Speaker 1: Welcome to the MIT CISR research briefing series. The Center for Information Systems Research is based at the Sloan School of Management at MIT. We study digital transformation.

Joaquin Rodrigu...: Hi, I'm Joaquin Rodriguez, Assistant Professor of Information Systems at Grenoble Ecole de Management, and a current research collaborator with MIT CISR. Today I'm excited to share with you the November 2021 research briefing that I co-authored with Gabriele Piccoli and Barbara Wixom, “Increase Data Liquidity by Building Digital Data Assets.”

Future-ready companies monetize their data assets by **improving** processes, **wrapping** products with analytic features and experiences, and **selling** innovative information solutions. MIT CISR research has found that data liquidity, the ease of data asset reuse and recombination, accelerates the pursuit of new data monetization opportunities.

Data liquidity varies along a continuum. One data asset might be more or less liquid than another, with highly liquid data being more prepared for planned and unplanned new value creation opportunities. Google Maps is a familiar service based on a highly liquid data asset. The data asset represents map information that can be reused and recombined for innumerable value creation initiatives, for example, root optimization) by numerous firms (such as rideshare company Uber).

Data often is illiquid because it is trapped in local business processes, closed platforms, or obsolete data structures; it requires movement, consolidation, or translation; or it is constrained by regulation, organizational boundaries, or technical limitations. Incumbent banks, healthcare organizations, and companies with long-established business models are often mired in illiquid data assets.

Increasing the liquidity of a data asset can be a costly, labor-intensive endeavor. Yet having liquid data is critical for organizations that hope to respond quickly to novel value creation opportunities. In our May 2021 research briefing, we explain that companies can increase data liquidity by investing in the company’s data monetization capabilities. My and Gabe Piccoli’s theoretical work identified a second approach: building **digital data assets**, or DDAs.

**The structure of digital data assets**

A DDA is a digital resource structured to eliminate friction in asset level reuse and recombination. DDAs result from the purposeful design and deployment of data assets with three structural elements: *value*, *modularity*, and a *programmatic interface*. These attributes produce extremely high liquidity and offer companies an unprecedented degree of reuse and recombination potential.

**Value:** DDAs possess significant value creation potential when they are important for successfully executing data monetization use cases. Google Maps is based on a DDA that exposes map data, which thousands of companies use to carry out improving, wrapping, and selling use cases. Google captures some of the value that these companies create by selling ads served alongside mapping results or charging a fee each time the DDA is accessed. In 2019 one analyst estimated that Google Maps revenue would exceed $11 billion in 2023. Rideshare company Uber alone paid Alphabet about $58 million during 2016 to 2018 to enable mapping services reliant on the Google Maps DDA in Uber's mobile applications.

 **Modularity:** Data asset owners abstract DDAs into modules to enable companies’ reuse and recombination of the data. Use of modular data assets requires minimal information about the assets’ inner workings. Any third party can use and reuse the assets without specific knowledge about their native technology, data architecture, or other structural elements. DDA users follow explicit use specifications that the DDA owner provides to draw on the black box asset and thereby create value. In the case of the Google Maps DDA, companies such as Uber integrate the DDA into their initiatives by following use specifications for the Google Maps API. In 2020, the Google Maps modularity enabled five billion Uber trips.

 **Programmatic interface:** DDAs are encapsulated within an interface that enables code-based data interchange between systems. The interface manages the DDAs’ technical requirements and the governance rules by which the DDA users must abide. Interfacing with the DDA is automated, so the ability of the DDA owner to scale to additional third parties is limited only by the technical context. The interfaces associated with the Google Maps DDA are combined into the Maps Software Developing Kit, or SDK, available for both iOS and Android, and the Maps JavaScript API. These interfaces automatically manage access to Google Map servers, map display, billing, and service level agreement oversight, thus eliminating the need for manual involvement and coordination by Google.

 **Digital Data Assets at Santander, a case of open banking**

In 2018, two European regulatory bodies introduced banking regulations that required finance institutions to share customer permission data about individual and business bank accounts with licensed third-party providers, or TPPs. In effect, the Europeans Commission’s Revised Payment Services Directive, referred to as PST2, and the Open Banking initiative from the UK's Competition and Markets Authority encouraged banks to create digital data assets by requiring that banks share their data assets via open, secure, and standardized interfaces.

 To comply with the regulations, most incumbent banks had to consolidate multiple systems of record, resolve data and technical conflicts, and abstract DDA users from the internal complexity of highly integrated legacy systems.

Initially TPPs struggled to access and use the shared data assets because they were not yet offer as DDAs. Swedish fintech Tink, for example, reported the need to resolve unexpected interdependencies with bank systems by manually coordinating with the banks “through lengthy email threads, conference calls, and WhatsApp text exchanges.” When first exposed, banks’ account data was neither modular nor fully encapsulated in a programmatic interface, leaving innovators like Tink to “make a connection, call the bank, and wait for their approval.”

 Over time, however, banking institutions increasingly succeeded in structuring customer account and transaction data as DDAs. For example, Santander group is a Spanish financial group founded in 1857 and headquartered in Madrid. The company serves more than 140 million corporate and private customers worldwide. Santander UK, the British subsidiary of the group, made its customer account and transaction data available to a digital data asset product called Account and Transactions V3.

 **Value:** Account and Transactions V3 creates value by providing transaction level and account level information for use by TPPs, which include startups and direct competitors. For example, the startup Coconut’s core product is a bookkeeping app that accesses Santander's UK customer account data to help the self-employed track income, claim expenses, and calculate taxes. Barclays, a British banking competitor to Santander UK, leverages the Account and Transaction V3 product to offer its own customers access to accounts held with other financial institutions via the Barclays mobile app. Moreover, like TPPs, Santander UK’s own initiatives can access the DDA to create value via reuse and recombination.

 **Modularity:** TPPs can integrate Account and Transactions V3 into their initiatives without specific knowledge of the technology used by Santander UK or the internal structure of the Account and Transaction Data being exchanged. TPPs refer to Santander UK's published data exchange protocols to make use of the DDA with expectations shaped by pre-specified service level agreements.

 **Programmatic interface:** TPPs access Santander UK's Account and Transactions V3 product without requiring physical or manual involvement from the bank’s engineers, managers, or operational staff. Rather, Account and Transaction V3 exposes data programmatically via an API that adheres to the Open Banking API specifications. The interface details technical specifications (for example, REST endpoints) and governance rules (such as GDPR compliance) that TPPs must follow when using and reusing the DDA.

 **Data liquidity built via digital data assets**

Historically, companies have increased their data liquidity by investing in enterprise data monetization capabilities. Today, technological advancements, such as cloud computing, multicluster technology, API gateways, and shared data architectures enable liquid data at the data asset level. At the core of such technologies is the ability to scale storage, compute, and service layers both independently and interdependently, as opposed to traditional data management technologies that have fixed compute and storage resources. Such breakthroughs are central enablers of data liquidity.

 Our theoretical work and early observations suggest that digital data assets unlock unprecedented levels of data liquidity. Before engaging in DDA creation, however, companies need to be clear about how they will monetize the data and how they intend to capture value from associated monetization activities. One option is to expose DDAs for internal use before unleashing them externally. For example, before exposing DDAs for external consumption. Banco Bilbao Vizcaya Argentaria, commonly known as BBVA, experimented years ahead of the introduction of PSD2 with configuring data assets for internal consumption. This approach has the dual advantages of ensuring that a data asset can be manipulated without requiring manual or ad hoc coordination and that the company can capture some of the value the data asset creates. Configuring a DDA initially for internal use facilitates the identification and resolution of existing interdependencies between the data asset, other data assets, and business processes. And a DDA used internally permits full visibility of the data asset’s reuse and recombination potential by way of comprehensive performance metrics that monitor internal initiatives.

Speaker 1: Thanks for listening to this reading of MIT CISR research and thanks to the sponsors and patrons who support our work. Get free access to more research on our website at cisr.mit.edu.