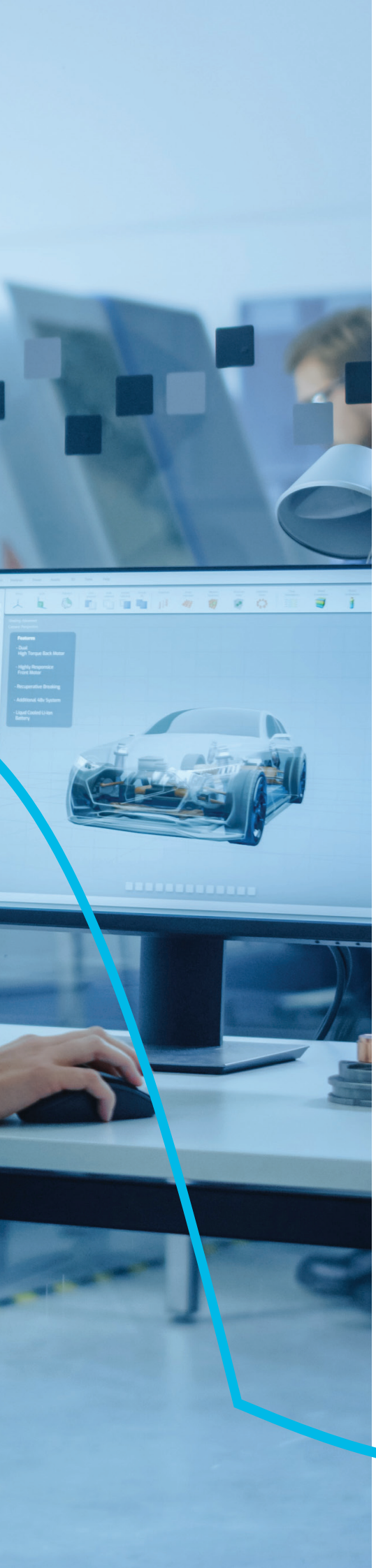
CAPGEMINI DIGITAL CORE FOR AUTOMOTIVE

THE SUSTAINABILITY ECOSYSTEM

Protecting growth and the environment in the automotive sector



CHANGING EXPECTATIONS

The concept of sustainability has long been a strategic priority for the automotive sector. This is hardly surprising given the predominance of combustion engine technology within the design concepts of most original equipment manufacturers (OEMs), and the very immediate connection this has with CO2 emissions and the widespread narrative on global warming. Technological innovation has to date been the response. The continued introduction of electric and hybrid power, allied to greater engine efficiency, has collectively helped lower the carbon footprint of all new vehicles entering the market.

Driven by consumer expectations, sustainability remains a critical strategic imperative. Indeed, it stands with equal authority beside the other key industry trends of globalization and operational efficiency. That said, sustainability remains arguably the hardest of the three to navigate, due to the fact that:

- Consumer demand itself has proven far harder to predict than anticipated
- The role a vehicle is expected to perform is also changing, as the concept of 'mobility' undergoes a radical transformation
- Recent events like a global pandemic, parts shortages, and trade wars have also seen resilience trump sustainability as the industry's principal short-term focus

Sustainability is also an idea that continues to grow in scale and application

It's growing in terms of the interconnected nature of the responses now needed to affect measurable environmental benefits. And it's also growing to incorporate the demands being placed on automotive OEMs to sustain their own profitability and long-term survival. The sustainable business model of today now extends beyond considerations of a purely environmental nature, to encompass plans for maintaining revenues and innovation simultaneously.

Adapting to this new reality requires change. At times radical change, yet no automotive business need atte think of the interactions that need to be maintained between OEMs, suppliers, partners, customers, and the vehicles themselves.

Expectations, like information, flow across the modern automotive value chain. Adopting a more holistic approach to product design, manufacture, and delivery is essential for meeting them. **A journey that will bring challenges as well as opportunity, as the industry sets course for a dynamic new future.**

A UNIFIED PURPOSE

Ecosystems in nature help denote a biological community of organisms and their environment. A complex, interconnected system whose sustainability is dependent upon all contingent parts: Where no individual organism can excel in isolation, and interconnectivity is everything.

Now apply this lens to the automotive sector, where vehicles have to exist and operate within a complex, ever-shifting environment of stimulus and co-dependencies. Where the relationships between suppliers and partners, between customers and manufacturers, can be multi-layered and instinctively multi-dimensional. Where the car itself is constantly updating, talking to other cars, and sharing data with the smart cities around it. And where no OEM can hope to survive by operating in a vacuum.

This is the new world of automotive mobility, where everything truly is interconnected.

It's also a long way from established, traditional ways of manufacture. Even today, many OEMs follow the same design and build principles that were in vogue 30 years ago. This determines why they're still fundamentally making the same product. Moving away from this paradigm is inevitably going to force many OEMs out of their comfort zones. This is revolution not evolution, that's occurring in tandem with:

- The demand for increased digitization within and across the full automotive value chain
- Car design becoming software-driven, and the emergence of software designed transformation as the impetus behind new agile development
- The increase in cloud connectivity that vehicles now enjoy, and the new customer experiences being created as a result

Another big area of change is the level of dependencies now in play.

As cars themselves are re-modeled from standalone vehicles to 'mobility platforms', a more extensive partner ecosystem is called for to deliver the necessary software and adjacent services. Many of these will also need to be on-demand, as the nature of car ownership itself continues to evolve in line with the desire for greater flexibility. And it's here that arguably the biggest change of all needs to happen, as OEMs learn to participate openly in this advancing automotive ecosystem. And open means just that: open to the sharing of ideas and standards, data and inspiration. Open to a whole new innovation cycle, where long-term planning around periodic model releases and upgrades is replaced by an almost constant cycle of upgrades – including software delivered over the air.

Innovation that's accelerated when OEMs have access to an interconnected network of skills and capabilities: innovations in entertainment, servicing, vehicle management etc. that further help manufacturers personalize their customers' experiences – based directly on the feedback gained from customer demand and behavior.

67%

OF CONSUMERS SAY THAT CONNECTED SERVICES INCREASE THE VALUE AND EXPERIENCE OF A CAR[1]

1. Source: Sustainable Mobility – A Cagpgemini report: https://www.capgemini.com/de-de/wp-content/uploads/sites/5/2021/03/Sustainable-Mobility-PoV-1.pdf

This is the promise of intelligent industry combined with customer centricity, and the ever-present drive for sustainability.

What's more, with intelligent industry comes 5G, software defined transformation, AI, and the Internet of Things (IoT): Each one each generating (and in many instances demanding access to) huge volumes of data, and requiring expert support to help collect, store, and make sense of it. Data that can then enable new services such as usage-based billing etc., working in conjunction with software that further opens customers up to the new capabilities being created inside extended ecosystems.

As a result, software evolves from being a set of commodity offerings on a vehicle's hardware platform, to becoming the platform itself.

Exploiting this potential means enabling data-rich connectivity, alongside associated factors including security, regulation, and interoperability – which are skills residing far outside the competencies of traditional OEMs. But in terms of maintaining a sustainable business model for the future, they're as essential now as a chassis or power train.

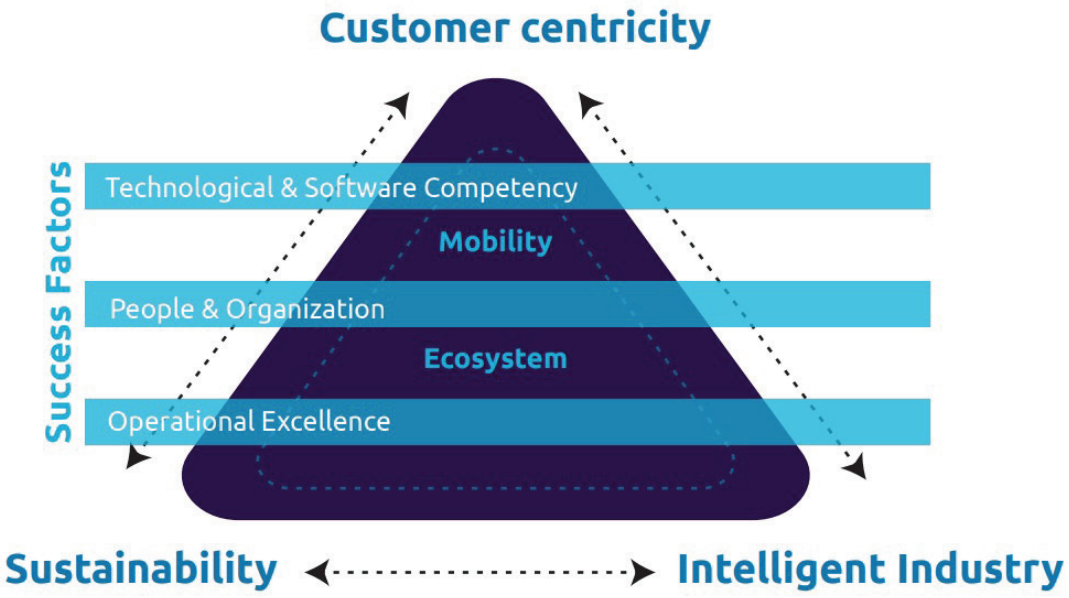
Exploring potential: Software-Driven Transformation (SDT)

SDT is fast turning into a major change driver for OEMs, in areas ranging from AI and ADAS to electric and connected vehicles. The impact this creates is felt up and down the automotive value chain, as a 'hardware first' mentality gives way to software-driven development: A transformation that's also fundamentally shifting the relationship between customers and their vehicles.

To offer an opinion on what this means for the business models and leadership styles of OEMs, as well as exploring the 'how' of SDT, Capgemini interviewed a number of our senior automotive management team. There responses can be viewed in the report: **Talking Points: Exploring the Potential of SDT in the Automotive Sector**

Figure 1

TRANSFORMATION FRAMEWORK FOR THE NEXT AUTOMOTIVE



EXPLORING THE MEGA-TRENDS IMPACTING AUTOMOTIVE

Sustainability

Customer Centricity

Intelligent Industry

MANAGING CHANGE

Clearly there's a lot for automotive OEMs to contend with today as the full implications of a connected society – including the advent of smart roads, smart cities, and smart products – take shape.

- There are new competencies and skill sets to acquire, raising the question of whether to develop in-house or outsource
- There are the new interdependencies that now exist with customers, leading to more direct interactions that transcend the increasingly outdated manufacturer/dealer/user model
- And there is the need to define new processes and methodologies as part of the move to a more collaborative ecosystem of shared innovation and insight

The challenge comes in managing each of these key points effectively, and using the outputs to improve growth, profitability, and shareholder value. A significant task in itself that's pushing OEMs to re-evaluate their core processes for development and production. An assessment that inevitably highlights the scale of change required, as well as a multitude of opportunities for business disruption.

The benefits of embracing a more interconnected, sustainable, ecosystem of innovation and opportunity however far outweigh the risks of change.

This is an important consideration, because it highlights those areas where support is desperately needed – and where it isn't. For example, OEMs need little assistance in evolving their hardware procurement. Finding the cheapest source of physical parts involves tried, tested, and familiar processes. But enabling the new world of mobility involves components that are a far more complex than ever before. Certainly when it comes to software capabilities that are not physical, involve highly complex purchasing, licensing, and liability agreements, and incorporate a host of additional interdependencies in their own right.

That's why we're already witnessing substantial change in procurement practices within the industry, as OEMs continue to develop their software capabilities, and new and existing auto suppliers rise to the opportunity. This is an intricate environment of interconnectivity, patch updates, and regulatory compliance etc. that's only made possible by specialist knowledge and experience. But it's also a landscape that's rich with opportunities for establishing new services and revenue streams. Hence the growth in capabilities surrounding these digital supply chains, including features for:

- Verifying materials sustainability – stretching from initial raw materials to usage and aftermarket
- Measuring the environmental impact of the entire production cycle to aid efforts aimed at reducing this footprint
- Factoring functional safety into all embedded systems and software products

The ultimate goal being the creation and maintenance of truly circular manufacturing processes that are fine-tuned to reduce both costs and environmental impact. Achieving this objective offers a win-win scenario for customers, suppliers, OEMs, and societies alike: **the fusion of business and environmental sustainability that sits at the heart of any future green economy.**

SUSTAINABILITY: MORE THAN A CONSUMER OR REGULATORY IMPERATIVE

The pressure is certainly on automotive OEM's and suppliers to embrace sustainability as a core value. Adopting a proactive stance is also vital for boosting bottom line revenues. Recent research from Capgemini suggests that the topic of sustainability is now a key influence in purchasing decisions across all major markets:

- 69% of consumers state that product sustainability is important for their purchase decision
- 79% state they would pay a premium for sustainability

You can find out more details in the report: Sustainable Mobility

THE PATH FORWARD

Explore the concept of software-defined transformation in the automotive sector, of the modern vehicle as an interconnected software platform, and it's not long before SAP S/4HANA enters the conversation. For many OEMs SAP is the technology platform on which they run their business, from procurement to HR, sales to marketing, operations to finance. Legacy infrastructures that, like vehicles on the assembly line, will only achieve their full promise when fully connected to a wider ecosystem of capability.

That's why migrating to SAP S/4HANA and accessing its own ecosystem of automotive-specific reference architectures and frameworks, makes complete sense – a move that provides them with their very own platform for driving product and supplier-led innovations.

But getting there without disrupting the business can seem an unlikely proposition.

This is a risk that's only negated when you have expert guidance available for all the key decisions, which is what you can expect from Capgemini. To deliver on this commitment, we've linked our highly valued Enterprise Architecture capabilities with proven SAP ERP implementation power, to create the Multi-Pillar S/4 Architecture (MPSA) that offers:

- Deep product and technical insights to help ensure the correct architecture choices are being taken for your business, and that a roadmap is clearly defined for making the transition to a modern SAP ERP landscape
- Out-of-the-box frameworks for optimizing current operations, and for achieving fast time to value when introducing new business models and innovative mobility solutions
- Wider capabilities for bringing together the people and organizational elements of transformation – with for example the Enablement as a Service (EaaS) offering from SAP that supports employee 'up-skilling' on-demand

It's also technology that helps extend sustainability models by exploiting all the real-time data now available across the automotive sector. Factor in SAP's Business Network, and OEMs can gain access to tools and insights across the areas of procurement, asset management, and logistics transformation. A network that alongside Capgemini delivers its own ecosystem of innovation, while also being a key driver of verifiable sustainability. It forms a key part of SAP's vision for "zero waste, zero emissions, and zero inequality", which aligns with Capgemini's focus on enabling action on climate change being at the heart of the Group's priorities.

This is a sustainability platform that inspires positive change for both the environment and the customer.

In the new software-driven era, multi-dimensional real-time insight becomes available into the way vehicles are being used, and how this manifests as an overall driving experience. This data enables a more interactive, two-way relationship with customers – where new services, apps, and features can be turned on and off to meet a customer's temporary or long-term needs and wants. This is a vision for a level of direct customer engagement that has traditionally been the preserve of dealers. Automotive companies can therefore lack some of the critical infrastructure needed to maintain a real-time view of the customer – or to accurately predict the 'next best action'.

From our depth of consumer markets expertise such as in retail ecommerce, Capgemini has experience, insight and frameworks to translate into the automotive market, as well as the deep SAP implementation skills that collectively are helping the automotive industry advance confidently into the future.
We're also a key part of the wider automotive ecosystem that today is empowering OEMs and suppliers to create agile, interconnected business models able to adapt to current and future market trends. This is vital for increasing profitability while maintaining sustainability as a core strategic priority, or as we like to put it: for delivering the Renewable Enterprise.

Together, SAP and Capgemini are bringing 'Digital Core for Automotive' to life.

This is an Automotive Industry Cloud solution. A Capgemini-designed automotive-specific reference architecture designed around the SAP S/4HANA digital core that incorporates BTP cloud solutions from Capgemini, SAP, and SAP's partner ecosystem. It's a combined offering built around the vision of an agile

CAPGEMINI – YOUR PARTNER FOR EMBRACING CHANGE

enterprise with SAP S/4HANA at its core. Where organizations are able to anticipate market conditions and customer needs, while pursuing a policy of continuous transformation to improve business performance through the exploitation of intelligent technologies. A vision that is equally aligned to the needs of the renewable enterprise, and delivering the key ingredients required including:

- **Intelligent automotive applications** aligned to business efficiency goals that collectively help OEMs and their suppliers sustain operational excellence and enhanced workforce safety – while continually driving down the costs of production and logistics
- **New and innovative business models** designed to accelerate the realization of new revenue streams, including an end-to-end solution architecture for fleet-as-a-service and a customer care and spare parts business on SAP S/4HANA
- **Sustainability for automotive solutions** ranging from electric car business architecture frameworks and a new battery production offering on SAP S/4HANA, to processes for sustainable operations – delivered through Green Core with SAP solutions in procurement, inventory, and logistics

These are capabilities designed to help automotive OEMs apply continuous innovation to their strategies, business models, processes, and technology platforms. End-to-end transformation that incorporates people, business outcomes, data, cloud applications and ERP – alongside the supporting infrastructure. What's more, the business models and outcomes activated also help inspire both the roadmap and the business case for the renewable enterprise. A journey that's tailored to a customer's current technology strategy and legacy infrastructure, spanning brownfield conversions and greenfield implementations, to ensure the rightfield approach is adopted across every unique engagement.

With Capgemini Digital Core for Automotive, Capgemini has developed the critical, industry-specific solutions needed to place sustainability at the heart of every company. From inspiring measurable revenue benefits to delivering recognizable environmental benefits, our goal is to put technology to work in realizing a vision of smart and sustainable business.

WE'RE READY WHEN YOU ARE.

About Capgemini

Capgemini is a global leader in partnering with companies to transform and manage their business by harnessing the power of technology. The Group is guided everyday by its purpose of unleashing human energy through technology for an inclusive and sustainable future. It is a responsible and diverse organization of 270,000 team members in nearly 50 countries. With its strong 50 year heritage and deep industry expertise, Capgemini is trusted by its clients to address the entire breadth of their business needs, from strategy and design to operations, fuelled by the fast evolving and innovative world of cloud, data, AI, connectivity, software, digital engineering and platforms. The Group reported in 2020 global revenues of €16 billion.

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About SAP

SAP's strategy is to help every business run as an intelligent enterprise. As a market leader in enterprise application software, we help companies of all sizes and in all industries run at their best. Our machine learning, Internet of Things (IoT), and advanced analytics technologies help turn customers' businesses into intelligent enterprises. SAP helps to give people and organizations deep business insight and fosters collaboration that helps them stay ahead of their competition. We simplify technology for companies so they can consume our software the way they want – without disruption. Our end-to-end suite of applications and services enables business and public customers across 25 industries globally to operate profitably, adapt continuously, and make a difference. With a global network of customers, partners, employees, and thought leaders, SAP helps the world run better and improve people's lives. For more information, visit http://www.sap.com

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