



FUEL DYNAMIC CAPABILITIES USING LIQUID DATA ASSETS

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MIT CISR research has identified that top-performing companies are more effective at building dynamic capabilities.¹ Dynamic capabilities represent a company's ability to leverage powerful, readily accessible technologies to navigate rapid change via three mechanisms: sensing, seizing, and transforming. Companies with strong dynamic capabilities are able to pivot during a crisis, experiment with new digital business models, and develop new digital offerings.

Notably, to enable such dynamism, the company must have created **liquid data assets** that can be reused and recombined easily (i.e., quickly, at low cost and with low effort). A liquid data asset is *a cohesive set of data that a company has made accurate, available, combinable, relevant, secure, and readily usable for future value creation*, such as by adopting data monetization capability practices or building digital data assets.²

To enable strong dynamic capabilities, a company must have created liquid data assets: cohesive sets of data specially prepared for easy reuse and recombination.

Since 2019, MIT CISR researchers have studied data liquidity and its relationship to data monetization.³ This year they came to recognize that highly liquid data assets help companies exploit their dynamic capabilities to sense and seize business opportunities and transform organizational struc-

tures and resources accordingly.⁴ At the same time, in the process of exploiting dynamic capabilities, companies develop their liquid data assets so that they grow in value creation potential over time. Figure 1 illustrates this virtuous cycle. In this briefing, we explore the relationship between a company's dynamic capabilities and its liquid data assets using the case of information solutions provider Healthcare IQ.

HEALTHCARE IQ NAVIGATES RAPID CHANGE

Healthcare IQ⁵ is a privately held data and analytics company that competes in the data analytics industry. For over thirty years the company's primary customers have been hospitals that need help managing and making sense of their data. Healthcare IQ provides its customers with information solutions that vary from data preparation and reporting to analytics and advisory services. At the heart of the company's offerings are two key data assets: a hospital supply chain data asset (detailed records of historical hospital spending) and a product catalog data asset (a comprehensive catalog of medical products).

The hospital supply chain data asset, sourced mainly from Healthcare IQ customer hospitals, contains records of what the hospitals have historically spent on medical products. This data asset includes records of \$30 billion in longitudinal annual spend data collected from the 2,400 healthcare facilities associated with Healthcare IQ's customer hospitals. Supply chain data includes data found in hospitals' invoices,

1 S. L. Woerner, L. Owens, and C. M. Beath, "Build Eight Dynamic Capabilities for Digital Business Model Change," MIT CISR Research Briefing, Vol. XXI, No. 8, August 2021.

2 J. Rodriguez, G. Piccoli, and B. H. Wixom, "Increase Data Liquidity by Building Digital Data Assets," MIT CISR Research Briefing, Vol. XXI, No. 11, November 2021.

3 Read about these concepts in B. H. Wixom and G. Piccoli, "Build Data Liquidity to Accelerate Data Monetization," MIT CISR Research Briefing, Vol. XXI, No. 5, May 2021.

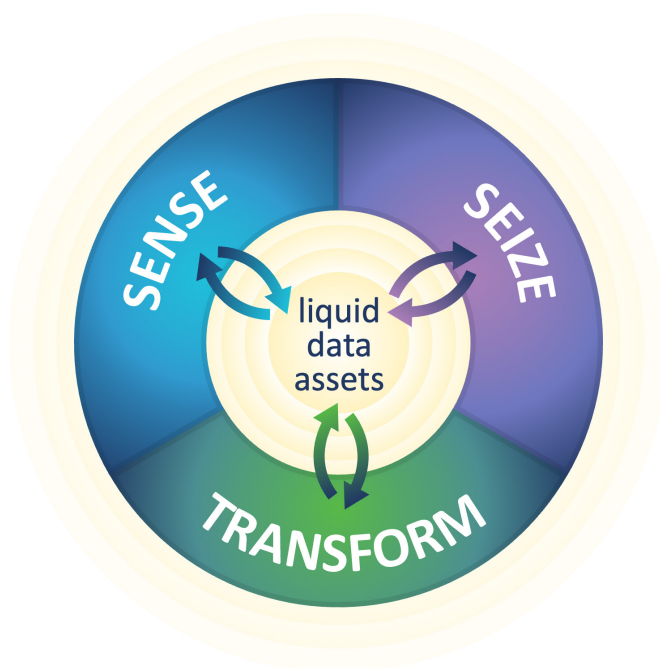
4 In 2022, the MIT CISR data liquidity research included thirty-three interviews with members of the MIT CISR Data Research Advisory Board and conceptual development described in Gabriele Piccoli, Joaquin Rodriguez, Barbara Wixom, and Ida Someh, "Data Liquidity: Conceptualization, Measurement, and Determinants," Proceedings of the International Conference on Information Systems (ICIS), December 2022 (forthcoming). The research was informed by MIT CISR's information solutions research, which included longitudinal case data about Healthcare IQ.

5 See additional detail on Healthcare IQ's transformation over the past decade in B. H. Wixom, C. M. Beath, Ja-Nae Duane, and Ida A. Someh, "Healthcare IQ: Sensing and Responding to Change," MIT CISR Working Paper No. 458 (forthcoming).

purchase orders, pricing contracts, item and vendor master files, electronic health records, and payor reimbursements. Once Healthcare IQ has blinded and aggregated the pricing and cost data, the company's contracts with its customers give Healthcare IQ ownership of the data it manages and allow the company to use the data for benchmarking and analytics purposes.

The product catalog data asset indexes medical products along with their attributes and relationships, and calculated benchmarks such as average pricing and average reimbursement amount. This data asset contains data on nearly six million unique healthcare products produced by more than 25,000 manufacturers. Healthcare IQ builds the product catalog from spend data provided by the company's customers, as well as from product data originally provided by distributor and manufacturer partners but more recently scraped from manufacturer catalogs and other internet sources. In its early years, Healthcare IQ staffed a large content team of domain experts, including former hospital procurement analysts and healthcare clinicians, to update, validate, and enrich the company's product data. After the company shifted to collecting product data from thousands of internet sources, its engineers created an AI-based process using natural language processing algorithms and machine learning to do almost all this work. Today, a smaller content team helps with model training and other tasks requiring human attention.

Figure 1: Liquid Data Assets and Dynamic Capabilities—A Virtuous Cycle



Healthcare IQ customers access the hospital supply chain and product catalog data assets using a suite of software tools that the company regularly upgrades with new and better reporting and analysis features. Customers use the tools and data assets to identify ways to save money and improve the quality of medical care.

Healthcare IQ assigns each new customer a customer care representative who ensures that the customer achieves desired savings goals from Healthcare IQ offerings. The representative monitors the hospital supply chain data asset to identify where the customer is realizing cost savings and where additional opportunities exist.

When Healthcare IQ customers need additional assistance using the company's self-service tools and data assets, they contact the IQ Center, Healthcare IQ's team of financial and clinical analysts. During the COVID-19 pandemic, the IQ Center experienced a substantial spike in information requests from customers with pandemic-related supplies questions. In many cases, IQ Center staff were able to draw answers from the hospital supply chain and product catalog data assets, which together maintain what products are being used in a hospital and by whom. For example, to help a customer seeking substitutes for products in short supply, IQ Center staff could reference the data assets to surface alternatives in use elsewhere in the hospital.

IQ Center staff also flag potential improvements in the assets. For example, when the US government introduced new value-based care legislation that pressured hospitals to manage costs relative to clinical value, Healthcare IQ customers started asking new questions about cost savings in the context of patient health outcomes. Customer requests helped Healthcare IQ understand that it needed to extend its hospital supply chain data asset to include outcomes from electronic health records and payor reimbursements.

Healthcare IQ's business development staff routinely meet with current and potential customers, listen to their strategic supply chain management needs, and describe the company's data assets and tools. These staff pay close attention to what resonates, as unmet needs represent opportunities. For example, in one such business development meeting, Healthcare IQ discovered that its ability to organize and quickly make sense of a hospital's data was appealing to professional services firms that specialized in helping hospitals manage their costs. Such firms commonly engaged in tedious and time-consuming data wrangling before they could begin performing high-value analysis and advisory services—and Healthcare IQ's data management services could eliminate weeks of data wrangling. In 2016, Healthcare IQ established an arrangement with one pro-

professional services firm to transform client data for the firm's consultants. The consultants would provide six-to-twelve months of a client's data to Healthcare IQ, which would then integrate, standardize, and curate the data, and produce a report of cost savings opportunities. The consultants would review this report with their hospital client and propose an action plan to achieve cost savings. By 2022, Healthcare IQ had parlayed this set of services into a standalone service line that the company now provides to multiple consulting firms.

DATA ASSETS FACILITATE DYNAMIC CAPABILITIES

In the past decade, Healthcare IQ pivoted during a pandemic to fulfill novel user needs, launched a new service line to support multiple consulting firms and their hundreds of hospital clients, and evolved its technical resources dramatically. The company overhauled its product catalog with internet-sourced and publicly available data, then used automation and AI to streamline core data management processes. To accomplish these things, Healthcare IQ leveraged the company's dynamic capabilities, facilitated by its data assets, to sense and seize business opportunities and transform organizational structures and resources. At the same time, the company has grown and improved its data assets—increasing their record counts, fine-tuning records and adding fields, and expanding the assets to include new related information such as reimbursements.

Data assets grow and improve as they facilitate ...

... sensing new business opportunities. Like Healthcare IQ, companies can use their data assets to sense how well they are serving customer needs and where offerings may be falling short, exploiting data assets to assess customer value realization and to create new reports and analyses. As offerings' unmet needs surface data asset shortcomings, a company learns how to grow and improve its data assets to fill important gaps. For example, Healthcare IQ learned that it needed to augment its hospital supply chain data asset with data about product utilization to answer newly important questions about product utilization and clinical outcomes.

... seizing new business opportunities. Companies can use their data assets to serve new markets in new ways—and yet, to seize new opportunities, companies often must improve their data assets with more or new data. Healthcare IQ leveraged its pre-existing data assets to create a service line for consulting firms that advise hospitals on cost management opportunities. This opportunity is paying off in additional data—each consulting project delivers a snapshot of up to a year's worth of a hospital's spend data—that enriches both of Healthcare IQ's data assets.

... transforming the company. In the process of making structural and resource adjustments, companies often must revamp their data assets. Automated data management practices can allow organizations to continuously refresh their data assets and increase their liquidity. When manufacturers, regulators, and other organizations moved their product information to the internet, Healthcare IQ created automated processes to update its product catalog. Healthcare IQ's existing product catalog data asset was critical to standing up the new capability, as the company's engineers leveraged it to train AI models for the new processes. The resulting AI-based data ingestion processes improved the currency, representativeness, and completeness of the product data asset because the new data sources were ingested more frequently and from more manufacturers and included a larger number of product characteristics.

Liquid data assets help a company to exploit its dynamic capabilities, which in turn develops the liquid data assets so that they grow in value creation potential.

LIQUID DATA ASSETS FUEL A DYNAMIC COMPANY

Are your data assets ready to help your company exploit its dynamic capabilities to sense and seize business opportunities and transform organizational structures and resources accordingly? Companies cannot exploit dynamic capabilities fully if their people must work with data that is not easy to reuse and recombine; they will spend all their time wrangling data.

But no company can afford to liquify all of its data. Therefore, companies must selectively focus on data that has the most value creation potential. They must liquify data that is broadly relevant and strategically important. Data assets with broad relevance can be exploited many times and in so many ways. Data assets with strategic importance can be exploited in ways that matter a great deal to the company.

A company becomes dynamic when its data-savvy people continuously find ways not only to exploit the company's data assets but also to improve them. Liquid data assets are not static organizational resources; they need to be renewed constantly to maintain relevance in an ever-changing world. Data assets that meet your needs today will not naturally do so in the future. This requires that data-savvy people constantly ask themselves: How do our data assets need to change? What attributes are missing? What related information should we add to our best data assets?

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MIT CISR is funded by Research Patrons and Sponsors, and we gratefully acknowledge their financial support and their many contributions to our work.

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