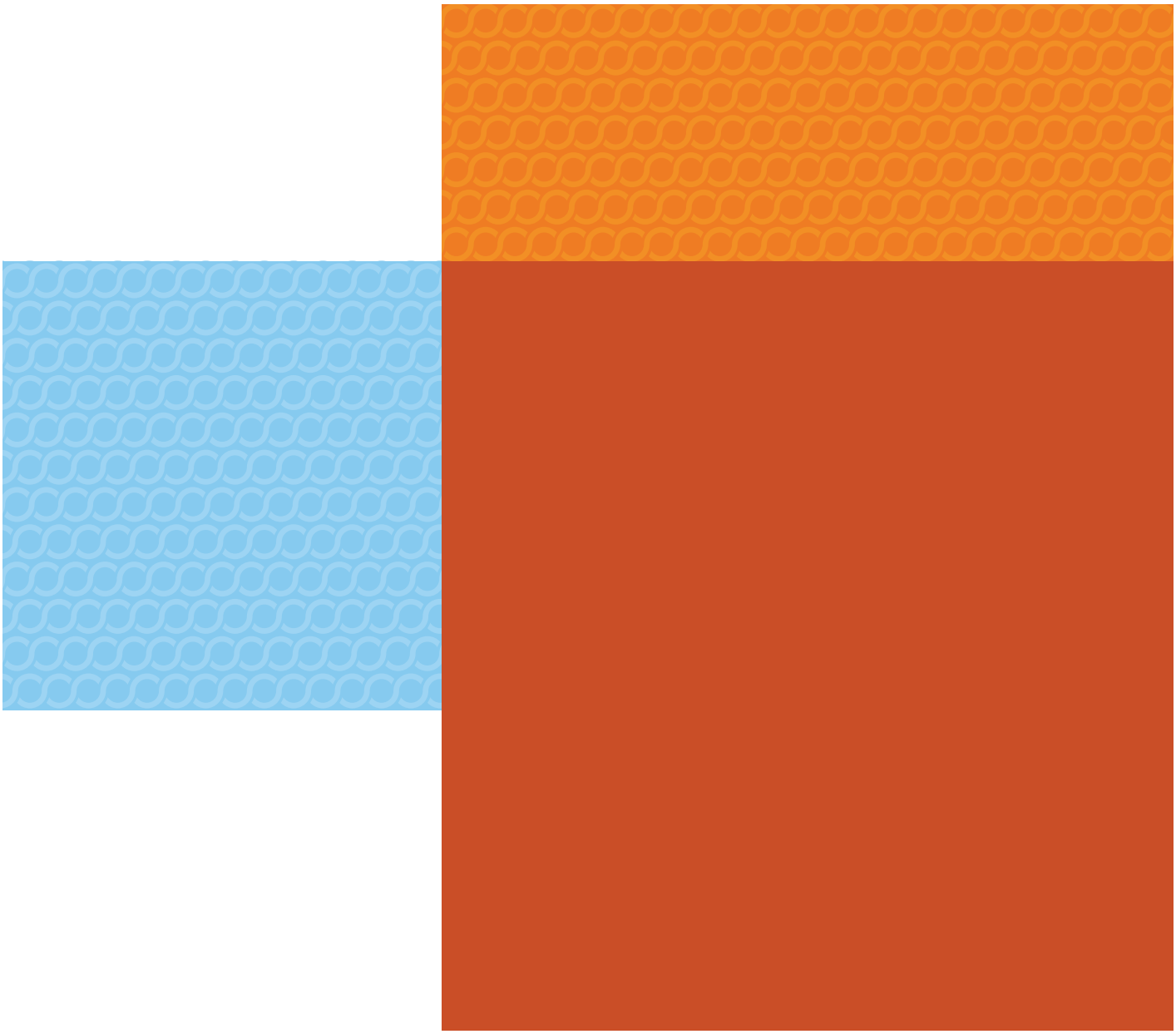
BANK OF ENGLAND

Markets

The Future of Post-Trade

Findings from the Post-Trade Technology Market Practitioner Panel

June 2020



Contents

Foreword 2
Figure 1 How much do banks invest in IT? 2
Figure 2 Overview: the Post-Trade Technology Market Practitioner Panel 5

Executive summary 6
Figure 3 Stages of the trade life cycle 6

1 Sizing the problem: issues in post-trade 9
Figure 4 What operational activities and data support financial market transactions? 9
Figure 5 What is the current state of post-trade processing? 10

2 Analysing issues in post-trade: what the Panel found 12
Figure 6 What are the pinch points in trade processing and their underlying root causes? 12
Box 1 Case studies 15

3 Enacting change: how to catalyse market-led reform 17
Box 2 The Bank of England's work to transform data collection from firms 18

Annex: Case studies 19
1 Client on-boarding 19
Box 3 An open-data platform for SME finance 21
Figure A A stylised diagram of the open-data platform applied to the SME finance use-case 21
2 Uncleared margin 22
Box 4 What are initial margin and variation margin? 23
Figure 7 How could utility arrangements be better utilised to improve uncleared margin processes? 24
Box 5 Outsourcing 25
3 Non-economic trade data 26
Box 6 Data standards 27

Foreword

Technological innovation has transformed wholesale financial markets in recent years, vastly improving the variety, speed and cost of services available to customers in the UK and globally. More recently, the impact of Covid-19 has also underlined the importance of technology in ensuring the continued functioning of these markets during times of crisis. Technology has helped keep markets open and has enabled market participants, including the Bank of England, to adapt to an unprecedented change in the operating environment.

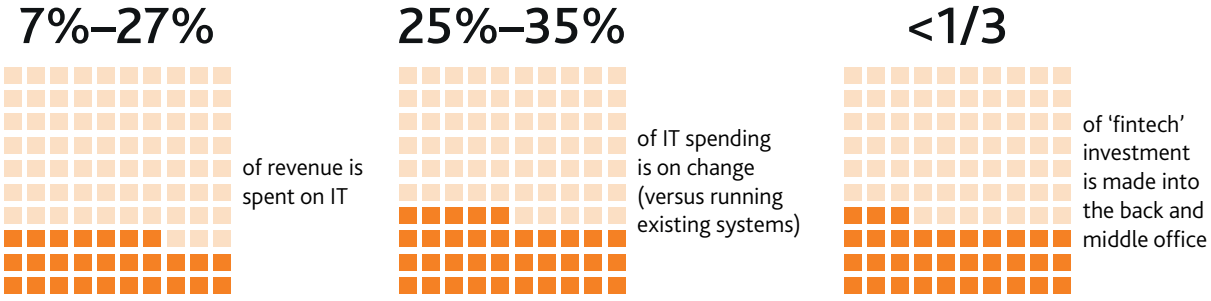
Discussion of the transformative power of technology on wholesale markets is often focused on financial institutions' 'front office' revenue-generating activities, such as electronic trading. By contrast, the so-called 'post-trade' systems and processes supporting that wholesale market activity often receive less attention. And that shows. Hidden from view, post-trade activities — such as accurate reporting and collateral management — still too often rely on a patchwork of manual or outdated technological processes, using systems and data definitions that can vary widely between and often even within firms.

> *'The pressure of technological change is pertinent to the post-trade system where industry-wide our capabilities are likely lagging our potential. There are obvious cost benefits in simplifying. But if you look at the kinds of innovation the sector has seen since it built the systems on which it runs, it is clear that there are also opportunities to take advantage of the benefits of new technologies and functions.'*
>
> **Dave Ramsden, Deputy Governor for Markets and Banking, Bank of England**

This complexity in post-trade matters, for three main reasons. First, it raises the cost of financial services that we all use — sometimes materially so. Second, it holds back innovation — because post-trade services provide the bedrock and data on which 'front end' services are built. And third, aged, slow or incompatible systems can pose real risks to operational resilience: an issue of great importance to firms and regulators, as we have been so vividly reminded in recent months.

Tackling these problems requires investment, and a great deal of that has been under way (see **Figure 1**). But individual firm-level action is not always enough, because post-trade services form a complex interlocking network, on which the financial system as a whole depends. Incompatibility between approaches can be as costly or risky as out-of-date systems. So firms also face a complex collective action problem: how to move forward together on the common problems they face, while maintaining effective competition between products and services offered to end-customers.

Figure 1 How much do banks invest in IT?



Sources: Bank of America Merrill Lynch, KPMG (Forging the future: global fintech study), McKinsey (The last pit stop? Time for bold late-cycle moves) and Temenos (Capital Markets Day 2020).

This challenge has been well recognised for some time in some areas of post-trade: for example, payments and centralised clearing. But in others it has been neglected: for example, in over-the-counter derivatives. And that is why the issue of harnessing new technologies to improve the resilience of the system overall was one of the priorities highlighted by the then Governor of the Bank of England, Mark Carney, in Summer 2019 in response to the Future of Finance report.(1) Where innovation can be enabled in ways that also improve monetary and financial stability, we at the Bank recognise that we may be able to use our position as an independent and trusted third party to bring market participants together to help catalyse market-led reform.

This was the context in which the Bank convened the Post-Trade Technology Market Practitioner Panel (the 'Panel'), with the aim of bringing together a group of experienced, senior decision makers to explore how market participants from across the industry might harness technological innovation to deliver a more efficient and resilient post-trade ecosystem.

The Panel met three times in the second half of 2019, and succeeded in building a common understanding of some of the key issues in post-trade today — as set out in this report. But that is only the first step. Enacting meaningful change to address these issues will take sustained and co-ordinated effort. I am therefore pleased to announce that the Panel has decided to launch a Post-Trade Task Force to explore the scope for moving from discussion to action, including a review of the co-ordination mechanisms available to implement next steps for the industry.

The rest of this report sets out the Panel's preliminary findings, and the case for co-ordinated action. I want to thank all of our Panel members for the time and energy they have so far invested in this exercise. We hope that this report and subsequent work by the Task Force will propel a powerful market response that will be the starting point for substantive improvements in the post-trade ecosystem.

Andrew Hauser
Executive Director for Markets, Bank of England
Chair of the Post-Trade Technology Market Practitioner Panel

(1) Carney, M (2019), 'Enable, empower, ensure: a new finance for the new economy', speech at Mansion House, June. See also Priority 5 on page 3 of the Bank's Response to the Future of Finance report.

Membership of the Post-Trade Technology Market Practitioner Panel

Bank of England: Andrew Hauser, Chair (Executive Director for Markets)

Financial Conduct Authority: Nike Trost, Observer (Senior Manager — Markets Policy)

Barclays: Andrew Kellner (Head of Financial Resource Management)

Blackrock: Robert Lamb (Head of Transaction Management)

Credit Suisse: Jeremy Lewis (Head of Group Technology UK and EMEA)

CLS: John Hagon (COO)

Euroclear GlobalCollateral: Gareth Jones (COO)

Euroclear UK & Ireland: Alex Powell (CTO)

Goldman Sachs: Joanne Hannaford (Head of EMEA Engineering)

JP Morgan: David Hudson (Co-head CIB Digital and Platform Services)

LCH: Daniel Maguire (CEO)

M&G Investments: Siobhan Clarke (Head of International Investment Operations)

Morgan Stanley: Katherine Wetmur (International CIO and Head of Reliability and Production Engineering)

State Street: Akbar Sheriff (Head of Global Custody and Head of EMEA Product)

XTX Markets: Mike Irwin (COO)

Figure 2 Overview: the Post-Trade Technology Market Practitioner Panel

The Bank of England convened the Post-Trade Technology Market Practitioner Panel

To bring together industry **experts** active in post-trade.

To address the **co-ordination challenges** of reforming post-trade.

And to build consensus in order to catalyse **market-led reform**.

The Panel considered current pinch points in trade processing and their underlying root causes

Post-trade pinch points

Activities that are **time consuming, costly**, or **unreliable** — with potential for improvement through industry co-operation.

Underlying root causes

Post-trade pinch points are all created or aggravated by issues relating to **data** and **processes**.

Potential actions

The Panel considered a number of potential actions to improve post-trade, taking forward three of these as detailed case studies.

The Panel developed three case studies to explore the potential for reform

Client on-boarding

Data collection as part of the client on-boarding process is not standardised. This leads to extensive duplication and significant manual processes for the industry.

Standardising client on-boarding could:

- **Reduce costly duplication** of inefficient processes.
- **Facilitate competition** and potentially **improve operational resilience** by reducing the frictions of trading with new counterparties.

Uncleared margin

Margin calculations, communications and dispute resolution processes differ across firms. Non-standard processes hold back automated processing — leading to operational risks and to disputes.

Streamlining margin processes for uncleared products could:

- **Reduce the costs** arising from dispute resolution.
- **Enable automatic processing**.
- **Improve transparency** and **reduce risks** around intraday collateral and liquidity management.

Non-economic trade data

Data required in post-trade are often incomplete, inaccurate, and inconsistent — causing a number of issues throughout the trade life cycle.

Improving non-economic trade data could:

- **Reduce the need** for trade enrichment.
- **Eliminate the need** to clean and reconcile data at every point in the trade life cycle and reduce errors, exceptions and breaks.
- **Unlock the potential** of post-trade data to add value by providing business insights and enhancing regulatory oversight.

Finally, the Panel established a one-year Post-Trade Task Force to take forward its work in 2020/21

By developing the Panel's **three case studies**, including next steps for wider **industry engagement** on these issues.

By reviewing ongoing initiatives in post-trade and the appropriate **mechanisms and bodies** available for **taking these forward**.

By engaging with the **Bank of England's review** of how it **collects data** from the firms it regulates.

Executive summary

Financial markets must be fair and effective to best serve the real economy.
Fixed-Income, Currency and Commodity (FICC) markets serve the real economy by helping to determine the borrowing costs of households, companies and governments, set countries' exchange rates, influence the cost of food and raw materials and enable businesses to manage financial risks.

To support this vital contribution, it is important that markets function fairly and effectively — and to that end they must be supported by resilient and cost-efficient trading processes.

This report by the Market Practitioner Panel focuses on one part of those trading processes — 'post-trade' — where Panel members see significant scope for improvements in efficiency and resilience. It sets out the Panel's analysis of the underlying issues, highlights some specific action areas, and sets out plans for further work aimed at catalysing reform in post-trade.

But the post-trade processes that support FICC markets are complex, costly and inefficient.
Post-trade is defined for the purposes of this report as the back and middle-office activities that support trade execution.(2) **Figure 3** illustrates some of the key activities run at each stage of the trade life cycle (see page 9 for more detail).

Figure 3 Stages of the trade life cycle

Post-trade processes, both within and across firms, have evolved organically over time, with layers of legacy technology systems, infrastructures, and workflows. The resulting patchwork, while functional, is complex, costly and inefficient — which impacts operational resilience. As just one example, data are not always standardised and are held in multiple systems that may require constant reconciliation, raising costs and the chance of errors. Taken together across the trade life cycle, across all asset classes, and across all firms, the inefficiencies in post-trade processes present both a significant opportunity for change, and a source of systemic risk.

While it focused on improving post-trade processes, the Panel also recognised that what happens before a trade is executed can have material knock-on implications for the efficiency and resilience of the processes that happen afterwards. For example a number of post-trade activities could be eliminated entirely if data were standardised, complete, accurate and consistently exchanged by all counterparties at or before the point of trade execution.

(2) Settlement and payment systems were not in scope of the Panel's discussions because there are a number of other parallel initiatives under way, including some involving the Bank of England in other capacities, looking at this area.

The Panel identified a number of particularly time consuming, costly, or unreliable aspects of post-trade processes ('pinch points')…

The Panel identified a number of areas that pose particular problems during post-trade processing:

- **Know your customer (KYC) and anti-money laundering (AML) checks** — data collection as part of the client on-boarding process is not standardised: inconsistencies arise in both the data themselves and the way data are collected. This leads to extensive duplication and significant manual processes for the industry.

- **Uncleared margin and collateral related processes** — margin calculations, communications and dispute resolution processes differ across firms. Non-standard processes hold back automated processing — leading to operational risks and to disputes, which are often dealt with via protracted bilateral communications (often over email).

- **Trade enrichment** — information beyond material economic trade data are not exchanged early enough in the trade life cycle and may be inaccurate, incomplete or not standardised, leading to the need to 'enrich' trade data through subsequent interventions.

- **Internal and external data reconciliation** — multiple copies of the same trade data are maintained (inconsistently) across firms, and automated interfaces for data exchange are underdeveloped. This holds back automation, resulting in duplicated processes, and increases operational and cyber-risks.

- **Handling trade errors, exceptions, and breaks** — lack of consistent protocols and procedures makes diagnosing and resolving errors time consuming and resource intensive.

- **Processing corporate actions (eg share splits, mergers) and derivative life-cycle events (eg novation, fee payments)** — requires manual overrides and checks, and can be vulnerable to errors.

- **Protecting against fraud and cyber-risk** — lack of standardised mechanisms for the collective sharing of data on suspicious activity in real time increases the vulnerability of individual firms.

…and prepared case studies for actions that could alleviate some of these pinch points.

Two broad themes emerged that underlie these issues, and give rise to complexity, cost and inefficiency: varying data standards, quality and accuracy; and different approaches to processes across firms.

With these broad themes in mind, and recognising the need to focus on actions that were achievable on a reasonable timeframe, the Panel considered a number of specific potential actions that would alleviate one or more of the pinch points. For three of these potential action areas the Panel developed detailed case studies. These are intended as specific examples of areas where co-ordination could lead to material improvements in post-trade processes.

The first two relate directly to the first two pinch points identified by the Panel:

Case study 1: Client on-boarding(3)

- Standardising client on-boarding data and processes (including KYC and AML checks) could reduce costly duplication of inefficient processes, facilitate competition and potentially improve operational resilience by reducing the frictions of trading with new counterparties.

- The Panel identified a number of options for improving efficiency here including: further adoption of existing service providers; improving interoperability between service providers (for example through an Application Program Interface (API)); further standardisation of formats and processes for sharing of information and

(3) Client on-boarding is not in itself a post-trade process. However, it relates closely to a number of post-trade processes, including those discussed in Case study 2 and 3. There is overlap between the non-economic data items required for client on-boarding and those required in post-trade (such as LEIs). Efficient counterparty on-boarding processes would also reduce the frictions associated with setting up custodian accounts for the purposes of posting initial margin.

documents (to provide interoperability between service providers and/or to standardise the sharing of information to and from end-users); or the development of utilities.

Case study 2: Uncleared margin

- Streamlining margin processes for uncleared products could reduce the costs arising from dispute resolution, enable more automatic processing and improve transparency and reduce risks around intraday collateral and liquidity management.

- The Panel saw potential to (i) tackle this pinch point through more widespread adoption of existing solutions, and (ii) tackle the underlying root cause of this issue through the development and use of margin calculation utilities.

The third case study is more cross-cutting and has the potential to alleviate a number of pinch points:

Case study 3: Non-economic trade data

- Improving standardisation, accuracy, and timely exchange of non-economic trade data could: reduce the need for subsequent trade enrichment; eliminate the need to clean and reconcile data at every point in the trade life cycle; reduce errors, exceptions and breaks; and unlock the potential of post-trade data to add value by providing business insights and enhancing regulatory oversight.

- In many cases, existing standards are in place for relevant data. But the Panel saw benefit in these being adopted more widely, more accurately, and in a more consistent way. The Panel also identified a need for data to be exchanged earlier in the trade life cycle in order to reduce downstream challenges around reconciliation and exception management. Finally, the Panel identified a small number of cases where new standards would be beneficial.

To make further progress on improving the efficiency and resilience of post-trade and related processes, the Panel has decided to establish a one-year Post-Trade Task Force to take forward its work in 2020/21.

Market-wide participation will be required to fully realise the benefits of innovation in post-trade processes — whether in reducing operational cost or improving resilience. Yet the incentives for individual firms to act first or on their own may be insufficient to ensure progress. Given differences in the priorities of market participants across the buy and sell-side, and in the face of legitimate concerns around competition and confidentiality, it can be difficult to achieve market-wide participation in appropriate solutions.

These co-ordination challenges have thus far hampered market action towards a scalable, robust and efficient post-trade system and limited the transformative impact of technology.

In this context the Panel has decided to establish a one-year Post-Trade Task Force. This will aim to: (i) make progress on the Panel's three case studies; (ii) review ongoing initiatives in post-trade and the appropriate mechanisms and bodies available for taking these forward; and (iii) feed into a Bank of England Discussion Paper on transforming regulatory data collection from the UK financial sector(4) (see Box 2 on page 18).

(4) 'Transforming data collection from the UK financial sector', January 2020.

1 Sizing the problem: issues in post-trade

When post-trade is streamlined and efficient it underpins the resilient provision of financial services to the real economy.

Post-trade refers to the range of back and middle-office activities that take place after a trade is agreed, or 'executed'. These activities can vary by asset class, but many are common across asset classes. **Figure 4** illustrates how post-trade fits into the trade life cycle; it sets out some examples of activities that occur before and during post-trade; and it provides examples of the common data required for each activity.

Figure 4 What operational activities and data support financial market transactions?

Stages of the trade life cycle	Activities undertaken	Data required
 **Client on-boarding**	• **Counterparty information** collected. • **Credit analysis** of counterparty undertaken. • **Know your customer** and **anti-money laundering** checks completed.	• Credit ratings and research… • Addresses, legal entity names and identifiers… • Regulatory status, ownership structure, source of funds, purpose of account…
 **Execution**	• **Economic trade terms** agreed.	• Price, volume, maturity, security identifier…
 **Post-trade**	• **Matching** of economic trade terms with counterparty. • **Confirmation** information for trade sent/received. • **Trade enriched** with additional data for risk management, financial records, regulatory and internal reporting. • **Collateral and margin** calculated, identified, and settled. • **Trade settles** (cash and securities are exchanged). • **Life-cycle events** and **corporate actions** occur throughout the trade's life, trade processes are then restarted.	• Price, volume, maturity, security identifier… • Net positions, fees, and commissions… • Legal entity identifier, transaction identified, execution style, fund allocation, market data (FX rates, curves, prices)… • Trade population, risk sensitivities, exposures, market data… • Settlement instructions, such as location of settlement, custodian, account information… • Trade terminations, amendments, distributions…

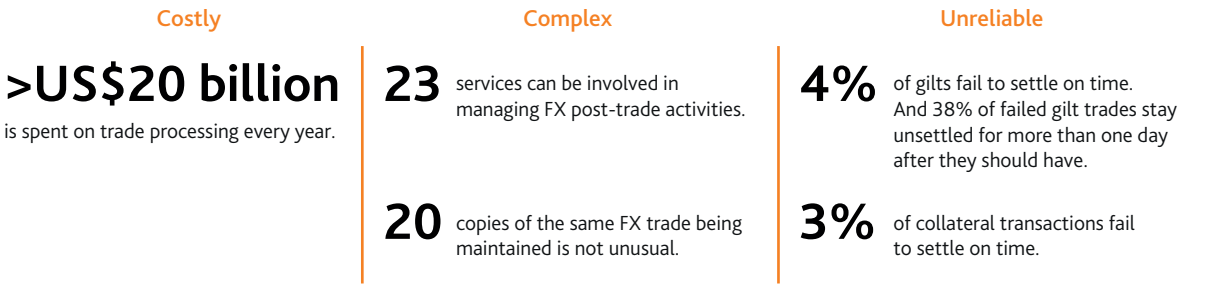
When post-trade processes work well, this can have important benefits both for individual market participants and for the market as a whole. Streamlined and resilient post-trade processing reduces overheads for firms and should enable financial services to be provided at a lower cost. It also improves market participants' ability to manage their risks effectively, which ultimately makes the provision of financial services more resilient.

Some areas of post-trade as it exists today, however, fall short of that ideal. This stems from the organic and piecemeal evolution of post-trade processes over several decades. As a result, some processes are composed of many layers of legacy technology systems, infrastructures, and workflows.

The current post-trade ecosystem is functional, but standardisation and compatibility across firms is low, which is holding back innovation.

A number of post-trade activities are supported by a complex combination of manual and automated (computer) processes. Firms each have their own, unique, IT systems used for post-trade processing. Generally, the systems of one firm are not compatible with the systems of another. Compatibility between systems in the same firm can also be low, which is problematic given that a single firm will likely use many different systems (**Figure 5**).

Figure 5 What is the current state of post-trade processing?



Sources: Bank of England (Securities settlement fails network and buy-in strategies), Broadridge (Charting a path to a post-trade utility), Cobalt (FX Operations and Credit: Hampering Liquidity, Raising Costs) and PWC & DTCC GlobalColateral (Implications of Collateral Settlement Fails).

Complexity occurs at an operational level as well as a technological one. Firms do not undertake post-trade activities in the same order or in the same way — they may have different 'workflows'.

The resulting ecosystem, while functional, is not as efficient nor as resilient as it could be. The current lack of standardisation is a problem. It results in the need to clean and reconcile information when it flows from one firm or system to another, increasing the risk of errors. Most importantly, it holds market participants back from making effective use of new and emerging technologies to improve the efficiency and resilience of wholesale financial markets.

Table A highlights how pockets of inefficiencies in certain post-trade processes today could be improved through innovation, and sets out some of the benefits that could be realised from making progress.

The impact of technological innovation in post-trade, while evident, has seemingly lagged behind innovations in wider financial services.

At a firm level, real progress often requires significant IT investment to overhaul legacy systems that are many decades old. The long payback periods on such investments have meant they struggle to get prioritised for IT spending when competing with revenue generating or regulatory projects.

This is exacerbated by the fact that cross-industry participation is often required to realise the full benefits of technological innovation in post-trade:

- First, co-ordination across the industry may be difficult to achieve when the awareness, engagement, and priorities of different market participants across the buy and sell-side can vary substantially.

- Second, legitimate competition and confidentiality concerns can inhibit responsiveness across firms and stand in the way of building consensus for potential solutions which are for the benefit of the market as a whole. Industry can therefore struggle to agree on the problem that needs to be solved, and on the way forward.

- Finally, a scalable, robust and efficient post-trade system benefits all market participants. But, given network effects, these benefits are also back-loaded. The efficiency gains to a late-joiner may be greater than for a first-mover, since more counterparties are likely to have made investments and adopted common standards by that time. This first-mover disadvantage reduces the incentive to act.

Addressing these challenges presents a significant opportunity for firms and the system as a whole. There is potential to reduce both the costs and the risks of post-trade processes through wide participation of market participants. Ultimately this should lead to lower transaction costs for end-users and a more effective, resilient market overall.

Table A How could innovation improve post-trade?

Post-trade today	Post-trade of the future	The benefits of making progress
Low-quality data: trade data exchanged at the point of execution (eg non-economic trade data) and throughout the trade life cycle (eg corporate actions) is frequently incomplete or inaccurate.	**Standardisation:** universally adopted standards for what data items are required, how they are represented and how they are communicated.	✓ Processes for post-trade enrichment, allocation, and internal/external reconciliation are reduced or eliminated. ✓ Errors and breaks are reduced. ✓ Intraday risk reduced and liquidity management enhanced as post-trade processes happen in near real-time with enhanced visibility. ✓ Regulatory transaction reporting is timely, accurate, and automated — enhancing supervisory oversight. ✓ Cross-firm interactions are secure and efficient.
Duplicated efforts: multiple (low-quality) copies of the same data are maintained, with duplicative data cleaning and validation processes needed across firms.	**Trusted data sources:** easily accessible, trusted, sources exist for commonly used data inputs.	
Delayed processes: non-economic trade data is frequently exchanged after trade execution (sometimes days later). Post-trade processes tend to be run on an end of day basis, versus intraday trading activity.	**Straight through processing:** all required trade data is captured accurately at the point of execution and post-trade processes are automated with little to no manual intervention required.	
Manual interfaces: communication and information exchange is often manual and unsystematic (eg email traffic).	**Automated interfaces:** firms can request, send, and receive information in an automated way. Both with other firms and regulators.	

2 Analysing issues in post-trade: what the Panel found

The Panel identified seven activities that it considers to be significant pinch points in post-trade today, and analysed their root causes, namely: issues related to (i) data standards, quality and accuracy; and (ii) non-standard workflows and processes. It built on this analysis by looking in depth at three case studies.

Figure 6 What are the pinch points in trade processing and their underlying root causes?

		Root causes	
	Pinch points	Process issues	Date issues
 Client on-boarding	**Case study 1** • Know your customer and anti-money laundering checks.	• No market standard process for requesting and collecting client information. • Relevant data collected during client on-boarding does not effectively feed into post-trade processes.	• The type and format of data required are not standardised.
 Post-trade	**Case study 2** • Uncleared margin and collateral related processes.	• Margin calculations, communications, and dispute resolution processes differ across firms.	
	Case study 3 • Trade enrichment. • Internal and external data reconciliation. • Handling trade errors, exceptions and breaks.	• Non-economic trade data are not exchanged early enough in the trade life cycle. • Lack of automated interfaces for data exchange. • Lack of consistent protocols and procedures for resolving errors.	• Non-economic trade data are often inaccurate, or incomplete, and not standardised across firms. • Multiple copies of the same trade data are maintained (inconsistently) across firms.
	• Processing corporate actions and derivative life-cycle events. • Protecting against fraud and cyber-risk.	• Firms have different definitions of life-cycle events and different procedures for dealing with them. • Lack of standard or mechanism for sharing data in real time on suspicious or fraudulent activity.	• Corporate action data provided by third parties is often incomplete and inconsistent across providers.

Pinch points

In exploring the potential for improvements in post-trade processes, the Panel identified those post-trade operations that it viewed as the most time consuming, costly, or unreliable — and where there is significant potential for improvements.

This class of challenging processes are referred to in this report as post-trade 'pinch points'. Settlement processes and payment systems were not in scope of the Panel's discussions because there are a number of other parallel initiatives under way, including some involving the Bank of England in other capacities, looking at this area.(5)

When considering potential pinch points, the Panel took a holistic approach and did not restrict its discussions to specific asset classes nor only to those processes undertaken after the point of trade execution. The Panel took the view that a number of issues in post-trade are cross-cutting in terms of the asset classes they impact. In addition, issues that occur earlier in the trade life cycle can have material knock-on implications on downstream post-trade processes.

The Panel identified a short list of seven pinch points. Some of these pinch points are targeted to specific products or asset classes (for example, processing derivatives life-cycle events), others are truly cross-cutting in that they are relevant for all asset classes (for example, client on-boarding and Know your customer checks). The Panel's list of seven pinch points is set out below and in **Figure 6**.

- **Know your customer and anti-money laundering checks** — data collection as part of the client on-boarding process is not standardised: inconsistencies arise in both the data themselves and the way data are collected. This leads to extensive duplication and significant manual processes for the industry.

- **Uncleared margin and collateral related processes** — margin calculations, communications and dispute resolution processes differ across firms. Non-standard processes hold back automated processing — leading to operational risks and to disputes, which are often dealt with via protracted bilateral communications (often over email).

- **Trade enrichment** — information beyond material economic trade data not exchanged early enough in the trade life cycle and may be inaccurate, incomplete or not standardised, leading to the need to 'enrich' trade data through subsequent interventions.

- **Internal and external data reconciliation** — multiple copies of the same trade data are maintained (inconsistently) across firms, and automated interfaces for data exchange are underdeveloped. This holds back automation, resulting in duplicated processes, and increases operational and cyber-risks.

- **Handling trade errors, exceptions, and breaks** — lack of consistent protocols and procedures makes diagnosing and resolving errors time consuming and resource intensive.

- **Processing corporate actions (eg share splits, mergers) and derivative life-cycle events (eg novation, fee payments)** — requires manual overrides and checks, and can be vulnerable to errors.

- **Protecting against fraud and cyber-risk** — of lack of standardised mechanisms for the collective sharing of data on suspicious activity in real time increases the vulnerability of individual firms.

Root causes of pinch points

The Panel recognised that its approach of starting from the most salient problem areas had the potential to consider issues in an isolated way and therefore risked overlooking cross-cutting solutions. The Panel hoped to overcome this challenge by reducing each pinch point to its fundamental root causes and then considering actions to address these root causes rather than the pinch points themselves.

(5) See the 'Panel's Terms of Reference'.

In that context, the Panel viewed these pinch points as created and exacerbated by issues relating to data and workflows. Addressing these underlying issues would go some way to alleviating the pinch points.

In the Panel's experience, the data required for post-trade processing is generally fragmented and non-standardised. While standards do exist for a number of important data items, data quality in these cases can still be poor. This means that data exchanged between firms may be inaccurate or incomplete. As a result, multiple (inconsistent) copies of the same data are maintained not only across firms, but also within different systems of the same firm — requiring constant reconciliation.

Workflows and processes also vary considerably across firms. This holds back automation, and makes errors and breaks between firms difficult to investigate and resolve. It has also meant the industry finds it challenging to prepare for and implement industry-wide change, for example in response to regulatory requirements or in preparation for the UK's departure from the European Union.

The pinch points identified by the Panel generally originate from one or both of these root causes. For example, firms still engage in a significant amount of non-automated and unsystematic communication when exchanging data — primarily over email. Compared to the alternative of standardised and automated interfaces, this is both inefficient and susceptible to operational and cyber-risk. Further, data are often exchanged too late in the trade life cycle due to inconsistent protocols across market participants. It is possible that some post-trade processes, such as trade enrichment, could be eliminated in their entirety if the data were (i) complete and accurate; and (ii) consistently exchanged by all counterparties at or before the point of trade execution. Later in this report, Case study 3 considers this issue in more detail.

Case studies

Having identified the underlying root causes in general terms, the Panel considered some specific action areas where it viewed progress as achievable through co-ordinated action by market participants. It developed three case studies aiming to (i) describe issues in a level of detail that allows for practical discussion of potential solutions, thereby catalysing market-led reform; and (ii) illustrate the collective need for change, and the feasibility of building consensus.

The three case studies discuss the gaps in work that has been undertaken by others in trying to address these issues and consider potential solutions. They do not include recommendations, but are instead intended as a first step in building consensus and catalysing co-ordinated action to improve the post-trade processes they relate to.

The case studies are summarised in Box 1, and set out in more detail in the annex to this report.

Box 1
Case studies

Case study 1: Client on-boarding[1]

Standardising client on-boarding data and processes could reduce costly duplication of inefficient processes, facilitate competition and potentially improve operational resilience by reducing the frictions of trading with new counterparties.

- **The problem**: Data collection as part of the client on-boarding process is not standardised: inconsistencies arise in both the data themselves and the way data are collected. This leads to extensive duplication and significant manual processes for the industry.

- **Initiatives already under way**: There are several effective services and standards developed to enhance the efficiency and effectiveness of on-boarding processes, from SWIFT's KYC Registry and IHS Markit's KYC.com to the Wolfsberg Questionnaire. Several consortia of banks are aiming to establish further such services.

- **Remaining gaps**: Options for improving efficiency here include further adoption of existing service providers; interoperability between service providers (for example through an API); further standardisation of formats and processes for sharing of information and documents (to provide interoperability between service providers and/or to standardise the sharing of information to and from end-users); or the development of utilities.

Case study 2: Uncleared margin

Streamlining margin processes for uncleared products could reduce the costs arising from dispute resolution, enable more automatic processing and improve transparency and reduce risks around intraday collateral and liquidity management.

- **The problem**: Margin calculations, communications and dispute resolution processes differ across firms. Non-standard processes hold back automated processing — leading to operational risks and to disputes, which are often dealt with via protracted bilateral communications (often over email).

- **Initiatives already under way**: The Panel pointed to successful market-led initiatives that have helped to standardise the calculation of initial margin and streamline dispute resolution processes for uncleared products. These range from the ISDA SIMM to LCH SwapAgent to solutions provided by AcadiaSoft, Cloud Margin, triCalculate and the Margin Trust Utility.

- **Remaining gaps**: The Panel saw potential to (i) tackle this pinch point through more widespread adoption of existing solutions; and (ii) tackle the underlying root cause of this issue through the development and use of margin calculation utilities.

Case study 3: Non-economic trade data

Improving standardisation, accuracy, and timely exchange of non-economic trade data could reduce the need for subsequent trade enrichment; eliminate the need to clean and reconcile data at every point in the trade life cycle; reduce errors, exceptions and breaks; and unlock the potential of post-trade data to add value by providing business insights and enhancing regulatory oversight.

- **The problem**: Non-economic data required in post-trade processing are often incomplete, inaccurate, and inconsistent. This generates a number of pinch points throughout the trade life cycle where firms have to check

(1) Counterparty on-boarding is not in itself a post-trade process. However, it relates closely to a number of post-trade processes, including those discussed in Case study 1 and 2. There is overlap between the non-economic data items required for counterparty on-boarding and those required in post-trade (such as LEIs). Efficient counterparty on-boarding processes would also reduce the frictions associated with setting up custodian accounts for the purposes of posting initial margin.

data quality, enrich trade information, reconcile their own records with the records of their counterparty and deal with breaks.

- **Initiatives already under way**: There are several existing standards that should improve data quality, from Legal Entity Identifiers (LEIs) to Standard settlement instructions (SSIs) and Unique Transaction Identifiers (UTIs). There are also several cross-cutting initiatives to improve the use of data, from DTCC's Institutional Trade Processing suite to the ISO 20022 messaging standard and the ISDA Common Domain Model.

- **Remaining gaps**: In many cases, existing standards are in place for relevant data. But the Panel saw benefit in these being adopted more widely, more accurately, and in a more consistent way. The Panel also identified a need for data to be exchanged earlier in the trade life cycle in order to reduce downstream challenges around reconciliation and exception management. Finally, the Panel identified a small number of cases where new standards would be beneficial.

3 Enacting change: how to catalyse market-led reform

The Panel recognises the scale of the challenge in reforming post-trade, but also the opportunity it presents, and has decided to establish a one-year Post-Trade Task Force to take forward its work.

The Panel acknowledges the scale of the challenge presented by reforming post-trade processes. The pinch points it has identified are in many cases long-standing issues. And a number of the potential actions it has considered to address these pinch points are ones that public authorities, firms, and industry bodies have attempted to tackle before, or indeed are trying to tackle today.

However, the Panel is optimistic that change is feasible. To do so will require careful consideration of the incentives for change. The Panel recognises the opportunity presented by reforming post-trade to reduce operational risk and costs in their businesses. At a time of multiple challenges for the financial sector these reforms are no longer a choice but a necessity.

Modernising post-trade could also improve firms' ability to capture and analyse post-trade data, which could provide an additional incentive for change. Standardised and reliable post-trade data is highly valuable to firms, both as a commodity in itself and as a means of generating business insights.

The operational processes underpinning financial markets have been put to the test during the outbreak of Covid-19. Key financial centres moved rapidly to remote working arrangements while simultaneously processing significantly heightened trading volumes. While there were signs of strain at the height of the period of market dysfunction, including increased settlement failures in some cases, key pieces of the post-trade infrastructure have so far coped reasonably well with these operational challenges.(6) Over the longer term, market participants have a number of pressing commitments to work through as a result of Covid-19, but some of the lessons learnt from this episode may also lend momentum to initiatives aiming to improve post-trade processes.

Next steps for the Market Practitioner Panel

Enacting change will require sustained effort. It will also entail the effective use of industry co-ordination mechanisms to help overcome barriers to market-wide action. In recognition of this, the Panel has decided to establish a Post-Trade Task Force to take forward its work in 2020/21.

The overarching objective of the Task Force is to make progress on improving the efficiency and resilience of post-trade and related processes. In its first meeting, the Task Force will agree granular objectives for the year, which will include:

- **Case studies**: the Task Force will deepen its analysis of three of the potential actions identified by the Panel — building on the case studies outlined in the annex. This work may include drafting detailed proposals on next steps and a plan of action for consultation with wider stakeholders both domestically and internationally.

- **New mechanisms for industry progress**: the Task Force will review ongoing initiatives in post-trade and the appropriate mechanisms and bodies available for taking these forward (such as trade associations).

(6) For example, CCPs have dealt well with the operational challenges of moving to large scale remote working, as well as sharp increases in trading volumes over the past few months. See the Bank of England '*interim Financial Stability Report*' (May 2020).

In a non-regulatory setting, public authorities are well placed to support these efforts, facilitating market-led reforms that will also benefit their own policy objectives. The Bank of England recognises it has a unique position as an independent and trusted third party and can play an important role in convening market participants to catalyse market-led reform.(7) The Bank of England and Financial Conduct Authority (FCA) will therefore sit as observers on the Task Force.

In addition, the work of the Task Force has synergies with the Bank of England's ongoing work to transform data collection from the firms it regulates, given common data points across post-trade and regulatory reporting.(8) Further information about this exercise can be found in Box 2. The Task Force will therefore engage closely with this work.

As part of its new data strategy the FCA is similarly working to improve the way it collects data from firms.(9) The Bank of England and FCA have committed to continue to work together on a number of regulatory data initiatives. This includes exploring joint work on common data standards and continuing to collaborate with industry on future phases of the Digital Regulatory Reporting project.(10)

Box 2
The Bank of England's work to transform data collection from firms

The Bank recognises that, by defining regulatory reporting requirements across the financial sector, it plays an important part in shaping how regulated firms approach their own data. As announced in June 2019 in the Bank's response to the Future of Finance review, the Bank of England is working on transforming data collection from firms. This offers an opportunity to provide impetus for wider improvements to the quality and usability of financial sector data. For example it could support data standards that more effectively meet the needs of the market, in line with the potential actions on data standardisation identified by the Panel.

The Bank's data review is seeking ways to decrease the burden on industry and to increase the timeliness and effectiveness of data in supporting supervisory judgements. To launch the review, the Bank recently published a discussion paper 'Transforming data collection from the UK financial sector'.(1) This sets out the issues facing the current data collection system and identifies and explores a series of potential solutions, to prompt feedback from and further discussion with industry. The review with industry will be ongoing throughout 2020 and the Bank's review team will engage with the Post-Trade Task Force, among other stakeholders, as part of that process.

(1) See 'Transforming data collection from the UK financial sector', January 2020.

(7) As it has done on many occasions in the past; for example with the FX Global Code and the Working Group on Sterling Risk-Free Reference Rates.
(8) See Bank of England Discussion Paper 'Transforming data collection from the UK financial sector', January 2020.
(9) See the FCA's Data Strategy, January 2020.
(10) See press release, 'FCA and Bank of England announce proposals for data reforms across the UK financial sector', January 2020.

Annex: Case studies

The Panel has developed three case studies on: non-economic trade data, margin processes for uncleared products, and client on-boarding. These are intended to identify a few specific, tractable issues, to help catalyse market-led reform. They are also intended to illustrate the market-wide need for change, and the feasibility of building consensus. The Panel has set out some of the options for progress on these issues, rather than dictating specific solutions. As set out in Section 3 (Enacting change) above, these case studies could form part of a suggested workplan for ongoing industry co-ordination.

(1) Client on-boarding

Standardising the client on-boarding process.(11)

What is the problem?

Data collection as part of the client on-boarding process is not standardised: inconsistencies arise in both the data themselves and the way data are collected. This leads to extensive duplication and significant manual processes for the industry.

Client and counterparty on-boarding processes currently include extensive duplication and significant manual processes. Similar information needs to be collected by each of an entity's counterparties, for a variety of purposes, including for example informing an entity's AML and credit risk judgements. But currently, it is generally collected once for each bilateral relationship; and neither the exact set of data required nor the format of these data are standardised. This leads to a process that can be heavily manual and duplicative; which entails significant costs for both the firm and the client, as well as contributing to time delays. Reducing the barriers to setting up new trading relationships could also improve operational resilience and competition by increasing substitutability — reducing the impact of an operational or financial problem at one market participant.

Currently, each firm typically has its own interpretation of KYC requirements; its own format for collating those requirements; and collects this similar information from an overlapping set of counterparties separately.

Panel lists discussed the information required by their on-boarding processes. The information required can often include hundreds of fields, although it often varies depending on the client's characteristics, and much of this information can be obtained from a smaller number of source documents (from annual reports to passports). It includes general information about the entity; about its finances, ownership and sources of funds; about its regulatory status, credit assessment and anti-money laundering controls. The number and complexity of data fields illustrates both the scale of the synergies that could be obtained by standardising and streamlining this process; and on the other hand, the scale of the challenge in bringing this together.

Reducing the costs of this process might entail agreement on what data and evidence was required to on-board clients; standardisation of the structure and format of these data fields; and/or streamlining access to the data.

(11) Client on-boarding may not in itself be considered a post-trade process. However, it relates closely to a number of post-trade processes, including those discussed in Case study 1 and 2. There is overlap between the non-economic data items required for counterparty on-boarding and those required in post-trade (such as LEIs). Efficient counterparty on-boarding processes would also reduce the frictions associated with setting up custodian accounts for the purposes of posting initial margin.

What initiatives are already under way to solve this problem?

There are several effective services and standards developed to enhance the efficiency and effectiveness of on-boarding processes.

There are a range of existing initiatives in this space:

- Several providers (eg SWIFT's KYC Registry and IHS Markit's KYC.com) provide KYC services on a third-party basis. To the extent submissions to one provider can meet the AML requirements of several of that provider's clients, this may reduce the duplication of effort. A consortium of Nordic banks, and another consortium of banks supporting the 'Clipeum' initiative, also aim to provide KYC services. Other providers have attempted to provide such services in the past, sometimes finding significant challenges.

- There have also been efforts to standardise data requirements for some parts of the process — for example, many market participants use the Wolfsberg Group's *Correspondent Banking Due Diligence Questionnaire* (targeted at higher risk or cross-border correspondent banking activities) to gather some information, including verifying that the client's AML processes are sufficiently robust.(12) This may reduce duplication where responses to one standard questionnaire can be shared with multiple counterparties.

Where are the remaining gaps?

Options for improving efficiency here include further adoption of existing service providers; interoperability between service providers (for example through an API); further standardisation of formats and processes for sharing of information and documents (to provide interoperability between service providers and/or to standardise the sharing of information to and from end-users); or the development of utilities.

Each firm requires different data from counterparties; and with some firms using a particular provider of KYC services and some firms using none, there remains substantial room for greater efficiency.

The Panel noted a range of potential options before the industry for reducing fragmentation and duplication, and improving efficiency.

- One option is to continue progress with and adoption of existing initiatives, as noted above.

- Another option would be for the industry to use utilities. The Panel felt that this might be a rather more ambitious target: it would need market participants to co-ordinate to achieve sufficiently wide-spread adoption; the industry would need to address issues relating to competition, data protection, data assurance, and cyber-risks; and to ensure a clear, appropriate allocation of responsibilities. But this could drive further efficiency if adopted, if it reduced duplication.

- Interoperability between vendors, perhaps through an API, could enable a client who had provided data to one vendor to authorise that data to be exported to another vendor.

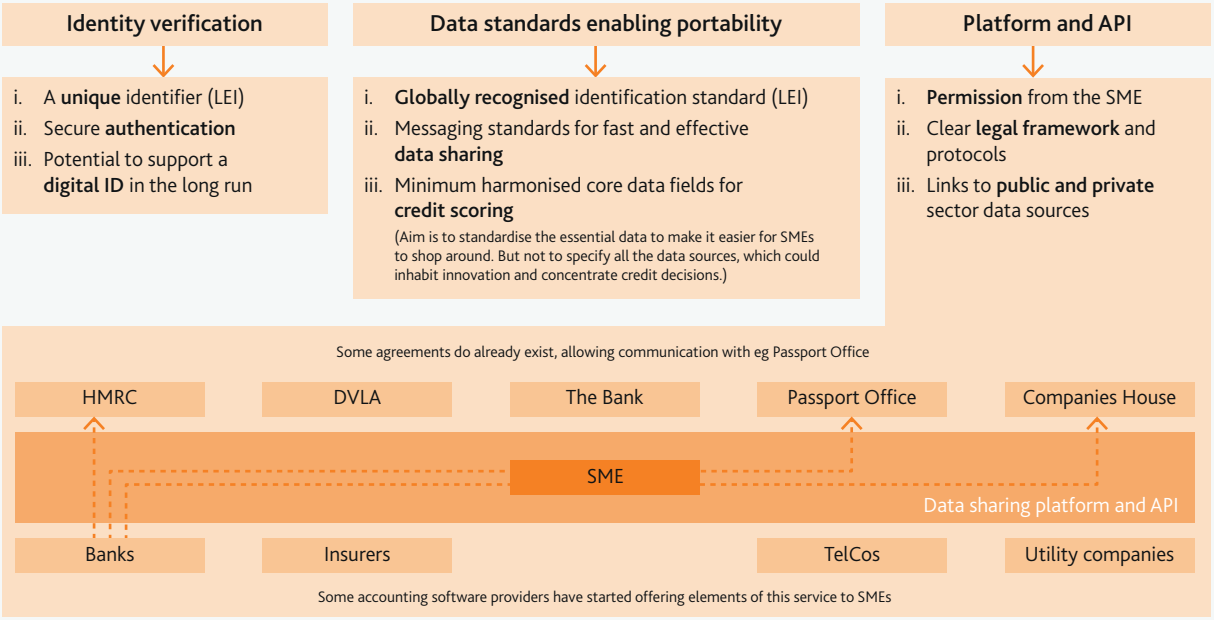
The Panel also noted ongoing work by the Bank of England,(13) as part of its response to the Future of Finance report,(14) on creating an open data platform to boost access to finance for small and medium-enterprises (SMEs) with a 'portable credit file'. The proposal aims to address two frictions in the SME lending market. First, the speed and ease of on-boarding new customers, which should enable SMEs to shop around between providers and increase competition between lenders. And second, the ability to assess effectively the credit risk of a potential new customer. Although this is aimed at the retail market, the first part of the problem is directly relevant. One option the Bank of England is considering is creating an API that, with the client's permission, will connect users of data with ultimate data sources (from the Passport Office to Companies House), without using a central registry — see Box 3. There may be synergies between that work and this case study.

(12) See the 'FSB action plan to assess and address the decline in correspondent banking: Progress report', May 2019.
(13) See 'Open data for SME finance: what we proposed and what we have learnt', March 2020.
(14) See 'Future of Finance report', June 2019.

Box 3
An open-data platform for SME finance

A model of data portability
The UK's Open Banking Initiative has successfully demonstrated that with the right permissions, sensitive financial data can be shared securely with third-party providers using an API. The Bank explored how this model of data portability could be taken further in the financial system of the future. If the same permissioned, data sharing standards were rolled out universally across the economy, small businesses would be able to harness the power of their data to access the financial services they need, quickly and effortlessly. With the touch of a button, the SME could permission the movement of their data from multiple providers to a potential new lender, creating a virtual, 'portable credit file' (**Figure A**).

Figure A A stylised diagram of the open-data platform applied to the SME finance use-case



An open platform
Instead of a central utility, an open platform could connect a decentralised network of data providers, using a standardised set of APIs to move data around the financial system instantly, at the request of the SME. No data would move without the permission of the SME, there would be no central data repository, and there would be no costly infrastructure to build.

Instant, digital data sharing
Instead, the SME would permission an API call to a handful of data providers with whom it already has a relationship (eg its bank, its utility company and its insurance company) to instantly share specified data fields with a third party (eg a non-bank business lender). The data transfer would be encrypted end-to-end and would provide access for a specified (minimal) period of time. If the third party needs access again, they can request it and the SME can authorise effortlessly, for example, with a fingerprint on their smartphone.

Vastly reduced on-boarding costs
Moving data around using a system of APIs like this would also bring the cost of AML/KYC checks down considerably, providing a clear and immediate incentive for financial and non-financial institutions to take part and help make it a success.

Common standards and interoperability

To deliver this open data platform would require a set of standards for identification, authentication and communication. Standardised APIs would make different data sources interoperable, enabling households and businesses to pull their data from many different nodes with a single application. To ensure trust, the transferred data would need to be encrypted appropriately and permissioned by the rightful data owner (the household or business). Integration with government data sources, such as the passport office, DVLA, DWP and HMRC would significantly improve digital identification and reduce frictions in authentication, supporting credit decisions and unlocking efficiencies in all markets.

And because it would rely on moving data between the rightful data owners, rather than replicating it or storing it in all in a single location, it has the potential to be secure, trusted and cost-effective.

(2) Uncleared margin

Streamlining margin processes for uncleared products.

What is the problem?

Margin calculations, communications and dispute resolution processes differ across firms. Non-standard processes hold back automated processing — leading to operational risks and to disputes, which are often dealt with via protracted bilateral communications (often over email).

The increased use of central clearing is a key post-crisis reform targeted at reducing systemic risk in the financial system. Central clearing is now mandatory in many jurisdictions for a large set of standardised products. But there remains a significant proportion of trading that remains uncleared. For example, the outstanding notional volume of uncleared derivatives is estimated to be in the region of US$230 trillion.(15)

Not all products are suitable for central clearing. This could be for a variety of reasons including insufficient liquidity or standardisation in the product.(16) The systemic risks of uncleared trades are instead mitigated through margining (see Box 4) and capital requirements that have been developed at a global level to ensure uncleared exposures are adequately collateralised and capitalised.(17) Regulators around the world have since implemented these margin requirements in regulation, commonly referred to as the Uncleared Margin Rules (UMR).

With UMR for Phase 5 and 6 firms coming into force in September 2020 and 2021, the Panel considered the efficiency and resilience of uncleared margin processes to be a pressing and timely issue in post-trade.(18)

For cleared derivatives, the centralisation of margin processes at a CCP provides a great deal of operational efficiency. In particular, a CCP centralises and imposes standardised processes around: (i) calculation of net risk exposures and margin amounts, (ii) margin call communications, (iii) margin segregation, and (iv) margin settlement.

The same cannot be said in the uncleared space, where margin operations can vary for each bilateral trading relationship — built up in a piecemeal fashion overtime using legacy processes and systems. As such these processes can be highly non-standardised across market participants, creating material pinch points for market participants on both the buy-side and the sell-side. Non-standard processes hold back automated processing — leading to operational risks, errors, and disputes, which are often dealt with via protracted bilateral communications (often over email). At best, disputes and their resolution represent an inefficiency and a cost. At worst, they risk collateral not being in the right place at the right time, potentially failing to mitigate risk as intended. Inefficient and protracted processes for margin calculation and settlement may also be holding the industry back from moving to more effective intraday collateral and liquidity management.

(15) See 'BIS OTC derivatives survey results', November 2019.
(16) See BCBS-IOSCO 'Margin requirements for non-centrally cleared derivatives', March 2015, and FSB 'Review of OTC derivatives market reforms', June 2017.
(17) See FSB 'Review of OTC derivatives market reforms', June 2017.
(18) In light of the challenges posed by the Covid-19 pandemic the BCBS and IOSCO have subsequently moved the deadline ahead by one year for the last two phases of the implementation of UMR.

Box 4
What are initial margin and variation margin?

Uncleared Margin Rules specify two types of margin that firms are required to exchange (**Table 1**). The first is variation margin, which covers current exposure and is calculated using a mark-to-market position. The second is initial margin, which covers potential future exposure for the expected time between the last variation margin exchange and the liquidation of positions on the default of a counterparty.

Initial margin protects the transacting parties from the potential future exposure that could arise from future changes in the mark-to-market value of the contract during the time it takes to close out and replace the position in the event that one or more counterparties default. The amount of initial margin reflects the size of the potential future exposure. It depends on a variety of factors, including how often the contract is revalued and variation margin exchanged; the volatility of the underlying instrument and the expected duration of the contract closeout and replacement period; and can change over time; particularly where it is calculated on a portfolio basis and transactions are added to or removed from the portfolio on a continuous basis.(1)

Variation margin protects the transacting parties from the current exposure that has already been incurred by one of the parties from changes in the mark-to-market value of the contract after the transaction has been executed. The amount of variation margin reflects the size of this current exposure. It depends on the mark-to-market value of the derivatives at any point in time; and can therefore change over time.(2)

Table 1 Comparing initial margin and variation margin

	Form of collateral used to cover margin amount	Timing of margin calculation and collateral exchange	Type of exposures being collateralised
Initial margin	Generally highly liquid securities, held in segregated accounts (often with third-party custodians).	Initial Margin calculated on occurrence of specified events (eg new contracts, life-cycle events) and a minimum of every 10 days.	Potential future exposure.
Variation margin	Generally cash, and not required to be segregated.	On a daily basis.	Current exposure.

(1) See BCBS-IOSCO 'Margin requirements for non-centrally cleared derivatives', July 2019.
(2) *ibid.*

What initiatives are already under way to solve this problem?

The Panel pointed to successful market-led initiatives that have helped to standardise the calculation of initial margin and streamline dispute resolution processes for uncleared products.

The Panel noted two categories of ongoing initiatives that aim to enhance the efficiency of uncleared margin processes. First, tools that tackle the pinch points firms face through the streamlining and standardisation of margin call communications and dispute workflows. Second, service providers that will take on the role of calculation agent — intermediating between counterparties by calculating risk exposures and margin requirements to eliminate the incidence of disputes and the operational processes needed to resolve them.

The first category of solutions aims to standardise margin calculation methodologies. The ISDA Standard Initial Margin Model (SIMM) is a published methodology defined by ISDA and its members for calculating initial margin. It puts standards in place both for the methodology of initial margin calculation and the inputs for these calculations, which are derived from the underlying trade population.(19) The Panel was supportive of this initiative, noting the benefits of its wide uptake and relative simplicity.

(19) See ISDA SIMM.

The second category makes use of mutualised services. There are service providers in the market today that provide a full suite of life-cycle servicing solutions for uncleared products. The Panel noted a number of providers that provide effective workflow tools for streamlining margin processes, in particular related to dispute resolution and operational workflows.(20)

Further to those solutions that aim to ameliorate the bilateral margining process are providers seeking to extend the clearing infrastructure to the bilateral market. LCH SwapAgent is one such example that offers centralised trade processing, valuation, margining, risk calculation and optimisation services for a subset of uncleared fixed-income products. This solution enables firms to leverage the operational efficiency of CCPs while maintaining the bilateral trading relationship and exposure with their counterparty.

Where are the remaining gaps?

The Panel saw potential to (i) tackle this pinch point through more widespread adoption of existing solutions, and (ii) tackle the underlying root cause of this issue through the development and use of margin calculation utilities.
Despite the ongoing initiatives in this space, the Panel thought there was scope for further progress. Firms, especially larger sell side firms, are still spending a significant amount of resource on margin processes. For example, some banks may process multiple thousands of margin calls a day with a high percentage of these (up to 40%) being disputed and needing resolution.

Two areas where progress could be made are: (i) further standardisation of margin calculations for both initial margin and variation margin to reduce the number of disputes, and (ii) addressing fragmentation in margin call communications across systematic electronic communication platforms (ie those of third-party service providers) and unsystematic communication (eg email) (**Figure 7**).

Figure 7 How could utility arrangements be better utilised to improve uncleared margin processes?

Answer 1: Tackle pinch points

Existing solutions

Can help to streamline margin calculation, margin call, and dispute resolution processes.

Challenges and considerations

- Adoption of these solutions is not widespread, and is fragmented.
- The root cause remains, limiting gains in efficiency and resilience.

Answer 2: Tackle root causes

Development of utilities or calculation agents

To match trades, calculate margin, and generate margin calls.

Potentially add the ability to instruct margin settlement.

Challenges and considerations

- Coverage across asset classes.
- Consensus on valuation methodology.
- Consistent market data.
- Common Credit Support Annex.
- Critical mass.

(20) For example, the Panel noted solutions provided by AcadiaSoft, Cloud Margin, triCalculate and DTCC ITP's Margin Transit Utility.

These issues could either be tackled by encouraging more widespread adoption of existing solutions and standards that aim to reduce the number of margin disputes and the resources required to resolve them, or via the development of utilities that can eliminate the root cause of disputes altogether.

The second option has the potential for the highest gains in terms of efficiency but would need to address a number of challenges to ensure sufficient effectiveness and uptake across the market:

- To achieve substantial efficiency gains any calculation utility is likely to need widespread adoption and broad a product set to ensure counterparties can still benefit from netting exposures at an asset class level.

- Achieving widespread adoption would take a number of actions including getting market consensus on valuation methodologies and common Credit Support Annexes.

- As this model involves giving up valuation rights to a third-party calculation agent there is also a question of how participating firms can maintain oversight of, and responsibility for, those calculations (see Box 5).

- A single central calculation agent introduces the risk of moral hazard, which would have to be mitigated, as the utility would be quantifying risks that it is not itself exposed to (unlike in a CCP model where the CCP takes on the counterparty exposures). It would also concentrate operational risk into a single firm, reducing resilience of the system as a whole. One way to address these risks might be to introduce a set of calculation agents that compete with each other, allowing firms to use different utilities for specific counterparties or trade populations. Further analysis is required to assess whether such a model is technically feasible, and could be designed to maintain both robust calculation methodologies as well as to allow efficient netting of exposures.

Box 5
Outsourcing

A key consideration for firms seeking to use mutualised services is the oversight and control they are able to maintain over outsourced activities. The reliance of regulated firms on third parties, in particular through outsourcing arrangements, is well established and has been subject to regulatory requirements and expectations for over a decade. However, firms are increasingly relying on technology provided by third parties, such as the Cloud, to gain entry to new markets, lower operating costs, fuel innovation and adapt to the digital economy.

These changes in firms' reliance on outsourcing and third parties bring potential benefits and opportunities, but also create risks. For instance, ensuring that confidential, important or sensitive data outsourced to or shared with third parties is secure and accessible to firms and regulators, including during or following an operational disruption is both challenging and essential.

Against this background, supervisory authorities around the world are updating their approach to outsourcing and third party risk management. In the UK, the Prudential Regulation Authority is currently consulting on modernising its expectations relating to outsourcing and third party risk management (see CP30/19).(1) This is well-aligned to the development of a regulatory framework on operational resilience, as proposed in CP29/19,(2) and the publication of the Future of Finance report and the Bank's response to it, which emphasised how the Bank can 'enable innovation, empower competition and build resilience'.

(1) See Bank of England Consultation Paper 30/19, 'Outsourcing and third party risk management', December 2019.
(2) See Bank of England Consultation Paper 29/19, 'Operational Resilience: Impact tolerances for important business services', December 2019.

(3) Non-economic trade data

Improving standardisation, accuracy, and timely exchange of non-economic trade data.

What is the problem?

Non-economic data required in post-trade processing are often incomplete, inaccurate, and inconsistent. This generates a number of pinch points throughout the trade life cycle where firms have to check data quality, reconcile their own records with the records of their counterparty, and deal with breaks.

The Panel felt that many of the pinch points identified in Section 2 above are driven by the root cause of inadequate data: data that is often not accurate, complete or standardised; and not exchanged early enough in the trade life cycle. This is a key contributor to the challenges and costs presented by the pinch points of: data reconciliation; exception handling; and trade enrichment. Investment in improving the quality of a small number of key data points upstream, or exchanging them earlier (eg at the point of execution), could substantially reduce the burden of these problems downstream.

The Panel identified a list of five key data points where improved standardisation and data quality could increase efficiencies in post-trade. These are:

- Legal entity identifiers (LEIs).
- Standing settlement instructions (SSIs).
- Trade allocations.
- Product identifiers (eg tickers/ISINs).
- Unique trade identifiers (UTIs).

For further details of the specific issues around these data points, see Box 6.

While this is not a comprehensive list, it does provide some concrete examples of where industry might focus their efforts in the first instance. A range of other data items were also noted by the Panel as causing issues.(21)

What initiatives are already under way to solve this problem?

There are several existing standards that should improve data quality.

Box 6 explains each of the above five data items and sets out the related initiatives currently in place that either require or aim to promote their adoption. For many of the data points identified, workstreams are under way to take these issues forward, as noted in the box. This includes work by FSB, Global Legal Entity Identifier Foundation and others to drive wider adoption of LEIs; and work by Financial Stability Board, Committee on Payments and Market Infrastructures, IOSCO and others on adoption on Unique Product Identifiers (UPIs) and Unique Transaction Identifiers (UTIs).

Several cross-cutting workstreams which could impact several data items are under way, including DTCC's Institutional Trade Processing suite (including for example GC Direct, an initiative to streamline processes for sharing Standard Settlement Instructions); the transition to ISO 20022, which aims to standardise a range of financial messages; and the ISDA Common Domain Model, which aims to provide a common digital representation of derivatives trade events and actions. The European Post-Trade Forum(22) has recommended a range of further actions across post-trade, including several points on data quality.

(21) These included: partial settlement; execution style; confirmations; settlement style; trade date and timestamps; corporate actions; rounding of rates and FX; day count conventions; holiday calendars; reversals; product data; liquidity/pricing data; order ID; execution ID; place of settlement; domicile; and segment Market Identifier Code (MIC).

(22) See 'European Post Trade Forum Report', May 2017.

Box 6
Data standards

Legal Entity Identifiers (LEIs)
The global financial crisis showed the difficulty of identifying counterparties to financial transactions across borders with accuracy and speed. The LEI, a globally unique reference for each legal entity, recommended by the G20 and taken forward by the Financial Stability Board (FSB), was one solution to prevent recurrence of this problem.(1)

The LEI is a unique 20-character reference code assigned to each legal entity that engages in financial transactions and associated reference data. Over 1.4 million entities have been uniquely identified by an LEI in more than 200 countries.

Widespread coverage of LEIs has been achieved in some financial market segments, with LEIs identifying reporting entities for close to 100% of the gross notional outstanding for over-the-counter (OTC) derivative trades in most FSB jurisdictions, and securities issuers for around 78% on average of the outstanding amounts of debt and equity securities in FSB jurisdictions. But LEI adoption remains low outside securities and derivatives markets, and is uneven across countries.(2) Sharing of LEIs could also be more efficient if the LEIs of more parties (eg brokers, custodians) was shared at the time of trade to avoid issues downstream. Some data quality issues were also noted (eg counterparties not recording LEIs correctly; or the LEI database taking time to reflect changes in entity details).

Standing settlement instructions (SSIs)
SSIs provide details of how to make payments and deliver securities — for example, they include the name of the custodian and the account number. There are a number of initiatives to streamline the use of standing settlement instructions (including DTCC's GC Direct, which automates the exchange of SSIs). But SSIs are currently shared in a range of formats and media — including as PDFs by email, which is inefficient and increases the risk of error.

Trade allocations
The Panel felt that trade allocations (the details of how each trade is allocated, for example between different funds run by the same fund manager) were an area where there was considerable inefficiency due to a lack of a standard process for sharing this information at the time of trade (generating manual processes and a need for reconciliation downstream). One option would be for details of these allocations to be exchanged at the time of trade, with each allocation given an 'Allocation ID' by the Fund Manager for sharing with the Broker and Custodian to ensure traceability throughout the audit trail. Such a solution would need to account for the potential sensitivity of these data and handled accordingly.

Product identifiers (eg tickers/ISINs)
Product identifiers (ie the reference numbers designating particular securities) were noted as another key pain point. For example, it was noted that dual-listed securities with one ISIN (designating the security) but multiple tickers (one for each exchange that security is listed on) often caused reconciliation problems.

The Unique Product Identifier (UPI) is likely to be part of the solution here. The FSB recommended this in 2014 in the context of OTC derivative markets;(3) and CPMI and IOSCO(4) have provided guidance on the use of UPIs and UTIs (see below). FSB has recommended(5) that jurisdictions implement this guidance by 2022 Q3.

Unique Trade Identifiers (UTIs)
UTIs are reference numbers generated to identify each trade. They are required under Dodd-Frank, EMIR and REMIT, and help facilitate reconciliation downstream. However, they are only used for OTC derivative trades; the Panel felt that extending their scope would be helpful.

(1) See FSB 'Report Global Legal Entity Identifier for Financial Markets', June 2012.
(2) See FSB 'Thematic Review on Implementation of the Legal Entity Identifier Peer Review Report', May 2019.
(3) See FSB 'Feasibility Study on Approaches to Aggregate OTC Derivatives Data', September 2014.
(4) The BIS Committee on Payments and Market Infrastructures and The International Organisation of Securities Commissions.
(5) See their 2017–18 technical guidance on UTIs, UPIs and other data elements; and FSB recommendations.

Where are the remaining gaps?

In many cases, existing standards are in place for relevant data. But the Panel saw benefit in these being adopted more widely, more accurately, and in a more consistent way. The Panel also identified a need for data to be exchanged earlier in the trade life cycle in order to reduce downstream challenges around reconciliation and exception management. Finally, the Panel identified a small number of cases where new standards would be beneficial.

The Panel felt that different data items require different solutions:

- In most cases, there are existing standards — but these need to be adopted more widely, more accurately, or in a more consistent way. For example, as noted above, Legal Entity Identifiers are not fully adopted in all jurisdictions or for all trade types. And while there are a number of initiatives to standardise Standing Settlement Instructions, these are currently shared in a range of formats and media.

- And in most cases, data needs to be exchanged earlier in the trade life cycle (and at the point of execution), to reduce downstream challenges around reconciliation and exception management.

- In some cases, standards need to be agreed — for example, to agree a common process for generating and sharing trade allocation IDs.

In addition, the work of the Panel has synergies with Bank of England's work to transform data collection from firms, given common data points across post-trade and regulatory reporting. Further information about this exercise can be found in Box 2 on page 18.