Dealing with car complexity

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Personalizing cars to the requirements and taste of the individual owner has long been a driving force in the automotive industry. But that goal appears to have spiraled out of control. As a result, car complexity has reached the point where there are so many options to choose from that it's gotten overwhelmingly cluttered – not just for original equipment manufacturers (OEMs), suppliers, and dealers, but for buyers, too.

Moreover, things are about to get even more cluttered: By 2025, the number of battery-electric vehicles (BEVs) coexisting with legacy internal combustion engine (ICE) platforms will probably boost the number of variants per carmaker by 50 – 100% worldwide.

This complexity affects not only end customers but also OEMs and suppliers, which must stock every possible option (or at least make them easily available). All this costs money and resources. Currently, roughly 30 – 40% of all OEM employees deal with variants and associated complexity issues, and more will be needed soon. This limits capital available for company transformation, new technologies, and new business models. By pursuing strategies to crack the complexity code, automotive players could optimize the process, increase profits between €500 and €750 per car, improve their supply chain, and create a better customer experience. Nowhere is the complexity challenge more striking than in the contrast between Germany's market and that of China. While automakers in China offer limited choices, German consumers often order and specify their cars themselves. In return, German car buyers are willing to wait months to get exactly what they want in their vehicle. However, the individual preferences of so many car buyers severely taxes OEM supply chain and logistics systems, especially during periods of stress, such as trade wars or the COVID-19 pandemic.

The lessons learned in Germany can help OEMs in other markets find the optimum balance between beneficial complexity and the value it can generate, and too much of a good thing. To provide a comprehensive picture of the case for optimizing complexity, this point-of-view examines the issue from the perspectives of the OEM, the supplier, and the consumer.

None of this complexity is taking place in a vacuum: Much of it serves a purpose, resulting

“Streamlining Complexity”

One automaker used the model to make an early decision to discontinue a powertrain variant that saved the company roughly ə14 million in complexity costs over the lifetime of the vehicle. The company¦s savings would have been even larger had it discontinued the powertrain entirely rather than only on one car line ʒ a step it is currently considering. In another case, an OEM used the model to optimize the build complexity of an entry-level vehicle and reduced costs by approximately ə20 million over the product lifecycle. In this case, the savings came from across the value chain.

A proven way to reduce complexity involves evaluating relevant information on an end-to-end basis and including both a customer and a cost perspective. To understand the likely customer response to removing a car option, complexity reduction teams model the percentages of customers the OEM could ∲upsellȷ to a better equipped vehicle, those that would simply do without the option but stay with the same vehicle, and the ones that would abandon the brand and seek a competitor product. The team then overlays these ╬ndings with cost data from individual departments along the value chain to determine the change¦s total cost impact over the lifecycle of the vehicle. (See Case Study 1: Less Is More.)

While e╨orts to reduce complexity outright ʒ cutting assembly lines, products, features, or equipment ʒ have the biggest impact, other approaches, such as harmonizing standardization, bundling options, and modifying build rules also generate results. Harmonizing standards across markets, models, and country variants can play a role.

that suppliers understand the end customer as well as, if not better than the automakers themselves. That costs money, and since not all innovations will be of interest to their OEM customers, these efforts can clutter a supplier's portfolio of offerings without creating value.

Operationally, suppliers march in lockstep with their OEM customers, gearing up to provide the features and options demanded in the quantities specified. If the OEM guesses wrong in its forecasts, the supplier either needs to throttle back production or speed it up dramatically. Today's increasing levels of complexity can complicate this process and the supplier's relationship with the carmaker.

Given their need to understand the end customer, suppliers require transparency into the end customer's desire for differentiated product offerings and what they are willing to pay for them. At the same time, incumbent suppliers must streamline their internal processes across their own value chains, pushing for leaner processes and cleaner organizational structures. They also need to keep an eye on all the new players circling the industry, from start-ups to tech giants, each trying to outcompete and out-innovate them to gain a place at the OEM's table.

At what point does the sheer array of options and features simply overwhelm car buyers? Consumers are of two minds on this question. First, they want the same levels of individualization available on social media platforms and other digital venues, which rely on software-driven virtualization to personalize offers — an avenue only partially available to automotive industry due to the lack of a standardized digital architecture. Second, many realize too much variety can make choosing difficult — and expensive.

Another concern among consumers adds a new layer of meaning to the complexity question: sustainability. Growing segments of buyers want to know the products they buy will be environmentally friendly or neutral — cutting complexity can appeal to these shoppers but doing so will require OEMs and suppliers to move toward sustainable and connected products.

The industry will never return to the days of one-size-fits-all utility, which means dealing with complexity will remain a fact of life. However, maintaining a consistent balance between necessary complexity and profitable growth can enable OEMs and suppliers to compete in the rapidly changing market.

Companies need to create a sustainable cA e lʼ ő M an o ʼ ta " l ş st pplna ʻ ueeiri ḣ

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