Authorised Push Payment (APP) Fraud Dataset Evaluation

31st December 2024

Contents

Project Overview

Project Overview (1)

Background

In 2022, APP fraud losses reached £485 million, highlighting the urgent need for advanced technological solutions to counter the evolving fraud landscape. In September 2022, the FCA and Payment Systems Regulator hosted an APP Fraud TechSprint to assess existing and emerging technology solutions, explore data-sharing practices, and identify barriers to tackling this type of fraud. A key challenge identified was the lack of access to data for developing and validating solutions. Synthetic datasets have since emerged as a powerful tool, providing high-quality data to drive innovation while protecting consumer privacy.

Project Objectives

1. **Facilitating Innovation:** Provide free, high-quality synthetic datasets to aid financial services and tech innovators in combating APP fraud.

2. **Gathering Feedback:** Improve dataset quality and understand synthetic data effectiveness through user insights.

3. **Fostering Collaboration:** Create a platform for sharing expertise and showcasing solutions to wider audiences.

Key Collaborations

- The **FCA** and **City of London Corporation** advanced their Digital Sandbox initiative, aligning with Kalifa Review recommendations to support UK Fintech innovation.

- **Smart Data Foundry (SDF)** created and enhanced the synthetic dataset, integrating user feedback to improve usability.

Timeline & Achievements

- **Launch (September 2023):** The project began with a launch event and workshop introducing participants to the synthetic data and the FCA Innovation Platform.

- **Application Window:** Innovators applied for access to the dataset as part of the FCA permanent innovation service, the Digital Sandbox.

- **Ongoing Feedback and Enhancements:** Workshops and surveys gathered user feedback, leading to dataset enhancements between January and September 2024.

- **Showcasing Solutions:** Digital Sandbox participants showcased their solutions at FCA Expos and the Innovate Finance Global Summit, sharing insights and experiences from the project.

- **Outcomes:** By September 2024, the dataset supported 61 users across 38 projects, including 20 targeting fraud, with over 111,000 access instances.

Project Overview (2)

Dataset Highlights & Enhancements

- **Initial Dataset (Sep 2023):** Featured 5.2GB of data across 37 datasets, including:

  – 15 million transactions

  – 58 million data points

  – 61,000 fraud attempts spanning two years, covering 20,000 synthetic individuals' bank and transaction data.

- **Fraud Typologies:** Began with five types—bank, police, and family impersonation, advance fee, and purchase scams—later expanding to include romance and investment scams.

- **Key Updates** (Jan–Apr 2024): Added foreign exchange transactions, transaction currency, and improvements to ethnicity, identity, and documentation data. New features included confirmation of payee, transaction categories, and enhanced accuracy for social finance and family data.

- **Enhancements** (Jun–Jul 2024): Introduced scam refunds, dynamic susceptibility, and scammer demographics. Adjusted typology frequencies, refined scammer behaviours, and enhanced consumer profiles with income and family data.
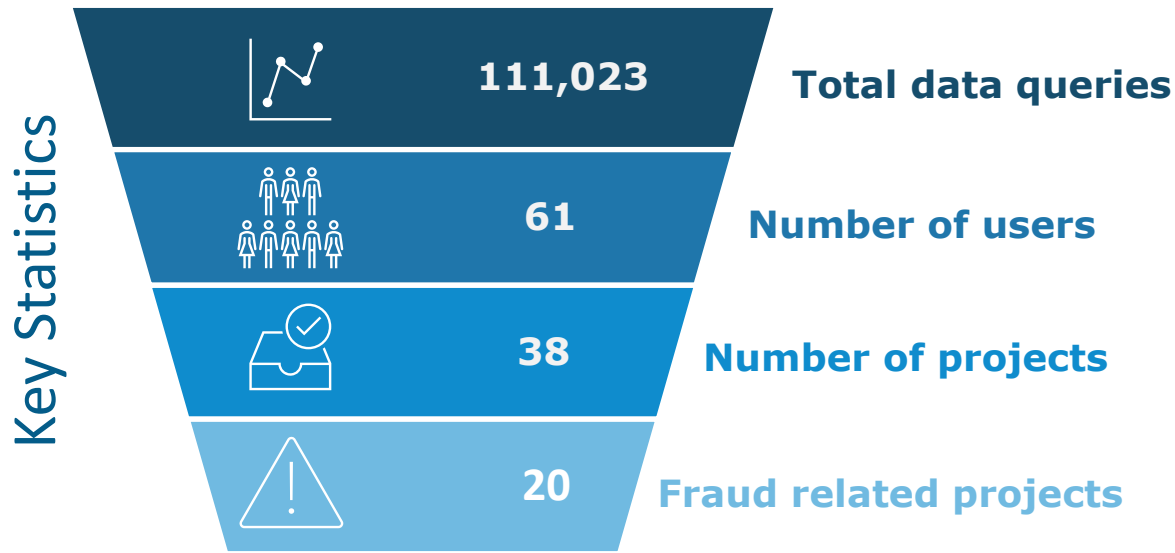
Accessing the Data

The APP Fraud Dataset is available on the FCA Innovation Platform, with an expanded profile dataset released in November 2024. Updates planned for 2025 include financial product insights and enhancements to credit scoring and outcomes data. Alongside fraud detection, Digital Sandbox users can utilise the dataset to support Consumer Duty compliance and improve outcomes.

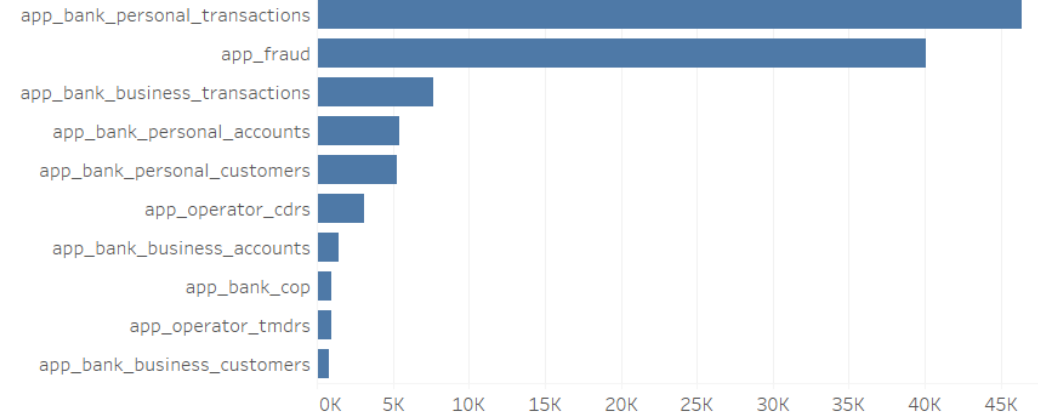For details on accessing the dataset, visit the FCA Digital Sandbox webpage.

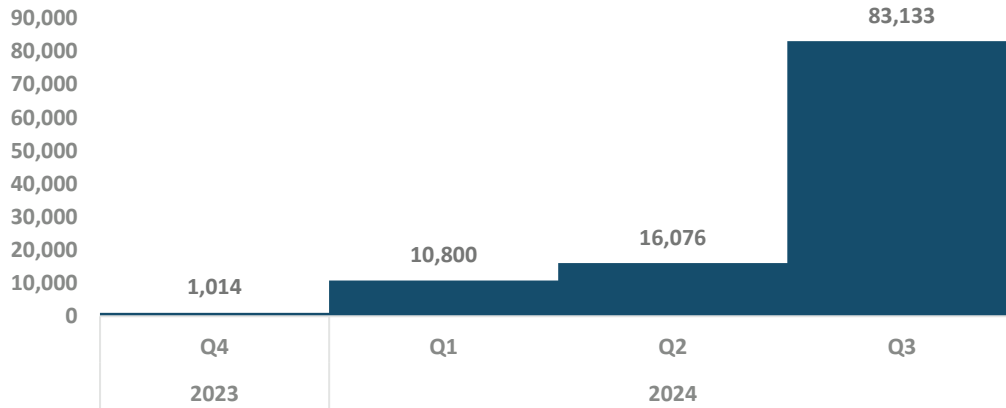# APP Fraud Dataset Statistics and Dataset Improvement Timeline
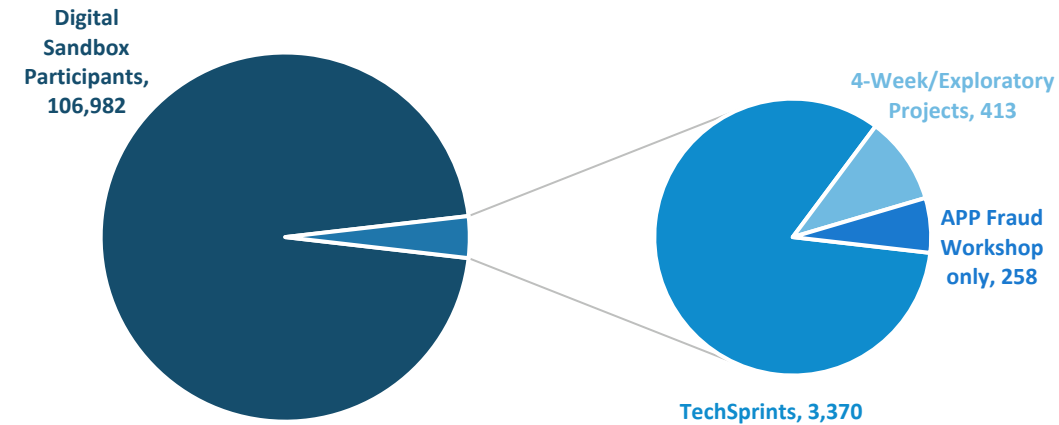
Authorised Push Payment (APP) Fraud Dataset Usage

Key Statistics

- **111,023** — Total data queries
- **61** — Number of users
- **38** — Number of projects
- **20** — Fraud related projects

Most Frequently Used Data Tables

(bar chart, most used to least)
- app_bank_personal_transactions
- app_fraud
- app_bank_business_transactions
- app_bank_personal_accounts
- app_bank_personal_customers
- app_operator_cdrs
- app_bank_business_accounts
- app_bank_cop
- app_operator_tmdrs
- app_bank_business_customers

(x-axis: 0K, 5K, 10K, 15K, 20K, 25K, 30K, 35K, 40K, 45K)

Data Queries Over Time

Period	Value
Q4 2023	1,014
Q1 2024	10,800
Q2 2024	16,076
Q3 2024	83,133

Data Queries by User Type

- Digital Sandbox Participants, 106,982
- 4-Week/Exploratory Projects, 413
- APP Fraud Workshop only, 258
- TechSprints, 3,370

PDS = Permanent Digital Sandbox Participant
FITS: Financial Inclusion TechSprint Participant
CDTS: Consumer Duty TechSprint Participant
MASTS: Market Abuse TechSprint Participant
Other = 4-week Access Project User
APP Fraud Launch / Workshop Attendee
SDEG = Synthetic Data Expert Group User

Authorised Push Payment (APP) Fraud Synthetic Dataset Improvements
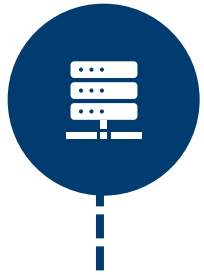
Data Launch

X4 Bank Transaction Data
- Individual & Corporate

X2 Telecoms Operator Data
- Individual & Corporate

X5 Fraud typologies
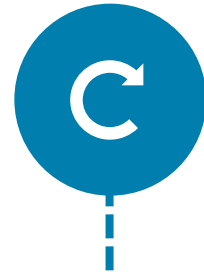
Data update 1

Major Updates
- Confirmation of Payee
- Family/Social finances

Minor Updates
- Transaction Category Column
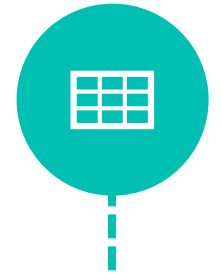- Typology Frequencies
- Behaviour updates

Data update 2

Major Updates
- Foreign Exchange Transactions

Minor Updates
- Transaction Currency
- Improved Ethnicity and Identity
- Improved Documentation
- Merchant Calibration
- Telco Bugfixes
- Bank Account Bugfixes
- Date/Time formatting
- Bank Transaction Bugfixes
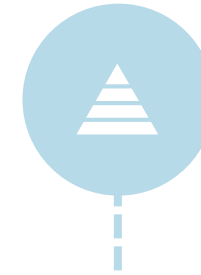
Data update 3

Major Updates
- Scam Refunds
- Dynamic Susceptibility

Minor Updates
- Scammer Demographics

Data update 4

Major Updates
- New Scam: Romance
- New Scam: Investment

Minor Updates
- Income updates
- Scammer Behaviours/Bugfixes
- Family/Children data update
- Typology Frequency

| Sep 2023 | Jan 2024 | Apr 2024 | Jun 2024 | Jul 2024 |

Project Evaluation

Method

- The evaluation of the APP Fraud Dataset is based on insights from nine APP participant interviews, a workshop, survey results, and findings from the September Showcase.
- Six success criteria were established at the start of the dataset launch to measure the projects effectiveness, with descriptions provided on the next page.
- User feedback was organised by themes and aligned with the success criteria. Over 230 responses were documented during engagements with APP dataset users.
- Some of the survey responses and feedback was received prior to updates of the dataset; therefore, elements of feedback are already incorporated into the dataset.

APP Fraud Dataset Success Criteria

Market Competition
How easy was data access and onboarding?

Data Quality
How rich was the dataset?

Data Trust
Did users trust the synthetic data and was it accurate?

SUCCESS CRITERIA

Market Impact
Has the dataset supported product development?

Collaboration
Has the programme created a collaborative community?

Innovation Support
Has the dataset increased the ability to innovate?

Interview Analysis

Success Criteria: Project Overview (1)

The whole project received a lot of praise and is a big step forward; however, the dataset could be marketed better. Participants are very interested in continuing to use the dataset.

Concept

The overall feeling of the APP Synthetic dataset is that its an excellent concept. All interviews praised the idea of a publicly available dataset. There were also positive remarks on FCA and CoLC for establishing the programme and making an important step in the right direction for fraud prevention.

"I absolutely commend the City of London Corporation and the FCA, because it's a massive step forward."

Naturally, there are issues and challenges with dataset, but the overall sentiment was very positive.

"I'd rate it 9 out of 10. It's innovative. It's a big step forward"

Future

As a result, every interviewee expressed an interest in using the data in the future and consider the continuation of the dataset as a big positive.

"I definitely hope that this initiative will continue."

"We would love to continue access, and we'd be very interested in continuing to explore."

Sandbox and APP marketing

Some interviewees found it difficult to find the data or considered themselves lucky that they found the data. For some, the sandbox and the dataset is not effectively marketed on the website, which is predominantly focused on regulation.

"We sort of stumbled across it to be perfectly frank, because not all the data sets in there are good"

"understandably, it's a very regulatory focused site. It doesn't scream innovation, but the Sandbox is incredible"

Furthermore, it was not always obvious what users could expect from the sandbox or the APP dataset and it was only once they started using it that they realised its uses and benefit.

"it was only until we got on the sandbox, we started to understand what we could potentially do with the data."

The events where users could run mini experiments were good hooks for potential users, as were data schemas. Marketing on the website and information about the benefits of the data could also improve engagement.

"You could just run some mini experiments on the day. And that sold it to me."

Success Criteria: Project Overview (2)

Better facilitation of mentors and introducing more timelines and deadlines would support participants and increase their engagement with the dataset.

Mentors

The mentors received mixed reviews. Some participants found their support and expertise helpful, and others found their matches too generalist.

"It helped push me a bit more to and take feedback as well."

There were also some participants who did not get adequate engagement from mentors.

"I picked out who would be a good fit, but I don't think any of them responded."

The concept of mentors was met positively, but greater facilitation of the programme and better matching of participants would be beneficial.

Timeline and goals

Businesses were not following a specific timeline to develop a product, once there was a requirement to showcase at an event this gave participants a goal and a deadline to work towards, which was useful.

"People often need a deadline, or structure, or some sort of milestone that they're supposed to show their outcome by"

Success Criteria: Market Competition

The accessibility of the dataset is good, but more detail around data schemas and dictionaries is welcomed. Some users found the environment and user interface challenging. The case managers are excellent.

Accessibility

Most interviewees found accessing the data and the onboarding process fine or positive. Typically, those experienced in using the sandbox found it easier.

"So, the sandbox was very easy to access, and I'm very straightforward. The instructions were good."

Some of the negative comments focused on minor technical issues accessing the data, the time it took to access, difficulty understanding the data for non data scientists, and greater clarity on data tables and data dictionaries.

"Perhaps just 20 lines of examples of what each table looks like. Because sometimes they don't necessarily want to know the distribution or the statistics. They just want to get a sense of the feeling of what those table looks like."

API and environment

The response to whether and API would've been an easier approach for participants was typically met with agreement that an API would be good, but an acknowledgment and understanding of why that may not be possible.

"We actually would have loved an API. We understand we couldn't just take the data and work with it offline."

There were issues working in the sandbox environment, predominantly an inability or difficulty to combine data sets and slow speeds.

"The query data was quite slow. In our own environment it can be quicker"

Case Manager

The case managers and engagement from the FCA received very high praise. The support and quick action on feedback from case managers was seen as a major positive for the project.

"They stayed with us, provided lots of really good information. They were always available."

"They've had sessions where they invited a lot of people to give feedback. It's been quite rich in touch points."

Success Criteria: Data Quality (1)

The complexity and variety of the dataset is excellent, but this left participants wanting more additions. The small size of the dataset means some users feel the uses are limited.

Complexity and variety

The complexity, variety and richness of the data was commended. Particularly the ability to see the whole picture of APP fraud rather than one perspective of one actor. There were several mentions of the benefit of access to telco and text data, the various attributes, and crypto data.

"Access to the telco data, something we've never had before was really interesting for us to explore."

Whilst there was positivity, there were also a lot of recommendations and a desire to improve the variety of data. For example, more qualitative data, more banks, money laundering, unstructured data, inbound fraud data, combining data sets, cross border data, and more variety in transactions. The ability of fraudsters to adapt, much like in real-world scenarios, would be an intriguing addition.

"The banks maybe to have different fraud MOS or fraud typologies."

"More data, more unstructured, qualitative and textual data."

"No adaptation in the way that you would see in the real world."

Size

Related to the variety of data was the size of the data set. There was a demand for a much larger data set. Whilst there was recognition that the purpose of the APP project was a rich data set, in reality the datasets can be of 10 million customers rather than a few thousand.

"I think it needs to be a few scales of magnitude larger for it to be even more realistic"

Access to data

For some participants, the size and complexity of the data were sufficient, and having access to a rich dataset, superior to other datasets they had used previously, was highly appreciated. This was typically true for smaller organisations.

"We've worked with some synthetic data sets that were quite weak. This dataset fulfilled the utility and fidelity elements."

Success Criteria: Data Quality (2)

The proactive engagement and improvements to data are well received, but the updates did not always reignite an interest and engagement in the dataset. The fidelity of the dataset could be improved.

Updates and engagement

The updates to the dataset were commended and the improvement of the dataset from feedback was appreciated. However, some users did struggle to use the updates if they already commenced their project, and others were indifferent or unaware of data updates.

"The new version has more data in it that could be of interest to us. However, we can't look at any more data, we had to fix the analysis on the point in time."

The proactive engagement from Smart Data Foundry and the FCA to improve the dataset and take on feedback was well received.

"Smart Data Foundry were very helpful, they've taken on a lot of my one-on-one feedback."

Fidelity

There were some questions raised about the fidelity of data and whether it was suitably accurate. Whilst there was recognition that the updates had improved the fidelity, and a workshop with participants could support improved fidelity in the future.

"more accuracy is something that I would hope to see"

Understanding Data

There were some negative remarks about difficulties in understanding the dataset, as well as the absence of a comprehensive data schema or data dictionary. The inclusion of sample datasets, along with more detailed schemas and dictionaries, would have been helpful.

"More detail on the data spec to show what the data is like, as well as how the environment operated."

Success Criteria: Data Trust

The data is considered quite realistic, particularly for a synthetic dataset. However, there are criticisms due to predictability and limited representation of real life scenarios. More detail on assumptions would be useful.

Realism

The opinion of the realism of the data was mixed, but the majority positive. There was an appreciation on the difficulty of creating a completely realistic dataset and that the APP dataset did a relatively good job.

"It's never going to be absolutely perfect. It's synthetic."

"After doing some experiments with the data it looked realistic."

Criticisms and recommendations centred on the data being occasionally too predictable and too perfect. There were also some attributes that were not accurate representatives of accounts, fraudsters, or fraud victims. Additionally, there was concern about transitioning from synthetic data to real data.

"It's probably quite easy to find all the fraud."

"It probably takes a bank to help them make it more realistic, and the more more realistic it could be, the better it would be."

Assumptions

Greater clarity regarding the inputs, assumptions, and transparency of the data would benefit participants uncertain about its realism. There were also concerns about whether the data was outdated and if it had been verified by banks and telecom providers.

"It would be useful to get more understanding on which statistics they use to generate their data and what assumption they made."

Success Criteria: Innovation Support

The promotion and ease of innovating with the dataset is excellent. Using the dataset made users develop new ideas and think more laterally.

Ideation and access to data

The dataset offered an excellent environment for participants to explore new ideas and think more creatively about fraud. The breadth of the data and the wider context it provided were particularly useful for new innovative approaches. Some participants noted that the dataset helped them better prepare for the future by considering the types of data they may have access to later on, that they don't currently have.

'It was amazing just to think just how many different light bulb moments I had."

"What's interesting about this data set, it gives you a view of other elements. That's quite interesting from an innovation angle."

"This has been a learning experience from a software engineering point of view."

Testbed

Additionally, the dataset offered a valuable platform for experimentation, enabling participants to develop and test products or models.

"It allowed us to create demos to explain our technology, which is very difficult."

Success Criteria: Collaboration

The events were excellent and provided an opportunity to collaborate. There is desire to build a more proactive and collaborative wider community. Data collaboration and sharing is a huge opportunity.

Community and events

There were moments and events that brought together sandbox participants, academia, regulators, potential customers, and others interested in APP fraud, which were positively received by interviewees. Collaboration among these stakeholders was a crucial aspect of the project. This interaction was seen as beneficial for generating ideas, engaging with clients or partners, and bridging gaps between different groups.

"You get a sense of how other businesses are using the data which sparks off ideas for you. You get to talk to the regulators, and you get to know your potential clients, and the user community."

Opportunities to present at events were important to many participants and some felt there was insufficient time to showcase their findings.

Several participants felt there should have been more opportunities for collaboration and interaction. While the responsibility for this doesn't rest solely with the FCA, greater facilitation of these opportunities to build the community would have been appreciated. For example, facilitating more roundtables or holding some events in different locations in the country.

"We could maybe have more group catchups that would have been quite useful, because then every time we got face to face, we were having discussions about data, what we're finding out, and how we're using it."

Data

There is a desire to have more collaboration around data with opportunities in data sharing. This is both important for validating and confirming the quality of the synthetic data sets, but also for enriching and improving data through combining data sets.

"I would like to see like a safe place for us to collaborate with data."

"Combining a synthetic or an industry data set with our data could be super powerful."

"Datasets are not aligned on the same level. There is a struggle to get everything aligned."

Success Criteria: Market Impact

Either directly or indirectly, all businesses felt there was a market impact from using the dataset, particularly through increased credibility and ability to externally validate apps.

Credibility

The greatest impact the APP dataset had on businesses and their development was providing credibility. The dataset offered participants a space to prove or demo their products to prospective clients. The credibility of working with the FCA opened doors for participants who are now in discussions with banks, telecom companies and other potential customers.

It makes companies, like the banks, listen, because they can see a company's been admitted into the FCA sandbox, and they're playing around with FCA synthetic data."

"We can show we did it in this instance, therefore you should buy our services."

"If we hadn't gone through this process with this data, we would not be having those conversations with large banks."

Product development and access to data

Not all participants felt the dataset directly supported a product development, however some did. Particularly businesses that had no access to any large datsets.

"I think it's a great starting point for a lot of industry practitioners without access to their own data."

Validation

Whilst not all participants felt the dataset directly developed a product, it did prove to be very useful for businesses looking to validate apps or models. The independent nature of the dataset meant businesses had another way of proving or testing their products.

"It allowed us a great a degree of rigor. It's external proof."

"It's definitely helped us gain some confidence."

Marketing

Some participants felt the FCA and the programme could do a better job at marketing the participants and their products. More exposure at events, articles, or online marketing from the FCA were mentioned.

"It would be nice if the FCA could communicate a bit more about the projects involved, give us a bit more spotlight."

"We have seven minutes to cascade our results and convey them to the audience. And that's quite a short amount of time."

Conclusion and Recommendations

APP Fraud Dataset Scoring

Market Competition
Good

Data Quality
Excellent

Data Trust
Okay

Market Impact
Excellent

Collaboration
Excellent

Innovation Support
Excellent

SUCCESS CRITERIA

Scoring based on frequency of positive feedback as a % of total feedback

Very Poor   **Poor**   **Okay**   **Good**   **Excellent**

23

APP Fraud Dataset Recommendations

Project Overview

1. Improve the marketing of the dataset and provide samples of data and other sales "hooks".

2. Closer facilitation of the mentor programme to find better matches for businesses and organise AMA group sessions.
3. Set goals and deadlines to promote engagement.

Market Competition

1. Develop an easier way of using the data to increase speed, usability, and opportunities to combine datasets.
2. Provide a more detailed data schema, data dictionary, and data samples.

Market Impact

1. Increase marketing opportunities for participants on social media.
2. Create more opportunities at showcases and events.

Data Quality

1. Continue to make improvements to the dataset in terms of fidelity and enrichment.
2. Increase the size of the dataset.
3. Workshops with participants and industry stakeholders to improve fidelity and enrichment.
4. Increase engagement after data updates.

Collaboration

1. Work on opportunities for data collaboration with participants or third parties.
2. Facilitate a more collaborative community by holding more events and creating the means for collaboration both in person and online.

Data Trust

1. Improve transparency and communication behind assumptions and inputs.
2. Workshops with participants and industry stakeholders to improve fidelity.

Innovation Support

No recommendations

SUCCESS CRITERIA

APP Fraud Dataset Users

APP Fraud Dataset Users

- Abducere
- Aptitude Global
- EKAI
- Feedzai
- FinCrime Dynamics
- Finexos
- Fintelligenx
- Kroo Bank
- LexisNexis
- Malverde
- Natwest
- Resistant AI
- Tazama
- Trident AI
- University of Nottingham
- Verifoxx

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