

**INDUSTRY 4.0 DIGITAL  
TRANSFORMATION  
SERVICE PROVIDER  
(DXSP) PEER  
BENCHMARKING 2021  
[EXTRACT]**

**SURUCHI DHINGRA, RESEARCH MANAGER**

December, 2021

---

## EXECUTIVE SUMMARY

This report analyses the relative strengths of twelve 'Industry 4.0 Digital Transformation Service Providers' (Industry 4.0 DXSPs) in delivering Digital Transformation capabilities for manufacturing/production and related industries. It features ABB, Ansys, Bosch, Dassault Systèmes, Emerson, GE Digital, Hitachi, Honeywell, PTC, Rockwell Automation, Schneider Electric, and Siemens.

Using its universal rating system for vendors in Digital Transformation, Transforma Insights has analysed the ability of these Industry 4.0 DXSPs to address enterprise requirements for functional capabilities (e.g. hardware, software, systems integration) across eleven technology families (including Artificial Intelligence, IoT, Blockchain). For each of a total of 92 combinations of function and technology the companies are rated for whether their capabilities are 'Emerging', 'Significant' or 'Market Leading' (or 'None').

*[This document is an extract from Transforma Insights' Industry 4.0 Digital Transformation Service Provider Peer Benchmarking 2021 report. References to companies other than Siemens have been redacted or removed and discussion of technology groups other than Product Lifecycle Management has been removed.]*

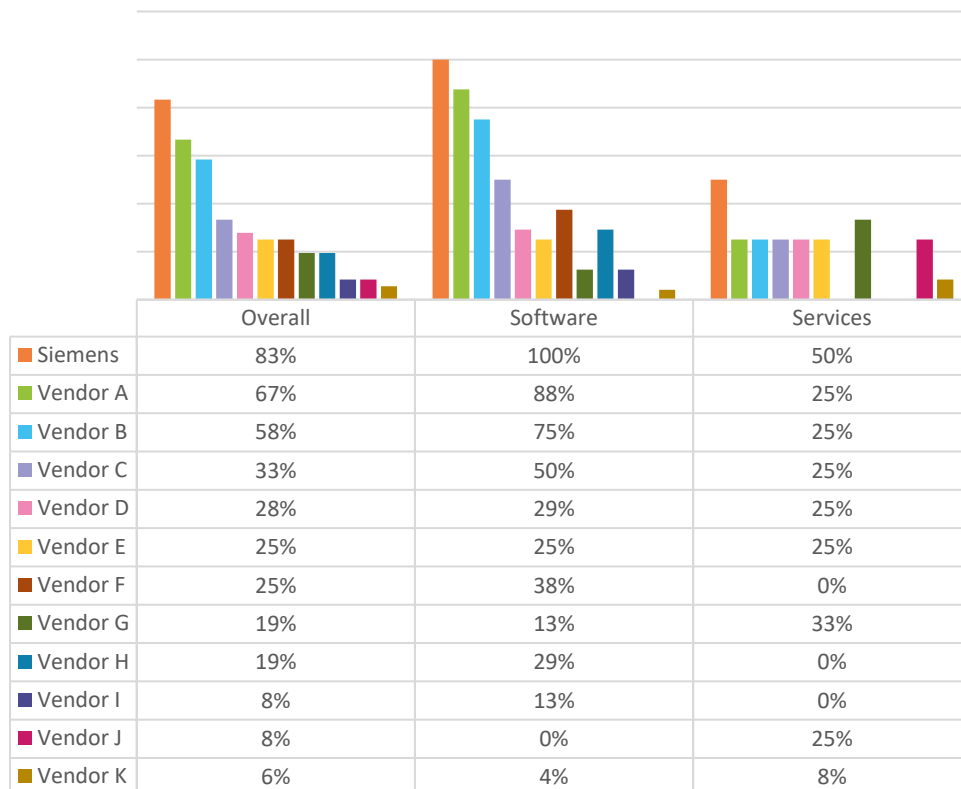
## VENDOR RATINGS: PRODUCT LIFECYCLE MANAGEMENT

[This document is an extract from Transforma Insights' Industry 4.0 Digital Transformation Service Provider Peer Benchmarking 2021 report. References to companies other than Siemens have been redacted or removed and discussion of technology groups other than Product Lifecycle Management has been removed.]

**Product Lifecycle Management (PLM)** is one of the most competitive spaces for vendors analysed in this report. Siemens (83%), Vendor A (67%), Vendor B (58%), Vendor C (42%) are top four vendors in PLM. Siemens and Vendor A both have strong offerings in PLM software (CAD/CAM and integrated solutions). The gap in their overall PLM rating is due to limited focus of the latter on PLM service engagements.

Figure 1, below, illustrates the overall score of each benchmarked vendor for the Product Lifecycle Management (PLM) technology area in isolation. Siemens and Vendor A have the strongest offerings in PLM software including CAD/CAM, PLM components and PLM integrated solutions. Siemens rates a notch higher in MES than Vendor A which takes its ranking in the PLM category higher than Vendor A. Both these companies have well defined strategies for SaaS as well as on-premises solutions.

**Figure 1: Vendor ranking in PLM [Source: Transforma Insights, 2021]**



Vendor B, Vendor A, Siemens, and Vendor C are market leaders in CAD/CAM/CAE software products. Vendor B, Siemens, Vendor A, Vendor D, Vendor F, and Vendor H have strong capabilities in Manufacturing Execution Systems (MES) software products. Most of these vendors bring vertical solutions in MES to the market to differentiate themselves and become a preferred vendors in particular industry.

## COMPARISON OF CAPABILITIES

*[This document is an extract from Transforma Insights' Industry 4.0 Digital Transformation Service Provider Peer Benchmarking 2021 report. References to companies other than Siemens have been redacted or removed and discussion of technology groups other than Product Lifecycle Management has been removed.]*

### Product Lifecycle Management

Product Lifecycle Management involves managing the development of a product from concept to ultimate redundancy and disposal. It includes all aspects of development, including computer aided design, as well as various techniques associated with managing the operational phase of the devices including Digital Twin. It also includes monetisation techniques that apply through the full product lifecycle.

Definitions:

- **Software products - CAD/CAM:** Provision of Computer Aided Design (CAD) or Computer Aided Manufacturing (CAM) software products.
- **Software products - Manufacturing optimisation:** Provision of manufacturing optimisation software related to extending PLM concepts into the manufacturing phase.
- **Software products - Solution components:** Provision of software solution components that can be used to enable an overall PLM solution.
- **Software products - Integrated solutions:** Provision of integrated solutions to support PLM. Includes the provision of PLM platform software environments.
- **Application development:** Provision of application development services to a third party related to PLM.
- **Systems integration & project management:** Provision of systems integration and project management services to a third party related to PLM.

Product lifecycle management is the process of managing the entire lifecycle of a product from inception, through engineering design and manufacture, to service and disposal of a manufactured product. From the digital thread to digital twin and digital deployment, manufacturers' digitisation push in the past few years has focused on building realistic digital simulations, making PLM one of the most important technologies for evaluating industrial digital transformation vendors.

Siemens' NX and Solid Edge portfolio, based on the same modelling kernel, form one of the market leading CAD/CAM/CAE<sup>1</sup> solutions. Siemens is continuously investing in strengthening Solid Edge, it has added 500 enhancements in the Solid Edge 2022 version.

In recent years, all major PLM vendors have made significant moves either through technology acquisitions or via partnership developments, to add or advance simulation capabilities, with a focus on offering customers a true digital twin. Siemens acquired MultiMechanics, a material

---

<sup>1</sup> Computer Aided Engineering

modelling and simulation platform, in 2019 to expand digital twin capabilities for material engineering. Siemens made a significantly large investment in simulation with its USD4.5 billion acquisition of Mentor Graphics in 2017.

Siemens has strong manufacturing operations management (including MES, APM, QMS, ...) and digital manufacturing offerings with Opcenter, Tecnomatix (Bill of Process, process planning, process simulation, virtual commissioning) and Valor for electronics manufacturing optimisation. Siemens has developed a range of industry-specific OpCenter MES solutions targeted at medical device, semiconductor, discrete manufacturing, process manufacturing, pharma and electronics.

Siemens Teamcenter is one of the most robust and scalable PLM solutions offered in the market. The solution features AI assisted adaptive UI, BOM management, change management, document management, simulation data management. Siemens has a strong ecosystem of partners. It entered into an alliance with SAP for selling the PLM suite Teamcenter and for integration between Siemens' PLM and SAP's ERP platforms. This, along with advancement in simulation and electronics tools, further enhances its overall portfolio. SAP's strengths like portfolio management and costing can also be integrated into Teamcenter. It also has a partnership with IBM to combine Siemens' Teamcenter software with IBM cloud platforms and services. The alliance provides customers with IBM's suite of hardware platforms, operating systems, middleware, business applications, cloud service offerings and managed IT services.

The way PLM is delivered and deployed is becoming a point of interest for SMEs as well as large size corporations. Vendors are seeing great interest in SaaS/cloud offerings particularly among mid-market and start-up customers, because of the ease and value it brings. Vendor A and Siemens have strong offerings in SaaS-based CAD and PLM solutions. Siemens introduced the 'Teamcenter X!', SaaS PLM solution, along with Xcelerator Share as a part of its overall strategy to focus on SaaS-based solutions. Teamcenter X enables a multi-domain Comprehensive Digital Twin combining electrical, mechanical, and software elements in a single platform. Teamcenter X is built using industrial components from Mendix, allowing customers to leverage cloud-native micro-services and stand-up new apps quickly.

Siemens and Vendor A also take the lead in PLM solution components. They offer a broad range of PLM components or 3D software development toolkits (SDKs) that enable CAD, CAM, CAE and related PLM applications. Siemens leverages these solution components into its own end user PLM applications (like Solid Edge, Simcenter, and NX software) as well as licensing it to independent software vendors (ISV's). 350+ companies license Siemens PLM components for use in 450+ commercial applications used by 6 million+ software end-users. Examples of customers using these SDKs are Autodesk, Ansys, Bentley, the Nemetschek Group and Solidworks. It offers developer kits for geometric modelling, simulation, visualisation, and data interoperability.

Siemens leads the PLM system integration and project management services category, with strong showings from Vendor C, Vendor G, Vendor B, Vendor D, Vendor J, Vendor E, and Vendor A. The overall profile of vendor strengths in PLM is summarised in Figure 2, below.

**Figure 2: Vendor capabilities in Product Lifecycle Management [Source: Transforma Insights, 2021]**

	Software Products				Application Development	SI & Project Management Services
	CAD/CAM	Manufacturing Optimisation	Solution Components	Integrated Solutions	Application Development	SI & Project Management Services
<b>Vendor I</b>						
<b>Vendor C</b>						
<b>Vendor G</b>						
<b>Vendor B</b>						
<b>Vendor K</b>						
<b>Vendor E</b>						
<b>Vendor J</b>						
<b>Vendor H</b>						
<b>Vendor A</b>						
<b>Vendor D</b>						
<b>Vendor F</b>						
<b>Siemens</b>						

*Key: Darker shading indicates stronger capabilities.*

## DETAILED PROFILE

*[This document is an extract from Transforma Insights' Industry 4.0 Digital Transformation Service Provider Peer Benchmarking 2021 report. References to companies other than Siemens have been redacted or removed and discussion of technology groups other than Product Lifecycle Management has been removed.]*

This section includes detailed profile information. As discussed in the 'Comparison Of Capabilities (Framework)' section, below, we rate the providers based on a four-level system for their capabilities in any given space: None, Emerging, Significant and Market Leading. The question of whether a capability is commercialised or not, as discussed in that section, is also indicated in the tables below. We include a marker, in the form of a "\$" for those capabilities that are commercialised to third parties. Those that are not will not have that symbol.

### Siemens

Siemens has four main reportable segments: Siemens Digital Industries (DI), Smart Infrastructure, Mobility and Siemens Healthineers (which has now been spun out as a separate company).

Siemens Digital Industries (DI) is the core automation and industrial software division of Siemens that provides end-to-end digital support and transformation services across the product lifecycle including design, planning, simulation, engineering, manufacturing, and service of the product. Siemens Digital Industries provides comprehensive Digital Twin solutions in the market connecting the 'real' product data to the 'digital' instance.

Siemens Digital Industries (DI) is focused on developing innovative solutions in automation and digitalisation. Closely collaborating with partners and customers, DI drives the digital transformation in the process and discrete industries. With its Digital Enterprise portfolio, DI provides companies of all sizes with an end-to-end set of products, solutions and services to integrate and digitalise the entire value chain. DI is constantly adding innovations to its portfolio to integrate cutting-edge future technologies.

Siemens Digital Industries (DI) is a leading industrial software company with more than 250,000 customers. Its global headquarters is located in Nuremberg, Germany. DI has regional headquarters in three major regions. The regional headquarters for software is in the United States, the regional headquarters for standard motors is in China and the headquarters for automation is in Germany. DI has revenues of greater than EUR16.52 billion in fiscal year 21 with profit margins of 20.3%. The company has 72,000 employees and claims engagement with 200,000 developers. The revenue breakdown for DI is:

- 65% Automation
- 28% Software (of which 65% is product lifecycle management, 33% electronic design automation, and 2% cloud offerings like Mendix and MindSphere)
- 7% Services

---

<sup>2</sup> All figures reference 2021



DI is a leading player in automotive, chemicals, and food and beverage industries and is expanding in pharmaceuticals, batteries and electronics. It has 40% market share in large enterprises but 20% in SMEs, with an increasing focus on SMEs.

In the Software area, Siemens has followed an acquisitive strategy to add relevant capabilities to its portfolio. It has spent around EUR10 billion in the past decade on the acquisition of software companies, including Mendix, Mentor Graphics, CD-Adapco, LMS International, Supplyframe and many others.

Siemens Digital Industries has transformed and complemented its services offering with the introduction of Digital Enterprise Services. With Digital Enterprise Services, the company focuses on enabling industrial companies of all sizes to integrate available and emerging automation and digitalisation technologies to exploit the full potential of Industry 4.0. The overall offering comprises consulting services, implementation services and optimisation services to support end users in manufacturing as well as machine builders with their digital transformation. These services are not reserved for customers with an already installed base of Siemens hardware or software, but for any company that wants to benefit from Siemens Digital Industries' domain expertise in automation and digitalisation.

## Siemens' capabilities in Product Lifecycle Management

Category	Capability Description
<b>Software products - CAD/CAM/CAE</b>	<ul style="list-style-type: none"> <li>- The NX and Solid Edge solutions by Siemens are based on the same modeling kernel (Parasolid), and together form one of the market leading CAD/CAM/CAE solutions. They deliver a comprehensive portfolio of software tools that address all aspects of the product development process – 3D design, simulation, manufacturing, design management and more.</li> <li>- Siemens is continuously working on strengthening Solid Edge; it has added 500 enhancements in Solid Edge 2022</li> <li>- Simulation capabilities with its Simcenter solution include simulation of individual parts, systems simulation, design space exploration and definition and computational fluid dynamics (CFD).</li> <li>- Simcenter includes a large set of predefined physical and application libraries to help build models effectively that can also be used for co-simulation with CAE and control strategy validation. Siemens has a broad and uniquely differentiating range of simulation capabilities with Simcenter.</li> <li>- Important investments include expanded capabilities in simulation and analysis support (S&amp;A) with Simcenter, electronics and electrification support with Mentor and software integration support with ALM and Polarion.</li> <li>- Solid Edge and NX are both integrated with synchronous technology, that is, it combines direct modelling with dimension driven designs.</li> <li>- In 2019, Siemens acquired Multimechanics to expand digital twin capabilities for material engineering. Its Multiscale technology supports structural CAE for a broad range of materials. This technology enables prediction of material failure virtually. This product was added to Simcenter 3D software portfolio.</li> <li>- With the acquisition of Mentor Graphics in 2017, Siemens expanded its software business significantly by entering the Integrated Circuit (IC) design and embedded software segments. With the convergence of Mentor's electronic design automation (EDA) software portfolio with PLM, Siemens is well positioned to address product development needs of smart products.</li> </ul> <p>Verdict: <b>Market Leading \$</b></p>
<b>Software products - Manufacturing optimisation</b>	<ul style="list-style-type: none"> <li>- It has strong Manufacturing operations Management (including MES, APM, QMS, ...) and digital manufacturing offerings with Opcenter, Tecnomatix (Bill of Process, process planning, process simulation, virtual commissioning) and Valor for electronics manufacturing optimisation.</li> <li>- Opcenter provides solutions for planning and scheduling, manufacturing execution, quality management, manufacturing intelligence and performance. Siemens has developed industry specific MES solutions targeted at medical devices, semiconductors, discrete manufacturing, process manufacturing, pharma and electronics. These include Opcenter Execution Medical Device and Diagnostics, Opcenter Execution Semiconductor, Opcenter Execution Pharma, Opcenter Execution Discrete, Opcenter Execution Process, and Opcenter Execution electronic.</li> <li>- Other products offered through Opcenter include Opcenter Quality for quality management, Opcenter APS for production planning and scheduling, Opcenter Intelligence for data analytics, and Opcenter RD&amp;L for product data management.</li> <li>- Opcenter expands and leverages the capabilities of legacy products including Camstar, SIMATIC IT, Preactor, R&amp;D Suite and QMS Professional solutions.</li> </ul> <p>Verdict: <b>Market leading \$</b></p>

<p><b>Software products - Solution components</b></p>	<ul style="list-style-type: none"> <li>- Siemens offers a broad range of PLM components or 3D software development kits (SDKs) that enable CAD, CAM, CAE (Computer-aided engineering) and related PLM applications. Siemens leverages these solution components into its own end user PLM application (like Solid Edge, Simcenter, and NX software). It also licenses it to independent software vendors (ISV's). It offers developer kits for geometric modeling, simulation, visualisation and data interoperability. These products are included under the following brands – Parasolid software, D-Cubed Software, Kineo Software, Iray+ and JT.</li> <li>- 350+ companies license Siemens PLM components for use in 450+ commercial applications used by 6 million+ software end-users. Examples of customers using these SDKs are Autodesk, Ansys, Bentley, the Nemetschek Group and Solidworks.</li> <li>- With the acquisition of Mentor Graphics in 2017, Siemens expanded its software business significantly by entering the Integrated Circuit (IC) design and embedded software segments. With the convergence of Mentor's electronic design automation (EDA) software portfolio with PLM, Siemens is well positioned to address product development needs of smart products. It acquired tools such as Electrical &amp; Wire Harness Design and Electronic Systems Design, and tools for IC Design, Verification, Test and Manufacturing.</li> <li>- Siemens is strongly positioned to provide industrial software across the entire value chain, including product design, simulation, verification, testing and manufacturing</li> <li>- Siemens has a broad and uniquely differentiating range of simulation capabilities with Simcenter. It combines physical testing, computer-aided engineering (CAE), computational fluid dynamics (CFD) and multi-physics system simulation solutions. Simcenter portfolio of solutions includes:             <ul style="list-style-type: none"> <li>&gt; Simcenter Amesim – Draws on 6,500 ready-to-use components in multi-physics libraries for modelling. Offers application-oriented solutions tailored to industries such as automotive, aerospace, industrial machinery, heavy equipment, energy and marine.</li> <li>&gt; HEEDS - Design space exploration and optimisation software leveraged in product development. It automates product development process by automating workflows (Process Automation) and maximising the available computational hardware and software resources (Distributed Execution).</li> <li>&gt; Simcenter MAGNET – For simulation and design of motors, sensors, transformers, actuators, solenoids or any component with permanent magnets or coils.</li> <li>&gt; Dedicated simulation systems for specific systems – Simcenter Prescan physics-based simulation platform for the development and validation of advanced driver assistance systems (ADAS), Simcenter Flomaster for modelling and analysing fluid mechanics in complex piping systems.</li> <li>&gt; Simcenter 3D, NX Nastran, Simcenter Samcef, Femap, Simcenter Madymo, Simcenter STAR-CCM, STAR-CD, Simcenter Flotherm, Simcenter Motorsolve are other solutions offered by the company.</li> </ul> </li> <li>- Simcenter engineering combines high-end testing with CAE and has a vast amount of experience with automotive OEM's.</li> </ul> <p>Verdict: <b>Market Leading \$</b></p>
<p><b>Software products - Integrated solutions</b></p>	<ul style="list-style-type: none"> <li>- Teamcenter is a robust and scalable PLM solution offered by Siemens</li> <li>- Features AI assisted adaptive UI, BOM management, change management, document management, simulation data management.</li> <li>- It also introduced 'Teamcenter X!', SaaS PLM solution, along with Xcelerator Share as a part of its overall strategy to focus on SaaS based solutions. Teamcenter X integrated with Mendix enables customers to develop their own solutions.</li> <li>- It entered an alliance with SAP for selling Siemens' PLM suite Teamcenter and for integration between Siemens' PLM and SAP's ERP platforms. This, along with advancement in simulation and electronics tools, is further enhancing its overall portfolio. SAP's strengths like portfolio management and costing can also be integrated into Teamcenter</li> <li>- NX software by Siemens is also a strong solution for product design and development.</li> <li>- Siemens has a partnership with IBM to combine Siemens' Teamcenter software with IBM cloud platforms and services. Teamcenter is certified on IBM's PureFlex platform in IBM's new PureSystems product family and the SmartCloud Enterprise Plus service offering. The alliance provides customers with IBM's suite of hardware platforms, operating systems, middleware, business applications, cloud service offerings and managed IT services.</li> </ul> <p>Verdict: <b>Market Leading \$</b></p>
<p><b>Application Development</b></p>	<p>Verdict: <b>None</b></p>
<p><b>Systems integration &amp; project management</b></p>	<ul style="list-style-type: none"> <li>- Siemens Digital Industries Software offers the widest range necessary that spans across consulting, program management, roadmap development, strategic advisory, implementation, managed services, lifecycle management, process and solution architecture, training services, optimisation and support services.</li> </ul> <p>Verdict: <b>Market Leading \$</b></p>

## APPROACH

*[This document is an extract from Transforma Insights' Industry 4.0 Digital Transformation Service Provider Peer Benchmarking 2021 report. References to companies other than Siemens have been redacted or removed and discussion of technology groups other than Product Lifecycle Management has been removed.]*

### Scope

Transforma Insights' Industry 4.0 Digital Transformation Service Provider Peer Benchmarking 2021 provides a benchmarking of a set of technology vendors in their capabilities in delivering industrial digital transformation, using a framework that Transforma Insights has developed to assess the capabilities of every supplier involved with Digital Transformation. The vendors included are described in detail, along with an explanation of their collective role and consideration of trends affecting them.

The bulk of the original report, provides our assessment of the capabilities of each of the vendors for each of eleven technology families and between 5 and 14 functions per technology family. This includes hardware, software, services, consulting, and various other elements. This analysis was compiled based on extensive desk research and interviews with and written feedback from the vendors. The section includes recommendations to enterprises on which vendor would be best placed to support them for different functions within the particular technology family.

Based on the rating of each vendor for each function in each technology family we are then able to rank the vendors, by technology, by role and overall for Industrial Digital Transformation. For the purposes of ranking the vendors, we apply a weighting for each function and for the eleven technology families relative to each other. The latter is based on the expected investment in that technology family over the next decade<sup>3</sup>. These weightings allow us to score the overall capabilities of the vendors for Digital Transformation as a whole.

As well as the ratings, there are a number of broader intangible factors that have been considered, such as how easy the company is to work with, the extent of its channels and the ability to deliver products and services in other adjacent areas.

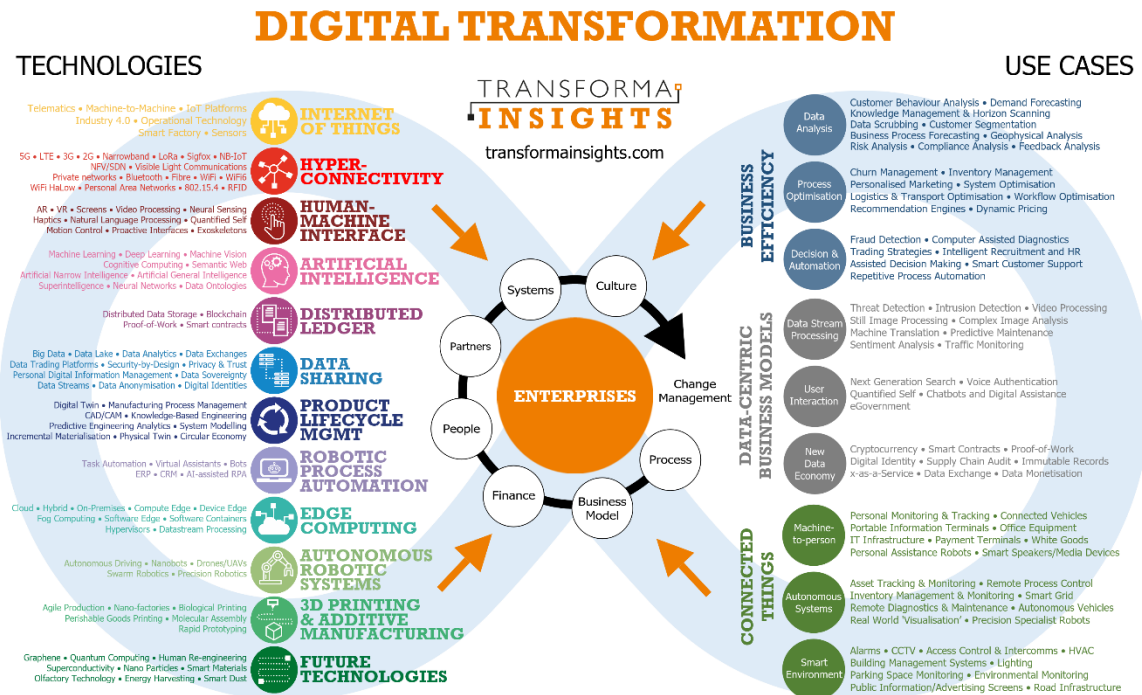
### Comparison Of Capabilities (framework)

Transforma Insights considers twelve families of technologies when examining capabilities in Digital Transformation, as illustrated in Figure 3, below. While these might not encompass every possible technology that organisations might need in order to pursue a Digital Transformation, they certainly represent the most disruptive, and therefore the ones of which enterprises should be most aware.

---

<sup>3</sup> See '[Digital Transformation Investment Forecast Report](#)' (January 2020)

**Figure 3: Digital Transformation technologies, use cases and business processes**  
[Source: Transforma Insights, 2019]



In this section we examine the capabilities of each of our profiled companies with regard to each of these technology areas. In all cases the over-arching technology umbrella term includes numerous different elements. Internet of Things, for instances, spans hardware, software, application development, implementation, field services and specialist services. Each sub-section examines the organisations' capabilities across the various elements in each of the technology areas. This maps directly to the segmentation that Transforma Insights uses in our Vendor Profiles<sup>4</sup> as illustrated in Figure 4.

For the purposes of comparing vendor Digital Transformation capabilities, we exclude 'Future Technologies' from the analysis, as the category is too speculative and by definition not quite ready for practical application.

<sup>4</sup> <https://transformainsights.com/research/vendors/>

**Figure 4: Digital Transformation roles and capabilities [Transforma Insights, 2021]**

	Specialised hardware	General hardware (servers, routers, etc.)	Software products	Application development	Systems integration & project management	Specialist services	Field & operational services
<b>3D Printing and Additive Manu-facturing</b>	3D printers; Integrated solutions	-	Printing software; Design software; Modelling software	Application development	Systems integration & project management	Certification & regulatory compliance; IP mgmt; Finishing services; Modelling services	Field & operational services
<b>Artificial Intelligence</b>	AI Accelerator Chips	-	Software platform; Integrated solutions	Application development	Systems integration & project management	Specialist services	-
<b>Autonomous Robotic Systems</b>	UAVs; Precision Factory Robots; Other Robots; Integrated solutions	General hardware (servers, routers etc.)	Robotic systems software platform	Application development	Systems integration & project management	Support services	Field & operational services
<b>Data Sharing</b>	-	-	Software platform; Monetisation services; Integrated solutions	Application development	Systems integration & project management	Transaction support; Data source	-
<b>Distributed Ledger</b>	-	-	Software platform; Integrated solutions	Application development	Systems integration & project management	Specialist services	-
<b>Edge Computing</b>	-	Edge hardware; Cloud hardware	Integrated solutions; Managed edge services	Application development	Systems integration & project management	Cloud services	Field & operational services
<b>Human Machine Interface</b>	Haptics; Headsets; Movement & touch sensors; Screens & video walls	-	Software platform; Integrated solutions	Application development	Systems integration & project management	Video processing	Field & operational services
<b>Hyper-connectivity</b>	Device - silicon; Device - module; Device - modem/gateway	Network infrastructure	Platform - Connectivity; Platform - Connectivity Support; Platform - Subscription Management	-	Systems integration & project management	Communications services: Cellular services; LPWA services; Satellite services; Other LAN services	Field & operational services
<b>IoT</b>	IoT applications; Integrated solutions	-	Platform - app enablement; Platform - device management; Platform - business rules; Platform - other	Application development	Systems integration & project management	Database and data management	Field & operational services
<b>Product Lifecycle Management</b>	-	-	CAD/CAM software; Manufacturing optimisation software; Solution components; Integrated solutions	Application development	Systems integration & project management	-	-
<b>Robotic Process Automation</b>	-	-	Platform - RPA; Integrated solutions	Application development	Systems integration & project management	-	-

Because of the breadth of what is considered, some of the technologies (and the capabilities within them) are more or less relevant to the types of organisations included within this report, and the specific companies. This is Transforma Insights’ universal rating system for vendors in the space and allows easy comparison for adopters between all types of companies providing products and services in the space. This rating system is applied to, for instance, Hyperscale Cloud Providers, Communications Service Providers, Systems Integrators and Consultancies.

We rate the providers based on a four-level system for their capabilities in any given space: None, Emerging, Significant and Market Leading. This rating is based on both the credibility of the solution and the position of the offering in the market (e.g. market share). This inevitably begs the question of whether these are absolute ratings, or relative ratings. They are a combination of the two, in reality. A company that happens to be first to market with something as a trial launch cannot really be considered to be ‘Market Leading’. In Figure 5 we illustrate the scenarios in which vendors will be rated against each of the three substantive categories.

**Figure 5: Vendor ratings [Source: Transforma Insights, 2021]**

	Less sophisticated or mature than mainstream market offer	As sophisticated as mainstream market offer	More sophisticated than mainstream market offer
Widely adopted product	Emerging	Significant	Market Leading
Moderately adopted product	Emerging	Significant	Market Leading
Early product with little significant market adoption	Emerging	Emerging	Significant
Emerging market concept	Emerging	Emerging	Emerging

There is a further degree of complexity to the rating based on the extent to which the vendor provides the service based on its own in-house developed capabilities rather than being a channel for products developed by third parties. Transforma Insights takes the view that simple resale of a third-party product does not count as a capability for the vendor in question. However, if some element of value is added, with a service wrap or integration with other capabilities, then that does justify a rating, although typically a lower rating than if the capability was originated in-house.

The final consideration is of commercialisation. Many of the capabilities that we consider might be developed internally by an organisation solely for its own purposes. For instance, a hyperscaler developing AI accelerator chips to improve its own AI capability. The aim with the

rating system is to provide would-be buyers of products and services with a guide to who they should consider. In this scenario, although the developer may have 'Market Leading' capabilities in terms of the technology, the product itself is not available to buyers. In this scenario we would rate the capability as 'Market Leading' but it needs to be distinguished that it is not commercialised. We include a marker, in the form of a "\$" for those capabilities that are commercialised to third parties. Those that are not will not have that symbol. It should be noted that in the scenario noted, that the vendor in question would provide, for instance, a commercialised offering in another category, for example either a 'software platform' or 'integrated solution', and would be indicated with a "\$" against this capability accordingly.

The original report provides our views on the capabilities of the companies specifically included in this report under each of the categories considered. Where they have no, or minimal, capabilities under a heading, the category is excluded. Each category includes a definition of the technology family and each of the elements within it, a table illustrating our views on the vendor capability and supporting explanatory text to help adopters make decisions about vendor selection.

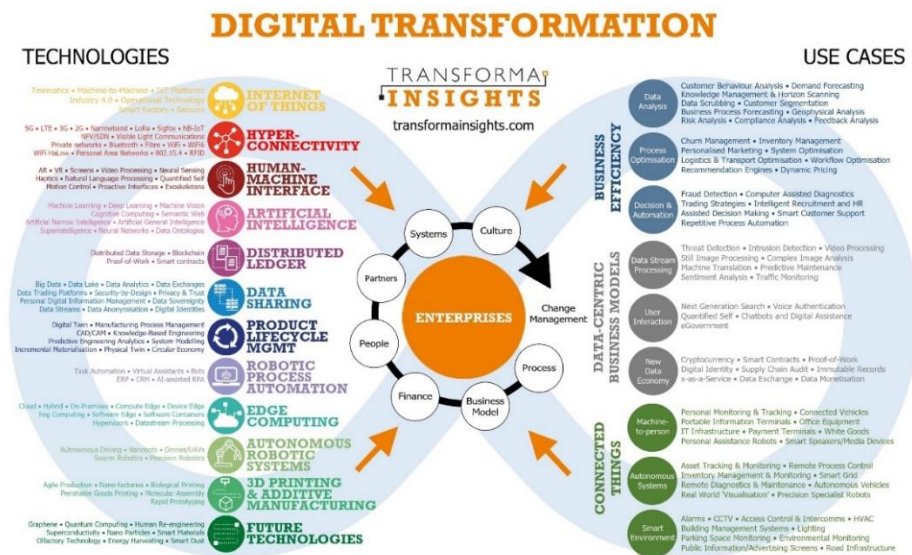


## ABOUT TRANSFORMA INSIGHTS

Transforma Insights is a research firm focused on the world of Digital Transformation (DX). Led by seasoned technology industry analysts Transforma Insights provides advice, recommendations and decision support tools for organisations seeking to understand how new technologies will change the markets in which they operate.

To address the implications of the technology-driven change, often referred to as Digital Transformation, we examine the intersection of three inter-related areas: **New Technologies**, **Emerging Use Cases**, and **Enterprise Change Management**.

Our starting point is a dozen families of **New Technologies**, comprising numerous concepts that we believe will have a significant impact on the commercial and operational models of most enterprises worldwide. These comprise the Internet of Things, Hyperconnectivity, Human-Machine Interface, Artificial Intelligence, Distributed Ledger, Autonomous Robotic Systems, Product Lifecycle Management, Data Sharing, Edge Computing, Robotic Process Automation, 3D Printing & Additive Manufacturing, and Future Technologies that are currently just over the horizon, but which are likely to have a transformative impact.



Technologies in isolation are irrelevant, they must be given practical applications. Accordingly, the second dimension of our research focuses on a comprehensive understanding of **Transformational Use Cases**. We categorise these under three headings: **Business Efficiency** (including the likes of customer behaviour analysis, workflow optimisation, and process automation), **Data-Centric Business Models** (including predictive maintenance, image processing, and bots), and **Connected Things** (covering diverse categories such as smart grid, autonomous vehicles, and smart speakers).

The third part of Digital Transformation concerns **Enterprise Change Management**. The biggest barrier in implementing any Digital Transformation initiative is typically internal. They typically involve culture changes, new business models, new processes, different skills, and

new partnerships, all of which needs to be implemented through a change management process.

In order to support our clients' as they navigate this intersection of technologies, use cases and processes, we provide a set of research tools.

<b>TAM Forecasts</b>	<p>Comprehensive guide to the DX market opportunity worldwide, including all 12 technology families (IoT, AI, Distributed Ledger etc.), 13 regions, 76 use cases, 20 vertical sectors and dozens of metrics including connected devices, technology splits, investment and revenue.</p>	<b>Insight Reports</b>	<p><b>Technology</b> give qualitative view on techs. <b>Case Study</b> analyse the information in the BP and VS DBs. <b>Forecast</b> expand on data in the TAM Forecasts. <b>Key Topic</b> cover interesting or noteworthy topics. <b>Vendor</b> compares vendor capabilities (and Peer Benchmarking gives more detail for CORPORATE users).</p>
<b>Best Practice Database</b>	<p>Contains hundreds of case studies of technology implementations. Each has detailed information of the deployment, including time to deploy/pay back, business impact, and technologies used. In aggregate it can provide unrivalled guidance on project prioritisation, best practice and vendor selection.</p>	<b>Client Enquiry</b>	<p>Unlimited client enquiry (for CORPORATE customers) allowing direct access to Transforma Insights analysts to ask about any aspect of our research, request clarifications, discuss new market developments, ask for feedback on your activities or anything else.</p>
<b>Vendor Selection Database</b>	<p>Allows buyers to see which vendors have successfully delivered products and services in the real-world. Includes detailed vendor profiles ranked on emerging, significant and market leading capability. Also our 'Vendor Connect' feature connects would-be buyers of DX services with vendors.</p>	<b>Custom Research</b>	<p>Some clients have specific requirements beyond the support offered by these products. Client-specific engagements might include deep strategy reviews, customised market forecasts or the development of marketing material such as white papers or webinars.</p>

The **Best Practice & Vendor Selection Database** is aimed at enterprises going through Digital Transformation. This database provides unrivalled information on current and historic deployments, comprising thousands of Case Studies, providing would-be adopters with critical understanding of project prioritisation, best practice, key success factors, and the key vendors with which they should be working. The Database also includes our new **Vendor Connect** platform, a mechanism for connecting technology vendors and would-be technology adopters.

Our **TAM Forecasts** will also be of interest to vendors in the Digital Transformation space. These quantitative guides to the market opportunity cover each of the twelve technology sectors mentioned above, looking at hundreds of use cases and covering 200 countries.

Finally, we publish a series of reports on all aspects of the technologies, markets and vendors that we cover. **Technology Insight Reports** provide a qualitative guide to the impact of the twelve technology families upon which we focus, **Case Study Insight Reports** analyse the information in the Best Practice & Vendor Selection Database, **Forecast Insight Reports** expand upon the data in the TAM Forecasts, **Key Topic Insight Reports** cover other interesting and noteworthy topics, and **Vendor Insight Reports** identify the relative strengths and weaknesses of vendors and show which should be top of any buyer's list when implementing Digital Transformation. A more detailed version of the Vendor Insight Reports is available for our 'Corporate' subscribers in the form of our **Peer Benchmarking** reports detailing the capabilities of vendors within the market being examined.

Some of our clients have specific requirements beyond the support offered by these products. We support these needs via Custom Research & Consulting. Client-specific engagements might include deep strategy reviews, customised market forecasts or the development of marketing material such as white papers or webinars.

Learn more at [transformainsights.com](https://transformainsights.com) or email us: [enquiries@transformainsights.com](mailto:enquiries@transformainsights.com).