



Global
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Public Transport Exchange Data Trust

Intermodal Transport Data Sharing Program for Exchange Square Public Transport Interchange

Summary

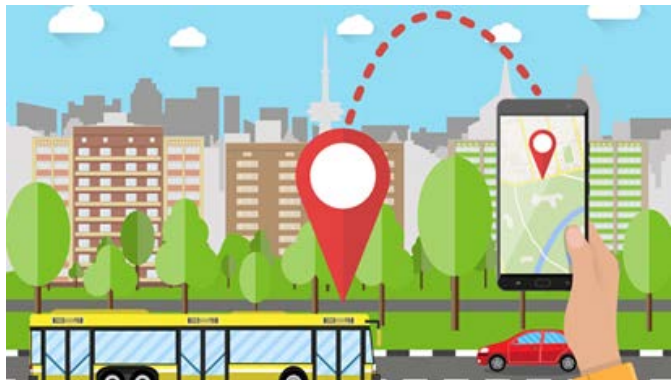
This case study was developed as part of *Effective Data Sharing: Beyond Platforms*, a study conducted by Athena Infonomics and commissioned by the Global Partnership for Sustainable Development Data. This project was made possible by a grant from Google.org.

Hong Kong's public transport comprises taxis, MTR (Mass Transit Railway), buses, minibuses, and tramways. Although the MTR is government owned it is run as a commercial lines and each of the other transport operators are privately owned, and there is limited data sharing between providers. The Smart City Blueprint, 2017 emphasised the need to integrate data sharing in public transport, focused on Intermodal Transportation. Intermodal Transportation services mean completing the trip of passengers from their origin to their destination using two or more means of transport in a manner

where all modes included in the transportation process are efficiently connected and coordinated through the exchange of information – in effect, providing planning, booking, ticketing and payment on a single interface. This is associated with increased economic efficiencies and environmental sustainability arising from connected, streamlined, and coordinated transportation services.

To give passengers a seamless experience through inter-modal transport, it is imperative to break the siloed datasets of various transport operators to enhance multistakeholder partnerships. However, private players were reluctant to share their proprietary data for commercial reasons; While a broader lack of precedence for data sharing amongst stakeholders within the regulated environment was also hampering efforts to formulate evidence-backed policies for intermodal transport.

A Data Trust at the Hong Kong University (HKU) was established as a Proof of Concept (POC) to overcome this barrier in real-time data-sharing based on a trusted third-party model that encouraged Data Controllers (public transport operators) to securely share their data with the Data Trust/Data Processor on arrivals and departures from a public transport exchange hub – “Exchange Square Public Transport Interchange”. The Data Trust, acting as a Data Processor aggregated the anonymised data and further processed it with the help of the Technical Data Analytics Service Provider (TDASP) to draw insights on the viability of implementing intermodality in public transport. This case study showcases a model of data sharing achieved through a trusted third-party model.



Facts and figures

Duration: 2017 to October 2021. Phase 2 Ongoing

Sector: Public Transportation

Typology by use: Public Sector Design and Delivery

Geography: Hong Kong

Governance Structure: Data Trust

Number of Entities Involved: transport operators plus 600 (Approximately) stakeholders

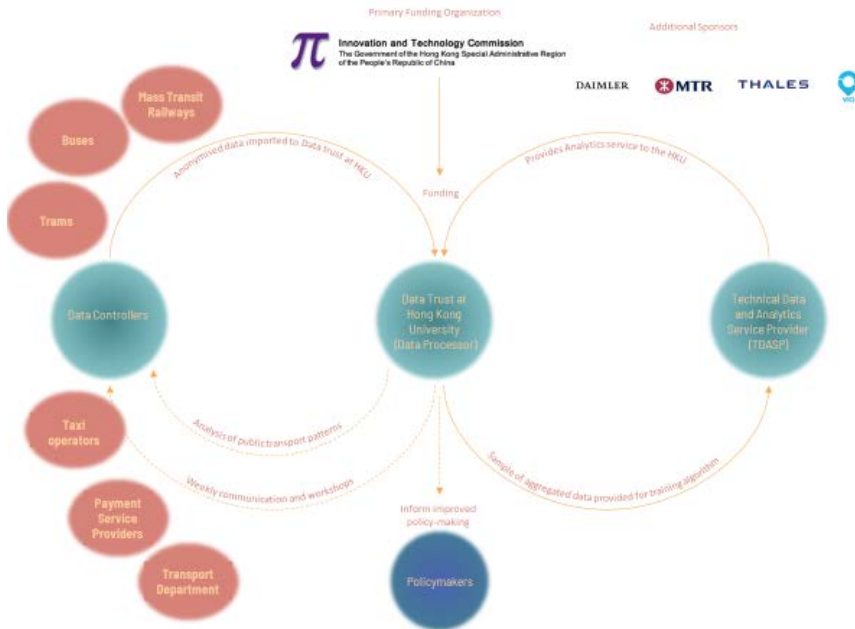
Ownership: It was situated in HKU with assistance from the Faculty of Architecture, the Department of Urban Planning and Design, and the Information Technology Services unit.

Funded: by the Government's Information Technology Fund

Key Challenge(s) that the initiative was trying to solve

- Contribute towards evidence-based policymaking for intermodal public transport in Hong Kong.
- Create a Data Trust Proof Of Concept to pave the way for future data sharing in Hong Kong.
- Build a trusted environment based on a technical and contractual framework, between the Data Controllers and the Data Processor to encourage data-sharing by multiple Data Controllers.
- Recognition of the potential commercial value attributed to data disclosed by the Data Controllers and the need for a trusted regime as host for such data

Data Sharing Structure



Data Sharing Approach

The critical problem in promoting data sharing was the commercial sensitivity of the data and a problem of trust to be overcome between multiple commercial transport service players and a lack of a framework to govern data sharing. A Data Trust was tried as a Proof Of Concept (POC) owing to the cultural and historical acceptance of a trusted third-party framework for sharing data. In Hong Kong, individuals can access the entire public transport system through a prepaid stored value means of payment – the Octopus card. This card results in transaction data sets from each transport service provider that are separately processed by the Octopus Card Limited, an organisation owned by various parties including the transport service providers themselves. Similarly, internet service providers in Hong Kong have in the past used the Chinese University of Hong Kong as a trusted third party to transit traffic between domestic and overseas parties for achieving commercial objectives.

“The model that I thought that might work in Hong Kong was Data Trust – if one looks at the history of the transport sector, the Octopus card works. It was created and owned by the transport companies acting effectively a trusted third-party provider.”

Considering the lessons of positive data sharing through a trusted third-party intermediary, HKU created a Data Trust as an entity with a fiduciary responsibility to the Data Controllers and the technical capacity to analyse and process the data.

Governing this framework were two MOUs for data sharing – one between a Data Controller and the Data Processor and the other between the Data Processor and Transport Data Analytic Service Providers (TDASP). Under the terms of this framework, the Data Controllers shared their anonymised data with the Data Trust (Data Processor). The Data Trust aggregated the anonymised data and further processed it with the assistance of TDASP. The data sharing was facilitated by a clear contractual framework, constant communication with the stakeholders and open avenues for feedback. A draft Code of Conduct was also developed for consultation that described the rights and responsibilities of each party to other parties.

“We went out of our way to not gain publicity but to tell people what we were doing through stakeholder consultations. The most crucial bit was stakeholder consultation to tell them what we were doing and how we were doing it. Monthly newsletters went to over 600 stakeholders to explain where we were. There was a weekly meeting that a stakeholder could join. There were various monthly interest group discussions, for ex., on the environment and foreign experience, to get feedback and suggestions.”

What were the key considerations in designing the initiative?

1. Establishing Trust: Since the entities pooling the data could be competitors, it was crucial to build consensus on the use-cases of the data shared and processed with the Data Trust. Consistent communication was the key here. For 18 months before launching the program, stakeholders were invited for discussions to agree on the potential use cases that would be explored from the aggregated data. Before launching the project, HKU organised three separate workshops – one for government agencies, one for transport business entities, and third for everyone else. Subsequently, a round-table conference on subjects such as privacy was organised. These stakeholders’ consultations allowed different players to engage with each other, understand the uses of data sharing and provided a forum for effectively exchanging concerns. The consultations also served as a forum for learning and innovation where global teams working on intermodal transport were invited to share their experiences.

“It was a consultation-intensive approach. There were knowledge cafes which brought in different players in the ecosystem where we created and deleted the ideas. It took us 18 months to reach the tipping point of establishing sufficient trust for the data sharing environment to operate for a specific well-identified research purpose.”

2. Developing a trusted data-sharing framework: Once onboarded, the Data Controllers had to be assured of the safety of their data. Outlining a data-sharing framework that would secure everyone’s data was paramount. The two MOUs between Data Controllers, Data Processor and the TDASP offered agreed-upon rules which assured stakeholders of the protection of their data. The critical safety provisions in the data sharing framework were:

- **Data Storage** – After the data-sharing program, the Data Processor would not be in possession of data. At the end of the research period, the Data Processor would destroy all data received from the Controllers and provide evidence for the destruction. [Note: a fu-

ture development might involve an ongoing Data Hub of data sets to be added to by third parties.]

- **Access** – Data could only be used for research purposes. Data of one Controller could not be transferred to another Controller. Ownership - Each Data Controller remained the owner of the data it provided; the Data Processor could not copy or otherwise infringe any rights that the Data Controllers may have in the data.

“The core idea was not to create an IT platform but a trusted environment. We felt the need to underpin standards and regulations to bring reliability, predictability, and gain trust – we knew this was a critical enabler.”

Financial Sustainability of the initiative

The proof-of-concept was funded mainly by a grant from the Innovation and Technology Commission (The government of the Hong Kong Special Administrative Region of the People’s Republic of China) with supporting sponsorship from the MTR, Daimler, Thales and Via. External funding was necessary for the proof of concept. However, models for financial sustainability can be explored once the model reaches sufficient scale. Since the model seeks to reduce participants’ operation costs and improve efficiency in the transport system, the potential for a self-sustaining financial model exists in the future.

Lessons Learned

- **Collaboration and trust are mutually reinforcing agents** – collaboration leads to increased trust, and increased trust leads to further collaboration. In the present case, the previous collaboration among the transport operators through the Octopus card program had established a model that participants were familiar with. An extensive effort was undertaken to communicate with all stakeholders and building a mutually agreeable legal framework was crucial in fostering trust and collaboration. The team at HKU worked with the data partners for nearly 18 months, developing a

data sharing framework that would allay the privacy and security concerns of the data controllers.

- **Developing a legal framework for data sharing was a pre-condition for the initiative's success.** However, it is essential to note that building a consensus around a data-sharing framework where there had been no precedence in an environment that include private sector participants, can be an onerous and iterative process requiring extensive investment in time and resources.
- **Identifying specific use cases helped improve buy-in from collaborators.** Owing to the divergent interests of the collaborators, it was essential to have a goal-directed collection, sharing or processing of data. In this case, it was helpful to develop use cases through consultation and to demonstrate how these use cases will be achieved through data sharing.
- **A policy push by the government can provide the necessary momentum to the initiative.** While there was initial reluctance to share data, The Hong Kong Smart City blueprint of 2017 had recognised the need for data sharing which provided the context for the Inter-modal Transport Data Sharing Programme to alert stakeholders to consider the benefits of data sharing and take the POC seriously. Global experience also validates the importance of support from the public authorities in developing inter-modal transport solutions.
- **Mid-course corrections must be accounted for.** Despite the detailed data sharing framework, there were some technical issues with software compatibility for data aggregation. A mid-course correction was made to improve the quality of data sharing. Adaptability to new technical processes must be built into the process.

The Data Trust 1.0 was a proof-of-concept that proved that transport players in Hong Kong could securely share their data with a single trusted party to enable various analytics activities and potentially help improve transport planning. The experience highlighted the importance of investing in relationships before starting the initiative.

The success of Data Trust 1.0 has paved the way for Data Trust 2.0. This programme points towards the utility of initially establishing a data-sharing programme as a proof of concept to identify and account for the possible flaws in the design.

Sources

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Stakeholder Interviews