



Roland  
Berger



# Automotive Innovators: It's Time to Own the Software

Software Is Driving the Perceived Value of the Vehicle.  
What's Driving Your Software Strategy?

**WHEN IT MATTERS, IT RUNS ON WIND RIVER**

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**EXECUTIVE SUMMARY**

Here's a simple question: At what point do automakers confront the fact that they are in the software business?

The trend has been building for decades, little by little, as software has contributed more and more to consumer functionality, the user experience, and the dynamics of the vehicle—from dashboard instruments to the connected vehicle, the powertrain, safety systems, and in-vehicle infotainment (IVI). Five years ago, the plug-in hybrid Chevy Volt already relied on 10 million lines of software code, 2 million more than an F-35 fighter jet. Today that trend is accelerating for automotive original equipment manufacturers (OEMs) and is rapidly confirming that the digital experience is fundamental to virtually every facet of the way we work, play, and live within our vehicles.

Simply put, the importance of software to the perceived value of the vehicle is on an accelerating upward spiral. Consumers are more concerned with what types of in-vehicle applications are available, what new connected vehicle capabilities are available, what new autonomous driving capabilities have been enabled, whether they can start the car remotely, and even whether drivetrain performance can be updated over the air. The vehicle has become a consumer device, with an added focus on security and reliability and with the expectation that software updates are continuous throughout its lifecycle.

Like a driver whose beloved, faithful, 20-year-old vintage convertible is suddenly performing erratically and displaying telltale signs of age and wear, auto industry executives must face the reality that their business model is about to change, and the impact will be substantial. The question is no longer whether to proactively and aggressively transform their software strategy, but how. The complexities and the implications are both enormous and present exciting challenges and opportunities to add value at the end-user connection interface.

This paper explores the pressing need for OEMs to adopt more complete and detailed software ownership strategies and the specific capabilities of Roland Berger and Wind River® for delivering on these demands.

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**OWNING THE SOFTWARE: KEY CONSIDERATIONS**

What exactly does it mean to own the software? For context, consider that automakers have historically “owned” the elements that comprised their customer value proposition.

In the early days of the industry, automakers did virtually everything, from designing their own engines to building their own powertrains to upholstering the seats. Over time, they started to move components that were outside their core value proposition to outside suppliers, and the automotive supply base was born. Many of those suppliers went on to become Fortune 500 companies in their own right, making springs and struts and brakes. But OEMs also thrived, because they continued to own their core value proposition; they owned what was most important to their consumers.

In recent years, the functionality and sophistication of software has continued to increase sharply, so that today software comprises a large percentage of the vehicle’s perceived value. Auto executives may disagree over what that percentage is today—whether software is 40%, 75%, or 90% of the car’s value driver—but there is no disagreement that the percentage is large and will only increase in the years ahead.

To cite one recent example of how automakers are responding to this phenomenon: Tesla is now viewing its entire vehicle design as an upgradable system, with powertrain performance as a software-upgradable function and its autopilot capabilities as a marketplace app. How valuable are software-oriented features to consumers? A survey conducted by Tesla shows that consumers in the U.S., Germany, and China were all willing to pay a high premium of \$3,000 for an Autopilot upgrade.

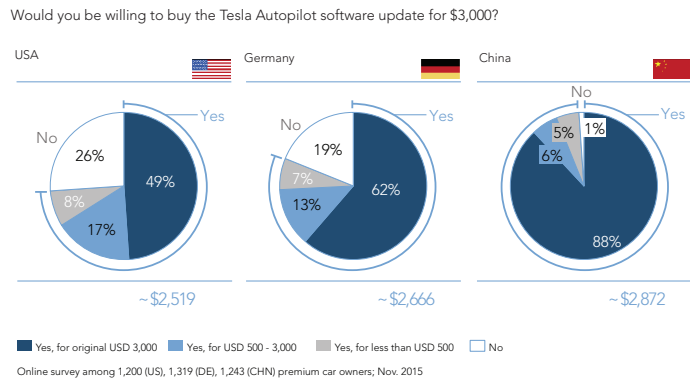


Figure 1. Consumers are willing to pay for software updates

As the industry moves now toward autonomous vehicles, we can see an extreme example of how important the software value driver may become. Since the consumer will no longer operate the car, vehicle dynamics will matter far less—there will be no interaction with the steering wheel, the gas pedal, or the shifting mechanism. The consumer will care more about whether the interior of the car can adapt to his or her preferences, whether the right type of music or entertainment is available on demand, whether the GPS system works properly, whether software-driven safety features are enabled, and so on.

In this extreme case, all the places where automakers have historically invested are reduced in importance, revealing a need to shift their investments to support consumers’ new value drivers. OEMs must own their software to some degree, or they will have no control over their value stream or the fundamentals of their business. Clearly, the software capabilities of auto companies must accelerate.

For this reason, virtually every automaker has begun assessing or experimenting with alternatives for taking ownership of software. But the challenges of moving into this space are myriad and complex. For example:

- The transfer of value changes everything, from the design and development of new cars to the retail model to the service and support model to supply chain interactions to the aftermarket. How do OEMs get a handle on what this shift means for their particular company and how best to create and move forward with a transformation strategy?
- In comparison to software and consumer electronics companies, the auto industry moves at a glacial pace. Most OEMs have already made significant investments in software-oriented innovation, but the pace of innovation is much, much slower because so much of it is tied to the traditional development lifecycle of a vehicle program, to its waterfall development methodologies, and to the freeze of the system configuration after start of production (SOP). How do OEMs accelerate their pace of innovation to compete with the quickest innovators in the market?
- Traditional software companies, such as Microsoft, Google, Apple, Samsung, and so on, have increased their presence in the auto space. How can automakers “own” the software when the technology driving so many consumer-oriented innovations is already controlled by enormous and powerful software enterprises?

- The connected car market is larger, more complex, and growing faster than many experts predicted (see Figure 2). But the development of the connected car is proceeding in a siloed, piecemeal fashion. Various elements—from the software driving the electronic control units (ECUs) that power dashboard instruments to IVI systems to embedded safety features, telematics, and powertrain functions—are evolving separately and are not well integrated. Moreover, another dimension of connectedness also needs to be addressed: the integration of the network inside the car into the broader external network, the Internet of Things (IoT). How will OEMs master the added complexity?

Connected Cars Market: Penetration Rate, Global, 2013–2020

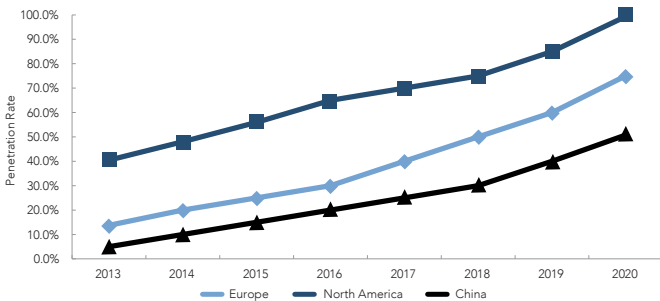


Figure 2: Uptake of connected cars is expected to rise dramatically worldwide (source: Frost & Sullivan, April 2015)

- The product lifecycle of the entire car will change to accommodate the software lifecycle. How will OEMs shorten time-to-market while providing ongoing software support?

- Many software-related trends continue to evolve. How will automakers stay abreast of changes in software development models, safety and security requirements, open source frameworks, human-machine interface (HMI) standards, ECU integration techniques, and more?

**MULTIPLE NEW MARKETS, MULTIPLE NEW STRATEGIES**

The transition toward the connected car coincides with the rise of the electric car, and both trends offer unprecedented opportunities for newcomers to stake a position in a business with huge potential in emerging market segments, but with an increasing overcapacity regarding its traditional market. The plebiscite observed through pre-reservations at the commercial announcement of the Tesla Model 3 has largely surpassed all historical automotive successes, such as the Citroën DS, with a level of demand more similar to today's consumer electronics market.

But automakers also have the specific skills in assembly planning, logistics, and quality necessary to predictably reach SOPs with high production volumes. And this experience remains a high-entry barrier for new players.

Large OEMs face a different challenge than newcomers: the need to transform. It starts with their market strategy; not only do they need to increase car sales but they also need to address the many topics of the connected car economy, such as mobility as a service (MaaS), energy in smart grids, insurance, and financial products. The connected car economy changes and streamlines the

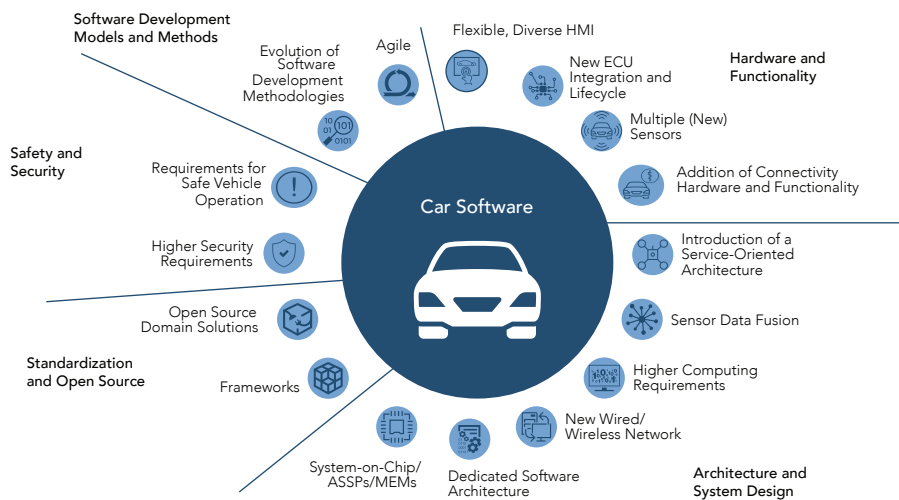


Figure 3: Software market trends challenge the automotive industry to own the software

value chain, which as a result requires more flexibility, modularity, and scalability. Traditional product management must adapt to address these new market segments and integrate business engineering capabilities to develop not only a product, but an entire business platform.

automotive industry accelerate its transition. Rebuilding the business ecosystem, as well as understanding that software is a new, continually fast-moving world, can help carmakers save significant time preparing to address new markets.

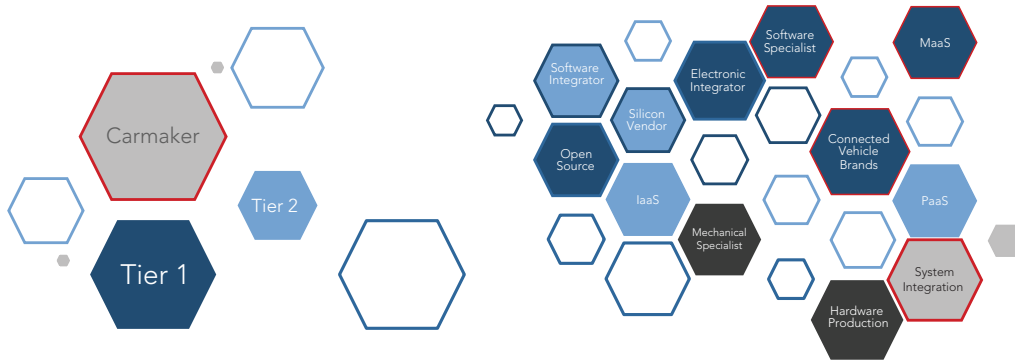


Figure 4. The roles of the carmaker and its business partners are being transformed

In addition, large carmakers will need to understand the new business model and what it takes to develop, produce, and commercialize the connected car as a business platform. The existing supply chain is giving way to a more fragmented set of solutions aligned with the IoT business and with its technical architecture. To integrate the value of the individual elements of this ecosystem, the software must be clearly and thoroughly understood.

Finally, these carmakers will need to plan and execute the changes impacting the technology roadmap, in the internal organization as well as in the business ecosystem and its supply base, to make this transition successfully while continuing to release new car models.

Adopting the technologies, organizational strategies, and methodologies necessary for the development of the connected car does not necessarily require a “big bang” approach. Other industries have already faced similar changes and have developed experience, standards, and technologies that can help the

### WHEN SOFTWARE AND STRATEGY REQUIRE CROSS-COMPETENCIES

Wind River and Roland Berger have partnered to deliver an innovative new approach that allows automakers to own the software that delivers on the consumer value proposition, so they can control their destiny.

Roland Berger and Wind River jointly provide an assessment of the current business model, where it is challenged, and where there are opportunities for differentiation, competitive advantage, and operational improvements. They provide an analysis of how software trends impact each client’s business model and transformation vision, along with threats and opportunities. They also provide detailed scenarios of how business models and technologies could deliver specific business outcomes, an implementation roadmap, and next steps.

The net result is that senior leadership teams understand their current capabilities and maturity levels as a software organization; they can explore new options and possibilities; and they can quantify expected benefits, required changes, and roadmap milestones.

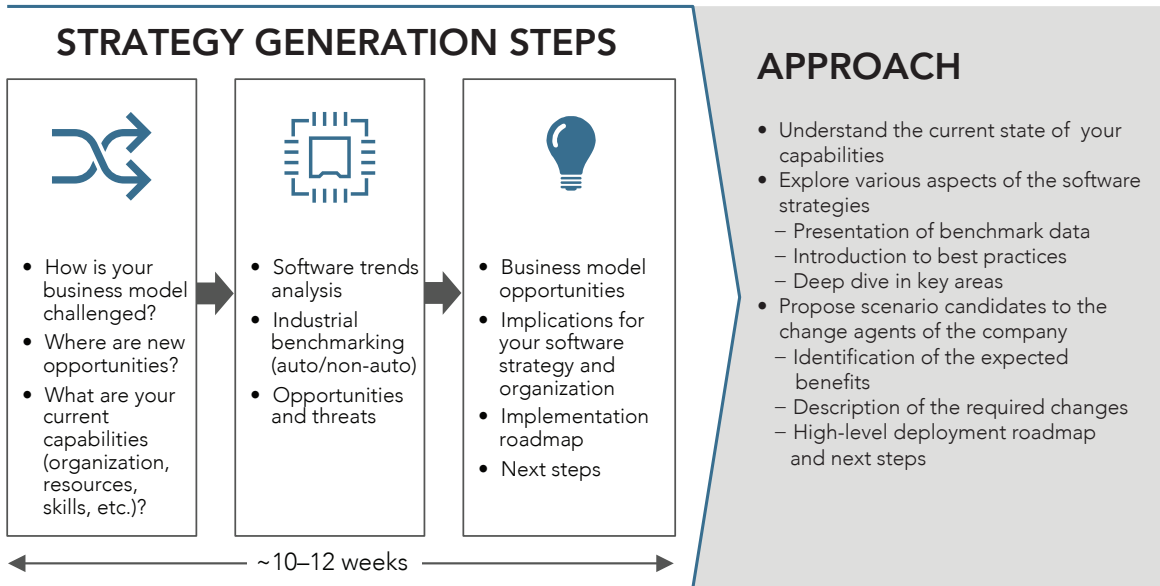


Figure 5: Roland Berger and Wind River provide a structured approach that can be customized to specific OEM needs

**FOR MORE INFORMATION**

Wherever you are in your strategy to own the software, Wind River and Roland Berger can help you take the next step in a way that maximizes innovation and minimizes cost and complexity. To learn more about the capabilities and offerings of Wind River and Roland Berger, which together provide an end-to-end solution from strategy to software implementation, please visit [www.windriver.com/auto](http://www.windriver.com/auto).

