Outsourced engineering services: From providers to collaboration partners

To capture the full value that collaboration can offer, manufacturers must determine required competencies, select the right engineering service provider, and apply success factors.

by Anna Herlt and Ruth Heuss

Automotive OEMs are increasingly looking for opportunities to focus on their core competencies while outsourcing other aspects of their business to service providers. They are motivated by a diverse set of pressures, including globalization, fragmentation of demand, operational complexity, technological challenges, digitalization, scarcity of engineering talent, and the desire to adjust capacities to fluctuating demand. Reflecting the emphasis on core competencies, many automotive OEMs have entered into product development outsourcing arrangements with engineering service providers (ESPs).

Specialized ESPs have always played a role in the automotive industry, but they were mainly used for specific tasks such as creating drawings, designing components and modules, calculating specifics, and conducting testing procedures. What has changed during the past few years is that automotive OEMs have outsourced a comprehensive range of engineering activities to ESPs, including idea generation and the development of systems and derivatives and even complete vehicles. They have also sought ESPs' support for services such as quality assurance, supplier and project management, and training programs.

To capture the greatest benefits from their more extensive collaborations with ESPs, OEMs need to address three key questions:

1. Which competencies required for the development project do we want to outsource?

2. Which ESPs have the competencies required for our project?

3. What are the key success factors for making the collaboration work?

Which competencies required for the development project do we want to outsource?

Development projects vary significantly. At one end of the spectrum are routine product enhancements, which in the automotive industry, for example, could include adding a new grille, headlights, tail lights, and other relatively modest changes. For these kinds of projects, an ESP needs competencies in selected areas of product development and typically does not need extensive skills with respect to system integration.

On the other end of the spectrum are completely new development projects. For such projects, an ESP must have expertise in all aspects of product development—just as the OEM does. These aspects include project management, concept development, and design and series engineering. ESPs also need to master system integration, testing and

validation, prototyping, production requirements, quality assurance, certification, and, potentially, series production support (Exhibit 1).

Exhibit 1

Key competencies are required when outsourcing complete vehicle development along the value chain.

ILLUSTRATIVE

Development and production process	Competence cluster	Key competencies			
Product development process	Project management	Coordination of OEM/ESP interface	Monitoring target achievement	Experience with OEM	Product data management
	Concept	Concept development	Definition of target system		
	Design	Design	Contours	Design validation	Aerodynamics
	Series engineering	Power train	Body	Chassis	Equipment and safety
		Electronics	Others		
	Complete vehicle functions	Complete vehicle sign-off	Acoustics and vibration	Energy management	Others
	Sign-off	Endurance test	Misuse test	Safety crash test	
	Special competence	Convertible	Electric vehicle	All-wheel drive	
	Production	Preseries	Model building	Virtual prototype	Component and module assembly
	Prototypes	Production planning	Logistics	Production	
	Quality assurance				
	Series support				

Which ESPs have the competencies required for our project?

The ESP will make or break the success of an outsourced product development project. This makes it imperative for an OEM to carefully assess the competencies of potential ESP partners for all elements of the specific project. OEMs can use a heat map to compare ESPs' competencies (Exhibit 2). They typically find that only a few ESPs are able to provide the complete range of expertise required for a new development project.

In addition to assessing competencies, an OEM should consider each potential ESP's financial health, its experience working on similar projects, its working mode, and its internal incentive system (to plan for potential conflicts of interest). OEMs also need to understand the ESP's available capacity and potentially be ready to issue letters of intent or frame contracts to secure the required capacity from the ESP during periods of high demand.

Exhibit 2

A heat map can be used to conduct a detailed competence assessment of ESPs across outsourcing-relevant competencies.

Legend: ■ Full competence　■ Some competence　□ No competence

1 For complete vehicle development

What are the key success factors for making the collaboration work?

After an OEM selects an ESP for a particular project, the two parties must precisely set out how they will work together to ensure an optimal end product. Experience suggests a number of interrelated ways OEMs can improve their chances of success in outsourcing complete product development.

Structuring the contract. The OEM's contract with the ESP should set out how work and responsibilities will be distributed between the parties, detail the specifications, and set clear targets for costs and completion time. The OEM must make the specifications in the contract detailed enough to allow it to measure progress toward achieving targets without the need for follow-up negotiations. The con-tract should also establish an incentive system that aligns the two parties toward achieving the targets. The incentives should focus on results, such as the faster achievement of milestones.

Handing over the project to the ESP. When the OEM hands over the project to the ESP, the two parties need to jointly set a number of sustainable targets that reflect the project's type and scope. The OEM needs to define clear, detailed deliverables that cover every critical aspect of the project. It should also detail all of the project's modular elements and define a process that the two parties' technical teams can use if modular components require modifications.

Managing the ESP's work. The management of outsourced development work is a complex challenge. To manage an ESP effectively, an OEM must clearly set out the project requirements, identify the best-suited project managers in both its own and the ESP's organization, ensure IT-system compatibility, and create a process for design-technology convergence. Both companies should establish

"mirror" organizations to make interactions easier. They should locate these organizations in close physical proximity to boost the effectiveness of problem solving and communications. Experience shows that the importance of close physical proximity increases along with the complexity of a project. The same is true regarding the importance of the cultural fit between the two organizations. Of course, it helps if the OEM has previously worked with the ESP, especially if the OEM and the ESP staff the people who worked on the previous project on their teams for the new project.

Preparing for production. Teams need to conduct feasibility studies to ensure that the design is buildable using the chosen technologies and production processes. To mitigate risks, feasibility studies require the early involvement of experts—typically from the OEM—in production, quality assurance, logistics, and systems integration. In addition, the OEM and ESP must agree on cost targets and then manage the project to achieve these targets.

□   □   □

OEMs are likely to continue to increase their outsourcing of engineering services as they seek greater flexibility to meet customer needs in a wide variety of regional markets. Also, the advent of connected cars and cyber security challenges will lead to a high number of software changes and software management tasks that an OEM may choose to outsource to ESPs in the future. The OEMs that gain the most value from their collaborations with the ESPs will be those that put in place the right strategies and processes to select their external partners and ensure that projects stay on track from start to completion∎

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