ïSG Provider Lens™

2021

Manufacturing Industry
Services 2021

imagine your future®

ISG (Information Services Group) (NASDAQ: III) is a leading global technology research and advisory firm. A trusted business partner to more than 700 clients, including 75 of the top 100 enterprises in the world, ISG is committed to helping corporations, public sector organizations, and service and technology providers achieve operational excellence and faster growth. The firm specializes in digital transformation services, including automation, cloud and data analytics; sourcing advisory; managed governance and risk services; network carrier services; technology strategy and operations design; change management; market intelligence and technology research and analysis. Founded in 2006 and based in Stamford, Conn., ISG employs more than 1,300 professionals operating in more than 20 countries — a global team known for its innovative thinking, market influence, deep industry and technology expertise, and world-class research and analytical capabilities based on the industry's most comprehensive marketplace data. For more information, visit www.isg-one.com.

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Introduction

The Manufacturing Industry Services 2021 study tracks and analyzes the offerings around several elements of manufacturing from the intricacies of product engineering such as design, development, pilot scale and industry scale production to shop floor manufacturing and remote product operations. Spanning the entire lifecycle of a product, from whiteboarding and 3D simulation to shop floor robotics, ISG tends to analyze the major disruptions taking place in the industry. Automation plays a significant role here, spreading across components such as manufacturing operations management (MOM) and manufacturing execution systems (MES), as well as capturing process data and storing it in the cloud or inside the new edge. Service providers have been working extensively on shopfloor transformation and integrated product development. They are bringing together electrical, electronic, mechanical, embedded and software components with conventional mechanical, electronics and electrical engineering. This has resulted in a combination of MES and product lifecycle management (PLM) solutions with cutting-edge machine-to-machine (M2M) connectivity and artificial intelligence-driven insights. The solutions use insights to drive the underlying product and manufacturing engineering for the internet of things (IoT) stratagem.

The study examines the role of service and solution providers across the entire value chain of manufacturing industry, spanning from product engineering, design capabilities and pilot scale implementations, virtual layout or simulation of the shop floor, ergonomics for machinery, and IT and operational technology convergence to aftermarket services. It also analyzes the capabilities of providers around after-sales support such as leveraging digital twin to check the condition of machinery while it reaches the wear-out period of the wear curve. In the three quadrants included in the study — digital engineering capabilities for transportation, hi-tech and industrial segments — ISG will consider the providers' ability to automate shopfloor functions across the entire ecosystem of digital manufacturing, from implementation of MES, MOM, and PLM and supply chain systems to product development and launch. Analysis of the business in terms of new age technologies such as remote monitoring of the production line (which necessitates moving workloads to cloud) and providing momentum to IoT, cloud, augmented reality, virtual reality and similar other technologies is an area of focus. Overall, the quadrants analyze the attributes of providers empowering organizations to transform a client into the digital world and accelerate digital strategy implementation. ISG will also analyze the provider's ability to implement predictive maintenance decisions such as scheduling diagnosis and roadmaps around capabilities in technologies such as 3D printing, augmented reality, virtual reality and other use cases of virtualization in several business landscapes. Additionally, the ability to integrate security in every layer of product and manufacturing engineering with in-house capabilities or partnerships will be analyzed.

ISG sets out to deliver a comprehensive research program with clear and extensive evaluation criteria, covering the developments and deliverables of service providers and solution suppliers in this dynamic market. This study accounts for changing market requirements and provides a consistent market overview for the segments, along with concrete decision-making support to help user organizations evaluate and assess the offerings and performance of providers.

The ISG Provider Lens™ study offers IT, engineering, Manufacturing, Procurement and CDOs as well as R&D decision -makers the following:

- Transparency on the strengths and weaknesses of relevant services and solution providers

- Differentiated positioning of providers by segments

- Perspective on several markets, including global, the U.S. and Europe

Our study serves as an important decision-making basis for positioning, key relationship and go-to-market considerations. ISG advisors and enterprise clients also use information from these reports to evaluate their current vendor relationships and potential engagements.

Quadrants Research

As part of this ISG Provider Lens™ quadrant study, we are introducing the following five quadrants on Manufacturing Industry Services:

Manufacturing Industry Services 2021		
Service Providers		
Digital Engineering – Transportation	Digital Engineering – Hi-Tech	Digital Engineering – Industrial
Solution Vendors		
Mobility Security Solutions		OT Security Solutions
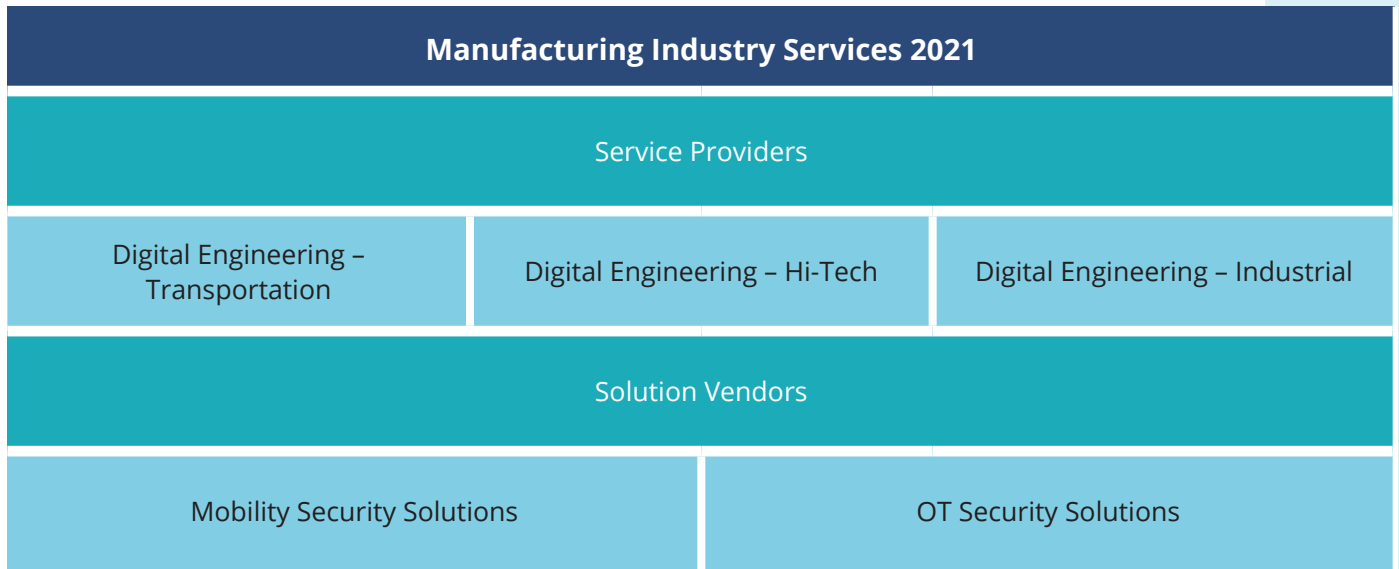
Source: ISG 2021

Digital Engineering – Transportation

The quadrant assesses the capabilities of engineering and R&D service providers and system integrators in systems engineering, including hardware (electrical and mechanical), software and embedded systems along segments such as small series manufacturing, tests and simulations. The digital engineering process starts from the design, development and pilot scale implementation phase to every aspect of industry-scale manufacturing engineering, including niche techniques such as additive manufacturing for passenger and commercial vehicles and two wheelers. Considerable focus is on the seamless integration of electronics, sensor technology and software systems to drive the concept of autonomous, connected, electric and secured (ACES), aligned with proficiencies in hydrogen propulsion concepts, virtual manufacturing, digital manufacturing and lean manufacturing. Lastly, ISG analyzes domain expertise across the latest testing methodologies such as noise-vibration-harshness (NVH), virtual vehicle and brake systems, and opportunities tapped in the growing market of test equipment design and testing-as-a-service, vehicle security, OT security, etc.

Eligibility criteria:

- Ability to execute at least one smart manufacturing process (that may or may not be a usable end product for passenger and commercial vehicles or a motorcycle) that meets OEM's requirements

- Demonstrate development capabilities in at least one automotive segment, namely body, engine, transmission, suspension, braking systems, powertrain or interiors

- Exhibit capabilities in advanced technologies such as nanotechnology for the manufacture of lightweight vehicles, fuel cell or hydrogen-powered propulsions to reduce emissions, and new battery chemistries to increase EV sustainability

- Specialize in at least one aspect of the automotive manufacturing process such as chassis production, electrocoating, surface finishing, pre-assembly or final assembly

- Demonstrate product development and obsolescence management capabilities

Digital Engineering – Hi-Tech

The quadrant analyzes the engineering and R&D capabilities of service providers in the mainstream semiconductor manufacturing processes and across front-end-of-the-line (FEOL) and backend-of-the-line (BEOL) subprocesses — from creation of transistors to the formation of interconnects within a device. ISG analyzes the provider's potential to bring software-defined product differentiation based on the foundational semiconductor engineering capability. ISG will also examine the ability to deliver disruptive use cases, such as AI-enabled chips and high-speed networks, and enable businesses to unlock the power of cloud through collaborations with hyperscalers. A provider's expertise is measured based on its design engineering prowess and the quality assurance capabilities. Some of the major functions include ensuring compatibility in interconnects, the small wiring schemes in devices, which contribute to the resistance-capacitance (RC) delay in semiconductor chips. A service provider is expected to have design capabilities in key subsegments, including digital, analog, high-speed physical interface intellectual property, embedded memory compiler, electronic design automation (EDA) and modeling.

Eligibility criteria:

- Demonstrate design and/or quality assurance capabilities in the complementary metal oxide semiconductor (CMOS) manufacturing processes, which may or may not be a usable end product for an electronic device vendor to meet an enterprise requirement

- Services should encompass one or more of the FEOL processes (wafer preparation, isolation, well formation, gate patterning, spacer, extension and source/drain implantation, silicide formation, and dual stress liner formation) and BEOL processes (dielectric film deposition, patterning, metal fill and planarization by chemical mechanical polishing)

- Demonstrate proficiency in integrated circuit (IC) manufacturing or IC fabrication, including materials, processes, integration, and lithography engineering, with in-house talent or by engaging contract manufacturers

- Demonstrate capabilities in or have plans to help manufacturers acquire certifications such as ISO 9001 and ISO 14001

- Specialize in at least one manufacturing process such as wafer preparation, photolithography, etching, cleaning, thin films, ion implantation, planarization, test and assembly

- Demonstrate experience with advanced technologies such as new materials (high-K/metal gate, or HKMG, and III-V materials or non-copper BEOL metals), new interconnect structures (FinFET/Trigate, nanowires, self-aligned via integration or Cu/air-gap interconnects), new integrations (3D IC, through-silicon via, or TSV, or 3D heterogeneous integration), and new lithography technologies [(double patterning, extreme ultraviolet, or EUV, lithography and directed self-assembly (DSA)]

Digital Engineering – Industrial

This quadrant analyzes the capability of service providers and/or system integrators to deliver product and manufacturing engineering services to enterprises operating in the industrial and heavy equipment segment (construction equipment, agriculture and forestry, materials handling and production machinery). ISG will analyze the service provider's value proposition of processes associated with product design, design support, design validation and manufacturing support across phases of concept generation, component and tool (jigs and fixture) design, hydraulic/harness routing, tolerance analysis, value engineering and re-engineering, 3D modeling, assembly management, static and dynamic analysis, etc. Overall, the quadrant analyzes the attributes of the providers empowering organizations to transform the industrial landscape and accelerate digital strategy implementation.

Eligibility criteria:

- Ability to support services across levels of manufacturing engineering, post pilot scale

- Demonstrate relevant experience in the consolidation of engineering services and deliver the right balance of onshore/offshore cost arbitrage

- Experience in engineering software development around application development, maintenance and support, and engineering process automation and tools customization will have added advantage

Mobility Security Solutions

This quadrant includes all aspects of solutions and services to protect connected cars and connected aircraft, including passenger jets, commercial vehicles, and on- or off-highway vehicles, against cyberattacks. The quadrant also analyzes the capabilities of solution providers to address challenges of integrating full connectivity into advanced moving platforms with new and ultra-fast communication networks, fast data-based systems and high-performance computing. Providers with secure by design software and hardware development capabilities and those catering to all cross section of customers such as car manufacturers, Tier-1 suppliers, fleet operators and aftermarket connectivity providers are considered to have a competitive edge over others. ISG also considers providers that have capabilities in spoofing protection software and integrating them into GPS systems. These systems integrate global navigation satellite system (GNSS) security into hardware at the chip or receiver level and offer positioning, navigation and timing (PNT) capabilities.

Eligibility criteria:

- Demonstrate experience in both cybersecurity and the mobility industry, offering innovative security methods and proven computer networking know-how with a deep understanding of automotive best practices

- Offer software-only, connected and system-agnostic solutions to detect, protect and mitigate smart spoofing

- Demonstrate experience in consulting, assessment and execution for mobility security alignments specified by the new regulations that have been launched and mandated (UNECE WP.29 and ISO 21434)

OT Security Solutions

Operational technology (OT) can be defined as the suite of hardware and software that monitors and controls the activities of equipment in a manufacturing environment. OT systems such as industrial control systems for heavy industries, which include manufacturing, transportation and utilities that have been in existence for decades, are traditionally not connected, thereby making them redundant (or obsolete) in the modern, advanced networked infrastructure. The lack of automation in legacy mechanical systems necessitates manual operation of equipment, log collection and monitoring. With the emergence of smart, connected devices, providers have more control over these systems. The growth of machine-to-machine (M2M) technologies and machine learning (ML) has led to a radical change in industry dynamics, wherein setups are gearing toward autonomy. The benefits are being realized in the form of preventive maintenance that improves machine longevity. ISG analyzes the security solutions offered by a solution provider to monitor Modbus, Profibus, ethernet traffic and proprietary traffic, and protect OT components such as PLC, human-machine interface (HMI), SCADA software, physical equipment, machine control systems, and remote industrial software that are not connected to the external world.

Eligibility criteria:

- Have offerings in at least one segment of OT security, for example, monitoring and visibility or decoy and deception technologies

- Have a track record of providing seamless security against all kinds of data breaches in the manufacturing campus or networks

- Ability to integrate complex and emerging technologies, including network technologies, into an overall security solution

- Demonstrate the capacity to rapidly innovate and stay apace with the latest threats from the rapidly advancing community of cyber criminals

Quadrants by Region

Quadrants	Global	U.S.	Europe
Digital Engineering – Transportation		✓	✓
Digital Engineering – Hi-Tech		✓	✓
Digital Engineering - Industrial		✓	✓
Mobility Security Solutions	✓		
OT Security Solutions	✓		

Schedule

The research phase falls in the period between **July and August 2021**, during which survey, evaluation, analysis and validation will take place. The results will be presented to the media in **November 2021**.

Milestones	Beginning	End
Launch	July 30, 2021	
Survey Phase	July 30, 2021	Aug 23, 2021
Sneak preview	October 2021	
Press release	November 2021	

Please refer to the link to view/download the ISG Provider Lens™ 2021 research agenda:

Access to Online Portal

You can view/download the questionnaire from here using the credentials you have already created or refer to instructions provided in the invitation email to generate a new password. We look forward to your participation!

Research Production Disclaimer:

ISG collects data for the purposes of writing research and creating provider/vendor profiles. The profiles and supporting data are used by ISG advisors to make recommendations and inform their clients of the expe-rience and qualifications of any applicable provider/vendor for outsourcing the work identified by clients. This data is collected as part of the ISG FutureSource process and the Candidate Provider Qualification (CPQ) process. ISG may choose to only utilize this collected data pertaining to certain countries or regions for the education and purposes of its advisors and not produce ISG Provider Lens™ reports. These decisions will be made based on the level and completeness of the information received directly from providers/vendors and the availability of experienced analysts for those countries or regions. Submitted information may also be used for individual research projects or for briefing notes that will be written by the lead analysts.

ISG Star of Excellence™ – Call for nominations

The Star of Excellence is an independent recognition of excellent service delivery based on the concept of "Voice of the Customer." The Star of Excellence is a program, designed by ISG, to collect client feedback about service providers' success in demonstrating the highest standards of client service excellence and customer centricity.

The global survey is all about services that are associated with IPL studies. As a consequence, all ISG analysts will be continuously provided with information on the customer experience of all relevant service providers. This information comes on top of existing first-hand advisor feedback that IPL leverages in context of its practitioner-led consulting approach.

Providers are invited to nominate their clients to participate. Once the nomination has been submitted, ISG sends out a mail confirmation to both sides. It is self-evident that ISG anonymizes all customer data and does not share it with third parties.

It is our vision that the Star of Excellence will be recognized as the leading industry recognition for client service excellence and serve as the benchmark for measuring client sentiments.

To ensure your selected clients complete the feedback for your nominated engagement please use the Client nomination section on the Star of Excellence website.

We have set up an email where you can direct any questions or provide comments. This email will be checked daily, please allow up to 24 hours for a reply. Here is the email address: Star@isg-one.com

Partial list of companies being invited for the survey

Are you in the list or do you see your company as relevant provider that is missing in the list? Then feel free to contact us to ensure your active participation in the research phase.

3D Systems	Cadence	Ferchau
Accenture	Capgemini/Altran	FEV
AKKA	Caresoft Global	Firemon
Alten	Cartesiam/ST	Forcepoint
Ansys	Centri	Forescout
aPriori	Claroty	ForgeRock
Argus	Cognizant	F-Secure
Armis	Continental	GlobalLogic
ASM technologies	CyberX/Microsoft	Guardknox
Aspire Systems	Cyient	Happiest Minds
Atos	Darktrace	Harman
Attivo Networks	Dassault Systemes	HCL
Autocrypt	Deep Instincts	Honeywell Forge Cybersecurity
Aveva	Dellfer	IAV
AVL	DEP	IBM
Axiscades	Digital.ai	Ignitarium
Bayshore Networks	Dragos	Imagination Technologies
Bentley Systems	DXC Technology	Indegy/Tenable
Bertrandt	EDAG	Infosys
Birlasoft	eInfochips	Intertrust
Bosch	Embitel	IPG Automotive
Brillio	ESCRYPT	ITC Infotech
Bristlecone	Eta Compute	Karamba Security
C2A security	Expleo	Kaspersky

KPIT	Pratum	Tata Technologies
LTI	PTC	TCS
LTTS	QuEST Global	Tech Mahindra
Menlo Security	R Systems	Thales
Menlopark Technologies	Radiflow	Upchain
Mindteck	Redeem	Upstream
Mindtree	Regulus Cyber	UST
Mobica	Sasken	Vector
Mocana	SCADAfence	Verve
Mphasis	Securithings	Volansys
NCR	SecurityGate.io	VVDN Technologies
Nozomi Networks	Sentryo/Cisco	WillowTwin
Optiv	Siemens	Wipro
Otorio	SIGA OT	Zensar
Penta security	Smokescreen/Zscaler	
PFP Cyber	Tata Elxsi	

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ISG Provider Lens QCRT Program Description

ISG Provider Lens offers market assessments incorporating practitioner insights, reflecting regional focus and independent research. ISG ensures advisor involvement in each study to cover the appropriate market details aligned to the respective service lines/technology trends, service provider presence and enterprise context. In each region, ISG has expert thought leaders and respected advisors who know the provider portfolios and offerings as well as enterprise requirements and market trends. On average, three advisors participate as part of each study's Quality & Consistency Review Team (QCRT). The QCRT ensures each study reflects ISG advisors' experience in the field, which complements the primary and secondary research the analysts conduct. ISG advisors participate in each study as part of the QCRT group and contribute at different levels depending on their availability and expertise.

The QCRT advisors:

- help define and validate quadrants and questionnaires,

- advise on service providers inclusion, participate in briefing calls,

- give their perspectives on service provider ratings and review report drafts.

The ISG Provider Lens QCRT program helps round out the research process, supporting comprehensive research-focused studies.

Do you need any further information?

If you have any questions, please do not hesitate to contact us at ISG.ProviderLens@isg-one.com.

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