

Data Fluidity in Healthcare Charting the Course to Efficient Future Care

Fluid Data Landscape

The importance of data as a commodity can hardly be stressed enough, especially in the continually evolving economic landscapes of today. While industries across the board have lapped up the wealth of data to better their offerings, Healthcare Organizations (HCO) are also employing effective ways to explore and harness data for growth.

However, bearing in mind that data is only as good as what can be done with it, it is crucial to ensure information is made available for further processing and action, across the board in a suitable way. This “ability to consume data at any point of exposure within an organization, in the form desired,” is called data fluidity.

Consumption-Driven Fluidity

To illustrate the nuances of data fluidity and consumption, let us examine this fluidity model. This illustration (see Exhibit 1) shows the process of consumption at various points of exposure.

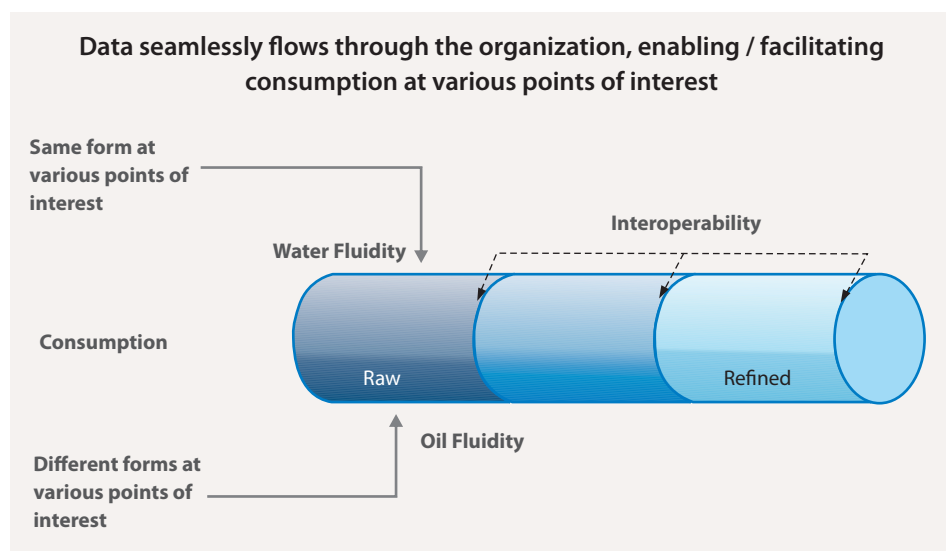


Figure 1 – Fluidity nature of data

It is evident from the depiction that it is not necessary for data to retain or maintain its nature throughout the consumption lifecycle. As long as data is easily available and can be explained in that form, it can be consumed.

To demonstrate this phenomenon, we have chosen two well-known forms of fluids, water and oil (crude). Water fluidity is similar to water flowing through the house, where the fluid is consumed in the same form at various stations/lines of business of an organization without changing its nature. Whereas, oil fluidity is where organizations consume data by refining it into the required form based on their needs, similar to the refining process for crude oil.

To put it in an HCO context, water fluidity might be prevalent in predominant parts of a provider organization. It is critical for the providers to ensure the nature of data remains unchanged in order to fulfill most clinical needs. For example, the lab results of a patient should flow through the system without any change for various consumers such as care provider, financial operations, coding, and patients. Similar explanations can hold good for supply chain data in a provider's system. Needless to say, research organizations in providers resort to water fluidity

more than oil fluidity. In contrast, payer organizations have more need for oil fluidity, where data is consumed at various refined forms, to help with member engagement, understanding high-risk claims, network sculpting, contract negotiation, and credentialing etc.

Cohesive Forces of Fluidity

As described, various organizational forces are required to work in conjunction to enable data fluidity (see Exhibit 2). Key elements include:

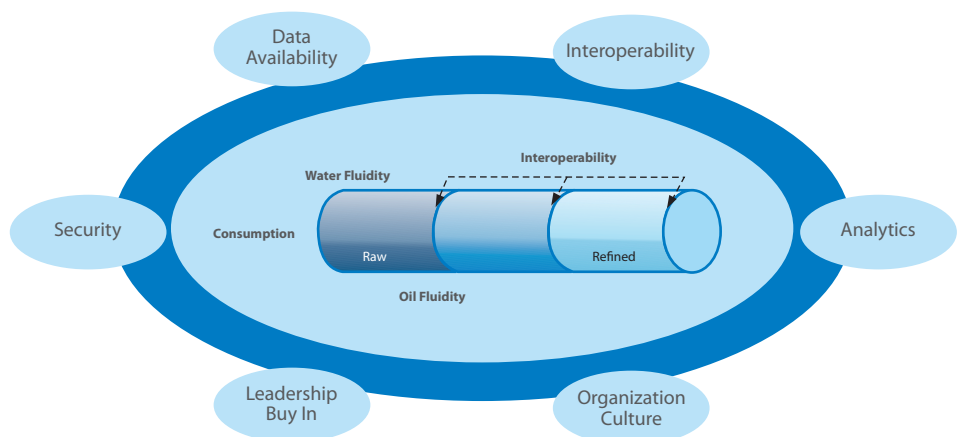


Exhibit 2: Cohesive forces of fluidity

- Regardless of its fluid nature (water or oil), for the data to flow across various points, it needs to be interoperable.
- Data availability is another key factor for data consumption.
- The extent to which consumers can derive insights via data driven analytics indicates the maturity of data fluidity.
- The security design and access policies about data must enable a free flow at various consumption points.
- Organization culture plays a vital role in deciding data fluidity. The organizations that have great appetite for data consumption to move up in the value chain, constantly attempt to enhance data fluidity.
- Vision of organization leadership as well as the commitment towards data-driven initiatives certainly has an influence on the state of data fluidity.

It is our view that all these factors may not necessarily contribute in equal proportions to enable fluidity. The level of contribution varies from organization to organization. This means, the maturity level of data fluidity is not universal but more contextual to an organization. For example, for member

engagement initiatives within payer organizations, analytics and security policies are more important whereas data availability is key for member enrollment functions in payer organizations.

Interoperability as an Enabler

Interoperability, a key enabler of data fluidity, has always been a challenge in the healthcare ecosystem. Traditionally, volumes drove (fee-for-service model) reimbursement/payments rather than care outcomes. This model did not necessitate the free exchange of health information and resulted in increased health costs and waste (e.g. repeated diagnostic procedures). With the focus on an outcome-based models and the introduction of regulatory mandates (e.g. HITECH act in US), data fluidity and thereby interoperability have been recognized as essential factors to healthcare.

Health Data Interoperability and Integration Challenge

Healthcare domain has a complex IT landscape given the myriad software solutions ranging from homegrown to COTS. Additionally, the industry is flooded with standards across the care continuum, when it comes to capturing, codifying, storing, and analyzing the data. All these add to the complexity of the integration. However, data integration for health solutions has become necessary to improve the coordination of care, control costs, and improve outcomes.

The meaning of data needs to be unambiguous for an integrated healthcare system to understand clinical data. Besides, clinical data should flow freely across the integrated healthcare system achieving true interoperability. This can be ensured by an efficient and effective healthcare integration paradigm.

Exhibit 3 depicts the integration scenario in an HCO environment. The inner circle - primary circle of influence - represents the integration across systems under direct operational control of the HCO. Whereas, the outer circle - secondary circle of influence - indicates the integration of data with the outside world, where the HCO has limited or no operational control. Depending on the maturity, the integration can range from utilizing simple crosswalk references to advanced integration allowing standardization such as "semantics/ontology-based integration."

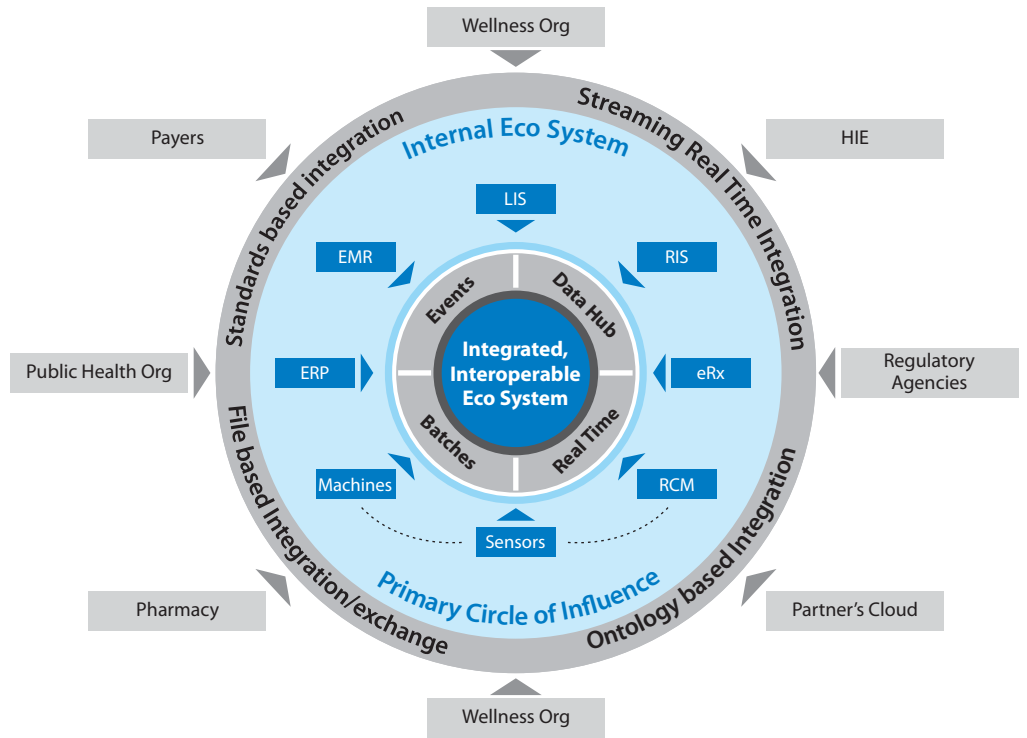


Exhibit 3: Integrated Health Eco System

Interoperability Maturity Map

Figure 4 depicts the maturity spectrum for data interoperability. Within the “high maturity” band of the spectrum, an organization achieves a higher degree of data fluidity. The progression of maturity does not necessarily follow a linear path and depends on the HCO’s specific interoperability demands.

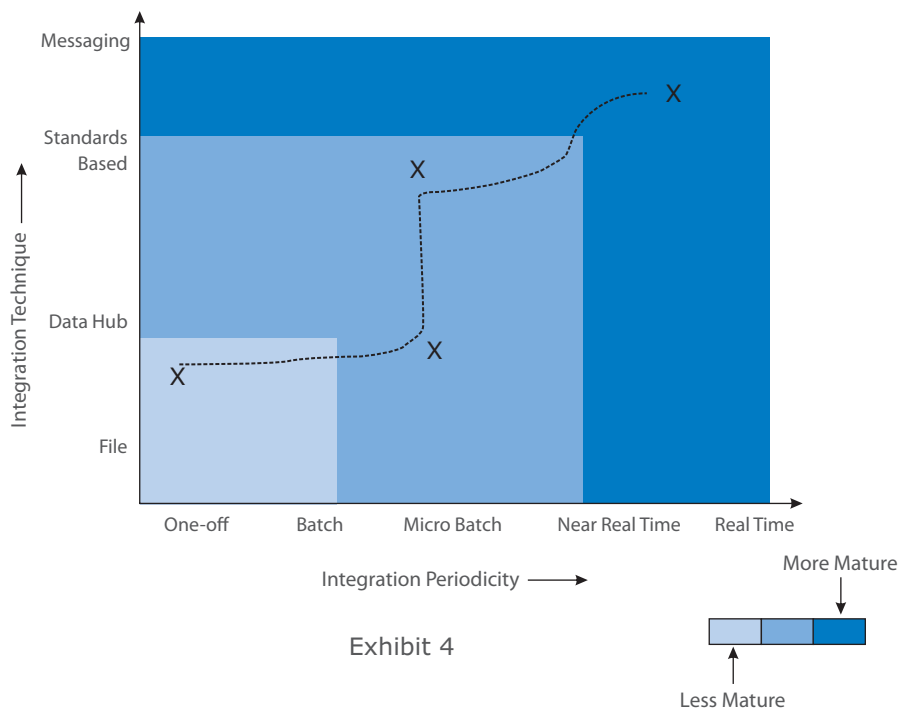


Exhibit 4

As the organization moves into the higher maturity band, the integration of a new system within both circles of influence becomes faster and more straightforward.

Interoperability in High-Order Maturity Space

As seen in Exhibit-4, at the higher end of maturity, interoperability occurs within and outside organizations through messaging in real-time mode. Recent efforts in health data exchange (e.g. 21st CCA, CMS blue button 2.0) emphasize the use of Application Program Interfaces (API) - a real-time data exchange promoting interoperability. This API-based data exchange is further reinforced by encapsulating modern data standards such as Fast Healthcare Interoperability Resources (FHIR). As a result, focus of interoperability is shifting from institution-driven interoperability to patient-driven interoperability where health data exchange is patient-driven or patient-mediated¹. Patients can directly retrieve their clinical data via APIs from a healthcare organization and share with other organizations directly. Through APIs, FHIR enables data-level access and makes the interoperability much faster and efficient.

Few studies/researches that focus on leveraging blockchain technology to facilitate health data exchange indicate the next phase in this journey. One of these studies¹ that alludes to fostering patient-driven interoperability indicates blockchain will enable a centralized and shared mechanism for the management of authentication and authorization rules surrounding data. With patients taking ownership of their health data, they can subsequently assign access rules and permissions around their data, allowing easier sharing. Additionally, patients can publish their own Patient Generated Health Data (PGHD) such as personal health device data, social determinants of health (SDoH) etc.

Journey Ahead

The goal of any health system is to provide excellent care at an affordable cost. We believe data fluidity can play a major role in opening up avenues for new opportunities. In that realm, when interoperability reaches a high order of maturity, it paves the way for accommodating a variety of new meaningful data sets/information that in turn will help derive new insights. With massive increases in data types, sources, and velocity in the healthcare industry, HCOs should assess if their data

integration strategy truly enables data fluidity and thus interoperability across the health system.

One of the widely discussed examples circle around the inclusion of Social Determinants of Health (SDoH). This is one of the few data sets offering visibility outside the health systems. When SDoH is exchanged along with clinical data, it can provide a holistic view of population health in turn driving towards improved outcomes and reduced health costs. Hence, it becomes imperative for the health system participants to be interoperable at a higher maturity level.

Further, organizations should assess where they stand with respect to interoperability standards on their maturity map. The primary circle of influence (internal) should be assessed for the maturity followed by interoperability with secondary circle of influence (external). We will need to look at not just the current needs of an organization, but also the vision for future business strategy and the roadmap. Needless to say, healthcare firms need to conduct periodical assessments to stay ahead of industry trends, regulatory requirements, advancements in technology, evolving customer preferences, and so on.

The rigor and strengthened focus that the healthcare industry is currently placing on creating an integrated and interoperable health ecosystem will certainly drive to incredible digital transformations. This is perfectly in tune with TCS' conceived Business 4.0™ philosophy: enable collaboration with other stakeholders by leveraging ecosystems, creating exponential values, and driving mass personalization to offer customized and contextualized healthcare services/offerings.

References

1. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6068317/> (Blockchain Technology for Healthcare: Facilitating the Transition to Patient-Driven Interoperability)
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6082774/> (FHIRChain: Applying Blockchain to Securely and Scalably Share Clinical Data)

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