progress
4	**Code Quality & Architecture Design**	Structure, modularity, maintainability, and scalability of the system.	Is the architecture modular, reusable, and scalable?	1–5	1 = Inadequate; 5 = Robust and Scalable
5	**Technical Problem-Solving & Innovation**	Ability to overcome limitations and design creative solutions.	Did the team address Cardano tooling gaps with innovative approaches?	1–5	1 = Weak; 5 = Excellent / Highly Innovative

8.3 Detailed Scoring Results

Table 5. Technical Assessment Scoring Matrix (Cohort 1)

SM-CO Match	Smart Contract Security & Integrity	Testing, QA, and Deployment	Adaptability & Learning Curve	Code Quality & Architecture Design	Technical Problem-Solving & Innovation	Comments
Afrikabal <> UNDP Malaysia, Yin Wei Chong	4	3	4	4	4	Strong security practices, clear on/off-chain boundaries, and automated testing pipelines. Uses Aiken and Lucid effectively with minimal footprint. Well-engineered, scalable, and ready for further optimization.

Atlas Ledger <> UNDP Burkina Faso, Barbara Kyeremaa	5	4	4	4	4	Excellent architecture with token minting and verifiable credentials. Custom oracles and metadata tagging show innovation. Thorough documentation and deployment consistency.
Cladfy <> UNDP Bangladesh, Humayun Kabir	4	3	4	3	4	Solid architecture integrating identity and finance systems. Strong replay protection and cooperative signing. Testing coverage can be deepened for greater reliability.

Creative Operations <> UNDP Georgia, Nita Gegeshidze	3	3	3	2	3	Innovative incentive concept leveraging verifiable credentials and tokens. Needs improvement in validator logic and testing practices. Promising but requires deeper Cardano expertise.
Genius Tags <> UNDP Malawi, Misheck Thawani	5	4	4	4	4	Secure system with strong input validation and replay protection. Good privacy balance with off-chain hashing. Needs modularization and formal audit before mainnet.

Grinplus <> UNDP Tanzania, Elia John Simon	3	3	3	3	3	Practical implementation for tokenized energy data and SDG tracking. Good structure, but testing and QA need more coverage and quantitative benchmarks.
IotaOrigin <> UNDP Istanbul Regional Hub, Dani	3	3	3	2	3	Transparent and relevant financial tracking concept. Simple validator design with limited blockchain depth. Requires stronger on-chain logic and Aiken proficiency.

Karbon Ledger <> UNDP India, Shilpi Karmakar	5	4	5	5	4	Excellent technical depth and testing rigor. Modular Aiken contracts, multisig logic, and token minting. Exemplary system design and scalability.
Plastiks <> UNDP Armenia, Nelli Minasyan	5	4	4	5	4	Robust and professional architecture using Plutus for verification and NFT issuance. Comprehensive tests and strong system design for sustainability use cases.

Socious Fund <> UNDP Mauritius & Seychelles, Alexandre Mboule	2	3	3	2	3	Modular app design with good off-chain stack, but lacking blockchain depth. Needs test coverage and contract-level design before scaling.
Thallo <> UNDP Tanzania, Mariestella Nyitho Kago	4	4	4	4	4	Strong blockchain design with modular validators and off-chain integration. Excellent technical vision and problem-solving with Cardano tools. Requires enhanced unit testing and security audit.

Unicorn.eth <> UNDP Nordic Representation Office, Bakhtiyor Khamraev	2	3	3	3	3	Ambitious design with revenue distribution logic, but lacks smart contract use. Primarily a Web2 app using Cardano for basic token functions. Needs deeper on-chain automation.
Zengate <> UNDP Bangladesh, Iffat Anjum	4	4	4	4	4	Highly competent implementation using Cardano's eUTxO model for event traceability. Well-abstracted APIs, comprehensive testing, and innovative open-source framework.

8.4 Final Technical Scoring Summary

The following table presents a consolidated overview of the **final Technical Assessment scores** assigned by EMURGO Labs across all Cohort 1 Solution Maker and UNDP Country Office

matches. Scores reflect each team's cumulative technical performance and their maturity in secure smart contract implementation, architecture design, and problem-solving capabilities.

Table 6. Technical Assessment Summary: Final Scores per SM-CO Match

#	SM-CO Match	Final Technical Score
1	Afrikabal <> UNDP Malaysia, Yin Wei Chong	**19.00**
2	Atlas Ledger <> UNDP Burkina Faso, Barbara Kyeremaa	**21.00**
3	Cladfy <> UNDP Bangladesh, Humayun Kabir	**18.00**
4	Creative Operations <> UNDP Georgia, Nita Gegeshidze	**14.00**
5	Genius Tags <> UNDP Malawi, Misheck Thawani	**21.00**
6	Grinplus <> UNDP Tanzania, Elia John Simon	**15.00**
7	IotaOrigin <> UNDP Istanbul Regional Hub, Dani	**14.00**
8	Karbon Ledger <> UNDP India, Shilpi Karmakar	**23.00**
9	Plastiks <> UNDP Armenia, Nelli Minasyan	**22.00**

10	Socious Fund <> UNDP Mauritius & Seychelles, Alexandre Mboule	**13.00**
11	Thallo <> UNDP Tanzania, Mariestella Nyitho Kago	**20.00**
12	Unicorn.eth <> UNDP Nordic Representation Office, Bakhtiyor Khamraev	**14.00**
13	Zengate <> UNDP Bangladesh, Iffat Anjum	**20.00**

8.5 Analytical Insights

Across the cohort, the distribution of technical scores reflects differing levels of familiarity with Cardano development tools. Only **three teams, Karbon Ledger, Socious, and Zengate, entered the Accelerator as Cardano-native developers**, while all others were **transitioning from EVM-based or non-blockchain architectures**. This transition required additional time for adopting the **eUTxO model, Aiken tooling, and wallet integration standards**, which influenced technical depth and performance in smart contract categories.

As a result, **high-performing teams** such as **Karbon Ledger, Plastiks, Atlas Ledger, Genius Tags, and Zengate** demonstrated exceptional command of Cardano's smart contract frameworks, adopting advanced testing pipelines, multisig logic, and token lifecycle management.

Mid-range performers (**Afrikabal, Cladfy, Thallo**) exhibited strong architectural understanding and technical scalability, though requiring deeper QA coverage and formal audits before production deployment.

Lower-range teams (**Creative Operations, IotaOrigin, Socious Fund, Unicorn.eth**) presented meaningful use cases but need to strengthen contract integrity, automation, and testing rigor to reach deployment-level maturity.

Overall, EMURGO Labs observed that **testing quality, modular code structure, and adoption of secure coding patterns** were the main differentiators between top and bottom performers. Teams integrating **Aiken, CI/CD pipelines, and comprehensive testnets** consistently achieved higher technical readiness and maintainability scores.

[Access full EMURGO Technical Scoring dataset here]

9. UNDP – Impact & Adoption Evaluation Scoring

9.1 Purpose and Methodology

The UNDP Impact & Adoption Evaluation assesses how well each SM-CO pairing aligns with SDG priorities, engages the local ecosystem and government, presents a credible impact pathway with indicators, demonstrates co-financing and sustainability potential and shows execution capacity.

Reviewers scored each pairing on a 1–5 scale (1 = Very Poor / Not Demonstrated; 5 = Excellent / Fully Aligned & High Potential), supported by qualitative comments tied to policy fit, partner readiness and practical deployability.

9.2 Evaluation Criteria and Scoring Legend

Table 7. UNDP Impact & Adoption Evaluation Criteria

Criterion #	Criterion	Description	Score	Meaning
1	SDG Relevance & Impact Path	Is the SDG problem, beneficiary, and theory of change clear with credible indicators for measuring impact?	1–5	1 = Very Poor / Not Demonstrated; 5 = Excellent
2	Partnerships & Ecosystem Fit	Are partners (CO/NGO/private) identified or engaged with roles, MoUs/LoIs, or concrete next steps?	1–5	1 = Weak; 5 = Excellent

3	Government / CO Interest & Policy Alignment	Is there demonstrated CO/government interest, policy alignment, and named focal points?	1–5	1 = Weak; 5 = Excellent
4	Co-financing Potential & Sustainability	Are funding pathways identified (grants/investors), with plausible unit economics and scaling costs?	1–5	1 = Weak; 5 = Excellent
5	Team Commitment & Execution	Do they have the bandwidth, governance, and risk management to deliver and sustain the plan?	1–5	1 = Weak; 5 = Excellent

9.3 Detailed Scoring Results

Table 8. UNDP Impact & Adoption – Scoring Matrix (Cohort 1)

#	SM–CO Match	SDG Relevance & Impact Path	Partnerships & Ecosystem Fit	Government / CO Interest & Policy Alignment	Co-financing & Sustainability	Team Commitment & Execution	Comments (Mandatory)

1	Afrikabal <> UNDP Malaysia, Yin Wei Chong	4	4	5	3	5	Verifiable, inclusive agricultural trade infra (USSD, dashboards, custody trails) with ESG-ready reporting across SDGs 1,2,5,8,9,13. Minor refinements (logistics mapping, SDG filters, on/off-chain cues). Strong GoM interest in blockchain.
2	Atlas Ledger <> UNDP Burkina Faso, Barbara Kyeremaa	4	4	4	3	5	Crowdfunding + community ownership for reforestation (10k-tree pilot). Geotagging, real-time monitoring, verifiable reporting. Aligns with SDGs 13,15,1,5. On national agenda; strong potential to scale via government.

3	Cladfy <> UNDP Bangladesh, Humayun Kabir	5	5	5	3	5	Transparent, automated fund disbursement for climate-vulnerable populations; aligns with SDG 13. Next: enhance automated insurance settlement; mobilize resources for scale in planned Phase II with donor.
4	Creative Operations <> UNDP Georgia, Nita Gegeshidze	4	5	4	4	5	Builds on 2024 e-waste pilot; supports Waste Management Code & EPR. Blockchain transparency + incentives for circularity. Wasteless co-financing interest signals strong ownership; new donor partnerships being pursued.

5	Genius Tags <> UNDP Malawi, Misheck Thawani	5	4	5	4	5	ClimateAid: anticipatory action + aid transparency with AI triggers, smart contracts, USDA-pegged stablecoin. Strong DoDMA/UBR ties. Clear KPIs and donor confidence mechanisms; formal endorsement & embeddedness will drive scale.
6	Grinplus <> UNDP Tanzania, Elia John Simon	4	4	4	4	4	ZECO energy-loss transparency via immutable ledger; phased roadmap and viable licensing/service revenue. Key risks: interoperability, buy-in, early proof of recovery. Strong replication potential if pilot shows ROI.

7	IotaOrigin <> UNDP IRH, Dani	4	3	2	3	3	Tokenized, ESG-compliant CRM financing concept aligns with regional priorities, but team capacity and gov buy-in are not yet sufficient. Needs institutional anchoring and investor coalitions to de-risk execution.
8	Karbon Ledger <> UNDP India, Shilpi Karmakar	5	5	4	3	4	IoT/AI/ML + blockchain for CETP performance & compliance (SDG 6,14). Solid design; government stakeholder outreach underway. Next: on-ground pilot, funding pathways, and O&M planning.

9	Plastiks <> UNDP Armenia, Nelli Minasyan	5	5	5	4	5	Strong alignment with forthcoming EPR; robust coalition (municipal operator, NGO, voluntary PRO, FMCGs). Clear roadmap & KPIs. Focus: long-term institutional adoption and credit monetization ops.
10	Socious Fund <> UNDP Mauritius & Seychelles, A. Mboule	4	4	4	4	4	Decentralized crowdfunding for school PV (SDG 4,7,13). Intuitive role-based dashboards; blockchain components pending. Active gov collaboration; clarify roles and complete missing modules for pilot integration.

11	Thallo <> UNDP Tanzania, Mariestella Nyitho Kago	4	4	4	3	5	National carbon credit registry/marketplace aligned with Article 6.2; strong gov buy-in. Needs sustainable revenue model and capacity-building for long-term ops; early outcomes will unlock replication.
12	Unicorn.eth <> UNDP Nordic RO, Bakhtiyor Khamraev	4	4	4	4	4	PoC integrating Cardano into Giveth flows for tokenized renewable energy. Key blocker: crypto-to-CO fund transfer policy—requires HQ guidance. Multiple COs engaged via Procurement Office.

13	Zengate <> UNDP Bangladesh, Iffat Anjum	5	5	5	4	5	API-integrated blockchain traceability for agri supply chains—simple, scalable, sector-extensible. Address data sovereignty, add "blockchain-certified" mark, and deepen policy-maker engagement for scale.

9.4 Final UNDP Scoring Summary

Table 9. UNDP Impact & Adoption – Final Scores per SM–CO Match

#	SM–CO Match	Final UNDP Score (/25)
1	Afrikabal <> UNDP Malaysia	21.00
2	Atlas Ledger <> UNDP Burkina Faso	20.00
3	Cladfy <> UNDP Bangladesh	23.00
4	Creative Operations <> UNDP Georgia	22.00

5	Genius Tags <> UNDP Malawi	23.00
6	Grinplus <> UNDP Tanzania	20.00
7	IotaOrigin <> UNDP IRH	15.00
8	Karbon Ledger <> UNDP India	21.00
9	Plastiks <> UNDP Armenia	24.00
10	Socious Fund <> UNDP Mauritius & Seychelles	20.00
11	Thallo <> UNDP Tanzania	20.00
12	Unicorn.eth <> UNDP Nordic RO	20.00
13	Zengate <> UNDP Bangladesh	24.00

9.5 Analytical Insights (UNDP Perspective)

- Top performers: Plastiks (24), Zengate (24), Cladfy (23), Genius Tags (23), clear SDG problem framing, strong government/CO engagement, mature partnerships, and credible sustainability pathways.
- Solid performers: Creative Operations (22), Afrikabal (21), Karbon Ledger (21), Atlas Ledger (20), Grinplus (20), Socious (20), Thallo (20), Unicorn.eth (20), strong alignment and partner momentum; next focus is operational sustainability (revenue/O&M), formalizing MoUs, and completing missing modules.

- Needs acceleration: IotaOrigin (15), compelling concept, but requires stronger institutional anchoring, investor engagement, and government buy-in to reach deployment viability.
- Cross-cutting: Early policy alignment and named focal points correlate strongly with higher scores; projects with explicit co-financing models and capacity-building plans show better sustainability outlooks. Lean, "anchor-on-chain" approaches continue to balance regulatory comfort with transparency.

[Access full UNDP Impact Scoring dataset here]

10. Descriptive Statistics and Distribution

The evaluation framework for Cohort 1 of the SDG Blockchain Accelerator served as the foundation for data-driven selection and validation of pilot readiness. Each matched pair of Solution Maker and UNDP Challenge Owner was assessed across three complementary dimensions:

- ELP Final Score (Product Evaluation): Measuring product design, usability, and value proposition maturity.
- ELT Final Score (Technical Evaluation): Assessing code quality, scalability, and architectural robustness.
- UNDP Final Score (Impact & Adoption Evaluation): Evaluating SDG relevance, policy fit, and potential for institutional adoption.

All evaluations were standardized on a 25-point scale, ensuring comparability across dimensions and projects. This multi-lens evaluation process was conducted jointly by EMURGO Labs' Product and Technical teams and UNDP representatives, providing a balanced assessment between innovation feasibility and developmental impact.

Table 10. Descriptive statistics across evaluation categories - Cohort 1

Metric	Product (ELP)	Technical (ELT)	UNDP Impact
Mean	**18.15**	**18.00**	**21.00**
Standard Deviation	**2.51**	**3.40**	**2.29**

Minimum	**14.00**	**13.00**	**15.00**
Maximum	**23.00**	**23.00**	**24.00**

The data show a clear hierarchy in performance distribution. UNDP scores averaged highest (21.00), indicating broad confidence in the policy alignment and real-world applicability of the selected projects. On the other hand, technical evaluations exhibited the largest variance (SD = 3.40), reflecting diversity in development maturity across the cohort. Product evaluations displayed moderate consistency, signifying generally coherent design foundations with room for further refinement.

11. Correlation Analysis

Table 11. Correlation between evaluation dimensions – Cohort 1

Relationship	Correlation (r)	Interpretation
Product ↔ Technical	**0.59**	**Moderate positive relationship: projects with strong design usually exhibit competent technical execution.**
Product ↔ UNDP	**0.54**	**Moderate alignment: clear, user-oriented design tends to correspond with higher SDG relevance and adoption potential.**
Technical ↔ UNDP	**0.50**	**Weaker correlation: advanced technical solutions do not automatically ensure institutional fit or policy traction.**

This correlation matrix illustrates cross-dimensional synergy but also underscores that technical sophistication alone does not guarantee developmental impact. Successful accelerator outcomes thus rely on maintaining alignment between technical excellence, user-centric design, and policy relevance.

12. Final Ranking and Comparative Insights

Table 12. Ranking of Solution Maker and Challenge Owner pairs – Cohort 1

Rank	SM ↔ CO Match	Mean Score
1	Plastiks ↔ UNDP Armenia	23.00
2	Karbon Ledger ↔ UNDP India	21.67
3	Zengate ↔ UNDP Bangladesh	21.33
4	Genius Tags ↔ UNDP Malawi	21.00
5	Thallo ↔ UNDP Tanzania	20.00
6	Afrikabal ↔ UNDP Malaysia	19.33
7	Atlas Ledger ↔ UNDP Burkina Faso	19.00
7	Cladfy ↔ UNDP Bangladesh	19.00
8	Unicorn.eth ↔ UNDP Nordic Office	17.67
9	Socious Fund ↔ UNDP Mauritius & Seychelles	17.33

10	Creative Operations ↔ UNDP Georgia	17.00
10	Grinplus ↔ UNDP Tanzania	17.00
11	IotaOrigin ↔ UNDP IRH	14.33

The distribution demonstrates a cohort clustering between 17 and 21 points, with Plastiks, Karbon Ledger, and Zengate leading as balanced, high-impact projects. Mid-tier performers such as Thallo and Genius Tags showed strong prototypes with high potential for scale. Lower-scoring teams exhibited promising concepts but require further technical or policy refinement to reach full pilot readiness.

13. Visual Interpretation of Evaluation Patterns

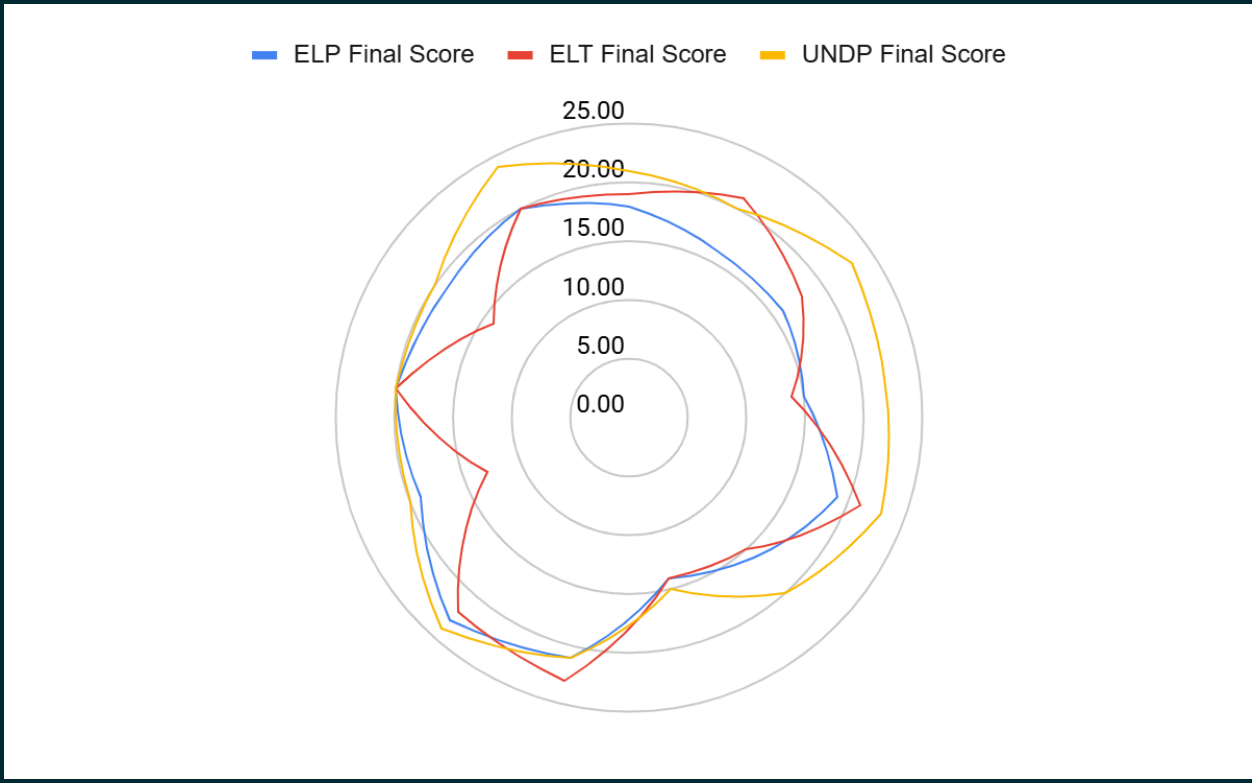

Figure 1. *Radar chart comparing mean scores across evaluators (ELP = blue, ELT = red, UNDP = yellow) – Cohort 1*

The radar visualization clearly depicts strong and consistent UNDP evaluations, forming the outer contour that reflects high policy relevance and real-world applicability. The technical (red) contour exhibits greater fluctuation, highlighting variance in code maturity and infrastructure integration. The product (blue) contour lies between the two, demonstrating conceptual coherence with occasional execution gaps.

The combined chart produces a triangular pattern characteristic of innovation-driven but technically uneven early cohorts, emphasizing that while impact and design alignment were strong, technical depth varied substantially.

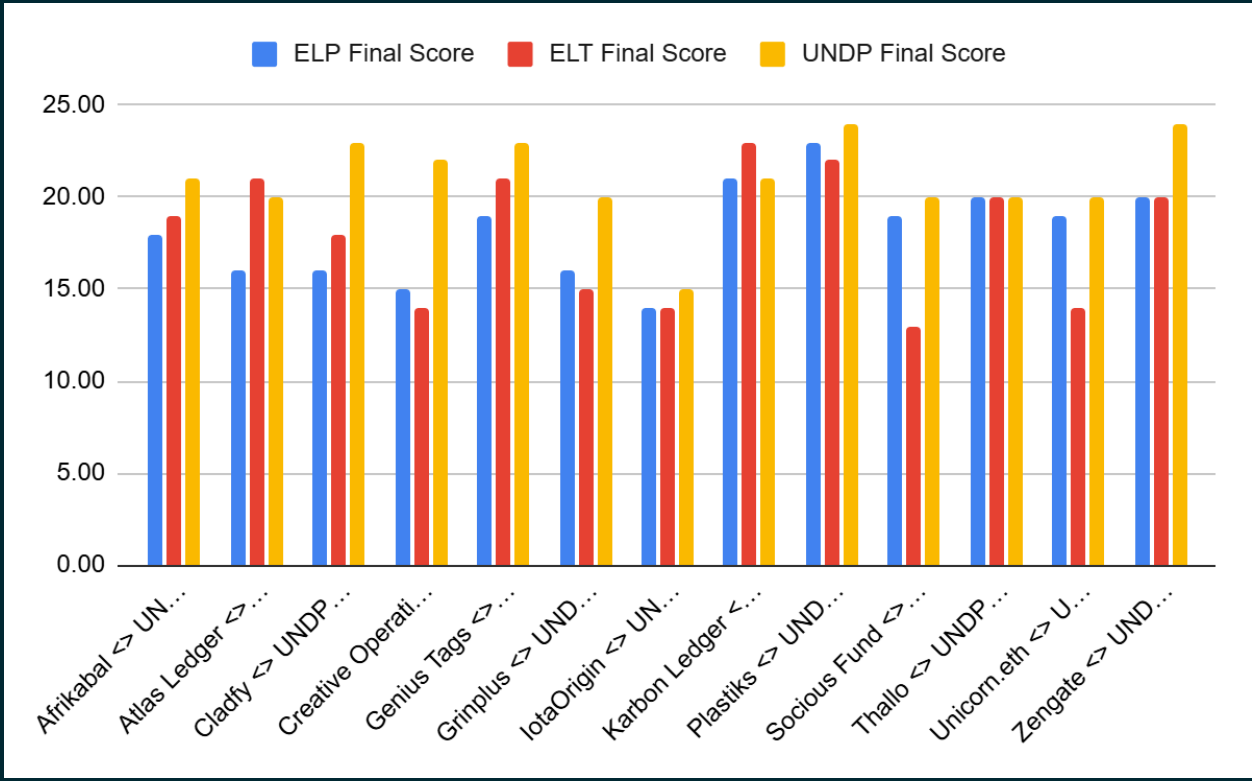

Figure 2. *Comparative Distribution of Evaluator Scores across Projects – Cohort 1*

Figure 2. visualizes the comparative distribution of **ELP (blue), ELT (red), and UNDP (yellow)** final scores across all Cohort 1 Solution Maker and Challenge Owner pairings. The chart highlights how each evaluator group perceived the same projects through distinct lenses, **product design**, **technical robustness**, and **institutional relevance**, enabling a deeper understanding of multidimensional project performance.

The chart reveals several key insights:

1. **Consistently High UNDP Scores (Yellow Bars):**
   UNDP evaluators generally assigned the highest scores across the cohort, emphasizing strong SDG alignment, country office engagement, and policy relevance. Projects such as Plastiks, Zengate, and Karbon Ledger demonstrate particularly strong institutional resonance, achieving near-maximum UNDP scores.

2. **Variance in Technical Evaluations (Red Bars):**
   The ELT (technical) evaluations exhibit noticeable variation across projects. Teams like Karbon Ledger and Genius Tags achieved strong technical ratings, while others such as Creative Operations and IotaOrigin received significantly lower marks. This confirms that technical maturity was the most uneven dimension in Cohort 1, consistent with the standard deviation findings (SD = 3.40).

3. **Moderate Product Evaluations (Blue Bars):**
   The ELP (product) scores are comparatively stable and clustered between 17–21 points, reflecting balanced conceptual maturity across most solutions. However, the modest gaps between ELP and ELT scores suggest that some well-designed products were still early in their technical build stage.

4. **Cross-Evaluator Convergence on Top Performers:**
   High-performing teams such as Plastiks, Karbon Ledger, Zengate, and Genius Tags display alignment across all three dimensions, confirming comprehensive strength across product, technical, and impact domains. In contrast, lower-performing projects like IotaOrigin and Creative Operations exhibit visible divergence between ELP/ELT and UNDP scores, indicating solid conceptual ideas that lacked technical or institutional readiness at the time of evaluation.

Overall, this comparative chart reinforces Cohort 1's defining characteristics: high developmental potential, moderate technical variance, and consistent product clarity. The visualization provides a concrete basis for refining selection, mentorship, and evaluation calibration methods, insights that were systematically embedded into the Cohort 2 accelerator design.

14. Interpretive Discussion

A multidimensional picture of readiness

Taken together, the product (ELP), technical (ELT), and impact/adoption (UNDP) perspectives create a coherent but intentionally tense view of pilot readiness. As summarized in Table 10, UNDP scores sit highest on average ($\mu = 21.00$) with the tightest spread ($\sigma = 2.29$), indicating strong policy fit and country ownership across the cohort. Technical scores show the widest variance ($\sigma = 3.40$), reflecting uneven depth in smart-contract engineering, testing pipelines, and performance optimization. Product scores cluster between these two ($\mu = 18.15$; $\sigma = 2.51$), suggesting generally sound problem–solution framing with occasional execution gaps.

Alignment is a strength but not automatic

The correlations in Table 11 ($r = 0.59$ between Product↔Technical; $r = 0.54$ between Product↔UNDP; $r = 0.50$ between Technical↔UNDP) indicate that strong performance in one dimension tends to coincide with strength in the others, yet high technical sophistication alone does not guarantee institutional traction. This is visible in Figure 2, where a few projects show solid UNDP scores but weaker ELT results, and vice versa. The implication is clear: accelerator value lies in orchestrating convergence across the three vectors, not maximizing any single one.

What distinguishes the leaders

The top quartile (Plastiks, Karbon Ledger, Zengate, Genius Tags) pair four traits repeatedly observed in the logs and scoring narratives:

1. **Early regulator engagement and named focal points** (Section 4.3)
2. **Modular, resource-aware on-chain design** with clear off-chain orchestration (Sections 4.1, 4.4)
3. **Evidence of operations thinking** (governance, O&M, handover plans) rather than "demo-ware" (Section 4.5)
4. **Continuous testing and documentation discipline**, enabling repeatability across environments (Sections 7–8)

Where friction persists

Lower-scoring teams typically exhibited one or more of: (i) monolithic validators and limited stress testing; (ii) incomplete wallet/key-management patterns; (iii) unclear off-ramp/compliance

paths; or (iv) insufficiently anchored partnerships. These are not fatal flaws, but they do convert into delivery risks during handover to public institutions.

Program design hypothesis validated

The cohort's performance supports the "anchor-first, migrate-later" architecture (Section 4.1). In multiple regulatory contexts, immutable audit anchors plus off-chain workflows proved to be the only viable way to advance while frameworks mature. This approach preserved trust and optionality without blocking future elevation to fuller on-chain registries.

15. Lessons for Future Cohorts

15.1 Selection & Scoping

- **Require named public-sector focal points** and a draft MoU/LoI by Week 3. In Cohort 1, early policy anchoring correlated with higher UNDP and overall means (Tables 9 & 12).
- **Bias toward problems with measurable unit economics** (utility losses recovered, plastic verified, carbon credited). Projects with clearer value capture advanced faster through stakeholder gates.

15.2 Architecture & Engineering

- **Mandate validator modularity and benchmark targets.** Set program-wide guardrails (e.g., max execution units per path; required negative-path tests; batch strategy for N payers → M beneficiaries).
- **CI/CD and reproducibility as a gate.** A green pipeline (lint, unit, integration, Preprod deploy, fixture data) should be a milestone for all teams by mid-program.
- **Standardize hybrid patterns.** Provide reference templates for: registry anchors; escrow & milestone disbursement; verifiable reporting with IPFS/Hashes; multi-sig governance; and UTxO consolidation jobs.

15.3 Product & Handover

- **Design for non-crypto operators.** Require role-based dashboards, human-readable event logs, and emergency controls; treat operational manuals as deliverables, not "nice-to-haves."
- **Low-connectivity pathways.** Encourage SMS/USSD onboarding and offline data capture where relevant (a recurring need in Sections 4.5 and 7.3).

15.4 Compliance & Finance

- **Early off-ramp planning.** Document fiat rails, custodial responsibilities, and treasury governance before Week 6.
- **Security checklist and light audit.** A standardized security rubric (keys, roles, rate-limits, oracle trust, DOS surfaces) plus an external light-touch review for finalists.

15.5 Program Operations

- **Milestone-based micro-grants** tied to evidence (test coverage %, Preprod tx hashes, signed letters from regulators, KPI dashboards).
- **Technical office hours + red-team clinics.** Concentrated support on UTxO stress, batching, and cost ceilings improved outcomes materially in Cohort 1—make this a weekly ritual.
- **Shared data catalog.** Provide a minimal schema for impact datasets and a reference analytics notebook so teams report KPIs consistently.

15.6 Measurement & Reporting

- **Weighted composite score.** For pilot-readiness decisions, consider a 30% Product / 35% Technical / 35% UNDP blend with hard fail criteria (e.g., missing CI/CD or no named government focal point).
- **Variance watchlist.** Use SD deltas to trigger interventions—e.g., Technical σ above program median flags a team for engineering pairing; UNDP σ flags partnership escalation.

16. Concluding Reflections

Cohort 1 demonstrates that blockchain can be positioned as public-infrastructure tooling, not a novelty layer, when three conditions are met: (i) policy alignment with named owners; (ii) resource-aware engineering that respects operational constraints; and (iii) clear value pathways that justify adoption by ministries, utilities, and local partners. The evidence base in Tables 10–12 and Figures 1–2 shows real convergence toward these conditions, with leading projects already exhibiting the maturity required for responsible pilots.

At the same time, the cohort underscores that institutionalization is the true finish line. Production readiness, in development contexts, is as much about handover and governance as it is about code maturity. The accelerator's most durable contribution is thus the pattern

library it has begun to codify: anchor-first registries, milestone-based disbursement, verifiable reporting, batch-efficient treasury flows, and operator-friendly dashboards.

Looking forward, the pathway is pragmatic:

1. Elevate the templates: ship official reference implementations for the most common patterns.
2. Tighten the gates: convert lessons into mandatory checks (security, CI/CD, policy letters).
3. Invest in counterparts: fund capacity-building and operational playbooks for COs and ministries.
4. Prove the economics: prioritize pilots with measurable, near-term ROI to reinforce trust and unlock co-financing.

If Cohort 1 was about proving shape, Cohort 2 can be about proving scale, reducing variance, accelerating policy-ready deployments, and standardizing what works. With disciplined engineering, explicit institutional design, and transparent measurement, the Accelerator can continue to transform high-potential prototypes into credible, auditable public-interest systems that advance the SDGs.