Tracking UK Aid on the Blockchain
- Pilot -

Report on Sprint 3:

Simulation Exercise

Prepared by Númi Östlund (numi@disberse.com) and Paul Currion (paul@disberse.com)

Sprint 3 Report

Executive Summary **2**

Introduction **4**
What is the Aim of the Pilot? 4
What were the challenges in Sprint 3? 4
How did Sprint 3 contribute to the Pilot? 5

Benchmarks Comparison **7**
Delivery times 7
Transaction times 7
Handling and Holding Times 8
Costs 9
Transparency 11
Improved visibility of delivery networks 11
Increased transparency of transaction costs 13
Financial Risks 14
Exchange Rate Volatility 14
Risk Mitigation 15

Use cases **16**
Delivery Chain Mapping 16
Audit and Control 17
Liquidity forecasts 18
Future Use Cases 20

Supplementary Analysis **21**
Data gaps and challenges 21
The Role of Blockchain 22

Conclusion: How do we build on Sprint 3? **23**

Executive Summary

- Sprint 3 was disrupted by the Covid-19 pandemic but the majority of Experiments were completed successfully. Experiment 1 ran the Simulation Exercise, recreating CBPF transactions for oPT and Iraq between 2018-19; to run the Simulation Exercise we adapted the existing Disberse analytical model to the CBPF context and compensated for a number of data gaps identified in the analysis. Simulation outcomes were incorporated into the benchmark analysis in Experiment 2, while additional visualisations and a new user scope were added to the platform in Experiment 3.

- The Simulation showed that the Disberse platform can decrease the time needed to deliver funds; and the longer the delivery chain, the greater the improvement in speed. This is primarily due to the decrease in transaction times due to the disintermediation of financial institutions. Two other causes of delay are handling and holding times, which were not reduced in the Simulation as they involve organisations' internal procedures; however they would become transparent on platform and could be addressed.

- The Simulation also indicated that the most potential for cost savings was up to 70-85% in currency exchanges in Tier 2. The current financial system makes it impossible to provide a true accounting of transaction costs, and this lack of transparency is a concern for efficiency and accountability. However bringing delivery chains onto the ledger would create potential for more savings through a new cost structure, under which donors would pay a small fee on deposit to reduce overall costs along the whole delivery chain.

- The Simulation confirmed that bringing CBPFs on platform would create visibility and improve analysis, making it possible to optimise the timing of currency exchanges, negotiate better exchange rates based on volume, and develop alternative funding strategies. It would enable risk mitigation through improved risk analysis and real-time information that could not be achieved by any individual organisation. Aggregate risk in a delivery chain is increased by a single weak link, and donors should be concerned with mitigating aggregated risk in order to preserve the value of their funds.

- Three Use Cases were explored:

    - Delivery Chain Mapping was highlighted by a range of different DFID departments, and we incorporated a network graph and a delivery chain builder into the platform.
    - Audit and Control is complicated by the multi-stakeholder complexity of CBPFs, but we were able to incorporate performance metrics into the platform.

    - Liquidity Forecasts could be used to improve efficiencies in the delivery chain; while this was more complex given the limited data, we incorporated simple analytics into the platform.
    - There are other possible long-term use cases based on added-value services which would incorporate existing capability, enhancing existing capability, or creating new capability.

- A number of wider challenges in financial tracking are reflected in the data itself, relating to banking costs, exchange costs, end-chain expenditure, and accounting discrepancies caused by the multi-year and multi-donor nature of projects. These are all aspects of the single central problem that this Pilot began with: existing financial services, combined with internal accounting practices, create a number of obstacles to meaningful transparency. The Disberse platform has the potential to provide aid organisations with the tools to address those issues themselves.

- Many of the issues uncovered during the research did not require blockchain technology in order to be resolved. In the short-term the main driver for using the platform will be traceability, with efficiency gains increasing in the mid-term. However there is also a long-term transformative proposition of distributed governance, and the Simulation should therefore be seen as the first stage in a longer-term process of adopting this technology. Wider adoption of the platform is where the distributed ledger aspect of the platform would come into play, creating a range of possibilities, in particular to address the present lack of infrastructure that obstructs localisation.

- Sprint 3 provides a solid foundation for a Sprint 4 proposal which would move the Pilot towards executing a live test of funds on the platform.

Introduction

What is the Aim of the Pilot?

The Pilot aims to test the central hypothesis that

> *"If we introduce distributed ledger technology to tracking UKAid payments through the delivery chain, then we will enhance transparency, increase the speed at which money flows to the end recipient, and reduce intermediary costs."*

The Pilot will test this hypothesis by running a Simulation exercise on a platform based on distributed ledger technology, using historical data from a County Based Pooled Fund (CBPF) managed by the UN Office for Coordination of Humanitarian Affairs (OCHA).

The Simulation will be compared to a "business as usual" benchmark to test for improvements in key metrics identified by stakeholders, and to identify potential strategies for mitigating risks in the "business as usual" model. This analysis will then be presented for discussion at the end of the Pilot.

The DFID Steering Group and Disberse Project Team have formulated a number of additional key assumptions to guide the Pilot in answering four key questions:

1. Does it have a positive social impact?
2. Will key stakeholders engage with it?
3. Does the technology work?
4. Will this grow after the pilot?

The Pilot is organised as a series of Sprints. Each Sprint is developed by Disberse, the technical partner selected by DFID, but the Sprint design must be approved by the Steering Committee based on the results of the previous Sprint.

This report introduces the findings from Sprint 3, during which the Simulation Exercise was carried out and the comparative analysis performed.

What were the challenges in Sprint 3?

Sprint 3 took place during the disruption caused by the Covid-19 pandemic, which affected the work in three ways. First, the imposition of travel restrictions and quarantine measures meant that it was not possible to carry out Experiment 4, which had originally planned a series of workshops with DFID staff in the UK. Second, although we attempted to compensate for this through one-to-one

telephone interviews, the shift in the work patterns of DFID staff meant that they were not able to engage, which also had an impact on Experiment 5.

Third, our project lead and developer team are in Belgrade, Serbia, which was subject to some of the tightest quarantine restrictions in Europe. This was extremely disruptive for the simulation development and performance itself, and we therefore requested and received an extension for this Sprint with no change in budget. With the benefit of this extension, Experiments 1, 2 and 3 were all successfully implemented and their results are described in this report.

The main challenge within those Experiments was that, while we had gathered a substantial dataset in Sprints 1 and 2 through querying existing databases and interviewing key respondents, there were still gaps in that data. We carried out additional research, based on similar institutions rather than re-interviewing previous respondents, and extrapolated from the extant data to fill these gaps.

We were not able to collect primary data on transaction costs and exchange rate spreads (partly due to the pandemic), so instead adapted our existing model based on our knowledge of CBPF delivery chains, as well as our previous experience in working with similar partners. There may be errors in these estimates, but our judgement is that any such errors do not significantly affect the trends that we identify, and we will refine this model as and when we gather new information.

How did Sprint 3 contribute to the Pilot?

Experiment 1 ran the Simulation Exercise. We put the historical data (broadly covering 2018-2019) through the data seeder developed for the Simulation exercise. This enabled us to “re-run” the activities of the Country Based Pooled Funds in Iraq and the Occupied Palestinian Territories as if they had been conducted on the Disberse platform. The Simulation outcomes were then incorporated into the analysis in Experiment 2.

Experiment 2 used the benchmarks established in Sprint 2 to analyse the Simulation outcome. However we identified that, despite extensive data collection in Sprint 2, there are still data gaps which are “built in” to the current system; we gathered some supplementary data and include a discussion of this in the section on Data Gaps and Challenges.

Experiment 3 added several visualisations to the platform, and created a new user scope. Usually clients can only view only their own account details and the delivery chains which they are part of; the new user scope allows the coordinating stakeholders (donor and OCHA) to view performance metrics and delivery chains for all implementing partners, but only related to their Pooled Funding. We have discussed with DFID the potential to record a video demonstration to enable DFID and OCHA colleagues to walk-throug the platform following Sprint 3.

Glossary of terms

Delivery time	The sum of Transaction, Handling and Holding times. This shows how long it takes for a given organisation to receive funds through the delivery chain.
Handling time	The amount of time it takes for an organisation to process funds from receipt to transfer to another organisation. Usually refers to internal administrative procedures.
Holding time	The amount of time an organisation holds funds on account before transferring them to another organisation or spending them, excluding handling time.
Transaction time	The amount of time it takes for funds to move from one organisation to another. Usually refers to a service provided by a third-party financial service provider, such as a bank.

Benchmarks Comparison

Delivery times

The Simulation showed that a blockchain-based financial service such as that provided by the Disberse platform can immediately decrease the time needed to deliver funds; and that the longer the delivery chain, the greater the improvement in speed.

Transaction times

Improvements are primarily due to the decrease in transaction times due to the disintermediation of financial institutions. Transaction times vary depending on a number of variables, such as whether they are domestic or international, but data collected in Sprint 2 showed an average transaction time of about 7 days between tiers. Across multiple tiers in a delivery chain, the transaction time from donor to end implementing partners is compounded by each transaction between tiers.

In the mapped delivery chains (CBPFs in Iraq and oPT) there were usually three tiers, making the average aggregated transaction time a total of 21 days. Since fund transfers on platform are instantaneous, these transaction times are reduced to zero for all in-platform transactions.[1] This decreases the average transaction time in every chain and produces a large time saving in aggregate (Table A).

Table A: *Transaction times and days lost in current delivery chain versus simulation.*

Total Delivery Chain	Sprint 2	Simulation
Average transaction time	21 days	0 days
Total days lost (aggregate)	400 days	0 days

[1] Withdrawals from the platform are subject to the usual transaction times, since these funds are withdrawn through the existing banking system.

Handling and Holding Times

Delivery chain mapping in Sprint 2 highlighted that Delivery Time is greatly affected by the time it takes for partners to handle funds (time from contracting or payment request to actual payment) and the length of time they hold funds waiting for such a contract or request (see Sprint 2 Report, page 8-9).

Handling and holding times are due to internal procedures, usually administrative in nature. While both would become immediately transparent on platform - enabling better benchmarking, monitoring and evaluation - both handling and holding times were not reduced in the Simulation (Figure A) since we were modelling Disberse as an external service.

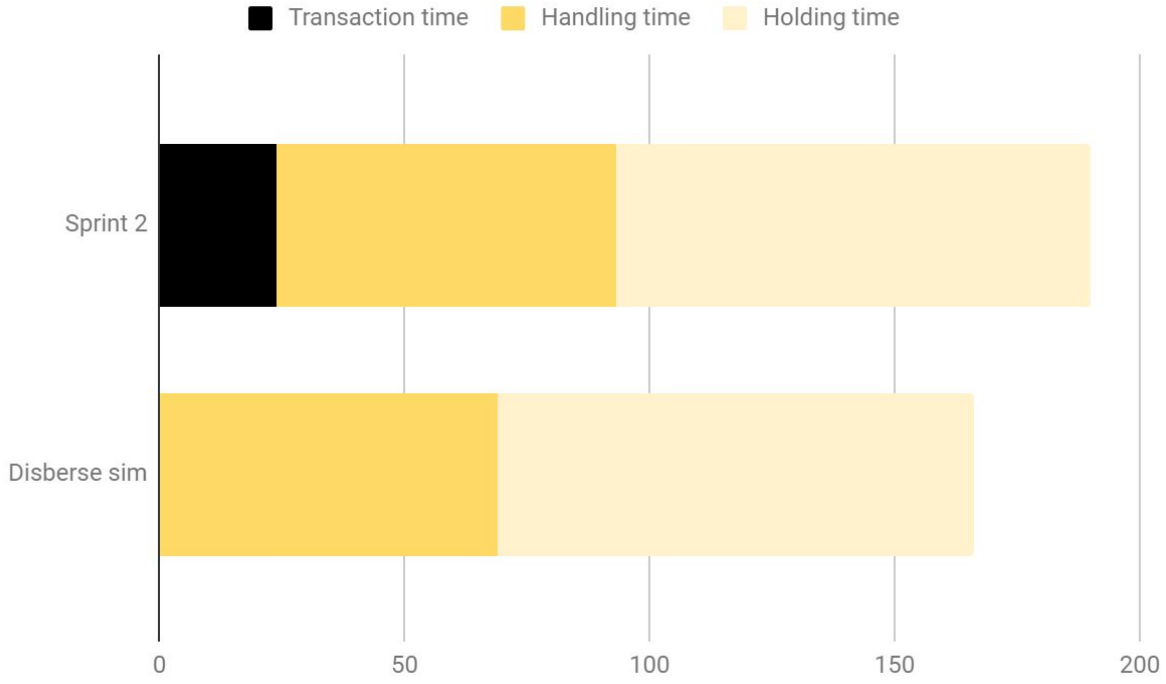

***Figure A**: Comparison of fund delivery time between Sprint 2 and Simulation for a single tier.*

While this limited the time efficiencies in the Simulation, it also emphasised that there is potential to build services on platform to improve both handling and holding times. These are discussed in the section on Future Use Cases.

Costs

As with delivery times, detailed financial cost data was difficult to establish, mainly because these costs are not transparent in the existing financial system. This is discussed in more detail in the section on transparency, below.

In order to address this gap and establish a baseline, we conducted additional data collection, including: i) analysis of budgets in OCHA GMS, ii) reaching out to IPs for additional data, iii) discussions with banking experts, iv) incorporating data from similar organisations (i.e. INGOs with operations in the same countries). We then adapted our existing cost analysis model to estimate current costs in CBPF delivery chains, which enabled us to perform benchmark analysis despite incomplete data.

The costing model not only allows a benchmark of the costs, but also identifies where the most potential for cost savings can be found. Currency exchanges carried out in Tier 2 represent the most significant costs, with the costing model indicating potential savings between 70-85% through eliminating or optimizing large and sometimes unnecessary transactions. As funds move further along the chain to smaller and often local organisations, there are fewer opportunities for cost savings, since major costs such as international transactions and currency exchanges have already been covered.

There are opportunities for additional savings by bringing all transactions onto a unified platform. This would allow for a different cost structure based on the business logic, underlying features and associated efficiencies of the Disberse platform. The Disberse business model is to charge institutional donors a fee of around 0.5% at the point of deposit, since donors have both the incentive to increase transparency and the resources to invest in that ambition. By definition clients further along the chain have fewer resources, and the fee structure is intended to ensure that all on-platform transactions remain free for all clients.

Tables B and C compare the existing cost structures for each CBPF with our model of the Disberse cost structure.

***Table B**: Cost breakdown and comparison IRQ CBPF (amounts USD)*

	Current IRQ	**Disberse IRQ**	**Savings**
Transaction fees and banking charges	39,700	0	-39,700
Exchange rate costs	1,180,400	367,000	-813,400
Service fee	0	443,800	443,800
Total	**1,220,100**	**810,800**	**-409,300**

***Table C**: Cost breakdown and comparison oPT CBPF (amounts USD)*

	Current oPT	Disberse oPT	Savings
Transaction fees and banking charges	20,700	0	-20,700
Exchange rate costs	248,200	67,200	-181,000
Service fee	0	155,300	155,300
Total	**268,900**	**222,500**	**-46,400**

Comparing the two tables shows that the amount of savings is not consistent across CBPFs; instead it varies depending on the implementing partners in the delivery chain (which determine the route which the funds travel) as well as the country destination. Anticipating that different CBPFs will have different savings, this provides a basis for future research to investigate the reasons behind these differences, and potentially to identify strategies that might be applied to increase the efficiency of CBPFs.

Despite these differences, however, both CBPFs indicate savings when aggregated across all delivery chains. Cost savings would also be accompanied by other platform features; if delivery chains were brought on to the platform, costs that are currently obscured within and fragmented between organisations could be made fully visible and further analysis conducted to identify additional efficiencies including optimising the timing of currency exchanges, negotiating better exchange rates based on volume, and developing alternative funding strategies.

Sprints 1-3 showed that such analysis is currently not possible without significant investment in research capability, supported by additional work on the part of all delivery chain stakeholders to provide this data. If those delivery chains were brought on the Disberse platform, analysis could be performed automatically; this should therefore form part of the cost-benefit analysis of platform adoption.

Transparency

The interviews conducted in previous Sprints revealed that there are multiple (and sometimes competing) perspectives on transparency, which we wrote about on the FTL blog.[2] This Pilot is focused on transparency in the specific context of the delivery chain, which we divide here into two parts.

Improved visibility of delivery networks

The existing system does not make it possible to visualise delivery chains easily, partly due to incomplete and inaccurate data, and partly due to the fragmented systems that hold that data. With considerable effort, linear delivery chains can be reconstructed and visualised but our (and other) research aggregates delivery chains to reveal a much more complex network of organisation and projects, connected by partnerships and transactions (Figure B).

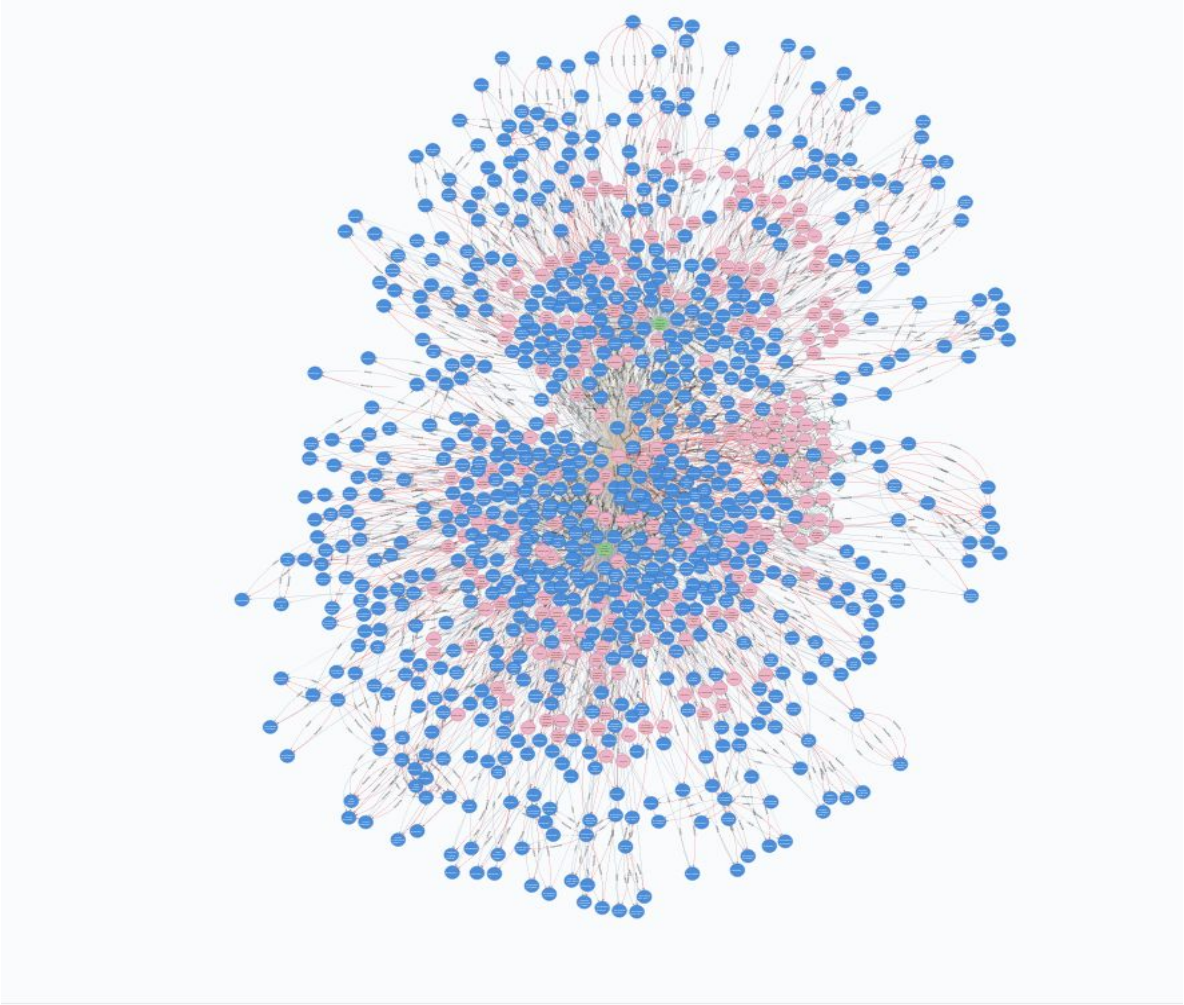

***Figure B**: Network graph of the Country Based Pooled Funds for oPT and Iraq*

[2] "What does transparency look like?", 4th February 2020 https://medium.com/frontier-technology-livestreaming/what-does-transparency-look-like-e9556cc83818

Figure B is intended solely to illustrate the complexity of just two pooled funds, but more granularity is needed to understand these relationships. Transactions on the Disberse platform are processed through smart contracts and stored on an Ethereum blockchain, which enables full transparency in real time. A graph database is layered on top of the blockchain which enables semantic queries on that data in order to trace delivery chains accurately and also to understand how they relate to each other (Figure C).

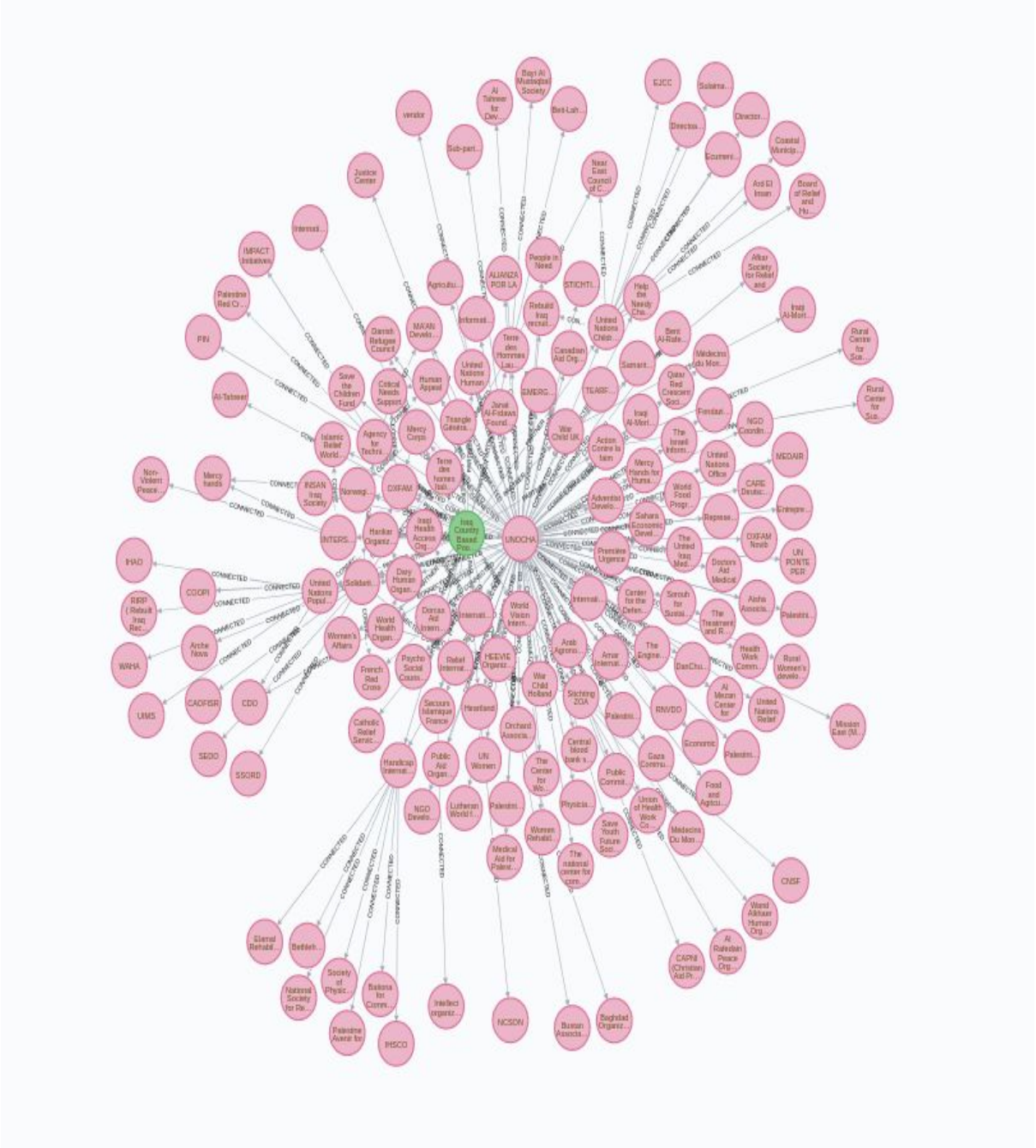

***Figure C**: Focus on organisation relationships within Iraq CBPF*

Increased transparency of transaction costs

Since Disberse does not just track delivery chains but handles their transactions, in a future scenario it would also make it possible to monitor and report those transactions in real-time. However the Sprint 2 data collection revealed that the actual costs of financial transactions, e.g. transfer fees and banking charges, are frequently obscured, often by being included in budget lines for administrative costs within an organisation, rather than accounted for separately.

This makes it impossible to provide a true accounting of these costs without an audit, which presented a challenge for the Simulation and this analysis; however this challenge to the Simulation is not the critical issue. This lack of transparency around true costs should concern anybody who values efficiency and accountability. Extensive further research and analysis would identify and quantify these costs; bringing the delivery chains onto the ledger would reveal them instantly.

Financial Risks

Exchange Rate Volatility

Data from Sprint 1 and 2 established that implementing partners are exposed to risk around exchange rate volatility, which we were able to calculate for each implementing currency (see Sprint 2 Report). Unfortunately we lacked the detail about which organisations use which currencies, which we would need to provide a detailed analysis of these risks. In Sprint 3 we attempted to investigate this issue, without taxing implementing partners with additional questions.

We reviewed outgoing transactions from OCHA to Tier 2 partners in order to identify the nationality of recipient banks, and then assumed a "functional currency" (i.e. the operational working currency) for each Tier 2 partner receiving funds from OCHA.[3] We concluded that the number of functional currencies is larger than assumed in Sprint 2, with organisations operating not only in Euros, US Dollars and local currencies, but also in Pounds Sterling, Norwegian and Danish Krone, Swiss Francs and several other currencies.

Currency markets are among the most volatile markets and, since CBPF contracts run for months, this creates financial risk. Figure D (below) shows the rates of a sample of relevant currency pairs during 2018-2019. It is clear that many organisations will have been subject to significant gains and losses, depending on the date of contact and the timing of financial transactions; all them will have been exposed to the risk created by these fluctuations.

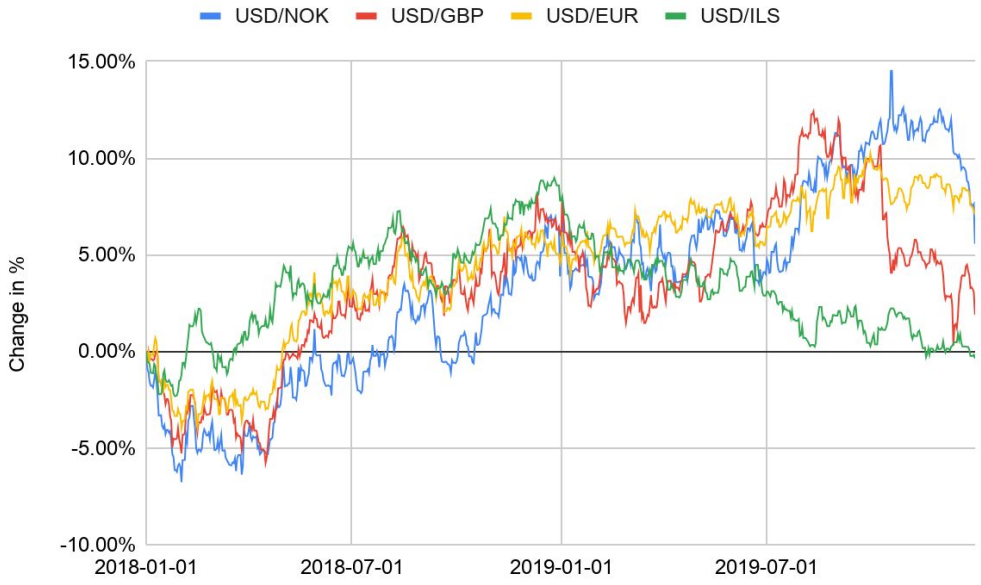

Figure D: *Currency rates for some major currencies used in oPT and Iraq CBPFs*

[3] See discussion about functional currency in the International Accounting Standards (IAS) https://www.iasplus.com/en/standards/ias/ias21

Risk Mitigation

Interviews and additional data gathering indicated that risk management varies considerably between organisations, with some organisations having better policies and practices than others. However the aggregate risk in a delivery chain will be increased by a single weak link, and donors should be concerned with mitigating aggregated risk in order to preserve the value of their funds.

Bringing delivery chains onto the platform would enable risk mitigation that could not be achieved by any individual organisation (possibly excluding DFID and other governmental donors) through improved analysis, as well as the benefit of scale in terms of greater fund volume and wider range of currencies. This aggregation would also enable other risk mitigation strategies:

- By having all transactional data on the platform, Disberse would be able to provide risk analysis and rate notifications within client accounts, enabling each organisation to have more insight into the risk of each transaction, and receive real-time notification of rate changes.
- These mechanisms could then be incorporated into scenario budgeting tools within the account, and provide clients with the option to hedge future disbursements within the platform, using smart contracts pre-agreed with donors. This would give DFID and other donors the capability to buy risk, mitigating that risk on behalf of the sector. This type of solution already exists in the toolkits of other governments and departments, making it feasible for DFID.[4]
- Earlier Sprints also highlighted high degrees of uncertainty in transaction times, usually between 3-20 banking days. Delays (and occasionally complete stops) by intermediary banks can force implementing partners to cover budgeted costs from their reserve funds. This risk could be mitigated by the Disberse platform; funds on account, while not on hand, are legally in the client's possession and could be budgeted against without risk.

[4] See for example Östlund, N. (2018), How predictable is Swedish aid? A study of exchange rate volatility, EBA Report 2018:03, Expert Group for Aid Studies, Sweden.

Use cases

The Sprint was originally designed to include a series of workshops with DFID colleagues to explore how the Disberse platform could be used internally. These workshops were to guide the Simulation analysis and visualisation, and to ensure that the Pilot continued to align with relevant use cases.

The pandemic made these workshops unfeasible. To ensure that use cases remained part of the Sprint, we reviewed participant responses from Sprints 1 and 2, and Steering Group feedback, to roughly explore our three intended use cases, and to consider how to incorporate them into the Simulation.

All three use cases focus on the utility to DFID of real-time data about the delivery chain that would be available using a blockchain-based financial platform.

Delivery Chain Mapping

The potential value of mapping delivery chains was highlighted by a range of different DFID departments. There was consensus that access to real-time data for tracking is of general utility for DFID, and that different departments could put this data to different uses.

Since it was not possible to get feedback from DFID colleagues on how that data should be presented during this period, we carried out our own design exercise. We reviewed DFID's own literature on delivery chain mapping in order to establish that there is no agreed template for delivery chain mapping; and that visualising even relatively limited delivery chains in the way that DFID usually does is a challenge due to the complexity of relationships and transactions in CBPFs.

We experimented with different types of visualisation before settling on two approaches. The first was to introduce a network graph which is useful for communication but less useful for comprehension (discussed in the section on Delivery Chain networks above); the second was to provide a search and build option based on a collapsible tree visualisation, which would enable clients to navigate through delivery chains (Figure E).

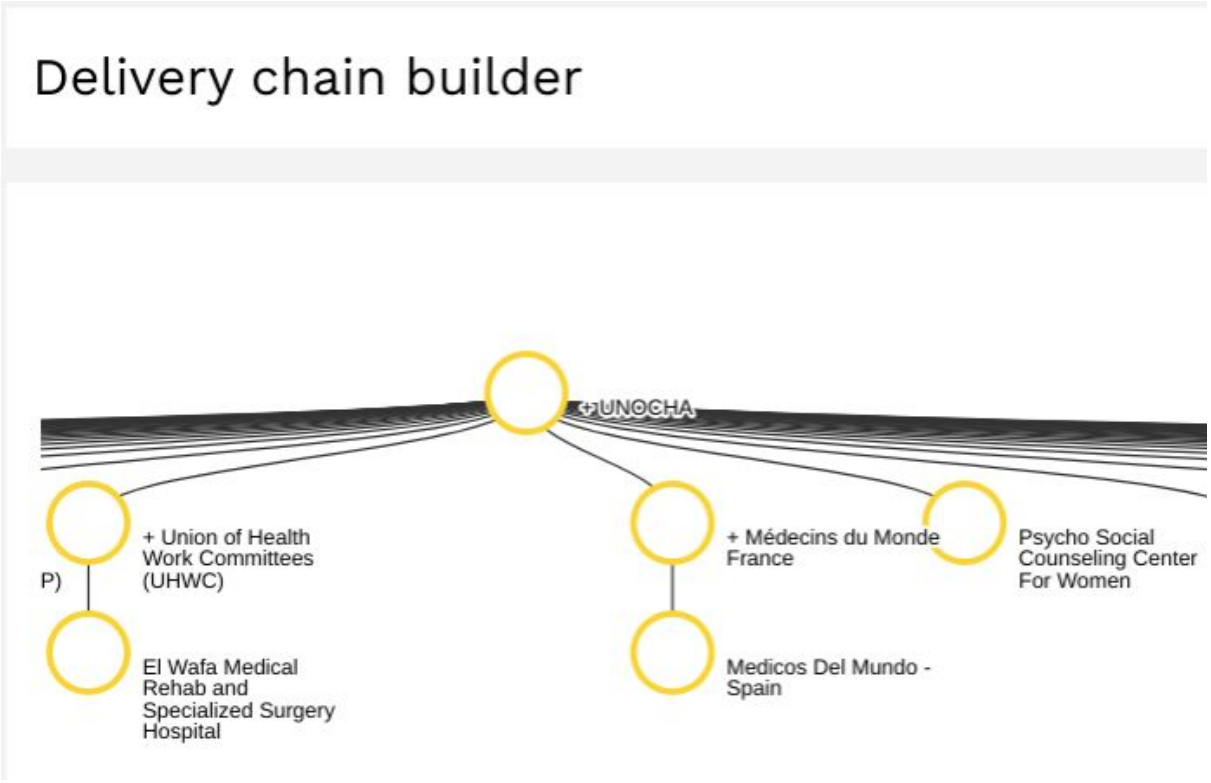

***Figure E**: Example of Delivery Chain Builder using oPT CBPF data*

Audit and Control

The responsible management and efficient use of DFID funds was the next most important use case. The data used in the Simulation poses interesting questions since it requires following the pooled resources of all contributing donors onwards from OCHA. The oversight requirements are therefore more complicated than if DFID was in a direct contracting relationship with an implementing partner.

Based on earlier Sprint interviews and discussions the platform provides some performance metrics for each Tier and each organisation, in the context of the delivery chain. We focus not just on Delivery Time - which measures the overall speed with which funds reach an implementing partner - but also the Holding and Handling times, which are more useful from a management perspective. Figure F gives an example of the bullet charts used to indicate performance metrics taken from a client account.

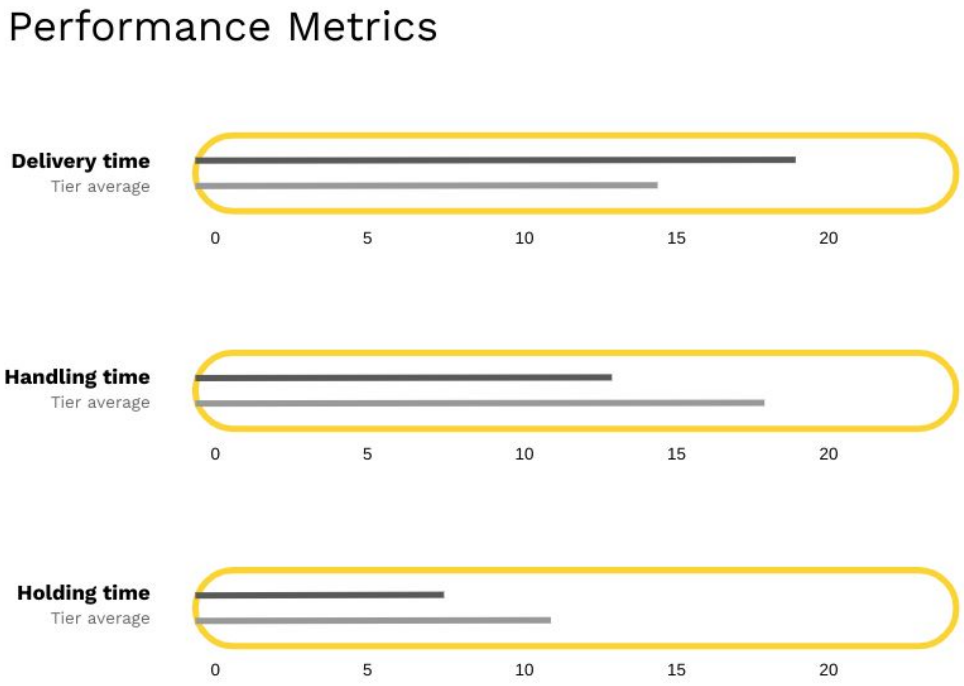

***Figure F**: Bullet charts indicating Organisation performance against Tier average*

Liquidity forecasts

The third use case focused on financing, where the key questions centered around how a financial service like Disberse could assist in forecasting financial flows from DFID and other organisations in the delivery chain). Such forecasts would be used to optimise payments from DFID and other donors, to provide earlier notifications about future funding requirements, and to increase efficiencies in the delivery chain overall. Such forecasting is only possible with insight into where funds are in the delivery chain, and how they flow through tiers.

The Sprint therefore incorporated funding flow visualisations and analytics into the platform, with examples given below based on oPT CBPF data. Figure G shows a transaction timeline for UNOCHA, where the monthly balance of funds held by OCHA indicated in the bars, and the monthly number of transactions indicated by the line, and Figure H shows the number of transactions per Tier, indicating when the velocity of funds is highest.

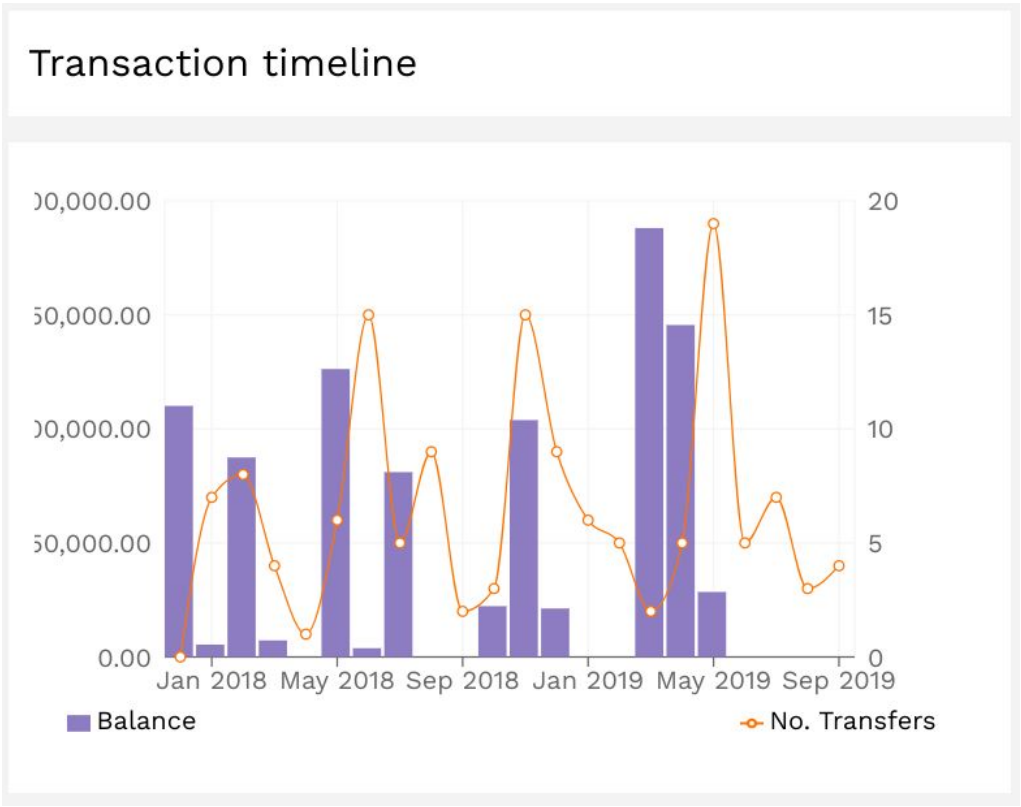

***Figure G**: Timeline showing account balance and number of transactions, oPT CBPF*

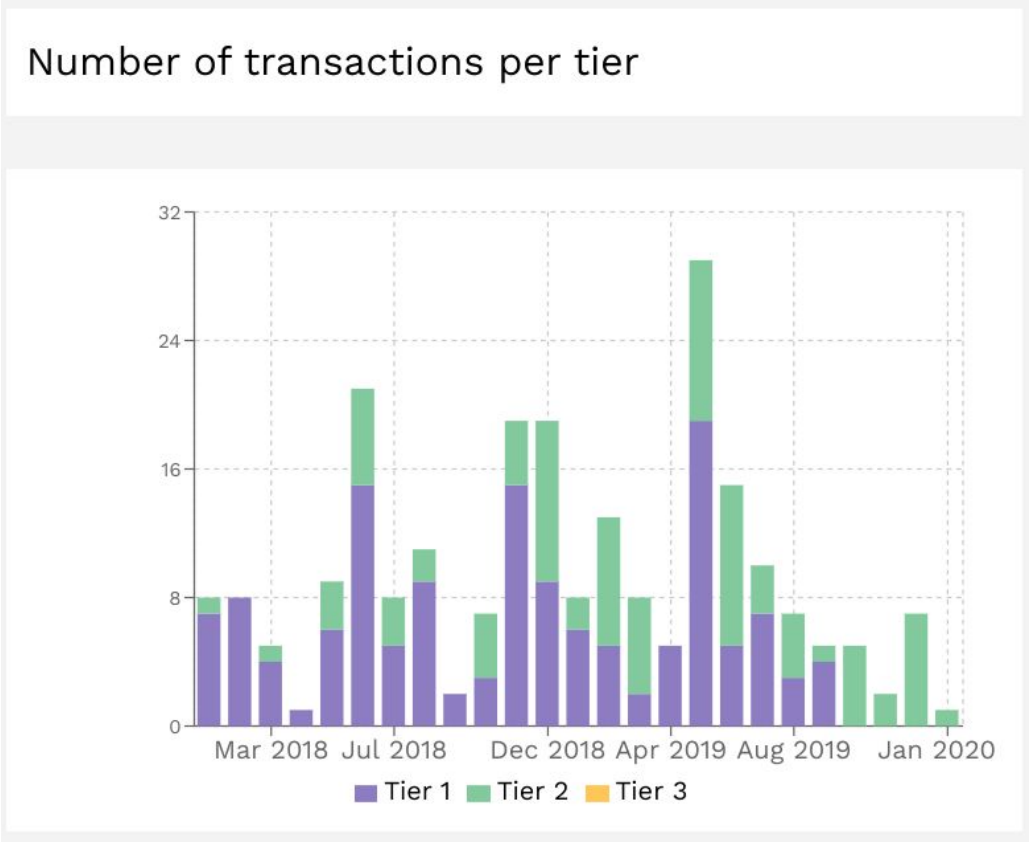

Figure H: Number of transactions per Tier, oPT CBPF

This access to forecasting data could be expanded into a number of more in-depth financial use cases. Having granular and real-time financial data would for example be a cornerstone in building cash management or financial risk mitigation strategies, while data on what currencies will be needed where and when could be used for example to develop hedging strategies.

Future Use Cases

While reviewing the Use Cases shows that there are immediate potential benefits to using the blockchain-based Disberse platform to track aid, the research indicated that there are other long-term possibilities that may be explored. These possibilities only partly reflect the capability of blockchain-based tracking and rather suggest added-value services, which fall into three categories:

1. Incorporating existing capability. There is scope for increasing efficiency further by bringing selected internal organisational processes onto the platform. For example, handling time could be decreased - potentially significantly - by including the platform's dual-signature function into organisational processes; our previous pilot experience suggests that an organisation using the on-platform dual-signature functionality will decrease handling times by at least one day.

2. Enhancing existing capability. Following from the above example, handling time could be further reduced by automating particular payments using smart contracts. Payments could be pre-approved for a particular date, removing the need for re-processing an existing contract obligation. Reductions in Delivery Times could be achieved by building multi-partner contracts which would move Funds directly from a CBPF to implementing partners or vendors at the furthest tier, without the need for intermediaries to approve transfers themselves (although they would remain in the chain to ensure accountability).

3. Creating new capability. Prolonged holding times are partly explained by the need for implementing organisations to mitigate liquidity risks inherent in their programming. Smart contracts could enable holding times to be minimised based on anticipated programming needs; payments could be triggered by specific events mutually agreed with contracting partners, either internal (such as funds falling below a certain threshold) or external (such as the deadline for a winterisation project). We also see the possibility to develop the Simulation as a service, enabling clients to model different fund management strategies based on historical data within the platform.

Supplementary Analysis

Data gaps and challenges

It is clear from the data collection and analysis performed in Sprints 2 and 3 that a number of wider challenges in financial tracking are reflected in the data itself. These challenges had an impact on the Simulation Exercise and subsequent analysis, leading us to adopt some work-arounds in our final reporting. The main issues that we discussed included:

- Banking charges are frequently included into organisational budget lines for administrative or operating costs. These budget lines obscure precise details, making it impossible to get a true account of banking charges either for individual organisations or pooled funds without an audit process.
- Currency exchanges - and any losses or gains associated with them - are not usually accounted for, and are again fragmented across multiple organisations. As with banking charges, this makes it impossible to get a true account, potentially even with an audit process.
- Respondents could provide very limited detail about withdrawals or onward payments specifically related to CBPF funding. We estimated the costs associated with withdrawals based on very limited data, and as a result Tier 4 details are the weakest part of the model.
- Existing banking transactions suffer different costs and delays depending on a range of variables, particularly the nature of the banking system in a given country, and the interaction between those banks and the global financial system. It was not possible to get detailed data about every transaction.
- The multi-year nature of the Pooled Funds and the multi-donor nature of individual projects supported by those funds creates accounting anomalies. We have compensated for these anomalies in our model, but the following issues would be resolved by the platform's internal accounting:
    - Negative holding times, i.e. organisations spend funds against CBPF budget lines before they receive CBPF tranches, using internal accounting processes to mitigate the risk of fund delays.
    - Protracted holding times, i.e. funds are deposited in e.g. 2016 and spent in e.g. 2018, which complicates global reconciliation and makes real-time tracking difficult.

Our assessment is that these are all aspects of the single central problem that this Pilot began with: existing financial services, combined with internal accounting practices, create a number of obstacles to meaningful transparency. The Pilot can identify but not address these issues; however the Disberse service has the potential to provide aid organisations with the tools to address those issues

themselves. Bringing all CBPF transactions onto the platform would address many of these issues with little additional work required for any of the stakeholders.

The Role of Blockchain

This Pilot is intended to test the added value of blockchain technology in tracking UK Aid. Many of the issues uncovered during the research, however, did not require blockchain technology in order to be resolved. The main driver for using the platform will be traceability in the short-term, with efficiency gains increasing in the mid-term. However there is also a long-term transformative proposition of distributed governance, and the Simulation should therefore be seen as the first stage in a longer-term process of adopting this technology.

The Disberse platform is a hybrid that combines the capabilities of electronic money (e-money) and blockchain technology in a single platform. The blockchain is used to manage the smart contracts that govern transactions and to store the data concerning those transactions. However as this was a Simulation only a single node was required, which means that the wider functionality of the blockchain was not utilised. A live transaction could also be executed with a single node, which creates a record that is immutable but not shared between stakeholders.

Wider adoption of the platform is where the distributed ledger aspect of the platform would come into play. In this vision multiple stakeholders would run a node of the Disberse blockchain, and therefore maintain a copy of that blockchain, so that the transaction record would be immutable and shared. It would not require all stakeholders in the delivery chain to run a node - this would require resources that many smaller organisations do not possess - but larger organisations could run a node relatively easily on behalf of the wider aid community.

This would create a range of possibilities, but in particular to create financial governance infrastructure to support localisation. Disberse believes that the present lack of infrastructure is one of the main obstacles to localisation. This would enable funds to be held closer to the point where they are needed, while still ensuring that donors and other stakeholders have sufficient oversight of those funds. Collective decision-making protocols could be built on top of this infrastructure to enable not just localisation but also more accountability.

Conclusion: How do we build on Sprint 3?

The Sprint 3 experiments illustrate how financial transactions can be executed and tracked on the Disberse blockchain-based platform. The benchmarking analysis gives an initial insight into the potential benefits, with real-time tracking, full transparency, zero transaction times and lower costs. These benefits are relatively limited across a small number of delivery chains, but scale quickly.

Going forward we will pick up and build on the remaining Sprint 3 experiments, with the results from Sprint 3 enabling us to expand our ambitions:

1. **To develop a roadmap for executing a live test**, with identification of key milestones and gatekeepers at DFID, and seek agreement of an accelerated schedule for a live test with key gatekeepers.

2. **To develop and expand DFID use cases**, covering both existing use cases and the potential use cases identified in Sprint 3, and identify gatekeepers who can lead exploration of these use cases.

3. **To engage a wider range of potential users** using results from Sprints 1-3, to capture a broader range of user needs and adoption pathways, especially with other donors and Tier 1 actors.

4. **To co-design and execute an experiment with IATI** to demonstrate interoperability and test assumptions regarding technical integration within IATI's reporting logic.