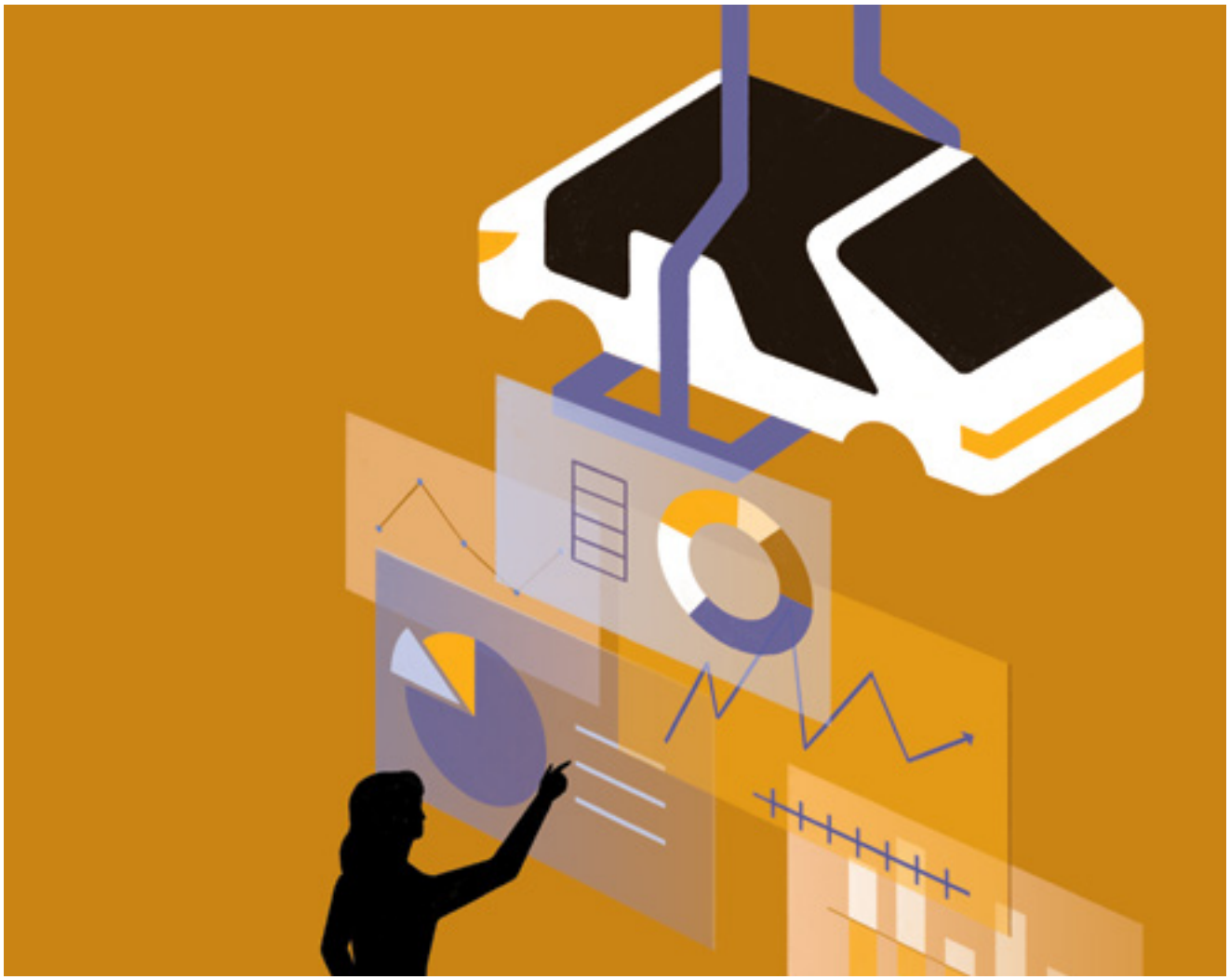


DESIGNING A PATH TO BETTER VEHICLE LAUNCHES

Next-generation DFMA can tighten integration between automakers and their multiple suppliers

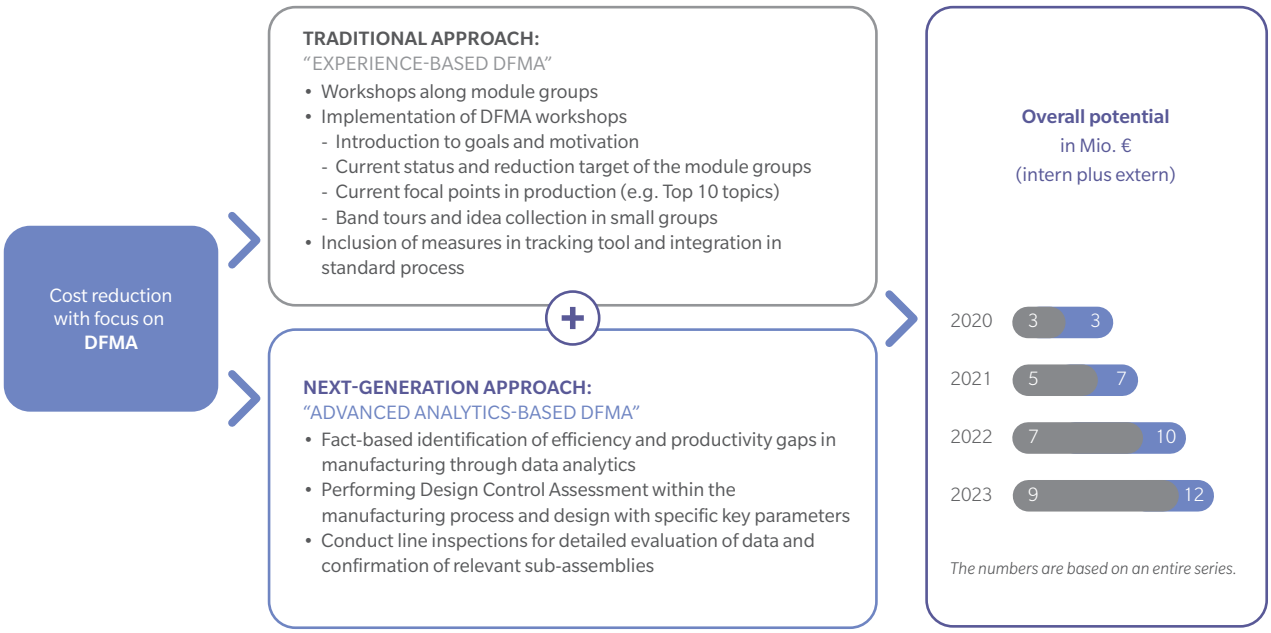
CAR DESIGN TEAMS from resolving classic quality problems to integrating advanced new technologies, launching a new car has never been tougher or more complex.

What is more, even as these difficulties increase, new vehicle programs must become faster and more efficient to remain competitive, and accommodate more ecosystem partners. Regarding the latter, automakers are increasingly working together on vehicle projects, complicating an already convoluted process that involves Tier 1 suppliers, digital giants, and other players. Major European, American, and Japanese automakers are currently hammering out agreements to share the development and production of everything from new autonomous vehicle technologies to complete cars. Product launch performance represents ground zero for this trend, and success mandates tighter upstream integration among automakers and their key suppliers.

One proven way to draw these bonds closer centers on a new configuration of design for manufacturability and assembly (DFMA). A tool employed by the automotive industry for more than 40 years to develop more "buildable" products, "next-generation DFMA" can help build stronger relationships among automakers and other ecosystem players. The primary differences between traditional and next-generation DFMA involve the former's focus on experience while the latter relies more on advanced analytics. (See Exhibit 1.)

EXHIBIT 1: TRADITIONAL VS. NEXT-GENERATION DFMA

How advanced analytics will change the automotive industry



Source: Oliver Wyman analysis

In action, next-generation DFMA analyzes manufacturing processes across six dimensions: scrap and waste, parts, tooling, time, labor, and equipment. It ranks each from low to high performance, then analyzes areas with performance issues and identifies root causes. Next, teams perform a DFMA-driven redesign to resolve issues and improve productivity. In one case concerning the installation of a safety-related component, a company discovered major problem areas included excessive labor intensity driven by high numbers of parts and difficult ergonomics, and extended processing times. The next-generation DFMA team successfully analyzed and identified the root causes of performance gaps and developed a new design along with a more efficient installation process. Consequently, the company significantly reduced the product's production costs and captured a sizeable improvement in productivity.

MAKING ROOM FOR MORE COOKS

The trend toward involving more than one automaker in the platform development process will require much greater flexibility and agility. Ecosystem players need to adapt their product platforms and manufacturing processes to handle more variants and manufacturing process derivatives. Furthermore, while products and their variations remain strong competitive differentiators, companies also need to master agile manufacturing to drive crucial cost advantages and synergy-derived savings.

With two automakers sharing a production environment, launch performance takes on much greater importance. The intensive collaboration among multiple automakers and their supply bases must begin much earlier in the product development phase and support significantly more flexible processes and assembly lines.

STRUCTURAL CHANGES AND NEW METHODS NEEDED

To launch tomorrow's complex, innovative vehicle programs successfully, automakers and their critical suppliers need to make next-generation DFMA a touchstone, employing it consistently, from the first minute of a new program to the last. However, capturing the greatest value possible from the next-generation DFMA paradigm will demand structural changes to the contracts between players, the ways they organize, and the methods they employ.

For example, automakers must expand the methodology they use to launch new vehicles, moving beyond the current focus on traditional "perfection". The traditional continuous improvement (CI) activities have their boundaries; therefore, automakers would need to use more data-driven, advanced analytics solutions and processes. They need to take many more parameters into account, such as the overall connectivity of more complex systems, designing the product differently to enable better integration into an existing assembly line and tooling strategy.

Uniquely, next-generation DFMA relies on information taken directly from the manufacturing process; nothing else, including the experience-based DFMA approach of the past, delivers the same level of performance.

ADDING DIGITIZATION AND ADVANCED ANALYTICS TO THE MIX

Several sophisticated tools and techniques can help companies augment their launch performance and optimization potential, and predict high-risk launch elements. These tools include digital platforms that feature advanced analytics, artificial intelligence, and machine learning, which will become key differentiators for a successful launch and help to establish strong co-ownership among the involved automakers and key suppliers.

Going forward, digital manufacturing platforms will capture most of the information necessary to analyze and predict process and product performance with different operational parameters, thus providing the basis for a next-generation DFMA approach. Consequently, users will be able to simulate manufacturing performance with different designs and process parameters, enabling them to arrive at an optimum configuration using data-driven iterative procedures.

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