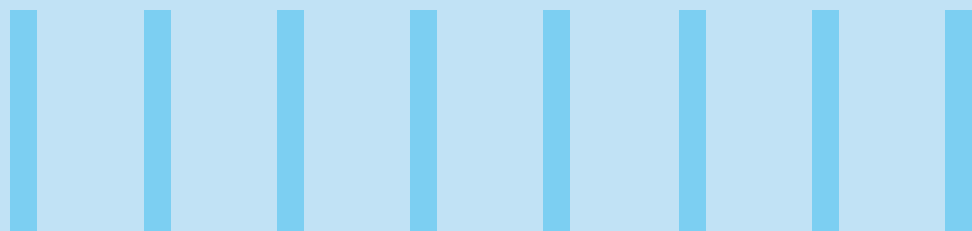




DATA ECONOMY IN THE DIGITAL ERA

a perspective on new data economy and how it is shaping newer opportunities for manufacturing enterprises and their ecosystems



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Digital-born companies have challenged large long-established businesses across industries with newer data, AI-powered experiences, products/services. Sustained competitive advantage through customer ownership and seller power has since been significantly challenged and overturned. Customers are taking to newer AI and data-powered products/services in their pursuit of better experiences and exponentially higher value. This has triggered every company to challenge status-quo, unleash themselves from very structure of industry and embrace transformation in the new world.

Data and AI have shaped themselves into a major economic force that is at the epicenter of transformation of every industry; through 3 horizons. Data, in the first horizon, was the key ingredient in driving more data-driven decisions. Data, in the second horizon, is playing a transformational role in the enterprises' pursuit of being Data Native Digital Native enterprise.

We believe the world is shifting to a new plane, the third horizon; whose fundamentals are very different from previous frame. A new economy has just been born, the Data economy. This will drive industry disruption, new business models, net new demand and catalyze governments' role towards shaping the future of enterprises, society and economy.

Yet, large enterprises have struggled to adapt in the face of digital disrupters. Their approach to operating in the new world is slow and silo'ed at worst, and use-case focused at best.

Navigating & Winning in the Data Economy:

What is the data economy for a manufacturing firm?

We define the data economy as a set of data analytics driven interactions between manufacturing firms, their customers and partners that generate new value for all stakeholders. Data economy has the potential to enroll civic societies, citizens and local governments as stakeholders as well. These opportunities are so fundamental that they are now shaping the primary strategy of these companies. Here are a few examples:

- **Ford Motors** has recast itself from an automobile company to a company that "drives human progress through freedom of movement"¹. **Ford Mobility Services**, a new company of the Ford Group, describes themselves as being "dedicated to solving the world's most pressing mobility issues"². It is striking that their objectives range from city innovation services, infrastructure management, public transportation related services- all evidence of how a data and AI driven ecosystem is being seen by manufacturers is seen having a citizen, community, city and nationwide impact.
- **Daimler Mobility Services** is a new partnership between Daimler AG and BMW Group, focused on the future of urban mobility³. Through a set of data and mobile device driven services such as "Share Now", "Free Now", "Reach

Now" and "Charge Now", the company is providing taxi sharing, trip planning, parking and other services⁴.

- **Airbus** has launched the **Skywise platform**, an open data platform for the aviation industry that collects data about Airbus aircrafts from airline companies. By creating analytical solutions on top of this massive digital store, Airbus is able to give valuable insights to its customers that result in improved flight operations, better disruption management, asset utilization and optimized maintenance.⁵
- **Rolls Royce** launched the R2 Data Labs in 2017, as an acceleration hub for data innovation. They are pioneering a collaborative innovation approach with partners, academics and 3rd parties to create a community of data innovators, resulting in new service offerings for their customers.⁶
- **Rolls-Royce** also has fundamentally changed its business model through its **TotalCare** services delivery model. RR uses its extensive design and maintenance experience to offer managed services for engine maintenance that removes the burden of maintenance from its customers and transfers the management of associated risks to RR. TotalCare is charged on a fixed \$ per flying hour basis, so RR is only

rewarded for engines that perform. This rewards reliability, a factor valued most highly by RR's airline customers.⁷

Rolls-Royce's TotalCare model leverages data for managed services

- The "Strategy 2025" of **Siemens Healthineers**, a leading medical technology manufacturer, describes the company's movement from providing "next generation product and platform launches" to using "Digital, data and AI" technologies to tap into adjacent growth markets in the short term and becoming a market leader in 2025 by being a "Technology enabled services provider"⁸
- In 2017, **Michelin Tires** unveiled its vision of autonomous, connected mobility of the future with its combination of technologies and services. The innovations of this vision concept are protected by 19 patents and include ideas such as a connected tire that informs drivers of any problems. The tire data is then used to innovate market specific products.⁹
- The government of Germany is executing a project – Industry 4.0 – to ensure industries can seamlessly move to smart manufacturing to improve manufacturing execution and leverage data across customers and business partners.¹⁰

The commonality in all these examples is a trend that can be observed with many leading manufacturers – Servitization. This is the concept of data & analytics driven services, that changes the relationship between manufacturer and purchaser from a product purchase driven, transactional relationship to a connected and continuous service delivery paradigm. It represents how data economy is driving new value for a manufacturer. This drives “net new” economic activities that range from mass produced services (such as a ride sharing app), to mass customized services (such as using tire data to design an extra-robust tire for the Indian and Chinese markets), and to hyper-personalized services (such as a tractor company providing a predictive alert to a customer). Thus opening immense possibilities and space for new business creation.

Data economies are disrupting industries through data driven positive externalities

The data economy is not just an opportunity. To most traditional manufacturers, this represents the threat of disruption by digital native manufacturing companies. It could perhaps be envisaged as the Sixth force in Michael porter's five forces model, given its capability to influence and disrupt the very structure of an industry. Any analysis that seeks

to articulate the structure of an industry and its competitive environment has to take data economy trends into account. In Porter's terms, the data economy has lowered the barrier for new entrants and increased the power of competitors and customers.

A few scenarios suggest themselves in this context:

You are your own complement:

Manufacturers are able to generate new sources of value by tapping their own core competencies and client needs. Many of them are moving from products to solutions. For example, Siemens Healthineers now provides Radiology services to hospitals that include equipment maintenance and optimal patient scheduling¹¹

Your supplier is your main competitor:

Supplier leading industry value chain targeting end-customer value e.g. Medtronic provides medical devices to end-patient outcome and collaborates with stakeholders worldwide to transform healthcare;¹²

Competitors to collaborators: BWM and Daimler, traditional competitors, now collaborate to provide mobility services¹³

Complement/substitutes from unrelated industry: Industry boundaries blurring with players entering non-adjacent

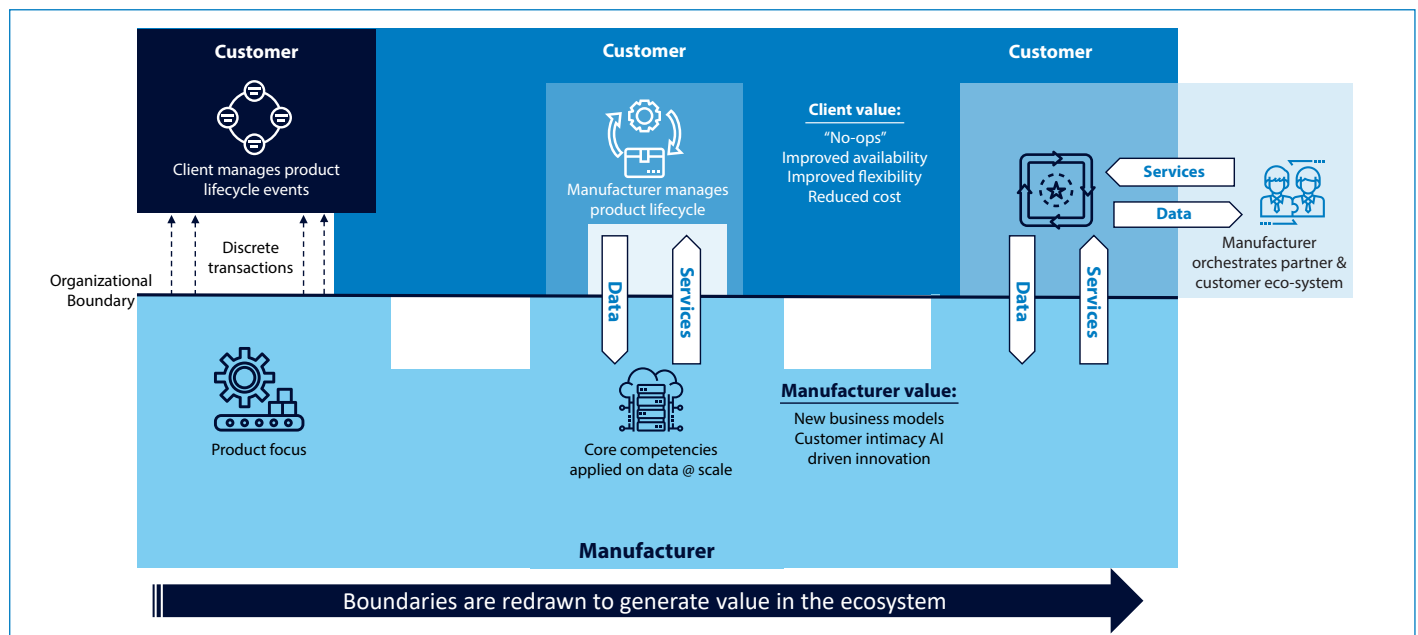
industries. e.g. Amazon has diversified into Cloud infrastructure, electronics and payment apps.¹⁴

Data natives as new entrants: New entrants focused on collecting and owning data disrupting existing players. Examples would include companies such as Otonomo focused on collecting data from millions of vehicles and serving it through an API.¹⁵

1. The data economy redraws boundaries

Manufacturing companies are no strangers to outsourcing. In essence, outsourcing is about allowing a partner to execute a part of the manufacturer's value chain because they are most capable of fulfilling those steps. This reduces cost, complexity and risk for the manufacturer. Manufacturer have used this lever to redraw the boundaries between them and their partners through the last few decades, with Hi-Tech manufacturers even outsourcing all aspects of the production value chain.

The data economy offers a similar opportunity to the manufacturer by offering similar managed services to their customers. A good analogy would be what cloud computing did to the IT function of any modern organization. By offering fully managed & elastic storage, processing and applications, the cloud providers are now the data center of many



organizations. The attractions of pay-per-use, no-ops, flexible and complete blocks of cloud services have become the engine for powerful innovation and dramatic cost savings for most organizations. The cloud providers were best suited to provide these services because they had developed these capabilities for their own strategic needs- and then realized that these capabilities were usable to great effect for other organizations.

Due to the data economy, manufacturers are best positioned to manage part of their customers' value chain, rather than just sell them products. Engine manufacturers can offer assured availability services to rail transport companies because they understand their products best. Siemens Healthineers offers radiology services because they understand how to use their

machines optimally. Aircraft companies can help airlines avoid unanticipated downtime for their aircraft because they can leverage usage and failure data across all their customers to support predictive maintenance models. The critical elements in all these scenarios is the availability of actionable data and the resident expertise of the manufacturer.

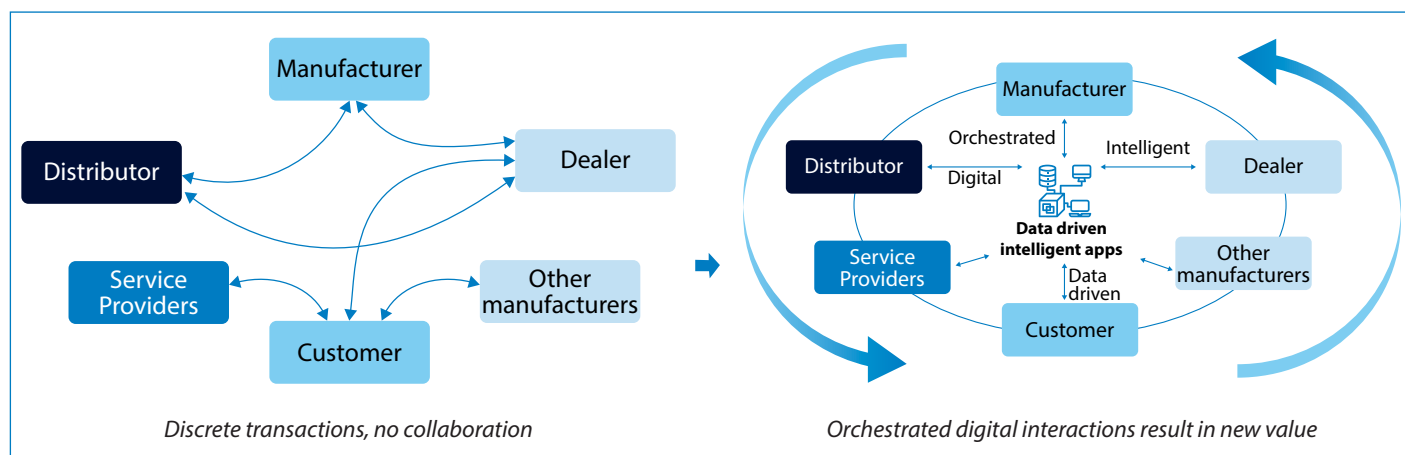
Siemens Healthineers has servitized its radiology equipment

2. What are the elements of the data economy?

The potential of the data economy is exciting, but requires the following elements to be maneuvered in place.

Orchestration: The value of the eco-

system is in the successful collaboration of the eco-system partners. For the manufacturer, these collaborators represent distributors, dealers, end customers, manufacturers of complimentary products and maintenance service providers. The manufacturer has to understand the needs, pain points and opportunities of each of these stakeholders in forging the new data economy. Success can come only through a deliberate act of leadership by the manufacturer - to realize value for themselves, they have to generate value for the other actors. The leadership also has to express itself in the more practical form of orchestrating new business processes across all actors to deliver new services.



Lowered cost of transactions and incentivization: This orchestration is possible through reducing the cost of collaboration, through the digitization of processes. Removing digital friction in the ecosystem through lowered cost of transactions is a crucial factor in creating new economic value. In fact, the manufacturer has to consider incentivizing participation of stakeholders in the process. For example, customers may be incentivized to provide their data in exchange for hyper-personalized services. For a leading agricultural manufacturer, who embarked on a digital transformation journey that connected their dealers, customers and themselves in an eco-

system. They incentivized customers to share their data in a customer portal by offering them easy self-service modes for services that they otherwise had to depend on dealers for. Together with Infosys, they formulated services such as tailored tractor configurations, personalized recommendations, centralized management of all of their assets. In return, they obtained crucial customer data that was used for driving further value added services for all the residents of the eco-system.

Agri customer incentivizes data sharing and monetization

Data and AI services: New digital pathways in the ecosystem paves the way to value, but the delivery of that value is through data and AI services. The digital processes often generate new data that is a result of the new collaborations. Sometimes, these processes give the manufacturer, data that they did not have access to earlier. In fact, it is crucial to design the digital processes such that they provide these rich veins of data. In the traditional view, data is the "exhaust of digital processes". In this paradigm, the endgame of the digital processes is the creation of this data. So it is important for the manufacturer to have a map to the data "El Dorado" - what exactly are the

high value data assets around which the process has to be orchestrated? The data could be product telemetry that allows the manufacturer to gain advanced insights into usage or health characteristics. It could also be customer data that can help understand customer characteristics and preferences better. These insights can be the basis of AI based prediction and optimization solutions such as predictive maintenance, customer segmentation, product recommendations, anticipating customer needs, optimizing product use etc.

Data marketplaces: Data can be collected through digital processes, but it can also be acquired. In a data economy, success depends on the heterogeneousness of data assets. “Better data” for analytics may often mean “different data”. Data may even need to cross sector boundaries. For example, in global supply chain, the robustness of procurement processes may often be tested. Delays in part shipments from China can be anticipated if the manufacturer has access to weather and regional event datasets. Partnerships may be critical to source those external data assets. Beyond partnerships, technology needs to enable the fast, easy and inexpensive exchange of such assets. A data marketplace platform can thus be a powerful tool in the repertoire of the manufacturer.

Boeing AnalytX is a good example. The platform consolidates data from various sources including its customers. A series of digital analytics solutions are then available to customers for use. But the platform also provides toolkits for self-service analytics. As an example, A total of 330+ customers use Boeing Maintenance Performance Toolbox to digitally access their fleet’s real-time maintenance data and essential engineering and certification information. AnalytX also lets 3rd parties provide value-added services to airlines on top of these toolkits and data. For example, the Cathay Pacific Group has signed agreements for Jeppesen Crew Rostering and the Jeppesen Fatigue Risk Management System. These Boeing AnalytX-powered crew solutions

will help optimize Cathay Pacific’s crew management strategy (Jeppesen is a subsidiary of Boeing). Thus AnalytX enables an entire ecosystem of services based on data and digital analytics services.^{15,16}

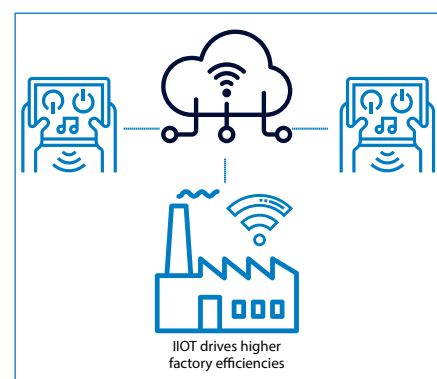
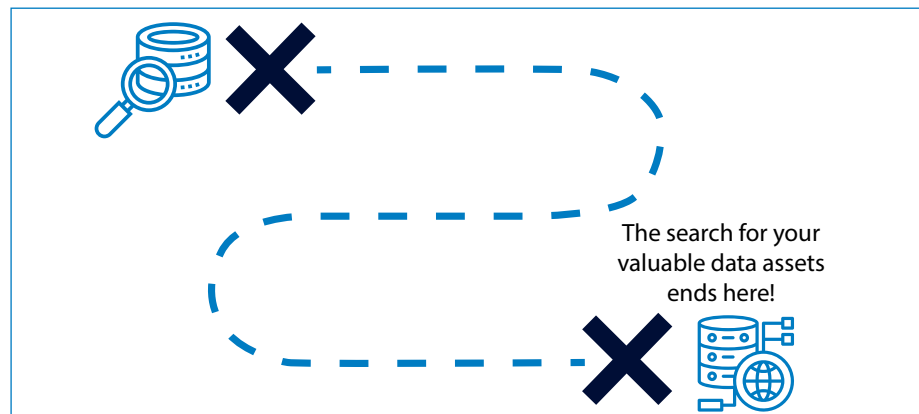
Boeing AnalytX is a data marketplace with self-service analytics capability

Enabling Technology: Supply chain and related analytics have always been a highly researched area in academia and industry. But due to unavailability of data and lack of digitization, low computational power and high cost of computation, organizations could not harness the value of analytics and operations research till the late 90s. We saw organizations adopting ERPs and digitizing basic supply chain processes in that decade. Right after, we witnessed organizations leveraging the power of operations research and implementing tools for forecasting, inventory optimization and network optimization. Till the decade of 2000, organizations leveraged data which was generated within the organization. But the last 10 years saw rapid advancements in real time data gathering technologies such as Social Media, Mobility, Block chain and IoT. Simultaneously, there have been dramatic advances in computational abilities on Cloud and AI & Machine Learning technologies. As a result, manufacturers now not only leverage internal supply chain data but also leverage external unstructured data such as text, video and images to make their supply chain more

agile and proactive.

For example, Industrial IOT is a key technology for the modern manufacturer. With increasing cost pressures, manufacturers are using IIOT to drive metrics such as ROI, ROA (Return on Assets), Corrective and Preventive Action (CAPA) and Operational Engine Efficiency (OEE) to levels that have not been achieved before, by enabling the tracking of machine data in real time. Advanced insights from IOT machine data is able to point to the top risks for OEE reduction, leading to better SOP formulations. IOT is able to measure input to output ratios in real time and minimize wastage caused by machine performance. Regression techniques applied on this data is able to formulate maintenance policy by product type.

While technologies are the catalysts that bring change, the manufacturer also needs “stabilizer” technologies that manage the change. Analytical platforms, data and model marketplace toolsets, AI workbench tools can help drive a standards based, enterprise analytics at scale.



3. Governments and the new data economy

Governments are strategically building data/AI powered economy that will drive their future GDP growth and enhance the nations' competitiveness. They are creating platforms, monitoring ethical use, promoting democratization, data sharing and portability while protecting sovereignty, data privacy and security. Global enterprises such as Facebook and Google have been on the watch list w.r.t. transnational data-use/share practices. At the same time, governments have significantly opened up "data markets" through OpenData initiative (Public good)

for start-ups to innovate new products/ services that help serve the citizens and consumers alike.

4. Multipliers in the data economy

- **Time value of data:** From instantaneous/momentary insights to learnable/predictive insights over a period of time
- **Data to knowledge:** Self learning prophecy; digital brain; system keeps learning as data keeps changing
- **Data is the new dictionary:** Semantics
- **AI:** New eyes (image/video/text) and ears (speech) of the data economy

- **Automation:** The digital operator
- **Open + Sharing + portability:** Allows for movement of data that's lifeblood of the data economy
- **Ethics + Privacy + security:** Fundamental fabric that protects the integrity of the data economy

In summary, these fundamentals coupled with business environment governed and promoted by governments, enterprises have tremendous opportunities to establish leadership and sustained competitive advantage in the new economy.

Execution Blueprint

There is a need for enterprises to take an agile, additive yet enterprise-grade approach in order to capitalize on the opportunities in the data economy. We recommend enterprises to adopt a modernize-monetize-network approach that ensures focused execution in line with the big picture. This is not necessarily a sequential approach but is more indicative of enterprise's navigation in the data economy.

Why Infosys?

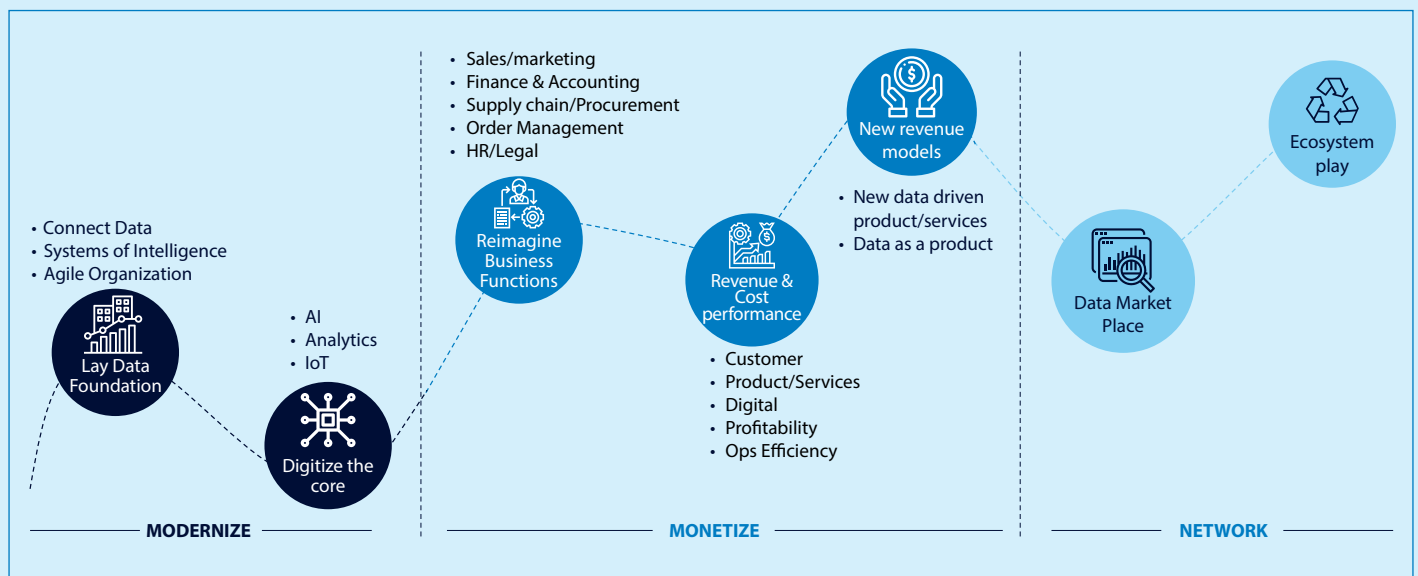
We help enterprises monetize data by navigating their journey through the data economy to achieve New revenue models, Operational efficiency, Better experiences

and Mitigate risks. We have worked with multiple Fortune 500 manufacturers enabling them to leverage the power of data. We have manufacturing sector specific data models that can be leveraged for generation of insights and automation.

- 1. Speed to market:** Investments in solutions, partnerships and deep expertise that can deliver 40-50% faster time to market
- 2. Outcome focused:** Navigate the journey from Advisory to Design to Delivery along with delivering technology.
- 3. Flexible models:** Align clients' costs/ investments to value delivered through as-a-service, outcome based models

4. Free up Capital: 40-50% cost reduction in legacy footprint (people costs, licenses, overheads), digitizing insights generation and consumption thus creating an investment corpus for data-led transformation initiatives.

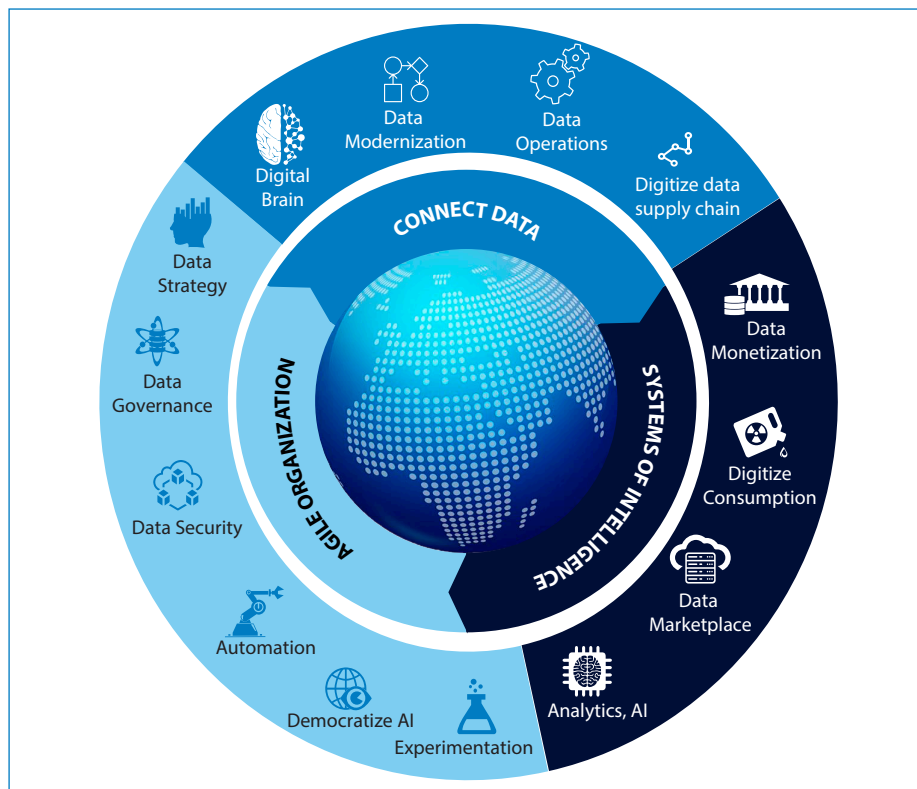
- 5. Capability:** Best-in-class People, Thought leadership
- 6. Capacity:** Build niche, future skills for us and our clients through our localization focus
- 7. Harness Ecosystem:** Of strategic partnerships with tech majors, start-ups, academia, data providers, talent ecosystem



Infosys Enterprise capability framework, Offerings:

Infosys has invested in an organizational capability framework that helps customers navigate their journey in the new data economy in a holistic yet iterative manner. This helps enterprises with faster time-to-value, reduced risk through best practices and reduced waste in business-technology cycles. This framework addresses the capabilities across 3 dimensions – **Connect Data** (context), **Systems of Intelligence** that helps create and consume intelligence for outcomes and **Agile Organization** that enables strategy to execution; agility through scale, democratization and automation; learning and adaptation.

Our offerings can enable our clients to take advantage of opportunities presented by the new data economy.



Customer delight is the product

Immersive superior and continuous engagement

Powered by Infosys genome solution, boundary less data platform, digital brain, analytics/consumption workbench coupled with Data consulting

Next frontiers Discovered now through

experimentation and innovation

Powered by Infosys experimentation platform + digital brain + design thinking + hackathons

Forge new models Data shifting balance

of power in every industry e.g customer becoming partners.

Powered by Infosys data marketplace along with data partnerships

Digital work force

Powered by bots, digital brain, embedded analytics engines, automation, digital refactoring of human workforce (innovation hubs, digital studios)

Secure against data breaches/theft/privacy violation

strong data governance and compliance practices
Infosys GDPR solution

Future tested decisions

Powered by Infosys Data labs and monetization/analytics



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