NEAT EVALUATION FOR INFOSYS:

Digital Manufacturing Services

Market Segments: Overall, Monitoring & Security Capability,
AR/VR & Digital Twins Capability, Next-Gen Services Capability

Introduction

This is a custom report for Infosys presenting the findings of the NelsonHall NEAT vendor evaluation for *Digital Manufacturing Services* in all market segments (*Overall*, *Monitoring & Security Capability*, *AR/VR & Digital Twins Capability*, and *Next-Gen Services Capability*). It contains the NEAT graphs of vendor performance, a summary vendor analysis of Infosys for digital manufacturing services, and the latest market analysis summary.

This NelsonHall Vendor Evaluation & Assessment Tool (NEAT) analyzes the performance of vendors offering digital manufacturing services. The NEAT tool allows strategic sourcing managers to assess the capability of vendors across a range of criteria and business situations and identify the best performing vendors overall, and with specific capability in monitoring & security, AR/VR & digital twins, and next-generation services.
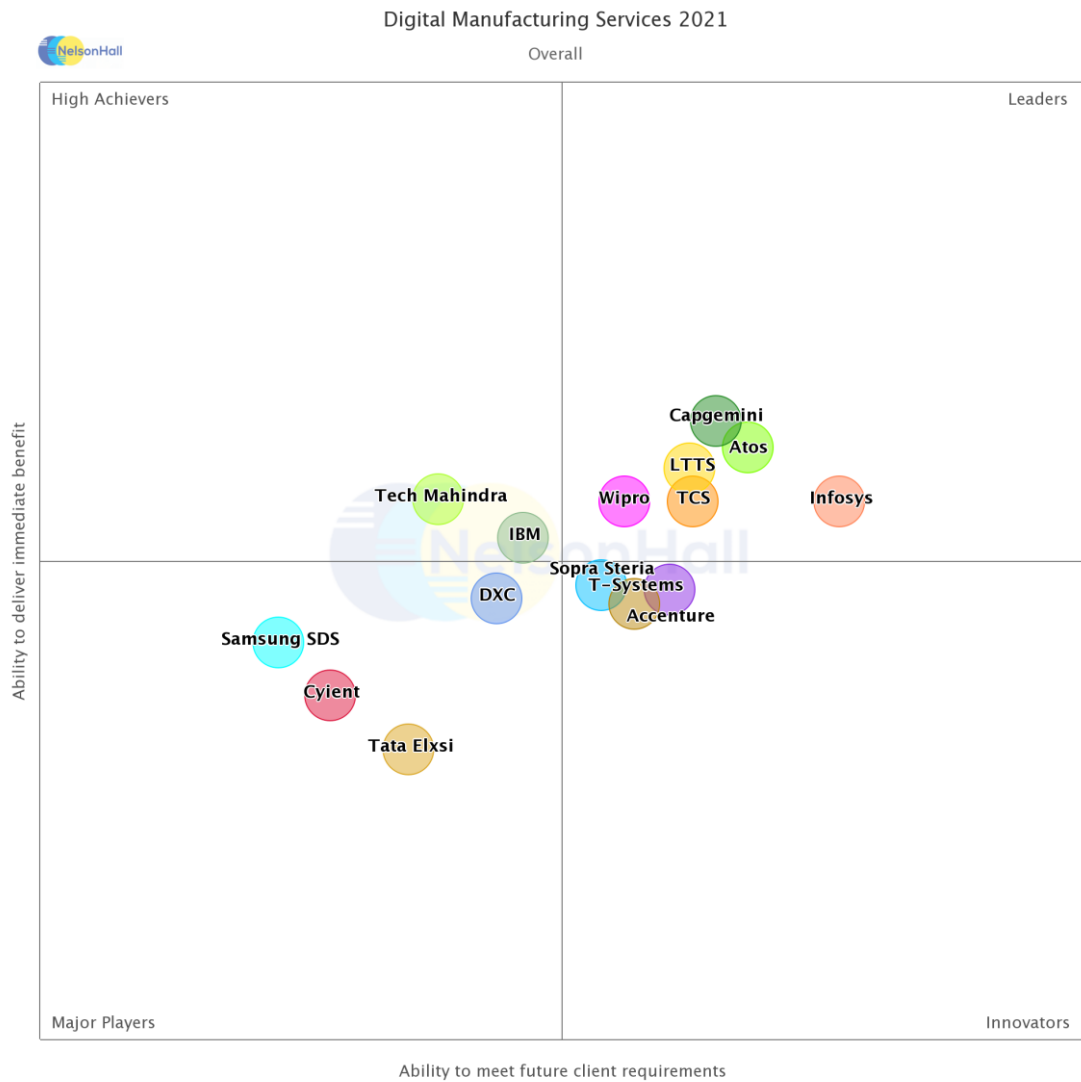
Evaluating vendors on both their 'ability to deliver immediate benefit' and their 'ability to meet client future requirements', vendors are identified in one of four categories: Leaders, High Achievers, Innovators, and Major Players.

Vendors evaluated for this NEAT are: Accenture, Atos, Capgemini, Cyient, DXC Technology, IBM, Infosys, L&T Technology Services, Samsung SDS, Sopra Steria, Tata Elxsi, TCS, Tech Mahindra, T-Systems, and Wipro.

Further explanation of the NEAT methodology is included at the end of the report.

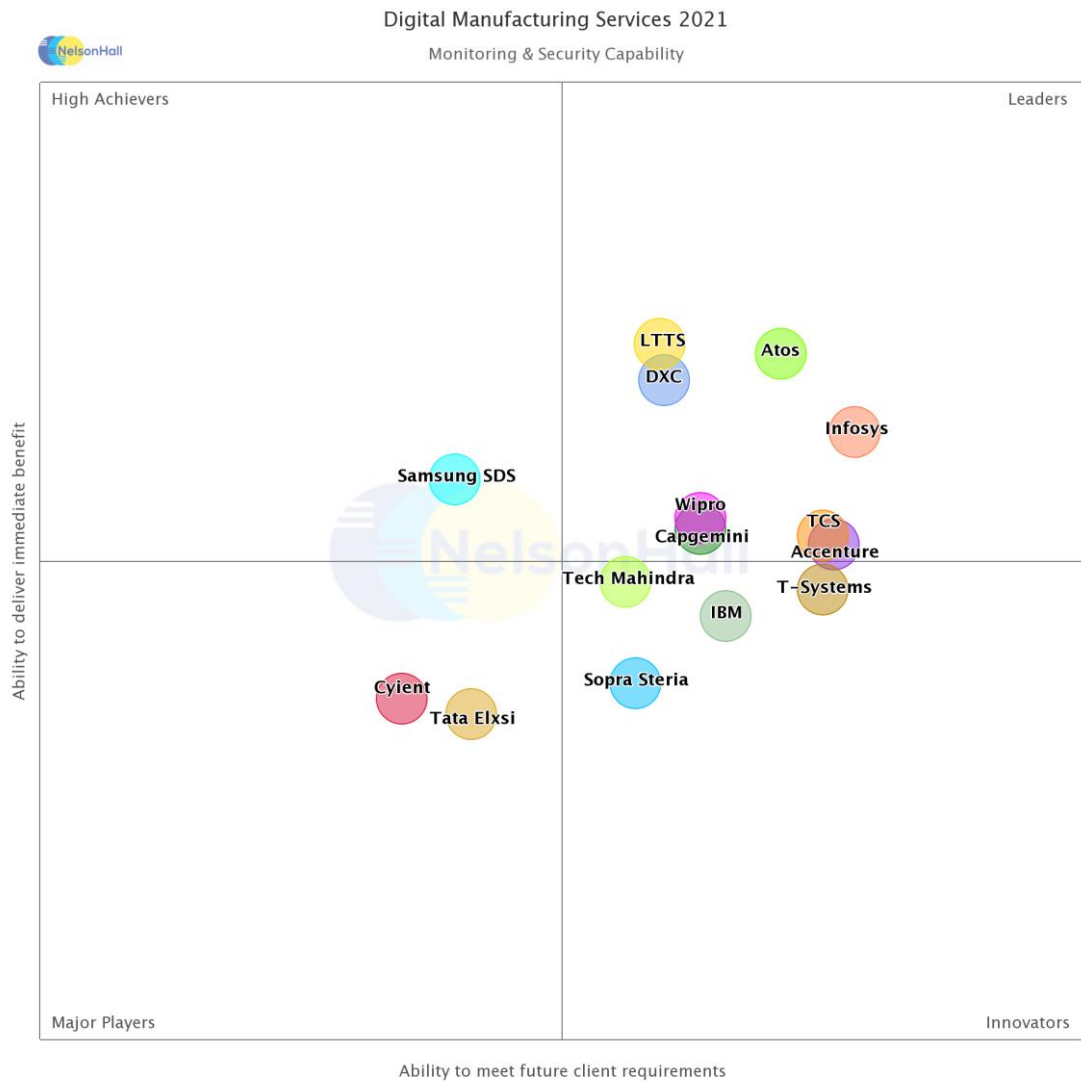# NEAT Evaluation: Digital Manufacturing Services (Overall)

NelsonHall has identified Infosys as a Leader in the *Overall* market segment, as shown in the NEAT graph. This market segment reflects Infosys' overall ability to meet future client requirements as well as delivering immediate benefits to its digital manufacturing services clients.

Leaders are vendors that exhibit both a high ability relative to their peers to deliver immediate benefit and a high capability relative to their peers to meet client future requirements.

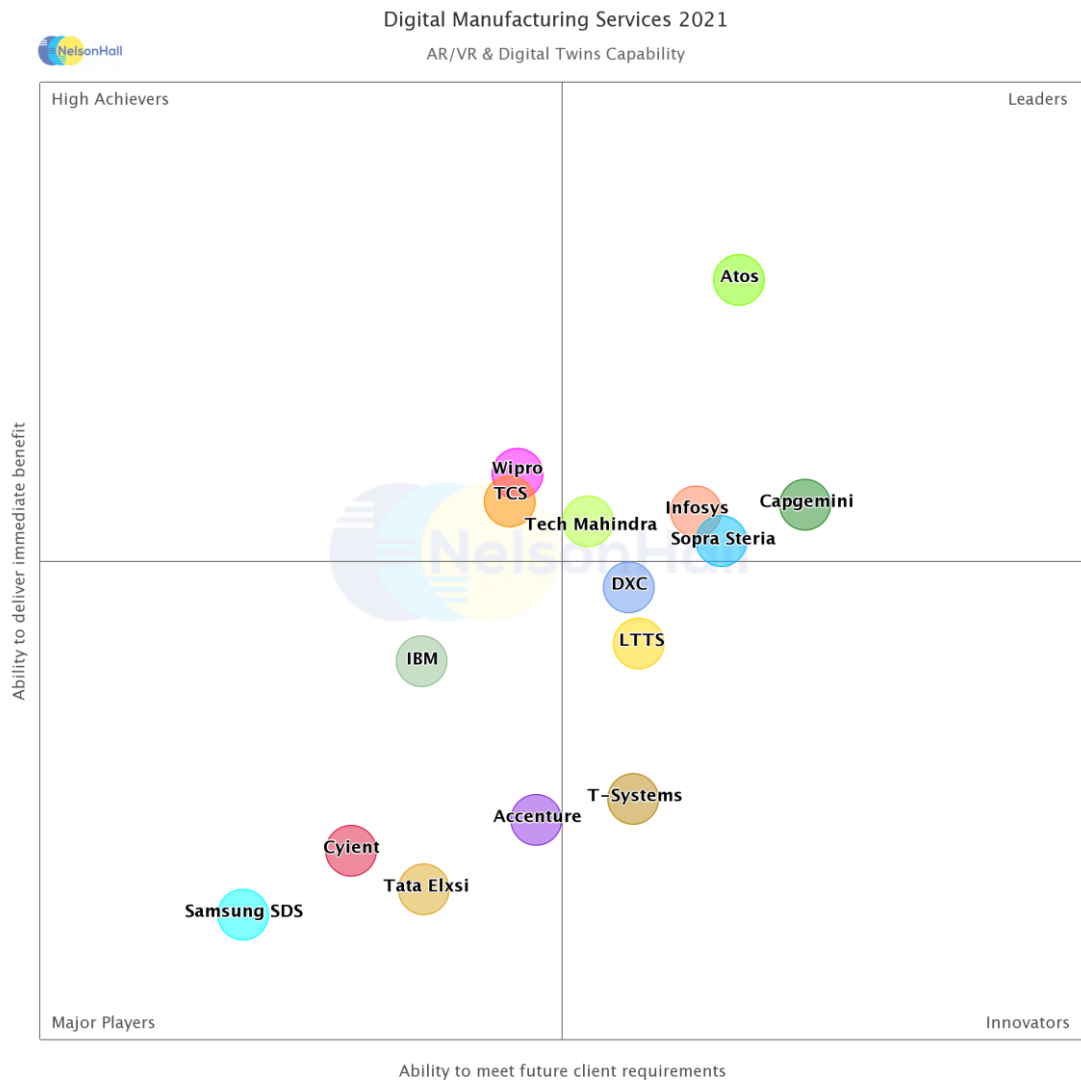Buy-side organizations can access the *Digital Manufacturing Services* NEAT tool (*Overall*) here.

NEAT Evaluation: Digital Manufacturing Services (Monitoring & Security Capability)

Digital Manufacturing Services 2021
Monitoring & Security Capability

NelsonHall has identified Infosys as a Leader in the *Monitoring & Security Capability* market segment, as shown in the NEAT graph. This market segment reflects Infosys' ability to meet future client requirements as well as delivering immediate benefits to its digital manufacturing services clients with specific capability in monitoring and security.

Buy-side organizations can access the *Digital Manufacturing Services* NEAT tool (*Monitoring & Security Capability*) here.
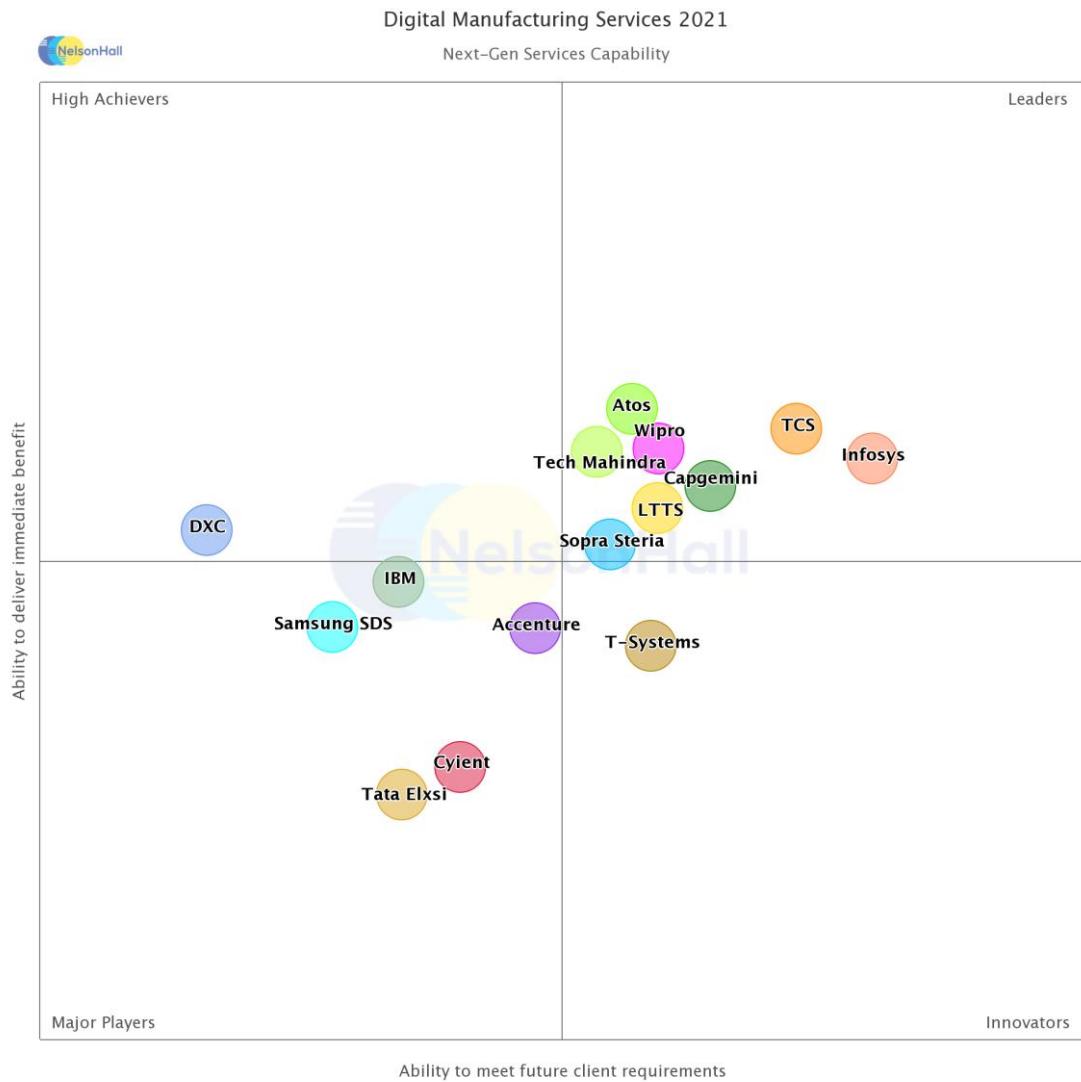
NEAT Evaluation: Digital Manufacturing Services (AR/VR & Digital Twins Capability)

Digital Manufacturing Services 2021
AR/VR & Digital Twins Capability

Source: NelsonHall 2021

NelsonHall has identified Infosys as a Leader in the *AR/VR & Digital Twins Capability* market segment, as shown in the NEAT graph. This market segment reflects Infosys' ability to meet future client requirements as well as delivering immediate benefits to its digital manufacturing services clients with specific capability in AR/VR and digital twins.

Buy-side organizations can access the *Digital Manufacturing Services* NEAT tool (*AR/VR & Digital Twins Capability*) here.

NEAT Evaluation: Digital Manufacturing Services (Next-Gen Services Capability)

NelsonHall has identified Infosys as a Leader in the *Next-Gen Services Capability* market segment, as shown in the NEAT graph. This market segment reflects Infosys' ability to meet future client requirements as well as delivering immediate benefits to its digital manufacturing services clients with specific capability in next-generation services.

Leaders are vendors that exhibit both a high ability relative to their peers to deliver immediate benefit and a high capability relative to their peers to meet client future requirements.

Buy-side organizations can access the *Digital Manufacturing Services* NEAT tool (*Next-Gen Services Capability*) here.

Vendor Analysis Summary for Infosys

Overview

Infosys highlights that its manufacturing expertise has a background in product engineering services through its Engineering Services' Manufacturing Services unit. In the past twelve years, Engineering Services (ES) has expanded its capabilities from product engineering services to services around:

- PLM and CAx

- Knowledge-based engineering

- Manufacturing applications, including services around ERP (SAP Manufacturing Intelligence, Integration, and Analytics and SAP Plant Maintenance), MES, MoMs, robotics, and other shop floor automation systems.

Infosys' strategy is to engage at the consulting level with clients, relying on its Industry 4.0 Assessment methodology. The assessment remains an essential door-opener for clients that are reconsidering their digital manufacturing activities.

In parallel, Infosys continues to develop use cases, most of which rely on a combination of IoT platforms, asset and process monitoring, and AI-based predictive models. An example of this approach is the company's Factory Cloud Canvas. With this, Infosys is migrating/developing digital manufacturing use cases to AWS and Microsoft Azure, standardizing on the hyperscalers' capabilities around cloud hosting, data and analytics products, and IoT platforms. As a result, Infosys is increasingly standardizing data and IoT platforms and focusing more on analytics, digital twins, and AI models.

Digital twins are an essential element of Infosys' Industry 4.0 service portfolio: the company combines digital twins, dashboards and KPI monitoring, 3D equipment; process and plant visualization; and AI models such as prescriptive maintenance, and automated root cause analysis taking a fault tree approach.

Partnerships continue to play an essential part in Infosys' digital manufacturing technology strategy. The company highlights that digital manufacturing is a fragmented area involving many technology vendors and ISVs. Infosys is focusing on 50 industrial IT partners. Within this large number of partners, Infosys is increasingly working with AWS and Microsoft Azure. Infosys wants to take more responsibility for integrating the different technologies on behalf of its clients.

Key services are:

- *Consulting Services* – Infosys is emphasizing its digital manufacturing consulting capabilities. The company highlights that clients usually start their digital manufacturing initiatives without a clear idea of their priorities. To support its consulting capabilities, Infosys has developed several methodologies, of which Industry 4.0 Maturity Assessment is its priority and the foundation of Infosys Engineering Services' digital manufacturing consulting services

- *Build Services* – Infosys Engineering Services provides IoT use cases such as plant and equipment monitoring, maintenance, and quality management. To back up its services, the unit has developed several IPs, such as Factory Cloud Canvas and Smart Fault Tree

- *Digital Twin and Digital Thread* – Infosys has implemented a digital twin to help the client set up a greenfield factory plant in APAC. The company helped the client in setting up real-

time control over the production with a digital twin, which helps identify how upstream events impact downstream, such as production, and identifying deviations in the optimal operating model. It goes all the way to provide instructions to operators then automatically

- *AR/VR* – Infosys has identified four primary use cases for its operations and maintenance offerings, based on two main types of technologies: digital twin and AR/VR. Specifically, for AR/VR, Infosys provides the following services: design (to allow engineers to visualize their prototypes on AV/VR devices and eliminate physical prototypes), training, maintenance (based on both AR/VR and digital twins), and operations

- *Industrial Automation and Robotics* – with its Infosys Autonomous Platform (IAP), Infosys has created an autonomous electric vehicle for material handling and people transportation. The company has developed Infosys Autonomous Platform with a modular approach in mind, integrating third-party hardware (e.g., lidars, sensors, and cameras) and software (e.g., real-time applications)

- *Additive Manufacturing* – Infosys has been involved in additive manufacturing/3D printing from a product engineering perspective. Here, ES conducts several activities:

  - Opportunity identification

  - Part selection, with ES identifying the characteristics of a part, and its benefits from moving to AM

  - Technology and process identification

  - Design for 3D printing parts

  - Value analysis/business case for estimating the cost of an AM project.

- 5G and Connectivity Services – with its 5G Live Lab, Infosys provides 4G or 5G private networks for enterprises. Services include:

  - Consulting services around design and feasibility. Infosys helps clients identify coverage gaps from other network technologies such as 3G and Wi-Fi

  - Survey and design of the network

  - Network deployment, including procurement

  - Support, maintenance, and monitoring.

- *OT Security Services* – Infosys focuses on plant brownfield opportunities, which the company considers complex, around OT security, taking best practices from IT security for device, data, network, and applications. Infosys addresses several plant security challenges such as:

  - Manufacturing software and systems without security features and legacy communication protocols (e.g., Modbus and CAN)

  - Lack of OS patching activity, password and configuration management

  - Lack of security measures such as access control management.

Financials

NelsonHall estimates that Infosys derived approximately $175m in revenues from digital manufacturing services in 2020.

Strengths

- *Consulting*: Infosys has an Industry 4.0 assessment methodology in cooperation with the University of Aachen in Germany, which provides credibility. With KRTI 4.0, Infosys has a bundled method and IP to capture logic in manufacturing systems, following a reverse engineering approach.

- *Build Services*:

  - *IoT uses cases*: Infosys has many IoT use cases, including remote monitoring and maintenance across several offerings. The offerings rely on several IPs, e.g., Factory Cloud Canvas, Smart Fault Tree, and Tracking System

  - *Digital Twins*: Infosys' offering results from the integration of several standalone capabilities and IP such as monitoring, maintenance, fault tree analysis, or simulation (thanks to the AP&S capabilities)

  - *Industrial Robotics*: while the core of Infosys Engineering Services' industrial robotics lies around AGV product engineering services, because of its experience in designing AGVs, it has developed AI models based on computer vision and many autonomous vehicle algorithms. We would like Infosys to expand from AGVs to further industrial robotics use cases

  - *OT Security*, with a comprehensive expertise-based consulting to managed service capability. We would like Infosys, however, to create supporting IP

- *Managed Services*: Infosys has just launched an OTSM offering based on ServiceNow for bringing ITSM capabilities for plant OT and IT management. The offering is one of the few offerings available in the market

- Infosys benefits from having adjacent digital skills relevant to digital manufacturing, particularly analytics and AI and UX (Kaleidoscope).

Challenges

- *3D printing/additive manufacturing (AM)*: we would like to see Infosys expand from a product design and engineering approach to consulting activities (e.g., identify the right AM product candidates) and manufacturing levels (e.g., redesign manufacturing processes based on AM's specificities)

- *Connectivity, including 5G-related IT services*: Infosys has mostly a professional service offering that relies on expertise and has identified several 5G use cases related to digital manufacturing and inventory management. Infosys highlights it has developed IPs and accelerators for CPS through its 5G Living Labs. Several of these IPs are relevant to enterprise clients

- *Onshore presence for manufacturing is limited*. At a corporate level (i.e., across all IT, BPS, and engineering and R&D services), Infosys is increasing its presence onshore, having focused initially on North America and then deploying its localization program in Europe.

Strategy

Infosys' digital manufacturing services priority remains providing a consultative-based approach to clients. Infosys will further build up its consultative approach, using its Industry 4.0 methodology and its KRTI 4.0, targeting initially German and Nordics manufacturing firms.

Infosys focuses on building and deepening use cases for the manufacturing sector along with the consultative approach. The company is putting most emphasis, within digital manufacturing services, on plant simulation and overall on advanced planning & scheduling.

The company believes that, in the short-term, the adoption of AR/VR technologies will gain momentum, notably through events such as the March 2021 contract awarded by the U.S. Army to Microsoft for ~120k HoloLens devices. The contract has an estimated value of ~21.9bn over ten years. Infosys Engineering Services is putting more sales effort behind its AR/VR-based offerings, anticipating accelerated demand.

Also, ES emphasizes its UX capabilities across its various ER&D projects. Infosys overall has built its UX and design thinking capabilities under the WONGDOODY brand, with acquisitions in the U.S., U.K. (Brilliant Basics), and Australia (Carter Digital). Mirroring Infosys' overall push in product design, in H2 2020 ES acquired Kaleidoscope Innovation, a design house mainly specialized in medical devices, looking at HMIs and providing usability testing for regulatory compliance. Kaleidoscope also provides manufacturing for its clients through partners. It had ~100 at the time of the acquisition and 2019 revenues of $21m.

Finally, 5G private networks for indoor environments is also a priority.

Infosys is aiming to back up its digital manufacturing priorities by IP and accelerators. An example is its Tracking System IP to localize objects or equipment indoors.

Outlook

Infosys will prioritize its commercial growth, focusing on personnel hiring, investing in pre-sales capabilities that combine business and technical expertise. The company has invested in specialized offerings, and we expect it to maintain this focus; it takes a systematic IP strategy to support these offerings. Over time, we expect Infosys Engineering Services to bring its IP approach to connectivity and OT security services.

Digital Manufacturing Services Market Summary

Overview

Digital manufacturing is a subset of industrial IT, which NelsonHall defines as the consulting and IT services required to automate manufacturing plants around applications and systems such as MES, control automation, asset management, process optimization, and other shopfloor automation.

Digital manufacturing as encompasses:

- IoT uses cases, including:

  − Standalone plant equipment: remote monitoring and diagnostics, predictive maintenance

  − Plants: inspection, and process improvement

  − HR: assistance, instructions, and training

- Digital twins, including remote monitoring, predictive maintenance, and production simulation

- Connectivity, including 5G-related use cases

- Industrial automation and robotics

- Additive manufacturing

- OT security

- Managed services.

Across use cases, AI is pervasive and continues to expand.

Buy-Side Dynamics

Buyers have two distinct approaches to digital manufacturing:

- Top-down and led at the CEO or executive level, and is broad, based on the belief that they need to invest in digital manufacturing to differentiate their operations. NelsonHall calls this client segment *Strategic Organizations*

- Bottom-up approach that looks to digital manufacturing to solve pain points in a specific plant. These clients are called *Operations-Focused Enterprises*.

These two approaches will continue to co-exist. Over time, with contracts becoming larger, executive-led agreements will become more common and outpace growth from bottom-up projects.

Enterprises are currently buying remote monitoring and control; and, to a lesser extent, predictive maintenance; inspection; assistance, instructions & training; and connected worker. Most contracts are small, ranging from consulting to PoCs leading to relatively small systems integration and deployment contracts. Enterprises award these as independent contracts, with few organizations awarding mega-deals.

Technologies most used are:

- IoT (including track-and-trace) is the primary technology used in digital manufacturing. It is complemented by data collection, analytics, and AI

- Within AI, computer vision gains in adoption

- Other technologies include AR/VR.

Market Size & Growth

The digital manufacturing services market is a niche ($1.7bn in 2021), but high-growth market (2021-2025 CAGR of 15%), initially driven by IoT use cases.

The pandemic has made digital manufacturing and its emphasis on remote work more relevant than ever. However, it also slowed down investment in 2020 across sectors and, in particular, in automotive and commercial aeronautics.

Spending will reach $3.1bn by 2025, driven by the increased number and size of systems integration contracts. The effects of the pandemic will be gone by 2025, and all verticals and geographies will contribute to spending growth.

Challenges & Success Factors

Strategic Organizations need a partner with broad capabilities from consulting to build services, and that can provide:

- *Business consulting*: demonstrate their understanding of manufacturing processes, share experience from other industries that are advanced in the adoption of digital manufacturing, e.g., automotive, and prioritize use cases

- *Build services*: provide the full range of services, from technology selection to implementation, while having the service integration skills to manage many different technology vendors

- *Project management* capabilities.

Operations-Focused Enterprises need vendors to be digital manufacturing multi-specialists. Vendors need to demonstrate:

- Specialized technical capabilities to solve the client's specific project's requirements initially for their first projects, and follow-up projects

- The ability to speak the same manufacturing language as the client.

Outlook

- Digital twins aggregate several use cases such as monitoring, maintenance, digital thread, and AR/VR-based assistance, instructions & training. Computer vision-based inspection will expand from products to incoming parts and raw materials. Many other use cases will emerge, around logistics and inventory management, within manufacturing plants. Track-and-trace use cases will also expand. AI will be pervasive across use cases

- The market will shift to a higher number of systems integration and deployment contracts, as buyers look to progress from their PoCs. Mega-deals will remain scarce, but mid-sized

deals will be more frequent, with buyers structuring their spending with a few preferred partners

- IoT will continue to play a key role and will be supplemented by other sources of data, mostly internal data from back-end and manufacturing applications. External data such as traffic and weather data will become more important for track-and-trace-based use cases. AI will gain further in strength, led by computer vision and across industrial automation & robotics, and 5G. Additive manufacturing has a long-term potential: currently most of the use cases are at the product design level, and not at the manufacturing one

- Over time, enterprises will become more knowledgeable of the digital manufacturing "art of the possible" and will require less consulting services, focusing on build projects. In parallel, security and managed services will be more in demand, thanks to availability, security, and safety requirements.

NEAT Methodology for Digital Manufacturing Services

NelsonHall's (vendor) Evaluation & Assessment Tool (NEAT) is a method by which strategic sourcing managers can evaluate outsourcing vendors and is part of NelsonHall's *Speed-to-Source* initiative. The NEAT tool sits at the front-end of the vendor screening process and consists of a two-axis model: assessing vendors against their 'ability to deliver immediate benefit' to buy-side organizations and their 'ability to meet client future requirements'. The latter axis is a pragmatic assessment of the vendor's ability to take clients on an innovation journey over the lifetime of their next contract.

The 'ability to deliver immediate benefit' assessment is based on the criteria shown in Exhibit 1, typically reflecting the current maturity of the vendor's offerings, delivery capability, benefits achievement on behalf of clients, and customer presence.

The 'ability to meet client future requirements' assessment is based on the criteria shown in Exhibit 2, and provides a measure of the extent to which the supplier is well-positioned to support the customer journey over the life of a contract. This includes criteria such as the level of partnership established with clients, the mechanisms in place to drive innovation, the level of investment in the service, and the financial stability of the vendor.

The vendors covered in NelsonHall NEAT projects are typically the leaders in their fields. However, within this context, the categorization of vendors within NelsonHall NEAT projects is as follows:

- **Leaders**: vendors that exhibit both a high ability relative to their peers to deliver immediate benefit and a high capability relative to their peers to meet client future requirements

- **High Achievers**: vendors that exhibit a high ability relative to their peers to deliver immediate benefit but have scope to enhance their ability to meet client future requirements

- **Innovators**: vendors that exhibit a high capability relative to their peers to meet client future requirements but have scope to enhance their ability to deliver immediate benefit

- **Major Players**: other significant vendors for this service type.

The scoring of the vendors is based on a combination of analyst assessment, principally around measurements of the ability to deliver immediate benefit; and feedback from interviewing of vendor clients, principally in support of measurements of levels of partnership and ability to meet future client requirements.

Note that, to ensure maximum value to buy-side users (typically strategic sourcing managers), vendor participation in NelsonHall NEAT evaluations is free of charge and all key vendors are invited to participate at the outset of the project.

Exhibit 1

'Ability to deliver immediate benefit': Assessment criteria

Assessment Category	Assessment Criteria
Offerings	Core services: platforms
	Use case: plant monitoring
	Use case: predictive maintenance and asset management
	Use case: inspection
	Use case: connected workforce
	Core offerings: other
	Specialized services: advisory services
	Specialized services: security services
	Specialized services: infrastructure services
	Specialized services: additive manufacturing
	Specialized services: AR/VR
	Specialized services: digital twins
	5G and connectivity
	Industrial automation and robotics
	Digital thread
Delivery	Number of manufacturing consultants
	Strength of accelerators
Presence	Globally
	North America
	EMEA
	APAC
Benefits Achieved	Improved asset scheduling & utilization
	Reduced production downtime
	Reduced cost of asset maintenance
	Improved data quality & immediacy
	Improved speed of new product introduction
	Reduced manufacturing inventory
	Reduced spare part inventory
	Increased speed-to-market for digital initiatives
	Increased end-user/business satisfaction/UX
	Pricing approach

Exhibit 2

'Ability to meet client future requirements': Assessment criteria

Assessment Category	Assessment Criteria
Level of Investment	Continued investment in IoT technologies and use cases
	Accelerated investment in specialized services: next-gen services
	Development of advisory services
	Investment in AR/VR and digital twins
	Investment in monitoring and security
Ability to Innovate	Mechanisms in place to deliver client innovation
	Extent to which client perceives that innovation has been delivered
	Suitability of vendor to meet future needs of clients
	Perception of suitability to meet future needs for emerging technologies
Other	Market momentum
	Financial security

For more information on other NelsonHall NEAT evaluations, please contact the NelsonHall relationship manager listed below.

Sales Enquiries

NelsonHall will be pleased to discuss how we can bring benefit to your organization. You can contact us via the following relationship manager:

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