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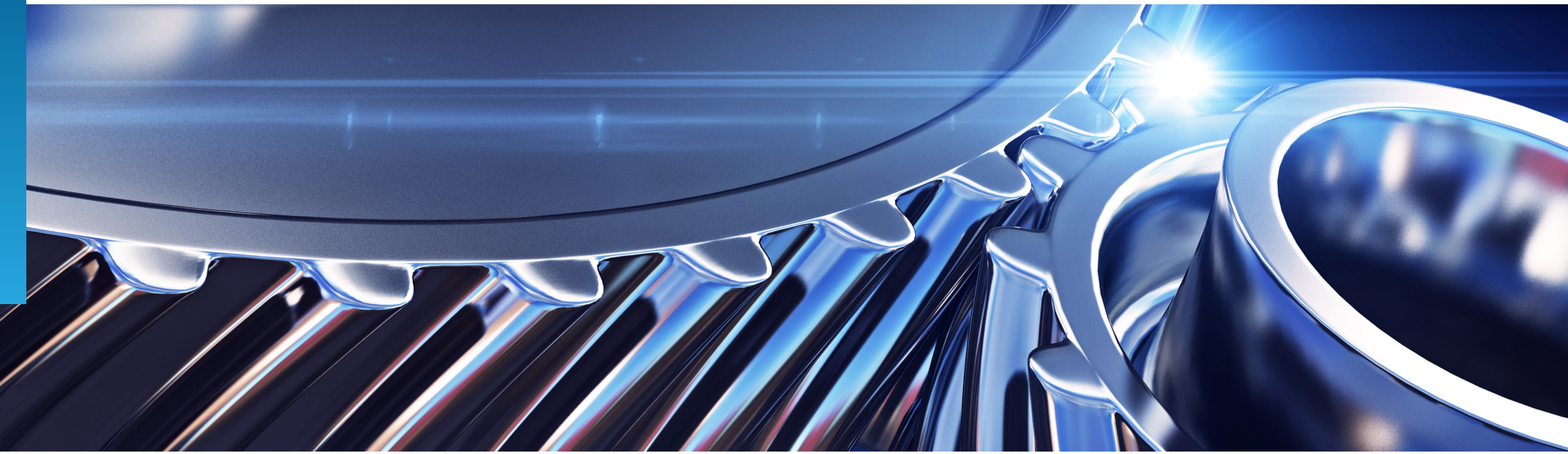
State of the Market Report | Engineering Services

Driving Next-generation Mobility Experiences: Autonomous, Connected, Electric, and Shared (ACES) Mobility Automotive Engineering Services State of the Market Report 2022

December 2021: Complimentary Abstract / Table of Contents



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Background and introduction of the research

Changing global demand and perception surrounding vehicles and the evolving experience-centricity around what they can offer is altering the automotive landscape much like digitalization has impacted the consumer electronics market. We see several trends affecting the industry; large OEMs have already started their journeys toward what is being perceived as the next normal. Some of these trends include:

- Global sustainability concerns, a carbon-free society, and reducing dependence on fossil fuels have resulted in moving propulsion technologies to hybrid and electric
- Technological advances in artificial intelligence and machine learning, combined with the low cost of sensors and improved networking technologies, have created a significant market for autonomous driving and Advanced Driver Assistance Systems (ADAS)
- Connectivity and data management are being used to optimize R&D and production costs, and even implement predictive maintenance and other new services
- Rising software-centricity in a vehicle and the entry of newer players is disrupting the market and accelerating the shift toward a technology-centric future

These developments have fueled the need to establish a compelling ecosystem of partners, and engineering service providers are actively enhancing their capabilities and offerings to help enterprises tackle these challenges in their automotive engineering journey, staying relevant, and creating experience-centric offerings for the end-consumers.

This report examines the dynamics of global automotive engineering services trends specific to the Autonomous, Connected, Electric, and Shared mobility (ACES) segments, driven by leading service providers, and includes an overview of the ACES engineering market, emerging enterprise spend dynamics and trends, and an in-depth view of outsourcing in this space.

Scope of this report:

Introduction and overview

Enterprise spending and emerging trends

ACES market trends

Outsourcing landscape

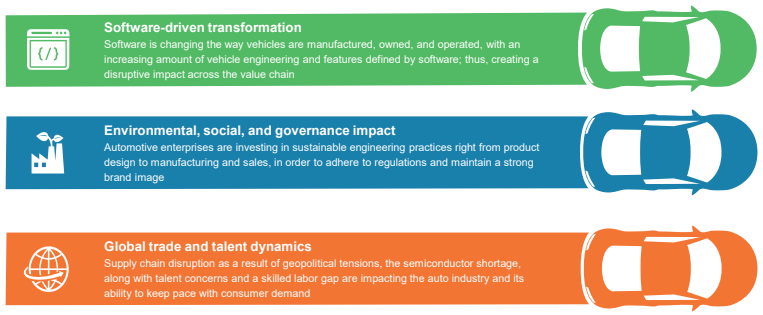
Appendix

Summary of key messages

Enterprise spending and emerging trends

- Overall enterprise spending for the market has seen a dip on account of global headwinds and supply chain impact as a result of the pandemic and related shutdowns
- Software is a key investment area as automakers are moving from a static hardware-based machine to an upgradeable software-centric electronic device
- ESG concerns are driving enterprise investments into sustainable engineering practices, driven further by regulatory policies and standards
- Material and talent shortages, along with geopolitical tensions, are impacting automaker revenues and growth prospects in an ever-evolving market

Three broad themes – software, sustainability, and global trade and talent dynamics – are shaping the automotive engineering market



ACES market trends

- Enterprises are spending ~35% of their ER&D budgets on the emerging segments of ACES, which amounts to around US$80 billion as of 2020
- Autonomous vehicle investments are focused on developing in-house software development and integration capabilities
- Spending on connected vehicles grew at a healthy pace as a result of higher demand for internet and communication-enabled services and features
- Electrification is the highest spend area, which is driven primarily by various global mandates on sustainability and reduced dependence on traditional fuels
- Shared mobility growth, which has been fairly muted, will rise as vehicles become more of an asset light offering

Electrification remains the primary area of investment for automakers, followed by connected and autonomous mobility

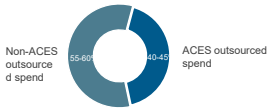
14-16%	21-23%	54-56%	7-9%
Autonomous	Connected	Electric	Shared
• Automakers have been integrating assisted driving and autonomy with an increasing number of vehicles across different customer segments • In terms of investment and maturity, L1-L3 levels of autonomy are of primary focus, with higher levels of automation only restricted to a few markets	• Connectivity features are a differentiator even among older and traditional car models, thus being a strong area of focus • Infotainment services, vehicle networking and connectivity, HMI, and related feature developments are driving investments in connected mobility	• Driven by regulatory concerns, higher efficiency, and reduced dependence on fuels, electrification is the largest spend area for automakers • Electrical spend is mostly associated with hardware and embedded software for power electronics, batteries, e-powertrains, control modules, lightweighting, charging systems, etc.	• This market has seen muted growth, primarily due to health-related concerns around ride-sharing and other mobility services, and low RoI on prior investments in this market • Current focus remains on MaaS, fleet management platforms, and associated services which enterprises are exploring

Outsourcing landscape

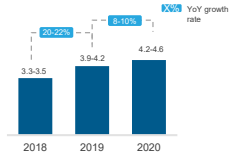
- Outsourced spend in the ACES area has seen credible growth leading up to 2020, and is valued at approximately US$4.5 billion
- Automotive enterprises from North America, EU, and Japan are the major contributors to this spend
- Among ACES segments, vehicle connectivity followed by autonomous mobility engineering see the highest spending
- Business growth rate is higher among the smaller service providers; however, larger players hold the major chunk of the revenues
- Service providers have invested in a range of competitive investments in order to remain competitive and offer differentiated solutions to clients

Service providers are now deriving 40-45% of revenues from engagements involving Autonomous, Connected, Electric, and Shared (ACES) mobility themes

Automotive engineering services[1] outsourced spending
2020; percentage
100% = US$9.7-10.1 billion



ACES automotive engineering outsourced services market size[1]
2018-20, US$ billion



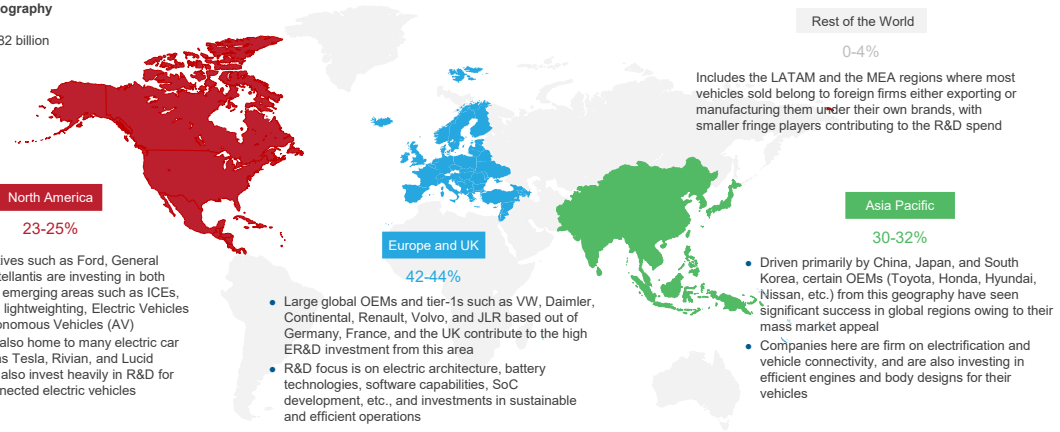
- Automakers are increasingly leveraging service provider expertise in software development, systems integration, and testing of emerging mobility offerings. ACES, which currently accounts for around 40-45% of the overall outsourced spending, is expected to increase through 2025 at an average growth rate of 20%
- The market size, which is currently valued at ~US$4.4 billion, varies in conjunction with enterprise ER&D spending in next-generation mobility themes
- Automakers are seen to be outsourcing projects that require non-core technology interventions, leverage of partnership ecosystems, and access to global talent markets for cost-competitive delivery and operations

1 Everest Group estimates
Source: Everest Group (2021)

This study offers three distinct chapters providing a deep dive into key aspects of the ACES engineering market; below are four charts to illustrate the depth of the report

Global enterprise spend dynamics for the ACES market

Market split by geography
2020, US$ billion
100% = US$177-182 billion



North America
23-25%

- NA market natives such as Ford, General Motors, and Stellantis are investing in both traditional and emerging areas such as ICEs, transmissions, lightweighting, Electric Vehicles (EV), and Autonomous Vehicles (AV)
- The market is also home to many electric car makers such as Tesla, Rivian, and Lucid Motors, which also invest heavily in R&D for smart and connected electric vehicles

Europe and UK
42-44%

- Large global OEMs and tier-1s such as VW, Daimler, Continental, Renault, Volvo, and JLR based out of Germany, France, and the UK contribute to the high ER&D investment from this area
- R&D focus is on electric architecture, battery technologies, software capabilities, SoC development, etc., and investments in sustainable and efficient operations

Rest of the World
0-4%

Includes the LATAM and the MEA regions where most vehicles sold belong to foreign firms either exporting or manufacturing them under their own brands, with smaller fringe players contributing to the R&D spend

Asia Pacific
30-32%

- Driven primarily by China, Japan, and South Korea, certain OEMs (Toyota, Honda, Hyundai, Nissan, etc.) from this geography have seen significant success in global regions owing to their mass market appeal
- Companies here are firm on electrification and vehicle connectivity, and are also investing in efficient engines and body designs for their vehicles

Key themes impacting the automotive engineering market

Software-driven transformation
Software is changing the way vehicles are manufactured, owned, and operated, with an increasing amount of vehicle engineering and features defined by software; thus, creating a disruptive impact across the value chain

Environmental, social, and governance impact
Automotive enterprises are investing in sustainable engineering practices right from product design to manufacturing and sales, in order to adhere to regulations and maintain a strong brand image

Global trade and talent dynamics
Supply chain disruption as a result of geopolitical tensions, the semiconductor shortage, along with talent concerns and a skilled labor gap are impacting the auto industry and its ability to keep pace with consumer demand

Emerging trends within ACES subsegments

14-16%	21-23%	54-56%	7-9%
Autonomous	**Connected**	**Electric**	**Shared**
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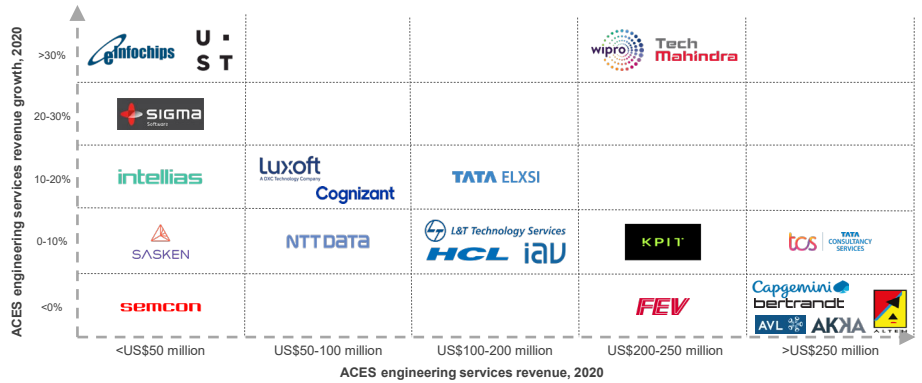
Outsourcing growth and revenue share across top players

ACES automotive engineering services – service provider[1] revenue and growth rate, 2020



1 For players featuring in the ACES PEAK Matrix Assessment 2021
Source: Everest Group (2020)

Research calendar
Engineering Services (ES)

Published | Planned | Current release

Flagship reports	Release date
A Transformational Leap in Cyber-physical Convergence − Industry 4.0 State of the Market Report 2021	April 2021
Exploring the Future of Mobility: Autonomous, Connected, Electric, and Shared (ACES) Mobility Automotive Engineering Services PEAK Matrix® Assessment 2021	September 2021
Reaching New Frontiers in Experience-centricity and Resilience – Software Product Engineering Services State of the Market Report 2021	September 2021
Envisioning the Connected Future: 5G Engineering Services PEAK Matrix® Assessment 2021	September 2021
Enabling the Hyper-connected Intelligent World – Semiconductor Engineering State of the Market Report 2021	November 2021
Driving Next-generation Mobility Experiences: Autonomous, Connected, Electric, and Shared (ACES) Mobility Automotive Engineering Services State of the Market Report 2022	**December 2021**
Medical Devices IoT Services PEAK Matrix® Assessment 2022	Q4 2021
Digital Engineering Services PEAK Matrix® Assessment 2022	Q1 2022
Digital Twin Services PEAK Matrix® Assessment 2021	Q1 2022

Thematic reports	Release date
Engineering Services Enterprise Pulse: Are Engineering Enterprises Truly Happy with Their Service Providers?	April 2020
Engineering Services Top 50	June 2020
Extended Reality and its Applications Across Industries	August 2020
Leading the Pack: Trends for the Top 200 Engineering Research & Development (ER&D) Enterprises 2021	September 2020
Engineering Services Enterprise Sourcing Handbook	Q4 2021
Trailblazers: Cloud Engineering Service Providers	Q4 2021

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