



Everest Group ACES Automotive Engineering Services PEAK Matrix® Assessment 2023: Navigating the Future of Automotive Landscape

Focus on TCS
October 2023



Introduction

The automotive industry is at an inflection point, where global sustainability concerns, increasing consumer demands, and rapid technological advancements have coalesced to propel rapid growth. In this dynamic landscape, the focus is shifting from conventional mobility solutions to a more captivating and immersive automotive experience. Automotive enterprises are now eagerly hopping on to this transformative paradigm, embracing the idea of enhancing customer experience, and redefining the future of mobility. Some of the major areas of investment include:

- **Autonomy advancements:** investments in L3 to L5 autonomous technologies, intelligent adaptive cruise controls, safety systems, and sensor fusion technology to transform driving experiences
- **Connected ecosystems:** connectivity and data management are forging powerful collaborations between automotive players and players from diverse verticals such as FinTech, insurance, technology, and telecommunication to bring in several after-sales services
- **software-centricity:** with the emergence of software-defined vehicles, there is an increased level of investments in software development and partnerships with technology players
- **Electrification imperative:** the need to address environmental concerns and stringent governmental regulations has accelerated the investments in electric, hybrid, and fuel cell technologies

This research, the fourth edition of Everest Group's [ACES Automotive Engineering Services PEAK Matrix® Assessment 2023: Navigating the Future of Automotive Landscape](#), evaluates 26 engineering service providers, features them on the PEAK Matrix®, and shares insights into enterprise sourcing considerations. The study is based on RFI responses from service providers, interactions with their automotive engineering leadership, client reference checks, and ongoing analysis of the engineering services market.

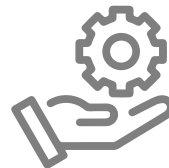
The full report assesses the following 26 leading engineering service providers featured on the ACES Automotive Engineering Services PEAK Matrix®:

- **Leaders:** Alten, Capgemini, HCLTech, KPIT, LTTS, TCS, and Wipro
- **Major Contenders:** Akkodis, AVL, Bertrandt, Cognizant, Cyient, DXC Technology, FEV, FPT, IAV, Infosys, NTT DATA, Tata Elxsi, Tata Technologies, Tech Mahindra, and T-Systems
- **Aspirants:** Onward Technologies, Sasken, Semcon, and Sigma Software

Scope of this report



Geography
Global



Providers
26 leading broad-based and
pureplay service providers



Services
Automotive engineering
services

ACES Automotive Engineering Services PEAK Matrix® characteristics

Leaders

Alten, Capgemini, HCLTech, KPIT, LTTS, TCS, and Wipro

- The Leaders segment comprises a mix of pure-plays, and well-established IT-heritage firms that have excelled in providing comprehensive automotive engineering services across multiple disciplines
- Leaders differentiate themselves by offering a comprehensive value proposition that spans emerging domains, service elements, and traditional automotive solutions
- They leverage assets and partnerships effectively, particularly in software and embedded systems development, resulting in a diverse portfolio of offerings in autonomous, connected, and electric mobility
- These players make significant investments in Intellectual Property (IP), Centers of Excellence (CoEs), employee certifications, and labs, showcasing their expertise in ADAS, sensor fusion, infotainment, V2X communications, battery management systems and software

Major Contenders

Akkodis, AVL, Bertrandt, Cognizant, Cyient, DXC Technology, FEV, FPT, IAV, Infosys, NTT DATA, Tata Elxsi, Tata Technologies, Tech Mahindra, and T-Systems

- The Major Contenders segment comprises a mix of IT-heritage firms, pure-play engineering firms with a broader industry focus, and players that have a dedicated focus on automotive engineering services
- While these players have made significant investments in building automotive engineering expertise, their service portfolio is not as extensive as that of Leaders (in terms of presence across the value chain elements, geographies, or service functions)
- They are also focusing on expanding their delivery presence and leveraging partnerships with hyperscalers, technology firms, and academia to strengthen their presence in automotive engineering services

Aspirants

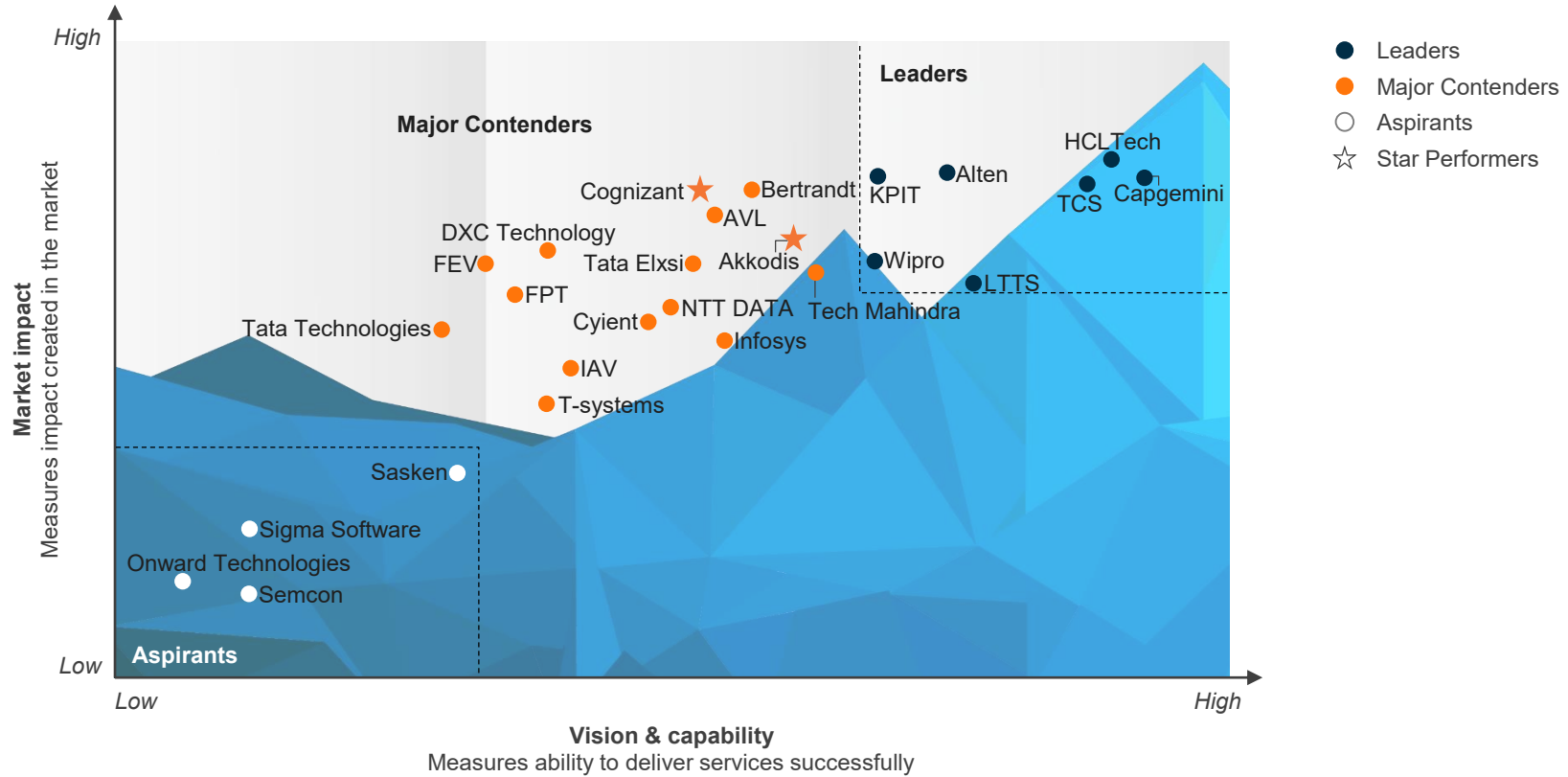
Onward Technologies, Sasken, Semcon, and Sigma Software

- Aspirants possess strong capabilities in specific technology areas and value chain elements; however, their global presence and ability to serve projects with wider scopes is limited
- They are making focused investments for enhancing their solutions portfolio, improving service enablement capabilities, and expanding their footprint and client base

Everest Group PEAK Matrix®

ACES Automotive Engineering Services PEAK Matrix® Assessment 2023 | TCS is positioned as a Leader

Everest Group ACES Automotive Engineering Services PEAK Matrix® Assessment 2023¹



¹ Assessments for Alten, AVL, Bertrandt, DXC Technology, FEV, IAV, Semcon, Sigma Software, and Tata Technologies exclude service provider inputs and are based on Everest Group's proprietary Transaction Intelligence (TI) database, service provider public disclosures, and Everest Group's interaction with buyer
Source: Everest Group (2023)

TCS profile (page 1 of 4)

Overview

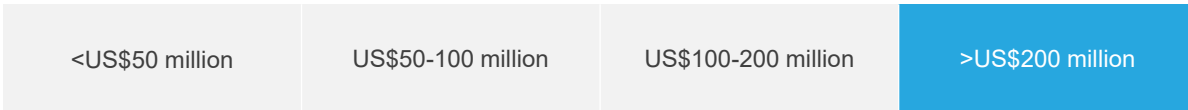
Vision and strategy

TCS envisions becoming a transformation partner for global OEMs and Tier-1 companies in the ACES automotive segment. Its goal is to lead in autonomous driving, connected services, shared mobility, and electrification through digital technologies, supporting its clients' market strategies.

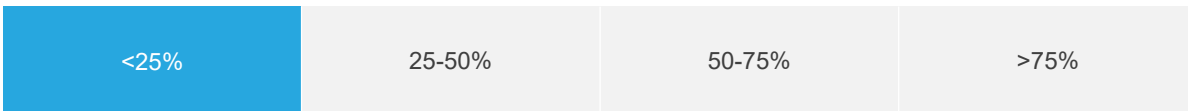
TCS emphasizes digital innovation to drive the automotive transformation for safer and sustainable mobility. It has invested in research, innovation groups, and demonstrator projects, including the TCS AI-based Autonomous Platform for data management.

The key pillars of TCS' strategy are vision, focus, innovation, and delivery. It has strategically aligned its roadmap to engage potential ACES customers, by leveraging R&D assets and experienced consultants. TCS has distinct strategies for autonomous, connected, electrification, and shared mobility. It actively fosters partnerships with leading technology providers to cultivate a mutually beneficial ACES ecosystem.

ACES automotive engineering services revenue (January 2022 – December 2022)



YoY growth rate in ACES automotive engineering services revenue (January 2022 – December 2022)



Low (<15%) Medium (15-30%) High (>30%)

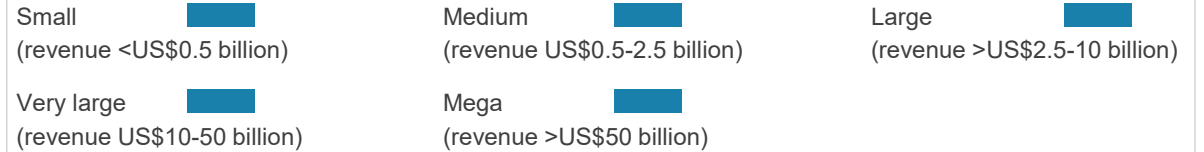
Revenue by ACES automotive engineering subsegments



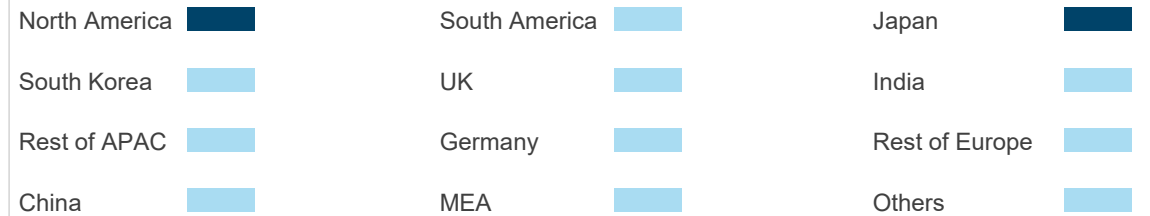
Revenue by value chain functions



Revenue by buyer size



Revenue by geography



TCS profile (page 2 of 4)

Case studies and solutions

Case study 1 Helped a client in the development of an L2+ autonomous system

Business challenge

The client needed to expedite development, adapt to various geographies, and optimize validation cycles for ADAS ECUs for improving time-to-market. It had been unable to do so because of the lack of virtualization and automation, which increased the overall development and validation costs.

Solution and impact

TCS developed an autonomous vehicle sensor and domain controller along with validation for Level L1 to Level L2+ features, which are currently already in production for multiple variants across various geographies, e.g., highway pilot, traffic jam pilot, adaptive cruise control, and automatic lane change.

Frameworks and solutions provided for Model-based System Engineering (MBSE), software engineering, Model-based Design (MBD), code development/generation, system integration, Hardware-in-the-Loop (HiL) testing, vehicle issue analysis, data collection system development, and vehicle adaptation for various geographies. This helped in the early detection of bugs; the cloud-based CI/CD framework reduced the time-to-market for ADAS ECU.

Case study 2 Developed an inverter Electric Drive Unit (EDU)

Business challenge

A UK-based major OEM was looking for the development of a complete inverter EDU, from prototype to production samples, for its future Battery electric vehicle (BEV), which was currently outsourced to Tier-1.

Solution and impact

TCS developed a traction inverter targeted for BEV with integration in EDU. This helped the OEM to achieve complete control of the hardware design changes by in-housing the product, and it also achieved faster time-to-market. The IP is owned by TCS and the UK OEM both, which will help in future industrialization for other customers.

Proprietary solutions (representative list)

Solution	Details
Autonomous Maturity Assessment Framework	Engagement with Autonomous Vehicle (AV) customers to understand the current state capabilities on the AV value chain and propose the desired future state capabilities; the framework is intended to accelerate the AV development cycle for the customers
AV Data Services and Insights	Comprehensive compute infrastructure architecture, data management solution, AI workbench, and toolkits to accelerate AV development
DAS TCS Mobility Suite	Data curation solution with cost-effective workflow orchestration, model management, and best-in-class AI tools
MiNE – Data Ingestion and Mining	Enables AV data teams to develop custom data pipeline and object detection models for processing AV data
TCS AI-based Autonomous Development Platform	Demonstrating vehicle control systems for autonomous driving levels L3, L4, and L5 capabilities, encompassing patented deep learning-based steering control, speed and braking, sensor fusion, HD maps, and path planning; TCS is equipped with patented algorithms, providing ready solution accelerators for the development of diverse AD/ADAS control algorithms
TCS DigiFleet™	IoT-powered, AI and ML-enabled suite, offered as a Software as a Service (SaaS) model that assimilates telematics and environmental data and empower customers with predictive, multi-modal, and real-time insights for assets on the move to accelerate transformation in supply chain and logistics initiatives
TCS Electric Vehicle(EV) Simulation Offering	Offers comprehensive virtual simulations or Computer-Aided Engineering (CAE) capabilities on every automotive subsystem/system during the complete vehicle development cycle, Powertrain, and e-Powertrain; TCS simulation capabilities support digital design development by managing vehicle performance in the key functional areas of system level simulations, crash and safety, Noise Vibration & Harshness (NVH), durability, multibody dynamics, fluids and thermal, and multi-physics simulations
TCS Mobility Suite Connected Vehicle Experience	Enables personalized and differentiated connected vehicle experience, reduces time-to-market for launching new connected vehicle platform and features, and reduces operational costs for developing and maintaining connected platforms
TCS Mobility Suite data Monetization Toolkit	Enables connected mobility ecosystem players to monetize the data from the ecosystem and realize new business models through platform solutions for data marketplace, consent management, and subscription management
TCS Smart Validation (TCS Mobility Suite)	Coverage-driven, simulation-led validation solution that can reduce physical testing (and costs), provide confidence to deploy publicly, and accelerate time-to-market

TCS profile (page 3 of 4)

Investments and partnerships

Key alliances and partnerships (representative list)

Company	Details
Mobility in Harmony (MIH)	Open EV alliance – open software, hardware, and components ecosystem for EVs; TCS became a community member within MIH in 2022
ANSYS	TCS-ANSYS Center of Excellence CoE for automotive emerging technology areas, such as pure electric and hybrid electric vehicles and Advance Driver-Assistance Systems (ADAS)
CERENCE	Partnership with CERENCE for developing conversational voice AI solutions for digital cockpit by utilizing CERENCE’s voice AI technology
Soundhound	Partnership with Soundhound for developing conversational voice AI solutions for digital cockpit by utilizing Soundhound’s voice AI technology
XPERI	Partnership with XPERI for creating solutions around internet radio technology
Oxa (Formerly Oxbotica)	Partnership with Oxa in the simulation-led validation for AV testing and validation along with data annotation for accelerated AV development
RENESAS	Signed the R CAR CONSORTIUM partners agreement with Renesas with the focus areas of autonomous, connected, and infotainment. TCS has signed the Renesas preferred partners program, Winning Combination, with a focus on reference design kit, edge, and AI areas to begin with
NVIDIA	Has a technology partnership with NVIDIA to develop solutions for AV software development-based, NVIDIA GPU-based, onboard and offboard platforms (Drive AGX and DGX platforms)

Recent ACES automotive engineering services investments/acquisitions (representative list)

Investment/target	Description
Joint solutions with partners in autonomous	Co-developing solutions with partners including NVIDIA, Microsoft, AWS, and Oxbotica; joint GTM opportunities to bring together best-in-class capabilities and offer the customer an end-to-end solution
Joint solutions with partners in connected	Strategic initiative for developing an automotive cockpit solution suite comprising customizable, extendible, and configurable solution components; paving the way for rapid deployment of unique features around emerging and futuristic technologies; and helping automakers create a unique brand experience and enable faster time-to-market
Joint solutions with partners in electric	Co-developing solutions with partners including Wallbox and Beyonder; joint GTM opportunities to bring together best-in-class capabilities and offer the customer an end-to-end solution on battery and EV charging solutions
Electric component engineering and digital product development	<p>TCS started an EV Simulation CoE to develop CAE solutions in the following areas and to address the needs of auto OEMs and Tier-1s:</p> <ul style="list-style-type: none"> • Battery electrochemistry: cell characterization, cell capacity fading, and gas phase reactions • Motor electromagnetics: motor demagnetization and coupled magnetic and thermal simulations • Power electronics: PCB thermal management, electronics components cooling, and reliability • Battery and motor digital twins • Virtual electric vehicle: battery range, performance prediction, and DC fast charging • Solution development in the area: TCS has signed an MoU with Ansys to develop CAE solutions in the EV domain
ACES CoE, labs, and experience center	Investment into dedicated CoEs and labs for the development of ADAS advanced features and their Verification & Validation(V&V) along with connected and electrification features; For the TCS Mobility suite, a state-of-the-art experience center was developed in Detroit, Pittsburgh, Toronto, and Paris to get hands on experience with solutions and co-development opportunities with customers

TCS profile (page 4 of 4)

Everest Group assessment – Leader

Market impact				Vision & capability				
Market adoption	Portfolio mix	Value delivered	Overall	Vision and strategy	Scope of services offered	Innovation and investments	Delivery footprint	Overall

Strengths

- TCS has made significant investments in building its ACES engineering competencies via IP across the value chain and across various subdomains such as ADAS, telematics, EV charging systems and sustainability, and fleet management
- Through strategic investments, it has built a strong ecosystem of partnerships, labs, and innovation centers, while also focusing investments on employee skillset development through certifications and CoEs
- Clients appreciate TCS for its flexibility in adapting to changing project requirements and scaling resources
- TCS has a very balanced client portfolio between both automotive OEMs and tier-1s and is engaged with a diverse clientele spread across small, mid-sized, and large enterprises
- It has a well-rounded portfolio of client engagements across the autonomous, connected, and electric subsegments

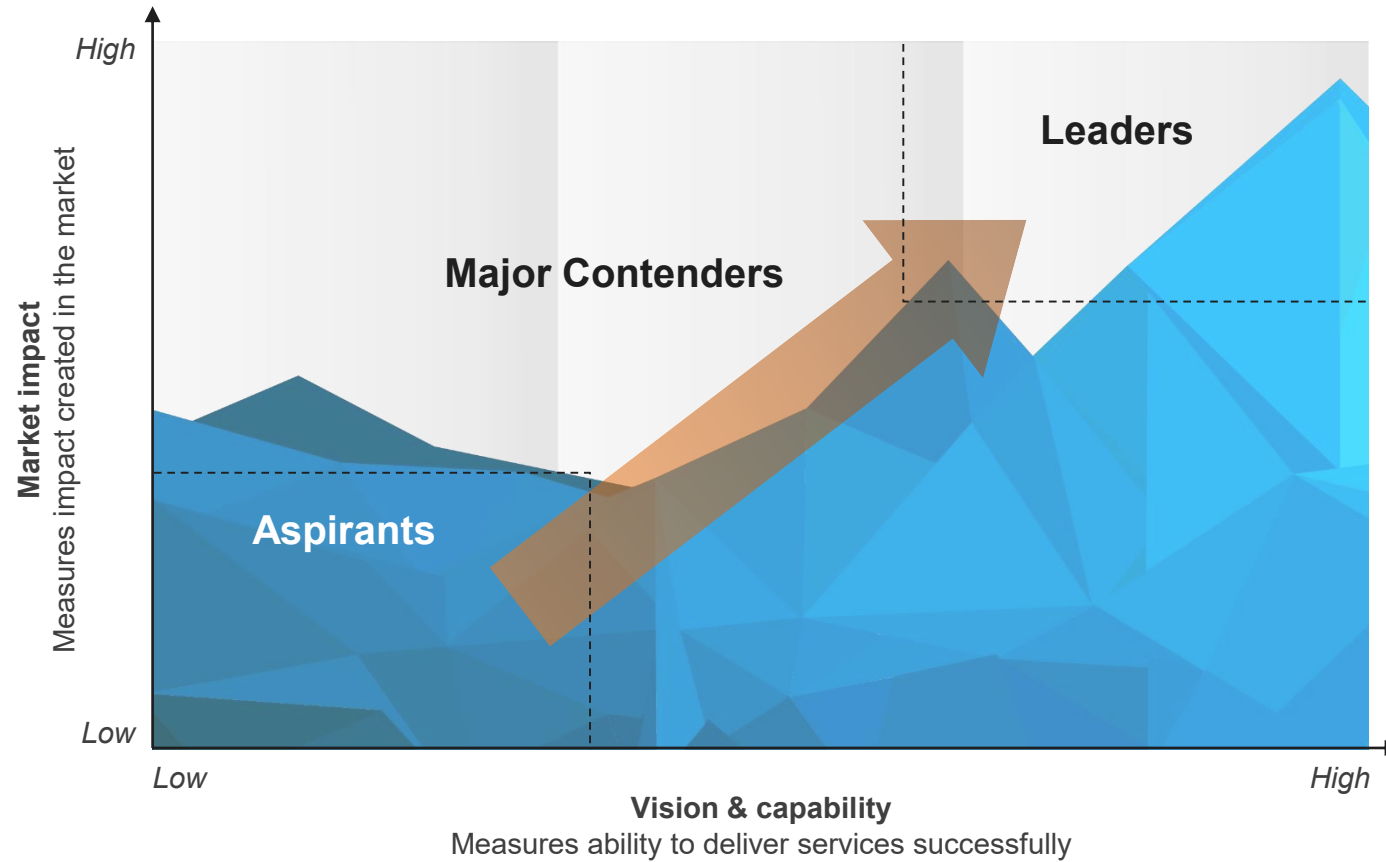
Limitations

- Clients suggest that TCS could proactively engage in improving operational efficiencies by establishing industry best practices during project implementations
- Customers believe that TCS could improve on its technical expertise in the areas of power electronics and embedded software
- TCS's offerings are majorly focused on the development and testing stage and have much lesser exposure to design and support stages of the value chain
- While its ACES service functions portfolio is skewed toward embedded engineering services, it could focus on growing its software engineering services business as this is a strong growth area in the automotive industry

Appendix

Everest Group PEAK Matrix® is a proprietary framework for assessment of market impact and vision & capability

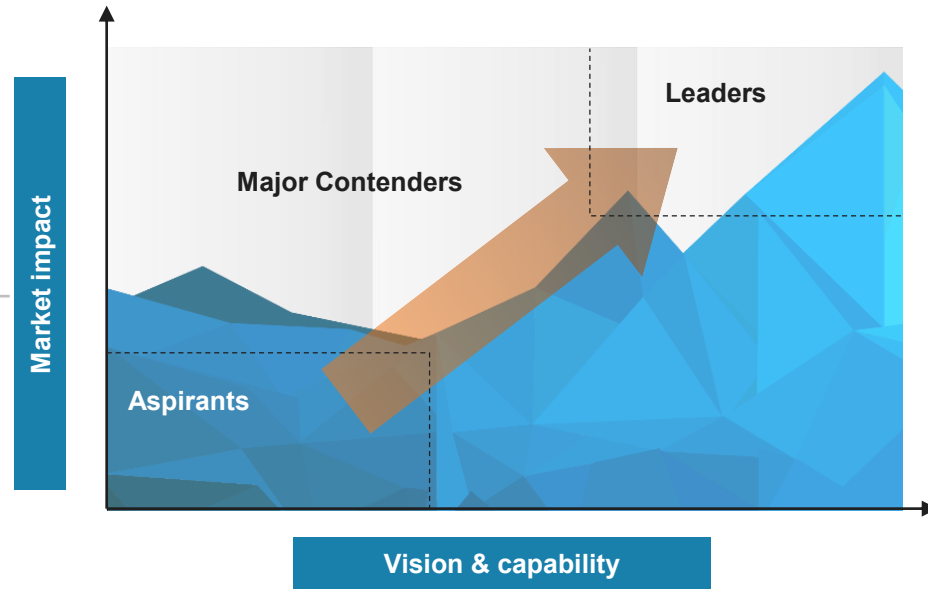
Everest Group PEAK Matrix



Services PEAK Matrix® evaluation dimensions

Measures impact created in the market – captured through three subdimensions

- Market adoption**
Number of clients, revenue base, YoY growth, and deal value/volume
- Portfolio mix**
Diversity of client/revenue base across geographies and type of engagements
- Value delivered**
Value delivered to the client based on customer feedback and transformational impact



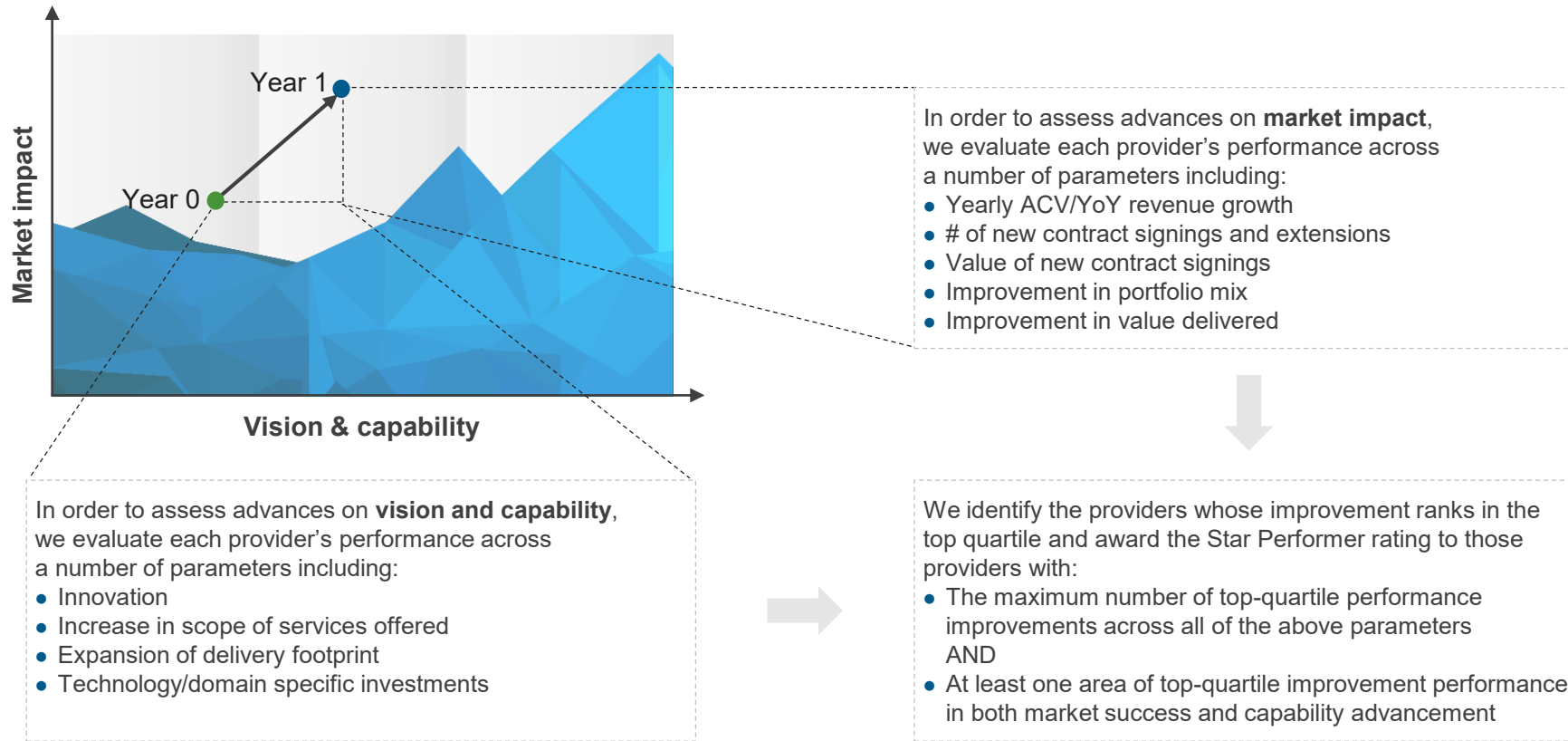
Measures ability to deliver services successfully. This is captured through four subdimensions

- Vision and strategy**
Vision for the client and itself; future roadmap and strategy
- Scope of services offered**
Depth and breadth of services portfolio across service subsegments/processes
- Innovation and investments**
Innovation and investment in the enabling areas, e.g., technology IP, industry/domain knowledge, innovative commercial constructs, alliances, M&A, etc.
- Delivery footprint**
Delivery footprint and global sourcing mix

Everest Group confers the Star Performers title on providers that demonstrate the most improvement over time on the PEAK Matrix®

Methodology

Everest Group selects Star Performers based on the relative YoY improvement on the PEAK Matrix



The Star Performers title relates to YoY performance for a given vendor and does not reflect the overall market leadership position, which is identified as Leader, Major Contender, or Aspirant.

FAQs

Does the PEAK Matrix® assessment incorporate any subjective criteria?

Everest Group's PEAK Matrix assessment takes an unbiased and fact-based approach that leverages provider / technology vendor RFIs and Everest Group's proprietary databases containing providers' deals and operational capability information. In addition, we validate/fine-tune these results based on our market experience, buyer interaction, and provider/vendor briefings.

Is being a Major Contender or Aspirant on the PEAK Matrix, an unfavorable outcome?

No. The PEAK Matrix highlights and positions only the best-in-class providers / technology vendors in a particular space. There are a number of providers from the broader universe that are assessed and do not make it to the PEAK Matrix at all. Therefore, being represented on the PEAK Matrix is itself a favorable recognition.

What other aspects of the PEAK Matrix assessment are relevant to buyers and providers other than the PEAK Matrix positioning?

A PEAK Matrix positioning is only one aspect of Everest Group's overall assessment. In addition to assigning a Leader, Major Contender, or Aspirant label, Everest Group highlights the distinctive capabilities and unique attributes of all the providers assessed on the PEAK Matrix. The detailed metric-level assessment and associated commentary are helpful for buyers in selecting providers/vendors for their specific requirements. They also help providers/vendors demonstrate their strengths in specific areas.

What are the incentives for buyers and providers to participate/provide input to PEAK Matrix research?

- Enterprise participants receive summary of key findings from the PEAK Matrix assessment
- For providers
 - The RFI process is a vital way to help us keep current on capabilities; it forms the basis for our database – without participation, it is difficult to effectively match capabilities to buyer inquiries
 - In addition, it helps the provider/vendor organization gain brand visibility through being included in our research reports

What is the process for a provider / technology vendor to leverage its PEAK Matrix positioning?

- Providers/vendors can use their PEAK Matrix positioning or Star Performer rating in multiple ways including:
 - Issue a press release declaring positioning; see our [citation policies](#)
 - Purchase a customized PEAK Matrix profile for circulation with clients, prospects, etc. The package includes the profile as well as quotes from Everest Group analysts, which can be used in PR
 - Use PEAK Matrix badges for branding across communications (e-mail signatures, marketing brochures, credential packs, client presentations, etc.)
- The provider must obtain the requisite licensing and distribution rights for the above activities through an agreement with Everest Group; please contact your CD or [contact us](#)

Does the PEAK Matrix evaluation criteria change over a period of time?

PEAK Matrix assessments are designed to serve enterprises' current and future needs. Given the dynamic nature of the global services market and rampant disruption, the assessment criteria are realigned as and when needed to reflect the current market reality and to serve enterprises' future expectations.



Everest Group is a leading research firm helping business leaders make confident decisions. We guide clients through today's market challenges and strengthen their strategies by applying contextualized problem-solving to their unique situations. This drives maximized operational and financial performance and transformative experiences. Our deep expertise and tenacious research focused on technology, business processes, and engineering through the lenses of talent, sustainability, and sourcing delivers precise and action-oriented guidance. Find further details and in-depth content at www.everestgrp.com.

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