



Trig Points a discussion paper

Towards Automated Proof-of-Impact – Gathering Ledger-Ready Data That Verifies Itself

Scout is a London-based impact R&D unit operating internationally. We're a fund manager, a deal-flow specialist and a technologist, pathfinding next generation impact and returns.

We're for asset and wealth managers going beyond ESG to develop ground-breaking impact products and services as purposeful as they are profitable.

Our job is to be out in front on your behalf, bringing you intelligence, helping you navigate in new territory, finding industry-leading income and outcomes for increasingly mission-conscious clients.

Discussion:

What could be accomplished if we could automate some kinds of Proof-of-Impact? How could we achieve this?

Blockchain: Claim & Verify

Setting aside tokenisation and crypto-economics, distributed ledger technologies offer an elegant *claim and verify* mechanism for proving impact.

- Evidence that something happened in the real world – or simply a company or individual's assertion that something happened – is written to a blockchain (the *claim*).
- An independent third party then checks that what has been captured is indeed correct, and stakes their reputation by adding their confirmation to the ledger (the *verification*).

Because both of these steps are on a DLT we can be confident enough that this record hasn't been tampered with to entrust smart contracts with the responsibility to act on it in pre-agreed ways.

This is the fundamental mechanism behind ledger-based escrow: on the strength of this model, vast sums of money will be released automatically by the coming generation of impact funds and bonds.

The Cost of Human Verification

So as it is currently envisaged, escrow release hinges on *human* verification. Paying for a trusted person to provide confirmation (which may sometimes involve being physically present in the place where the impact is being claimed to have happened, for example) can get expensive. Affordability, therefore, places limits on what we decide to corroborate, how often, and to what level of detail.

It's not just escrow; it isn't difficult to imagine a near-future where provable impact is a first-class citizen among other key determinants of business-critical choices. Should I divest from this company? Where do I focus, to deliver most value for shareholders? Is my supply chain compliant? Myriad actions will be transparently handled by smart contract once we trust the data behind them.

To support or make big decisions effectively, ideally we'd want to be absolutely sure of not only every outcome, but everything that happened along the way to those results – exactly *how* they were achieved, step by step – but in most cases, by current approaches, cost prohibits this.

The records on DLTs can't be massaged, retracted or lost, making end-to-end assurance tantalisingly possible. But for the verification of impact to be *automated* – potentially making it cheap enough, and *practical* to gather higher levels of detail, more frequently and at greater scale, without any drop in confidence – *the integrity of the way the data is captured before it hits the blockchain* is critical...

Just because something is *on-ledger* doesn't mean it's true, unless you can be sure of (a) how it got there and (b) how accurately it reflects the state of the thing in the real world you're interested in.

Gathering Ledger-Ready Intelligence

What if much of the data on a blockchain was pre-verified, by virtue of how it got there? We've started to think about the two enabling areas that help make pre-verification attainable:

- (1) Point-of-Capture
- (2) Triangulation

Point-of-Capture is interested in the robustness of the mechanisms used to gather data upstream of it being written to DLTs. How secure is the intelligence-gathering equipment and methodology being used? How difficult would it be to compromise?

Triangulation is a working term for when multiple independent data points corroborate the same aspect of the world. The more discrete sources of intelligence indicating a common state or event, the more we're inclined to trust what all those data points agree is how things really are out there.

Both these areas can be measured by degrees: we can imagine different ratings of robustness in our Point-of-Capture and different levels of Triangulation. If there were simple, open classifications for how we describe these different degrees, we could decide the minimum we would be content with for different kinds of information, under various given circumstances, for different sorts of decisions.

Trig Points: a conversation piece

Let's imagine a system of 'Trig Points' that allows any social impact bond, impact fund – or any decision- or policy-making body – to define what will constitute 'sufficient verification', for which specific data points, to be able to act without further checks.

What kind of impact data are we talking about? (eg Engagement data, learned from talking to people? Transactional data, gathered from financial records or supply chain exchanges? Ambient data from sensors and satellites?)

What must it score on a scale of Robustness to qualify? (What should the scale take into account?)

How many different sources should Triangulate it, before we accept it? (And how independent or diverse should they be?)

What level/frequency of human audit is required? (eg Percentage of outcomes/way-points corroborated? Regularity of any spot-checks on the way it is gathered?)

What parties or authorities should have what level of visibility over sensitive data included for Triangulation? (eg Anonymised? Pseudonymised? Mediated by a trusted identity broker?)

What would be a blueprint for an effective schema or protocol, for use with smart contracts?

There will be plenty of situations where removing human audit from the loop is unnecessary, or impossible. But we see an opportunity for a large proportion of blockchain-based systems to support better intelligence, deliver greater returns, and greater impact, by gathering 'ledger-ready' data that is less reliant on a human-centric *claim and verify* model.

Over the following pages we offer some background information and examples of how we're thinking about Point-of-Capture and Triangulation for our own impact investment trusts in high-growth cities.

Background: ScoutX

ScoutX helps you **gather** intelligence, continually **optimise** impact and **prove** what's happening in the world as a result, whether you're a fund manager with a portfolio, a wealth manager with a roster of high net-worth investors or a multinational managing a network of suppliers.

The image below depicts how we intend to manage impact using *ScoutX* on our own investment trusts. As we'll explain, these tools and techniques are easily applied to diverse scenarios and needs, including non-place-based, conventional investment portfolios, or extended, complex supply chains.

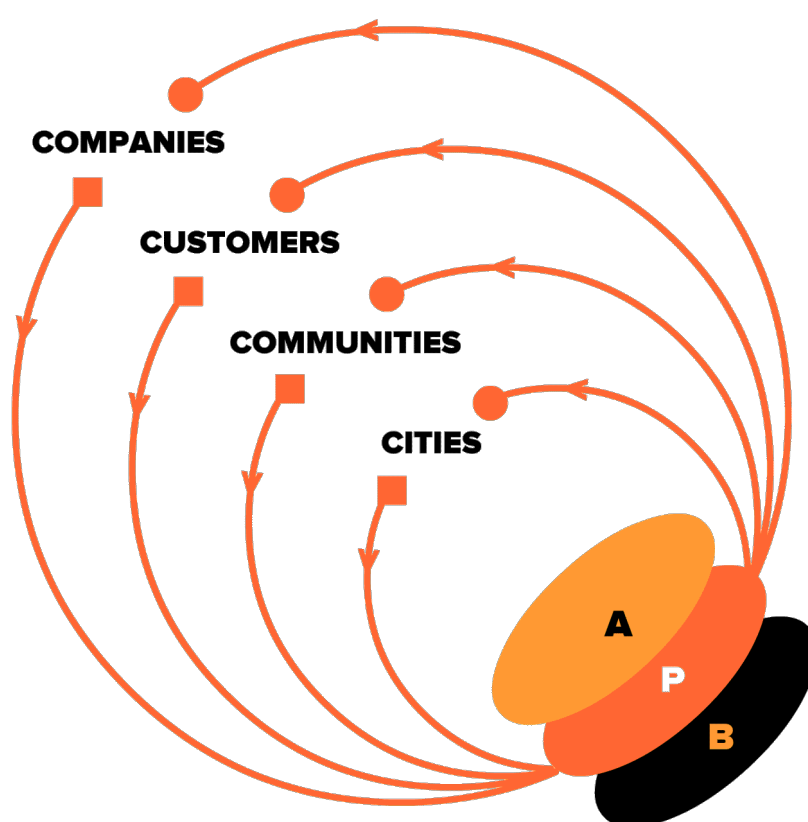
We gather impact data at four resolutions – our investee companies, their individual customers, our wider target communities in informal settlements and, stepping back, city level – to give a rich picture.

Everything is mirrored to our blockchain (**B**) on its way to any 3rd party platforms being used (**P**).

We use inference and machine learning to analyse (**A**) the data, surfacing patterns and insights.

All stakeholders at every level (including investors, not pictured) can explore close to real-time impact as smart, highly visual, interactive 'ground truth' reports.

Every iteration informs the next, helping to tune and optimise impact strategies over time.



5 Elements, 3 Stand-Alone or Integrated Products

1. **Point-of-Capture Solutions;** hardware, software and services for gathering ledger-ready impact data in ways that minimise data cleaning, QA and the need for human verification
2. *High-integrity Persistence;* writing data to 3rd party ledgers while mirroring to our own, modelled as knowledge graphs to support enhanced discovery and interoperability
3. **Analysis & Optimisation Tools;** for querying daily aggregated data in open-ended ways; using machine learning/inference to surface patterns and opportunities for optimisation
4. *Open Standards, Benchmarking & 3rd Party Integrations;* Rosetta stone mapping between data and impact (open formats, protocols, standards, scoring frameworks); APIs with 3rd party platforms
5. **Stakeholder Proof & Inclusion;** smart, interactive reporting tailored to any audience, visualising impact and providing supporting evidence, facilitating polling, feedback and decision support

Point-of-Capture: **Convergence & Triangulation**

We're field-testing ways 'triangulation' between multiple data sources is cheaper than human audit – and more effective in the majority of impact verification scenarios – providing a richer, timelier, more actionable picture for investees, communities, portfolio managers and investors.

We make it easier and cheaper to bring together and capture 3 kinds of impact data:

Transactional

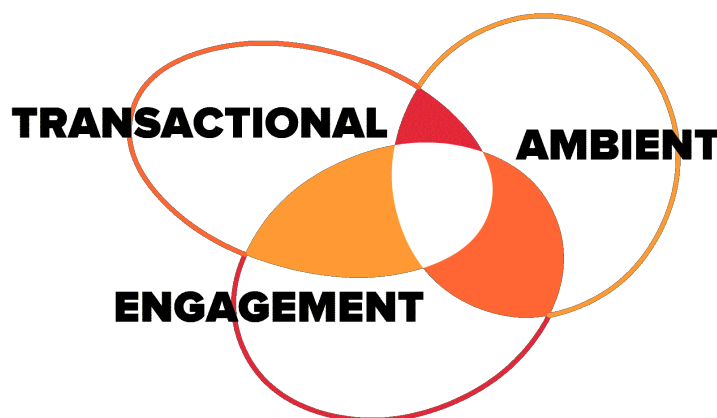
Payments between organisations/people
'Handshakes' between suppliers in a chain

Engagement

Customer feedback, net referrer scores
Community consultation, polls, surveys

Ambient

Sensor and beacon data; 3rd party feeds
Satellite imagery; stills and video



Using 3 main categories of point-of-capture:

Our **mobile apps** will work on low-cost smart devices provided to employees or households, leveraging the camera, biometrics and GPS to verify user ID and location of photographic evidence

Cheap, **remote IOT sensors and beacons** embedded in buildings, equipment and the environment (securing owners/residents' permission, privacy) emit data over mesh networks and mobile internet

High-resolution **satellite imagery**, algorithmically processed, provides keyhole and time series analysis of visible effects – from promising signs, to early warnings and retrospective explanations

(Tracking payment hops & analysing still/satellite imagery are 3rd party services in the background)

How It Works

Our field research with pilot partners in Colombia and Bangladesh is focused on ways independent data points can effectively *corroborate each other*, reducing the need for human verification. Let's say a small, shared solar array is fitted to the roof of a community building:

- On-site photographs of the completed installation, taken by the registered engineer
- A new stream of performance data from the live, connected panels themselves
- A customer's confirmation of delivery and their feedback on the quality of the work
- A real-time record of the neighbourhood collective's first re-payments to a micro-lender
- The lender's payment to the solar provider
- An algorithm's automatic confirmation that shapes in the next day's satellite imagery are panels...

... all enter our system via distinct channels within 24hrs of each other, bearing aligned location- and time-stamps. No data cleaning, or further verification of this step of the impact activity is required.

Analysis & Optimisation, With Stakeholders

Over time we capture how much electricity the array produces, which nearby households purchase it (also how much, and at what dynamic price), how satisfied these residents are with the supply, the percentage increase in artificial light in the vicinity at night and whether or not repayment plans continue on schedule. Patterns, and any conflicting signals, trigger alerts to different stakeholders as appropriate (the solar provider knows when maintenance is required, local residents know when electricity is cheapest, the fund manager knows when their investee is attracting a bad reputation, impact investors know when a target volume and price-point of renewable energy has been generated in off-grid communities previously reliant on kerosene).

After a few months, an impact specialist from the fund sits down with community leaders to review impact to date, and plan next steps. Using a tablet to explore the latest reports and aggregated information, overlaid across the-day-before's aerial pictures of their community as they pinch and zoom, they notice that the new road is nearly ready, uptake of micro-grid services is going well, and people are happy with the benefits – but that sales of sanitation solutions are flat. This is a concern in one area of the settlement in particular because last year's satellite imagery shows it's prone to flooding. They agree a sales promotion from the investee water and sanitation provider might be helpful, to raise awareness of the risk and what's available; they also quickly customise a 3-question employment survey together, from a library of templates, and email their specialist investee recruiter to add a list of current vacancies and deploy the micro-questionnaire in that neighbourhood as soon as possible. Finally, they note an uptick in arrivals in the last few days and can clearly see new growth in unsafe, makeshift accommodation along the settlement's periphery. They notify all investee building services and micro-finance providers. Also, at the present rate, it's likely the crèche will very shortly become oversubscribed and it would be good to develop a second site.

After meeting with the community leaders, the impact specialist heads across town to a regular coffee meeting with the city's head of urban planning, to discuss the latest proof of impact and projections. They've been talking about a social bond linked to how many displaced people entering the city find safe accommodation with basic services. And with more informal settlements about to be connected to the city centre by road, it's important the infrastructure for businesses to take advantage of the increased labour supply, and access those new outlying markets, is in place.

At about the same time in a neighbouring country, a fund manager is meeting with two institutional investors interested in a follow-up tranche to expand into new cities. Onscreen, they compare progress to date in three urban communities similar to the ones they're considering (topography, population size/density, income spread). Two are on track to meet targets, but despite comparable levels of investment, the third has already significantly outperformed the others on impact levels and business growth to date. They type a query, looking for an explanation – the top inference is that mobile coverage was broader, earlier in the investment programme in that community; the investors nod, this makes intuitive sense, and the asset manager confirms it's something their optimisation analyses have picked up in other settlements too – they will be prioritising early mobile internet provision with the new tranche. Towards the end of the meeting the investors admit they're also considering another asset management firm with a fund that targets Global Goals 1, 9 & 11 (their priorities); the market rates of return are identical, so the asset manager brings up a side-by-side visualisation of target impact levels against the sub-indicators for the three SDGs, comparing the relative outcomes from investing £100M in each.

Later, one of the investors, who manages the pension trust for a large multinational, sends an email to all employees, linking to the interactive side-by-side comparison, with his assessment of each fund. Within minutes hundreds of people are exploring at city-scale, drilling into *exactly* where and how both funds are currently delivering against the specific Global Goals their company stands for.

ScoutX & Blockchain

Our strategy is to focus on the **pre**-chain (point-of-capture), **off**-chain (analysis and optimisation) and **post**-chain (stakeholder inclusion) opportunities the wider blockchain movement creates.

Where we *do* apply distributed ledger technology, rather than for tokenisation or crypto-economics, we're primarily interested in the data integrity it affords: allowing us to provide evidence (with appropriate privacy controls) either on public record, or to selected third parties of certain events/activities/impacts, or that a certain claim was asserted by a certain party, without the possibility of tampering, retraction or data loss.

Our persistence layer will employ so-called '2nd generation' distributed ledger technology to both guarantee the integrity of data immediately downstream of point-of-capture and provide fast, scalable access to it for computation. Extending this, we're also exploring server-less, device-side 'mesh integrity' for additional assurance during acquisition. We're evaluating IOTA and Dat for these purposes, and will review further options.

We may also integrate 3rd party blockchain-based services in the background, as they mature, eg:

- Integrity checks between repositories/computations
- Tracking financial transactions
- KYC/ID management

ScoutX & Crypto-Economics

As above, our greatest opportunity around crypto-economics is providing the low-cost point-of-capture solutions that excel in frontier markets at providing the quantity, quality and integrity of data the emerging class of tokenised, blockchain-based platforms and marketplaces will require.

Going forward we'll also be well-placed to explore crypto-economic approaches on our own platform and trusts, potentially including *dynamic supply-chain equity* (releasing value from scattered, tokenised inventory), or *hyper-local pricing incentives* (using geo-fencing and community consultation to influence the mix of services residents invest in at street level).

ScoutX & Validation Services

With impact intelligence that, as far as possible, reliably *corroborates itself*, and token-driven ecosystems by ixo, Alice and RootProject opening-up new markets for 3rd party verification services, we're confident the way impact validation is procured, performed and paid-for will be disrupted.

About Scout

We're not your typical R&D lab. What we're working on doesn't begin in a sterile, closed environment, but in complex, vibrant and challenging parts of the world – from frontier markets to fragile states.

Places our clients and partners are invested, places impact is limitlessly scalable – it's here we develop funds, management software & deal-flow, from the ground up.