



## ENABLING A DATA ECONOMY FOR ENTERPRISE OF THE FUTURE

### Abstract

Digital enterprises will evolve to be connected, intelligent, sentient and have symbiotic relationship with all participants in the emerging digital ecosystem. The Infosys Data Economy enables the hyper-connected ecosystem for Data providers, data aggregators & data consumers with secure data sharing in an efficient manner. This enables the creation of new data-enabled products and services that transcend industry boundaries. This helps realize value from data assets for all stakeholders and capitalizes on platform simplicity and scalability of Infosys and Partner solutions.

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## Introduction

As part of a recent conversation with one of our premier retail clients, we discussed growth of their data landscape, and their interest in assessing and realizing the value from their data assets for Internal and external consumers. They had two paths in front of them, one approach would have been to have traditional Mega data partners (e.g. Nielsen) to process data assets and turn them into insights with a revenue share. The alternate approach was to create a micro-monetization model, unlocking value, retaining the control, and understanding digital consumers better. This seems to be a trend not just in retail but also in many other industries.

In today's digital economy 'Data is the new oil'. As enterprise systems grow in complexity, data is expanding rapidly from on-premise systems, cloud systems, clickstream data, Social media and 3rd party data aggregators. It is estimated that

over 2.5 quintillion bytes (2.5 e+9 GB) of data is created every day. Interestingly, over 90% of this data has been collected just within the past 5 years. Further, data consumption is growing exponentially with multiple consumers, platforms, analytical needs driving innovation in the way data is being consumed, shared and monetized. Complex systems, processing and consumption are creating a complex data fabric running across multiple systems. This is resulting in increased data movement and inefficiencies, as well as lost opportunities in leveraging the data Just-in-time and increasing the complexity of data access and "Total cost of consumption" (TCC) for end consumers.

The Infosys Data Economy offering with partners such as Snowflake addresses Data sharing, information exchange, Mega- and Micro-monetization themes. The Infosys offering addresses the need for

a seamless mechanism bringing together Data providers, data aggregators and data consumers with effective sharing of data and secure consumption with data governance in an efficient manner.

The story does not start and end with bringing publisher and consumer together though it helps in making the initial push. The 'network effect' enables all the stakeholders to create more data products in turn and publish it back. Expanding the number of publishers and consumers makes the data platform richer in content and adoption opening new possibilities in terms of opportunities and collaboration.

The Infosys Data Economy offering helps realize value from data assets for all stakeholders and capitalizes on platform simplicity and scalability of Infosys and Partner solutions, with the likes of Snowflake.



## Industry trends in Data Sharing and Monetization

Even though data sharing is a relatively new concept in the digital world, this is present even in the traditional data world in a nascent form in across industries like Retail, Finance, etc. through Nielsen Consumer Panel data, IRI data, D&B data etc. who serve data needs by acquisition and processing from different providers and enable consumption. Industries like Utilities have seen an increased need of meeting compliance requirements to make the consumer more energy-friendly. Healthcare payers have regulatory requirements of Interoperability who are looking to implement faster and quicker solutions to meet demands of sharing patient history data. As this process involves multiple hops and a wide variety of data providers it leads to data latency, resulting in lost value and increased risk. In the modern digital world, with the improvement in technology and cloud landscape, there are multiple players in this fast expanding market space with varied capabilities.

### Snowflake Data Marketplace

Snowflake Data Marketplace provides live, ready to query data unlocking insights empowering data scientists, business intelligence and analytics professionals, and everyone who desires data-driven decision-making, from an ecosystem of business partners, customers. Offers thousands of data sets from data providers and data service providers. Snowflake's Data Marketplace combined with Snowflake's Data Sharing and Exchange, helps eliminate delays to democratize external data overlay with internal data offering rapid, secure insights without compromising pii data without consent, and tightly manages the "right to be forgotten"

Snowflake Data Marketplace is hosted on Snowflake's Data Cloud offering live data with no ETL/API, provides third-

party data access at scale, improving data collaboration across business ecosystems with a secured governed process.

Snowflake's multi-cluster architecture for its Snowflake Data Marketplace offers centralized, elastic storage, multiple MPP, and independent compute clusters with unlimited storage and compute through its superior compute engine, poly-cloud availability and poly cloud compatibility.

### AWS Data Exchange

AWS Data Exchange makes it easy to find, subscribe to, and use third-party data in the cloud. Qualified data providers include category-leading brands such as Reuters, who curate data from over 2.2 million unique news stories per year in multiple languages; Change Healthcare, who process and anonymize more than 14 billion healthcare transactions and \$1 trillion in claims annually; Dun & Bradstreet, who maintain a database of more than 330 million global business records; and Foursquare, whose location data is derived from 220 million unique consumers and includes more than 60 million global commercial venues.

AWS data exchange platform is hosted on AWS cloud platform with data sharing enabled from S3 and IAM framework for managing security of data. Currently AWS has over 1,000 data products available from more than 80 qualified data providers. However, there is curation of data happening which may not be readily consumable for end users. End consumers will need to import this data into their platform to generate insights.

### Azure Data Share

Azure Data Share enables organizations to simply and securely share data with multiple customers and partners. Data providers are always in control of the data that they have shared. Azure Data Share makes it simple to manage and monitor what data was shared, when and by whom.

Azure Data Share is hosted on Azure Cloud Platform with data sharing enabled from ADLS, Azure Synapse, Blob Storage, Azure SQL Database, Azure Data Explorer.

However, there is no curation of data happening limiting end user consumption. End consumers will need to import this data into their platform to generate insights.

Also, Azure provides Open datasets which are public datasets available for ready consumption for ML use cases.

### Google Data Marketplace

Google Data Marketplace has a rich set of public datasets as well as commercial datasets. Public dataset providers include some of the high demand data such as US Census data, NASA, bitcoin etc. It is used for industry use cases such as Healthcare, Weather & climate, Transportation, Crypto Currency etc. Commercial datasets are readily consumable insights for consumers which can be consumed on Google Platform without having to copy or move data.

Google Data Marketplace is hosted on Google Platform with multiple data sets ready for analysis, distributed via BigQuery, Google Cloud Storage, or Google Cloud Pub/Sub, and the Google Cloud AI Platforms.

### Market Data Aggregators

Nielsen & IRI acquires data from multiple data providers in an industry and enrich data through processing. Data Monetization happens through marketing insights generated from this data. For example, Nielsen has lot of rich data in terms of Consumer panel, Household panel, trade panel. Consumers will have to subscribe to this data and access through Nielsen platform such as Nielsen answers, Nielsen connect, or raw feeds will be provided to consumers.

The Infosys Data Economy offering, leveraging Infosys and partner solutions such as Snowflake addresses the critical gaps in this offering by bringing together various stake holders, enabling a holistic governance model and ensuring availability of consumable data products on time to end users.

## Challenges & Considerations

Data Marketplace or seamless Data Sharing is an exciting prospect with good monetization opportunities for all the stakeholders. There are however few challenges that need to be considered and managed carefully.

Data providers are looking for an effective and safe way to publish and monetize data assets quickly, without giving up control over their key data. This leads to concerns about data sharing in three main categories:

### 1. Growth and Scalability

#### Adoption, Collaboration and Shareability

Even though data acquisition and provisioning on the data platform is relatively easy, increasing adoption of the platform is key to the success of the initiative and needs to be a win-win proposition for all stakeholders. This will require vast network of data providers with a good platform for collaboration and sharing of data in secure manner.

#### Competitive and Conflicting Interests

As there are multiple stakeholders involved, there could be conflict of interest and competitive concerns. For example, Snowflake is compatible with multiple cloud platforms, but the cloud providers have their own data sharing platforms. This needs to be addressed through a robust framework to ensure interest of all the parties is addressed through technological and legal means.

#### Monetization Models – Enrichment of all stakeholders

As data is shared between participants in the ecosystem, there is the need to realize financial value and valuating the monetization potential of data assets to avoid focus on low-value assets. For example, one of our retail clients did an

initial self-evaluation of monetizable assets and pricing for the same. Infosys helped provide a valuation model to accelerate proof of value and a roadmap to realize the ROI on the monetization journey.

### 2. Platform & Operating Model

#### Discoverability and Traceability

Data should be easily discoverable for end consumers which requires tagging the data properly and providing an efficient search engine capability on the data platform. Any information retrieved or accessed needs to be auditable and traceable for governance purposes

#### Data latency

Getting the right data at the right time is business critical for many enterprises. This requires an efficient mechanism to address data latency issues. For example, there could be processing delays on provider/aggregator side at times. These issues need to be addressed through data reliability framework with self-healing capabilities.

#### Data quality and data certification

Data trustworthiness is essential to increase adoption of the platform. Data quality and certification needs to be an essential component of data processing across the life cycle.

#### Infrastructural issues

High availability platform with lighting performance will help in increasing the platform availability and user satisfaction with good adoption

### 3. Compliance

#### Data Privacy

Consumer Data privacy is a concern in many markets; however, this is not a white and black scenario for all the consumers. The increasing adoption of data services consumers are more amenable to data sharing in a secure fashion with incentives such as loyalty points or other avenues. However, there is a technological need of sharing data without intruding into individual data privacy concerns.

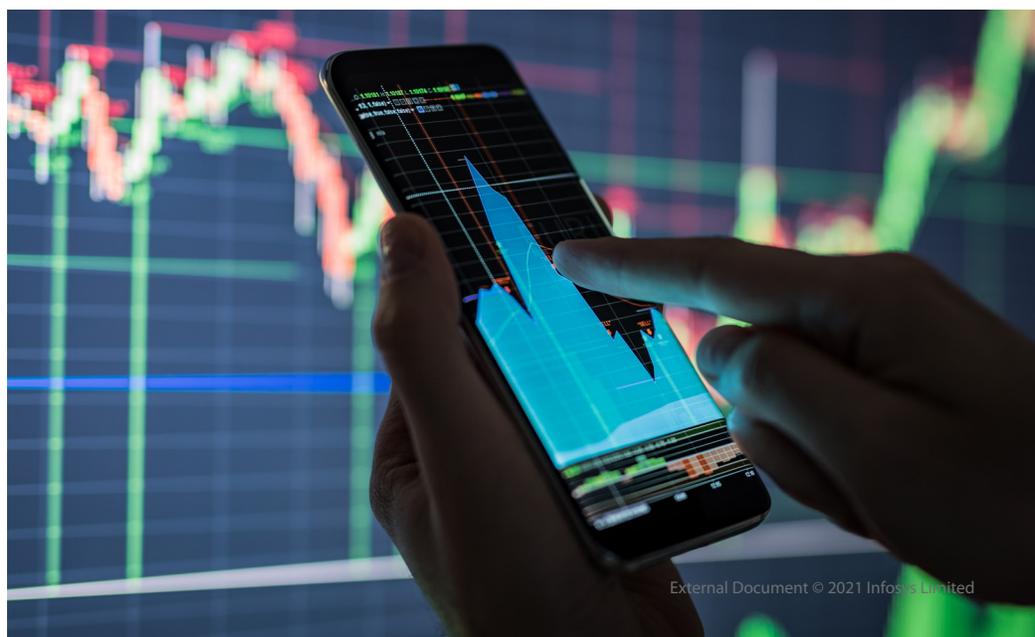
#### Data governance and data management

Data providers will be more willing to share data if their data governance concerns are addressed through data platform capabilities. There is a need for self-service governance to enable or disable data sharing and effective controls.

#### Security and Compliance

In certain markets such as EU there are strict laws around consumer data privacy and, GDPR compliance. There needs to be an efficient technological and legal framework to address these concerns.

To summarize the key challenges and industry trends, there is an ever-increasing demand to provide a safe and scalable ecosystem that reduces lead time to data sharing and monetization across industry boundaries, assess and mitigate business risks early, avoid low-value efforts and high expenditures and support an agile environment that can support evolving industry and business shifts.



## Industry Stories

The Infosys Data Economy offering, leveraging Infosys and partner- solutions such as Snowflake has immense potential. This offering can enable the network participants to realize both the “Amazon for Data” and “Google for Data” to be the best-in-class data consumption engine in tomorrow’s world with win-win proposition for everybody.

While data economy is emerging as a trend across industries, this offering is truly cross industry as organizations see potential to unearth unique insights by leveraging diverse datasets. For eg. In the Telecom industry data can enhance customer information for retail organizations. Patient data & healthcare data can greatly enhance risk & fraud mitigation models for insurance companies.

### CPG

In CPG industry there is a need for sharing information about product shipments to various retailers so that better inventory management can be achieved on the retailer’s side. Similarly, CPG provider needs to understand the consumption of their brands and how effectively products are being sold by retailers. Also understanding consumer behavior pattern is essential for both the CPG manufacturers and retailers as well to plan for campaign and promotional activities. For meeting these data and analytical needs, there is to the need to have a cost-effective data sharing mechanism along with secure consumption to address any anti-trust and competitive concerns. Infosys Data Economy offering acts a key aggregator by leveraging Infosys solutions such as TradeEdge to acquire data from retailers and enrich the data by building consumable data products for end consumers. Also plays an important role as an aggregator & moderator in ensuring data governance.

**Data Economy for CPG Clients:** Our solution for a global CPG client enabled the organization to monetize data & provide personalized data to consumers by processing 22 Billion records in less than a minute & aggregated loyalty data for basket analysis.

### Healthcare

In Healthcare industry, there are multiple stakeholders involved such as Pharmacy, Insurance, doctors, Patients and PBM systems which require constant sharing of information across the stakeholders to address patient needs in an efficient manner. For example, Healthcare Payer needs to adhere to regulatory requirements and interoperability requirements while sharing patient history in a secure manner. For a Pharmacy, during the prescription filling process it needs share patient information in a secure manner during adjudication process with other stake holders like Insurance provider, doctors and PBM service.

Apart from data exchange during transactional processing, there is larger need for sharing aggregated information at segment level to measure patient adherence trends, claim analytics, preventive needs for patients to minimize cost later and driving desirable patient outcomes through digital interventions in needed cases. Infosys Data Economy offering provides excellent capabilities on both foundational and advanced use cases.

**Data Economy to co-create specialty Healthcare products:** Infosys has partnered with a global healthcare & biotech company to establish seamless & secure data exchange between internal & external partners to expedite co-creation of specialty drugs.

### Retail

In retail industry, having a strong supply chain network with optimal inventory management is key to success. Customer is also another important dimension to promote targeted campaigns based on the customer behavior. All these processes invariably need lots of information to be exchanged between different platforms internally and external sources as well.

In a retail store, typically there will be multiple utility stores co-located sharing the same floor space. This is done to increase footfalls and leverage cross-selling opportunities.

Infosys data economy offering can help retailers unleash the opportunities by helping them in the data monetization process by building the framework.

**Data as a Product Monetization Platform & Operating Model:** Infosys enabled ‘Data As A Product’ platform for a US retail company by conducting a Data Fitment Analysis to identify & prioritize monetizable data modules. Recommended Target Operating Model based on Industry best practices & organization vision.

### Manufacturing

In the manufacturing industry high-end electronics clients deal in the business of manufacturing Performance Materials (OLEDs, Chips, ICs etc.), these are semi-conductor materials, chip sets, Registers, ICs used in electronic products for consumer, healthcare, automotive industries etc. Clients are keen to understand how their products perform with customers and use the IOT-time series product data (e.g. Temperature, Concentration, Molecular composition of substances, Pressure, Molarity etc.) to predict anomalies in the manufacturing cycle, providing input to R&D for better product design, and identifying good/

bad batches in the manufacturing cycle. Insights are expected to be derived from pre-agreed dashboards and/or executing data science models which help with principal component analysis, contribution plots etc. In the initial phase, data will be ingested in batches, and in near real-time. There are challenges around infrastructure, platform for secure exchange of discrete data due to security concerns and lack of feedback data from end customers on products.

**We enabled a Data & Insights Marketplace for Drone Operators** by extending client's value chain (FAA) by enabling a data and insights marketplace for drone operators to effectively plan flight schedules. Our cloud-based data platform curates, consolidates and harmonizes data from 300+ aviation applications.

### Financial services

In financial services, there is a high degree of data acquisition and monetization

across boundaries to maximize the value of information in a secure, controlled manner. This requires cross-industry data sharing and partnerships with data contracts to ensure effective and secure data exchange, as well as a mechanism to create and monetize new data products and services. For example, when a customer approaches a financial institution a lot of data is collected about the customer and external data is accessed to make critical decisions. This involves secure sharing of information as per regulatory requirements and involves data exchange. It is valuable to have a platform to share this information and monitor any critical events from customers' perspective to leverage or finetune offerings. Infosys Data Economy can prove to be a shot in the arm in these cases for Financial services clients

**Data Sharing platform for a European Bank:** Infosys deployed its Data Marketplace solution with

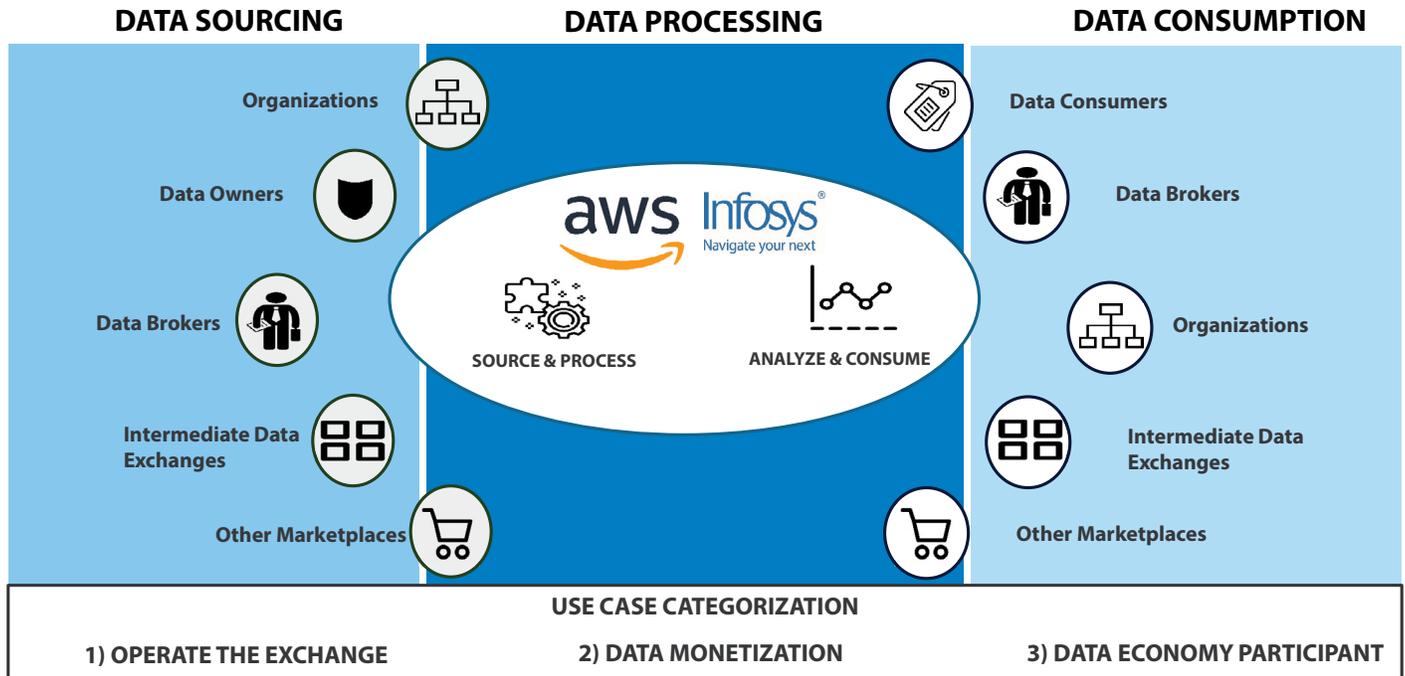
customizations to provide unified view of enterprise data residing in data lake, user shared datasets, 3rd Party datasets for easy consumption. The solution has user friendly UI for users to browse, view profile, search, comment, rate, tag, preview data, shop for required datasets

### Pharma real-time use case

In a connected world, real-time integration of transaction data with external data such as weather to unleash cross-pollination of opportunities. Ex: In the specialty drugs segment as drugs are expensive with limited storage ability, if not consumed within its limited duration, it goes to waste. Due to Weather disruption or any other reason, if a drug is not used by a particular patient it can be immediately dispatched to other patients in need. Infosys Data Economy offering can help drive such critical & timely insights by monitoring data events and enriching them with external data such as weather.



# Business Operating Model



Role	Functionality	Benefits
Data Provider	Provide data to platform	<ul style="list-style-type: none"> <li>• Easy sharing of data</li> <li>• Monetize data effectively and if leveraged properly can “self-fund” the data platform</li> <li>• Incentivize data management</li> </ul>
Data Platform	Provide platform for storage, secure consumption and royalties to provider if any	<ul style="list-style-type: none"> <li>• Revenue generation through consumption</li> <li>• New leads and client connect</li> <li>• Expand platform consumption</li> </ul>
Aggregator	Build consumable data products Build Insights for marketing Push intelligence to consumer	<ul style="list-style-type: none"> <li>• Better platform to market insights</li> <li>• New leads and client connect</li> <li>• Helps develop new data applications</li> </ul>
Data Consumer	Access data from Snowflake	<ul style="list-style-type: none"> <li>• Ease of data access</li> <li>• Superior performance</li> <li>• Provide feedback loop</li> </ul>



## Infosys Value Proposition

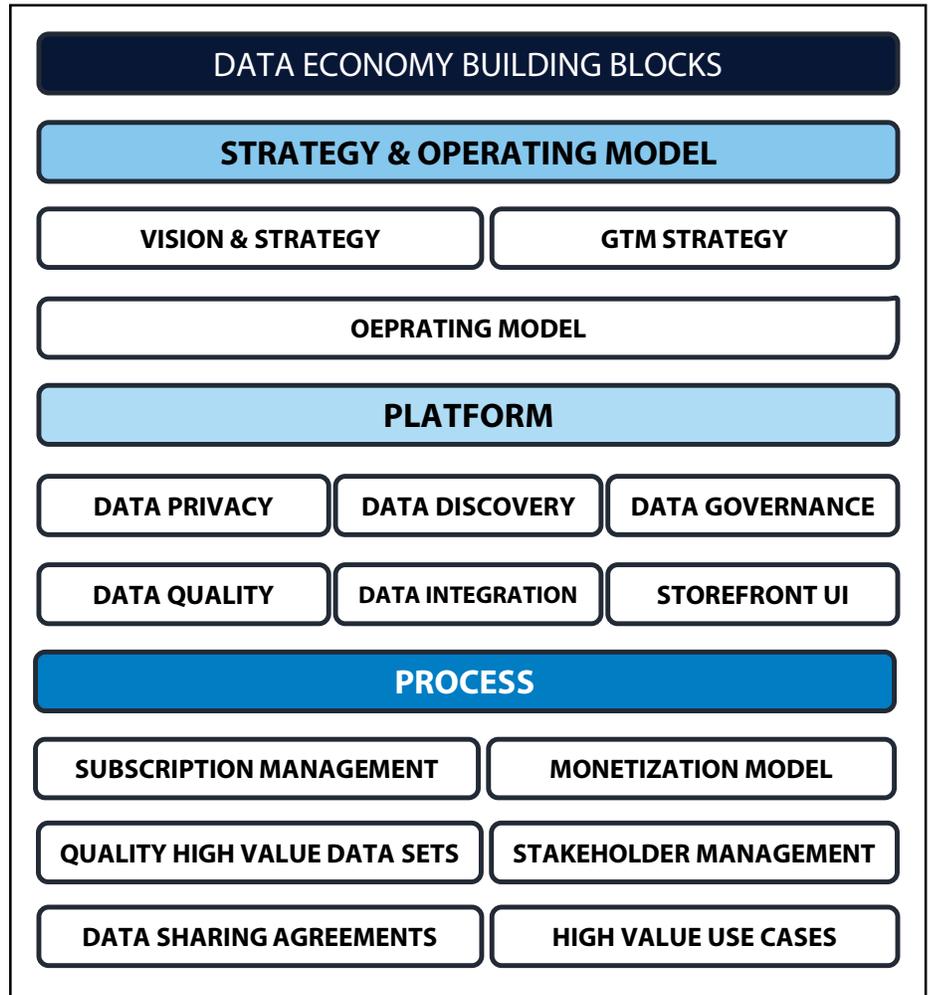
Apart from Infosys's Enterprise Data Platform solution, Infosys leverages its partnerships with key data economy solution providers such as Snowflake Data Marketplace, Azure Data Share, Google Data Marketplace, AWS Data Exchange & Harbr. Infosys, in partnership with these key solution providers, enables platform capabilities that are key to a data economy.

- **Information Cataloging & Data Shopping:** Enables 'Shopping' like experience for a Data Economy's dataset consumers
- **Live & Ready to Query Data:** Enables access to live & ready to query data from all Data Economy partners
- **Data Monetization:** Monetization Models that can help Data Providers with opportunities to create new revenue streams
- **Secure Exchange:** The platform ensures safeguarding of sensitive information along with personalized & secure views
- **Scalable Platforms:** As the Data Economy grows, the platform is capable of seamlessly onboarding data providers & consumers

Infosys is uniquely positioned to this service offering through its rich network of clients and partners across various industry segments and decades of experience in providing end-to-end solutions to customers.

Infosys has developed a comprehensive set of capabilities to address challenges across the data economy ecosystem, through the Infosys Enterprise Information Marketplace, which is a modular framework for enterprise information assets combined with the power of self-service and collaboration.

Some of the offerings include Consumable data products enriched through processing, data discovery to search for Data, KPIs, Reports, AI Models, Descriptive insights, Data insights, Data



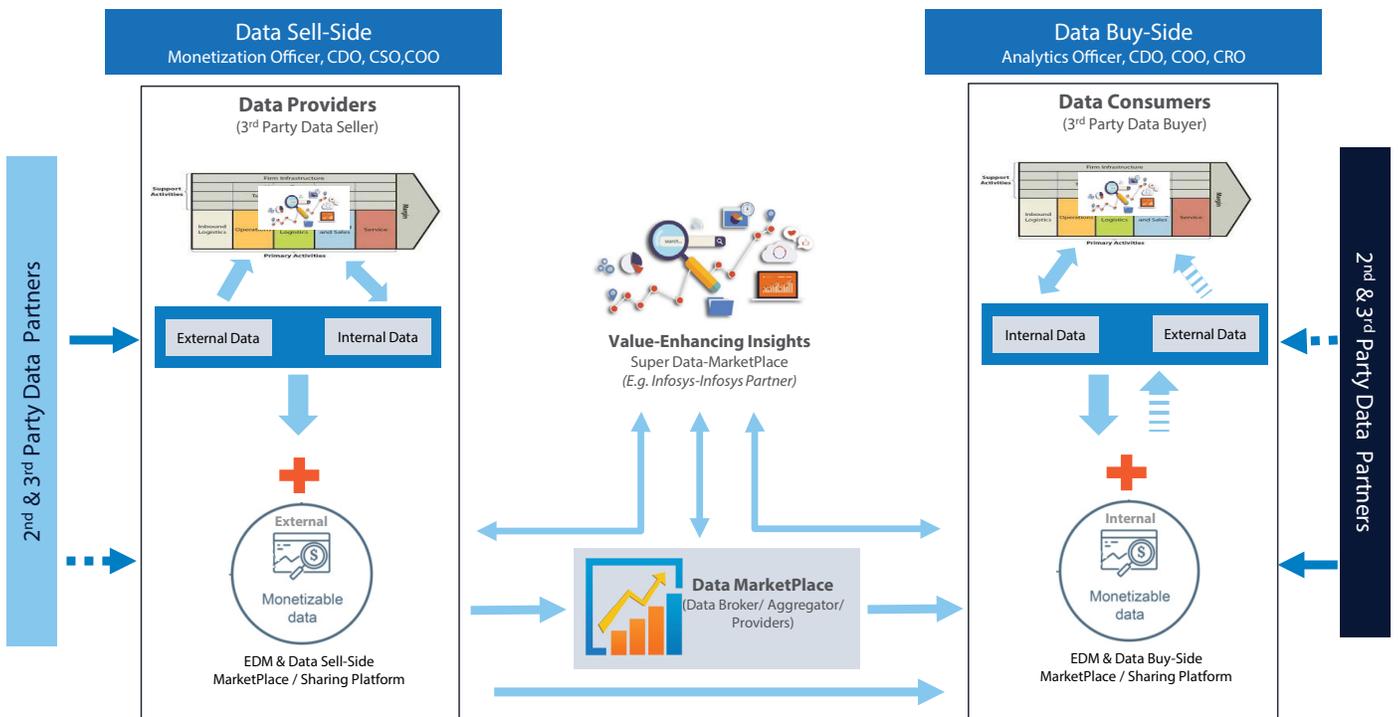
exploration, Reusability to promote data sharing and collaboration, enterprise security integration with ML-based controls, auditability and smart data governance, compliant with industry- and

country-specific regulations such as Rule 24, SCHREMS II, GDPR, etc. aggregator/moderator roles for data being shared through the scalable platform that supports the hybrid data landscape.



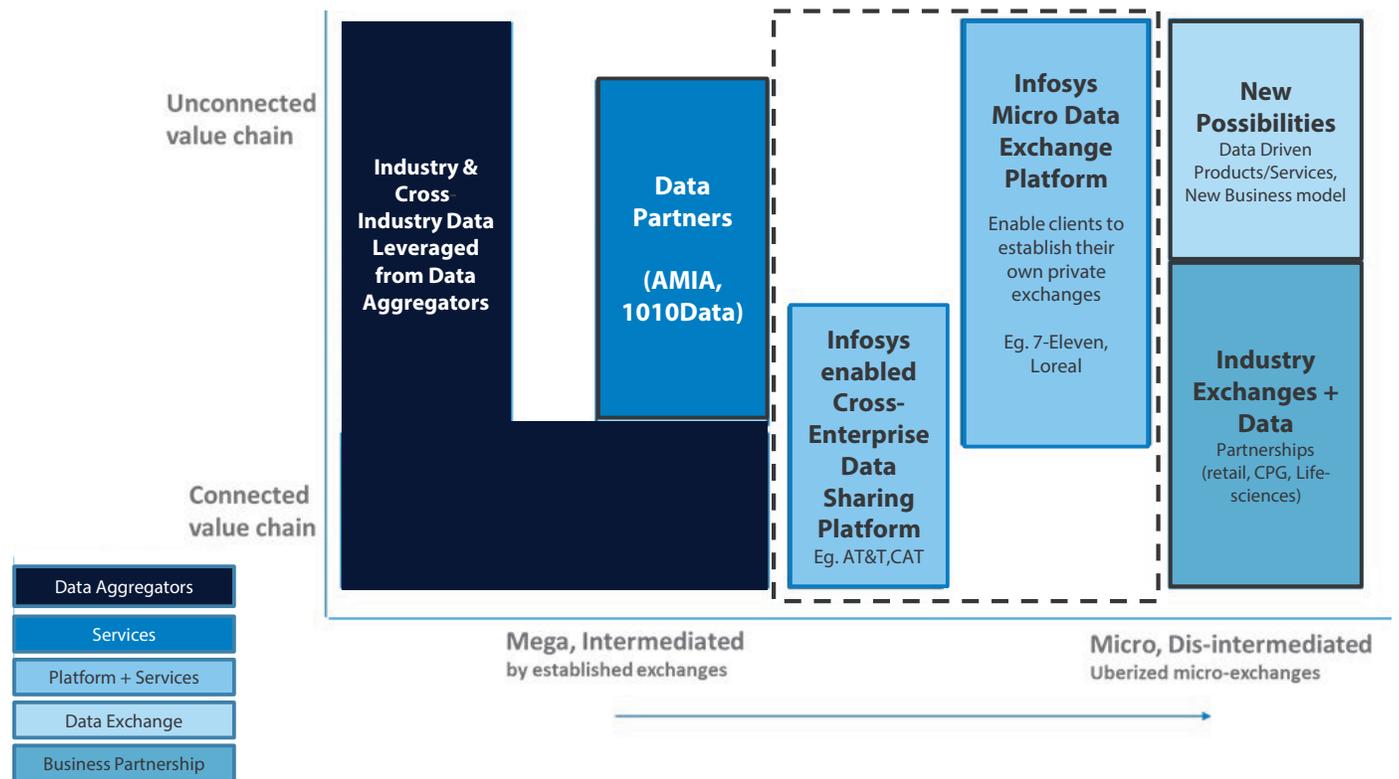


## Infosys Data Economy Ecosystem



# Infosys Data Economy Value Realization

Enabling organizations to come together and create value far beyond what individual data producers and consumers can achieve through innovative ways of sharing information in a secure manner



The Infosys Data Economy ecosystem is based on a win-win proposition for all the stakeholders involved by developing and deploying state of the art data platform.

The Value Proposition addresses four key themes:

- **Time to Market:** Reduced processing time for insights resulting in lower market response time
- **Delivering and Scaling Value from data products:** Diverse cross industry

data sets integrated from trusted & incrementally growing data providers

- **Security:** Robust platform securing capabilities combined with data sharing agreements & processes enables secure data exchange
- **Seamless Self-Service Experience:** Code free store front UI & easy to use data platform

All the above is realized across the Data & Insights Value Chain from Connected

to Unconnected participants, driving adoption through smoothing of data consumption, access, and security issues. Through the Infosys Data Economy ecosystem, which is designed as a scalable self-funded model data platform for its clients, micro-exchanges have a level playing field with mega, intermediated exchanges. Infosys brings cross-industry data partnerships and industry platforms to unlock new possibilities for data aggregation, moderation, consumption, and monetization.

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