NIO
Case Study

Photo courtesy of NIO

Challenge

Electric vehicle innovator NIO needed to rollout an R&D platform to support its rapid global expansion and improve collaboration between its regional teams across China, the US and Europe to help them design and launch new models faster.

Solution

NIO chose the **3D**EXPERIENCE platform and its Electro Mobility Accelerator industry solution to bring together different disciplines in its development and manufacturing teams. Engineers can now quickly access complete vehicle data at any time, regardless of location, and verify the vehicle's digital mockup, all within one system.

Benefits

The company was able to move from concept to launch of its ES8 model in just three years, thanks to enhanced collaboration between its global teams and partners. With completely integrated design and manufacturing processes and accurate data, NIO can focus on innovation as it continues to scale its business.

MORE THAN AN ELECTRIC AUTOMAKER

Born from a growing concern about the high pollution levels in many cities across China—and worldwide—NIO hopes that when the car ownership experience exceeds expectations, electric vehicles will simply become the natural choice for everyone, leading to a more sustainable tomorrow. Hence, the electric automotive start-up's Chinese name: Weilai, which translates as 'blue sky coming.'

Since it was founded in 2014, the company has been building a new generation of electric road cars that deliver superior performance and unique user experiences, backed by its vision to help consumers rediscover the 'joyful lifestyle' of car ownership. More than just simply another premium electric carmaker, NIO wants to become the first "User Enterprise" and is capitalizing on the huge changes underway in the automotive industry-to change the way people perceive and use cars for the better.

"Our customers are basically young people and families who live in first and second-tier cities and surrounding urban areas," said Shengjun Wang, vice president of digital business development at NIO. "They have higher requirements around consumption and quality. Before making a purchase from NIO, they compare our offering to the world's premium car brands and best high-performance electric vehicles, and choose to become NIO car owners. This demonstrates that the products we have launched so far have resonated with our customers, both in terms of the product itself and the services we offer. They like the free quality assurance, roadside assistance and car connectivity services offered for the duration of the vehicle's lifetime, proving our competitiveness in the industry."

But convincing more consumers to buy smart electric cars is not easy. "We still have a lot of work to do," Wang said. "We have to manufacture better products and provide better services."

PROVEN PLATFORM PARTNER

NIO is a start-up with an ambitious vision. From the very beginning it was committed to expanding its global reach and needed a strong technology platform to support its growth.

"Five years ago, NIO was a start-up with aims to be global, so we checked various solutions that were available on the market," said Yong Jiang, senior director of project management at NIO. "We found that Dassault Systèmes provides the best solution to help us develop products and achieve collaboration across many countries. It was the right choice for us."

The company chose the **3D**EXPERIENCE® platform as the foundation for its enterprise-wide research and development (R&D) activities.

"What is most important to NIO is time," Wang said. "We carried out a systematic investigation into our new enterprise R&D platform and chose Dassault Systèmes' industry-leading **3D**EXPERIENCE platform with great confidence. Now, we have truly realized a global R&D strategy and our engineers in China, Germany and the US can work in a collaborative manner on new products and designs."

The migration to the new platform took just four months, allowing NIO to get its designers and engineers up and running on the new solution as quickly as possible.

GLOBAL PRESENCE

Before implementing the **3D**EXPERIENCE platform, NIO's designers and engineers worked in siloes, focused only on their local product development activities. Many processes were offline and paper-based, making it difficult for workers in different sites in China, the US and Europe to access the data they needed and share information.

"Our colleagues in North America were unable to track our progress," Jiang said. "However, since using ENOVIA on the **3D**EXPERIENCE platform, collaboration is no longer a problem. We're able to update files from any of our locations, and when we need to make decisions in meetings, we know we're working from the same page, which significantly improves our efficiency."

NIO now has a truly global development platform it can rely on.

"We're now running all of our product development through a single system that even incorporates our partners, including those in Sweden and India," Jiang stated. "All stakeholders can

access the same data, whether it is WIP (work in process) data or released data."

Now that NIO has a complete overview of its operations, the company can keep projects on track, helping to reduce development cycles.

"With ENOVIA, rapid collaboration is enabled across different disciplines of our design team, as well as between development and manufacturing," Wang said. "Our engineers can quickly access complete vehicle data at any time and verify the vehicle's

digital mockup, saving huge amounts of time. We also can identify and solve issues at the earliest stage of development with simulation and collaboration. This shortens our development cycle and allows us to work far more efficiently."

DESIGNING AT SPEED

NIO's recent ES8 electric seven-seater SUV model launch was developed entirely on the **3D**EXPERIENCE platform.

"We had many teams collaborate on the platform to quickly iterate product designs," Wang said. "Our entire R&D cycle is much faster than traditional development methods."

NIO was able to move from concept to product launch ahead of the competition.

"It may take four to five years or even longer for a traditional carmaker to develop and launch a new model," Jiang said. "But we launched the ES8 in three. We were able to move fast because Dassault Systèmes' **3D**EXPERIENCE platform helped us to streamline our development process."

Today, it only takes 15 minutes to load a full vehicle in production compared to over three hours with the prior methods. Now, the tools to visualize designs in 3D and connect all processes from design concept through to final assembly are in one platform allowing the company's designers and engineers to work as effectively and efficiently as possible.

"The **3D**EXPERIENCE platform drives our users' creativity and promotes innovation by allowing them to work in 3D," said Zhe Yao, lead product manager at NIO. "Having a single product design platform, coupled with synchronized engineering, significantly accelerates product design. This strong technology support certainly helped to accelerate the ES8's time to market."

"In my opinion, the **3D**EXPERIENCE platform has two advantages," Jiang added. "Firstly, it enables us to design and review intuitively in 3D, so we can collaborate with other teams in a straightforward, simple and fast way. Secondly, this platform connects all information flows, integrating product data, bill of materials (BOM) data, manufacturing data and even partner data on a single platform to enable seamless sharing."

CONNECTED INFORMATION FLOWS

NIO uses **3D**EXPERIENCE to manage its entire product development lifecycle, ensuring digital continuity, data integrity and effective change management at every stage of the process.

"The **3D**EXPERIENCE platform connects CAD, BOM and our manufacturing simulations, enabling us to design together," Jiang said. "It also facilitates the approval process for design changes as we no longer need to have a separate offline approval process for BOM changes and configuration management updates. From BOM to downstream manufacturing, the collaboration between various teams, including data sharing and rapid approval, is enabled on the platform. There is no need to switch between different systems or worry about loss of data."

NIO believes this agile approach distinguishes it from traditional original equipment manufacturers who are burdened by legacy IT and data silos. "As an emerging automotive company that was founded in the era of mobile internet, NIO is following a development path different from that of traditional car makers," Wang said.

More about Electro Mobility Accelerator
The Electro Mobility Accelerator solutions provide the industry-proven capabilities to germinate new electric vehicle ideas, explore regional options, virtually simulate & validate performance, all on one secure, powerful platform. Thanks to the **3D**EXPERIENCE cloud-based (and on-premise) applications companies can capture and assess social media intelligence, analyze market demand, then develop and deliver customer-preferred innovations to market, faster and more efficiently.

Benefits:
• Accelerate optimal innovation
• Enable better productivity & save costs
• Create & validate better innovations
• Boost efficiencies & reduce time-to-market cycle
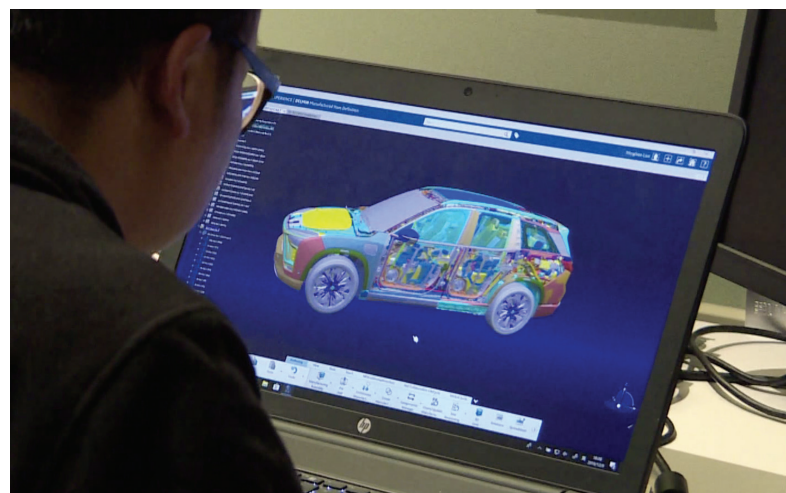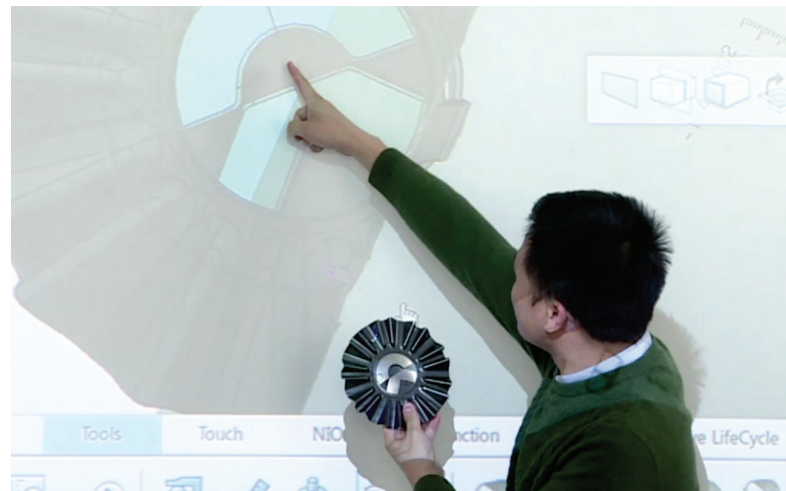
Top image: Engineers are able to identify potential issues in 3D environment anytime to optimize the design.

Bottom image: 3D model of NIO's ES8 in the **3D**EXPERIENCE platform: While designers work on their design, integration engineers are able to review the overall 3D model anytime to do the slicing, measuring and DMU check.

In addition, NIO can manage various BOM data, configurations and changes with extremely high accuracy and efficiency, at all stages of the product development lifecycle.

"As we have incorporated the core data management capabilities from the platform into our processes, it takes far fewer human and material investments to build our BOM system," Yao explained. "Integrated product change management improves accuracy and efficiency. And all of our BOMs can be represented in a 3D environment."

This continuous information flow carries through into final assembly too, thanks to the **3D**EXPERIENCE platform's digital manufacturing solution DELMIA. DELMIA helps NIO work with its factory partner to plan, validate production, and gain real-time visibility, control and synchronization of global production performance and quality.

"Using final assembly as an example, we can define the final assembly process data for models like the ES6 and ES8 on DELMIA with product, process and resource data," said Longyun Zou, associate director, digital engineering team & expert at NIO. "This data continuity is enabled as DELMIA is a downstream extension from CATIA on the **3D**EXPERIENCE platform. In this way, our process design can directly use the model at the design stage to define and issue 3D process planning and 3D operation instructions."

The technology is not only helping to streamline processes and make best use of the company's resources, it's reducing costs.

"At our workstation, all information of an operation step can be found in process data, such as work hour, resource, spare part and resource consumption," Zou said. "This helps us balance our working hours and production line, and assess worker performance, improving our analysis capabilities. By verifying processes using virtual simulation, we can also maximize our chances of finding manufacturing issues in the 3D environment and correct them upfront, without a physical prototype. This helps us to significantly reduce development costs and avoid unnecessary waste."

ADVANCING AUTONOMOUS DRIVING

As it continues to focus on its innovation pipeline, NIO is now exploring developments around autonomous vehicles.

"In the future, smart autonomous electric cars will become a part of our everyday lives," Wang said. "At the moment, we are using NIO Pilot automated driver assistance technology to improve adaptive cruise control to ease driving and autonomous emergency braking that actively intervenes during driving. To help drivers avoid risks and reduce hazards, NIO endeavors to develop more advanced autonomous driving technologies."

NIO plans to develop its autonomous car on a new enterprise technology platform called NP2.0, built on the **3D**EXPERIENCE platform.

"We plan to continue advancing our platform-based strategy for NIO and develop a completely new NP2.0 platform based on our current platform," Wang said. "We hope to leverage all of the advantages of **3D**EXPERIENCE to build the NP2.0 platform, especially its systematic efficiency and collaboration capabilities, so that our engineers around the world can continue to work together on product development and rapidly iterate product designs."

In the meantime, NIO intends to explore the powerful lifecycle support capabilities in the **3D**EXPERIENCE platform to further strengthen its product development processes.

"We're especially interested in using its strong electro-mechanical software collaboration capabilities and simulation capabilities," Wang said. "It will help us carry out joint development and testing of software and hardware, and increase the development speed and product maturity of all our new platforms and models."

Our **3D**EXPERIENCE® platform powers our brand applications, serving 11 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3D**EXPERIENCE Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating 'virtual experience twins' of the real world with our **3D**EXPERIENCE platform and applications, our customers push the boundaries of innovation, learning and production.

Dassault Systèmes' 20,000 employees are bringing value to more than 270,000 customers of all sizes, in all industries, in more than 140 countries. For more information, visit **www.3ds.com**.

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