WHITE PAPER

Ansys

Digital Transformation Best Practices

How to Integrate and Expand the Use of Simulation Across the Enterprise

By now, everyone is aware of digital transformation, but what does it really mean to digitally transform a business? Digital transformation describes how companies can respond to rapidly evolving customer expectations by embedding technology across their people and processes to drive new business models and revenue streams. The benefits are many: greater product development efficiencies, more agile operations, and competitive advantages that result in greater value to employees, customers, and shareholders.

Digital transformation is no longer optional for most business sectors. Some companies have a roadmap for it and others will get left behind. Those companies who are actively guiding how technology is embedded across their businesses have the most to gain. The road ahead is fraught with obstacles and opportunities.

/ DIGITAL TRANSFORMATION OPPORTUNITIES

The challenges to widespread transformation across an enterprise, supply chain, and product life cycle are many:

- Collaborating on widespread changes across an entire, often siloed, organization
- Integrating new technologies and workflows among supply chain partners
- Building a sustainable infrastructure for the future without losing critical legacy data
- Understanding and evaluating new products and market opportunities
- A digital skills gap among employees
- Developing a culture of innovation that is embraced by employees

Digital Transformation Defined

"Digital transformation describes how companies can respond to rapidly evolving customer expectations by embedding technology across their people and processes to drive new business models and revenue streams."

Simulation plays a critical role in meeting many of those challenges. By performing more simulations earlier in the product development process, companies can reduce time to market by performing fewer design cycles, increase quality by reducing errors and rework, and improve margins by reducing physical prototypes and design turns. But the benefits of simulation extend beyond product development with data that feeds a collaborative product life cycle and, in turn, is constantly improved by new data across the organization that is being fed into increasingly sophisticated simulations.

Such innovation is possible in a business model connected by a digital thread that links previously siloed people, processes, and data. That is the digital transformation destination, but to get to where they're going, organizations first have to assess where they are.

/ THE VALUE OF ASSESSMENT

Ansys has developed a systematic Simulation Transformation Assessment that reviews how simulation is being leveraged to impact a company's overall goals.

This common methodology covers the full product development process. Historically, companies have focused their simulation efforts only on the verification process. A thorough assessment reviews all the stages and gates of product development and looks for the white space where simulation could have a significant impact in areas such as cycle time reduction, quality, and innovation.

The Ansys Simulation Transformation Assessment covers all phases of product design and development, from proposal into manufacturing. It casts a wide net beyond simulation experts in engineering to ensure other stakeholders are included, such as program managers, quality assurance, and engineers who may have never used simulation. While the Simulation Transformation Assessment uses an established, tested methodology, it is highly configurable to meet individual business initiatives and metrics. All of these are co-defined with the customer up front to meet your business objectives.

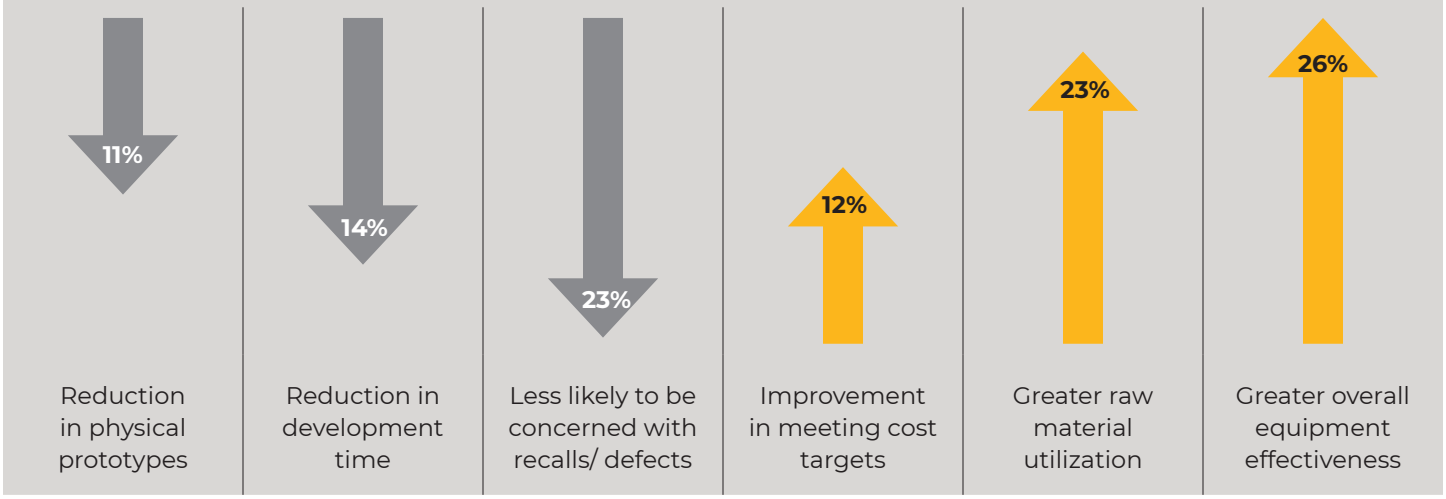
Customer Testimonial: Assessing the Assessment

"Sub-Zero Group recognizes that digital transformation is one of the key elements that support competitiveness. Simulation as a capability in the product design process is one of the pillars that supports digital transformation, thus requiring thoughtful strategy for its success. Having Ansys perform a thorough Simulation Transformation Assessment was crucial to identify gaps in key attributes related to people, processes, and technology. Unlike other consulting services, Ansys guided our engineering team to identify opportunities that are intrinsic to our culture and development process, therefore facilitating buy-in from key stakeholders. In addition to that, the Simulation Transformation Assessment team was able to help us gauge where we are compared to our industry peers as far as simulation transformation as well as where we should be to support our product and technology road maps. Today, our vision for simulation is shared across the organization and the strategy to achieve that vision is very clear"

— Anderson Bortoletto,
Principal Engineer, Advanced Product Development,
Sub-Zero Group, Inc.

Throughout the process, Ansys celebrates the areas where companies have successfully leveraged simulation and we co-develop a prioritized roadmap based upon our 50+ years of experience, best practices, industry trends, and emerging technologies.

PRODUCT DEVELOPMENT BENEFITS OF SIMULATION



Sources: "Simulation, the Secret Weapon to Cut Costs, Acclerate Innovation, and Boost Quality," September, 2020, Aberdeen, and "Quantifying the Impact of Simulation Across the Product Life Cycle," Aberdenn and Ansys.

/ FOUR BEST PRACTICES TO ASSESS YOUR USE OF SIMULATION

The Ansys Simulation Transformation Assessment is customized for each customer. Some customers may want to focus on engineering productivity, automation, training and enablement, sustainability, model-based engineering, or other topics. Other customers may want to zero-in on business benefits, such as time to market, cycle time reduction, or first-time-right quality initiatives. No matter how the Simulation Transformation Assessment is customized, the methodology is the same.

1. Benchmark Where You Are

To gain the necessary insights into the customer's goals and business initiatives, a pre-assessment questionnaire and surveys are sent to stakeholders. These are followed up by interviews with the appropriate business units to uncover how simulation is being used successfully and to identify potential opportunities.

That collected data is categorized and then measured against best-in-class industry data to celebrate successes and show how the business stacks up against the competition.

Customer Testimonial: Assessing the Assessment

"Using analysis to prevent problems early in the development stage has a huge impact on the business. Unplanned turns and validations could cost company half a million each time if we had to stop, figure out the issue, build more parts, etc. That's half a million to a million plus dissatisfied customers. The last person you want to be is the person who delays a new product launch."

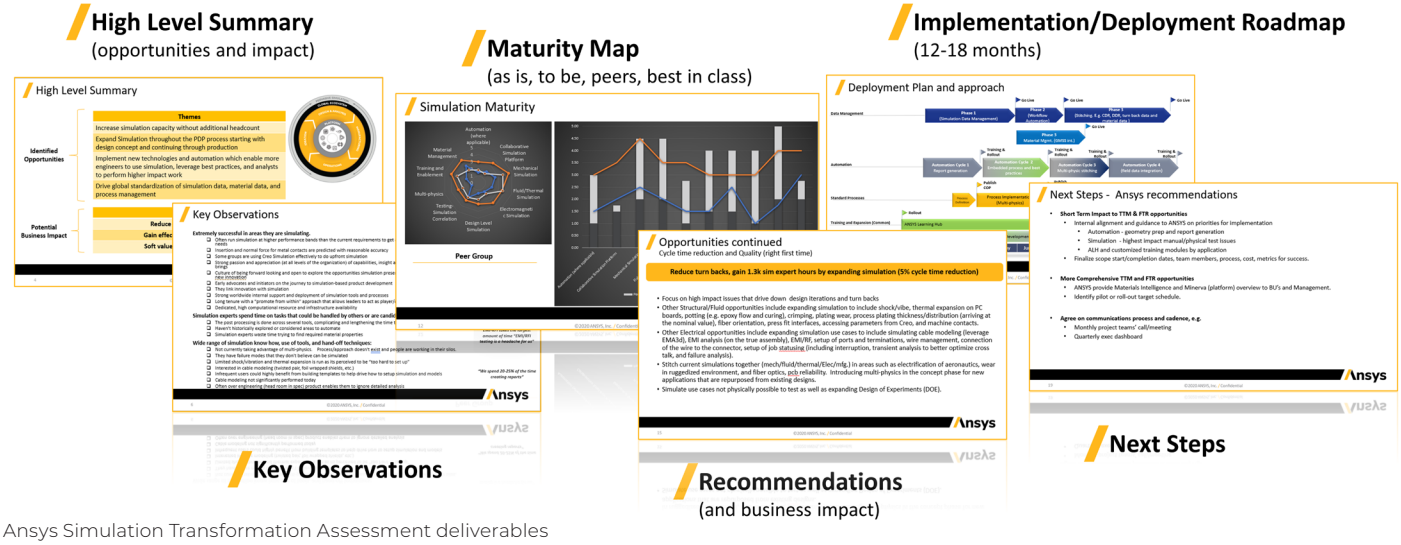
— Jack Bednarz, Chief Engineer, Electrified Hardware, **BorgWarner**

2. Establish a Vision for the Future

The benchmarking data is used to facilitate workshops that gather stakeholders to discuss various engineering processes and optimization opportunities. These hour-and-a-half to three-hour sessions are typically held over a period of two weeks.

Workshops are customized based on customer goals, but often include:

- A business unit kickoff for executive sponsors, engineering management, the CIO and/or CTO, and/or project managers
- A product development process / program life cycle workshop that identifies all of the simulation solutions used across the enterprise, as well as physical testing and prototyping
- A series of deep-dive engineering process breakout sessions focused on engineering disciplines (fluids, thermodynamics, structures, electromagnetics, etc.) that review workflows among designers, engineers, and analysts to ensure consistency and identify overlaps.
- A series of optimization and automation review breakouts by engineering disciplines to identify the top candidates for optimization based on pre- and postprocessing durations.
- Training and enablement workshops that gather stakeholders from all engineering disciplines together to review onboarding and training infrastructure.
- Breakout sessions with engineers, analysts, and quality assurance leads to take a deep dive into physical testing, prototyping, and simulation correlation processes.



Ansys Simulation Transformation Assessment deliverables

The workshops are guided by Ansys experts who help stakeholders uncover where they are vs. where they would like to be in their simulation transformation journey. The workshops focus on the product development process as a whole, not just Ansys simulation solutions.

3. Agree on a Roadmap
Once goals are established and aligned upon in the workshops, the next step in the Simulation Transformation Assessment methodology is to provide feedback and recommendations that include important industry trends, key observations, and an appraisal of the company's simulation maturity based on metrics. Near-term, high-impact opportunities are identified, as are potential business impacts. Value calculators are used to determine the benefit of embarking on specific advice.

The assessment deliverables are used to help stakeholders agree on a roadmap for implementation. Ansys Customer Excellence (ACE) subject matter experts collaborate with customers to help define recommendations on how to get where the customer would like to go.

4. Create a Deployment Plan
Transformation does not happen overnight. A short-term, actionable deployment plan is included with each assessment, which covers the first three years of transformation. The deployment plan addresses:

Customer Testimonial: Assessing the Assessment

"The fast pace of our industry requires a rigorous roadmap process for TE's technology advancement. The Ansys Simulation Transformation Assessment helps us identify industry trends early so that we can anticipate future gaps in our customer needs. This information enables TE to develop roadmaps that align our product capability and timing to our customers' future challenges."

— Dave Helster, TE Fellow, Director, Signal Integrity & System Architecture,
TE Connectivity

- **People** who can champion the agreed-upon improvements across the enterprise
- **Technologies** needed to meet customer goals, including — but not limited to — Ansys software, computer hardware, and physical testing technologies
- **Processes** to efficiently integrate people and technology, such as model-based systems engineering (MBSE), cloud collaboration, process integration and design optimization, simulation product data management (SPDM) and digital mission engineering (DME)

/ START YOUR SIMULATION TRANSFORMATION JOURNEY

When Ansys began more than 50 years ago, our goal was to help you use structural simulation to verify physical tests. Over the years, simulation came to be defined by the physics challenges being solved — structural, thermal, fluidic, optical, electromagnetic — and the Ansys product portfolio expanded, incorporating best-in-class physics simulation capabilities across a broad spectrum of engineering disciplines. Our goal was to help you answer the engineering challenges you faced.

Today, our goal is to help you design, develop, deliver, and operate the most innovative products and services imaginable using Ansys simulation. This requires more than just multiphysics. It requires many different people, processes, and systems that are often separated by geography, culture, expertise, and priorities. Consequently, our Ansys portfolio continues to expand. We now incorporate simulation technologies for collaboration and integration across the product life cycle — all the way from product requirements through early-phase ideation and conceptual design, to the detailed physical analysis, and the management of the product within its daily operating environment.

However, we realize that companies often use multiple simulation toolsets outside of the Ansys portfolio. The Ansys Simulation Transformation Assessment takes today's complex, multi-provider engineering workflows into account to recommend integrations and improvements to match each customer's preferences.

Simulation is a critical part of the solution to the biggest engineering challenges you face, as well as a fundamental element necessary for progress on your digital transformation journey.

Assess Your Digital Transformation

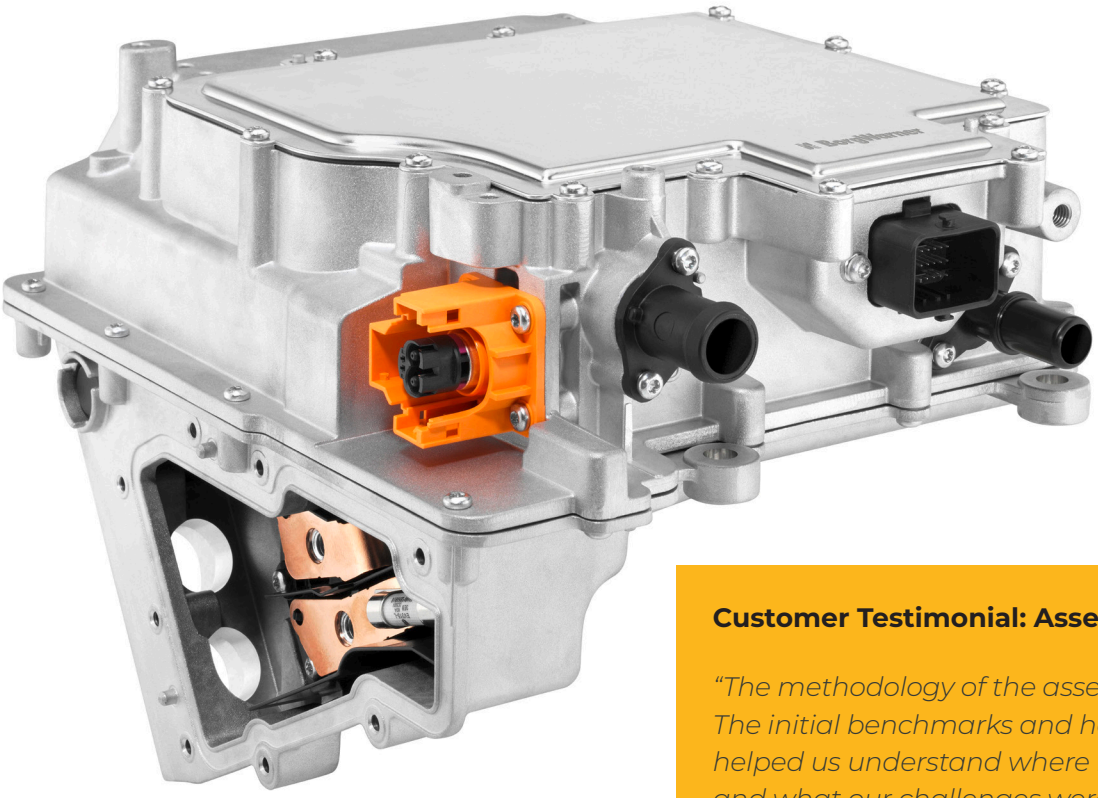
If you would like more information on the Ansys Simulation Transformation Assessment, reach out to your account manager.
www.ansys.com/contact-us

Assessing the Assessment: BorgWarner Case Study

BorgWarner is Charging Forward to Accelerate the World's Transition to eMobility

/ ABOUT BORGWARNER

For more than 130 years, BorgWarner has been a transformative global product leader bringing successful mobility innovation to market. Today, they're accelerating the world's transition to eMobility by helping to build a cleaner, healthier, safer future for all. The company's mission is to deliver innovative and sustainable mobility solutions for the vehicle market. They participated in the Ansys Simulation Transformation Assessment because simulation is an integral part of that mission.



A BorgWarner high-voltage inverter.
Image courtesy of BorgWarner.

Customer Testimonial: Assessing the Assessment

"The methodology of the assessment was good. The initial benchmarks and how we could do better helped us understand where BorgWarner was and what our challenges were: computing power, automation, and storing and sharing analysis results. Those first reviews were very helpful and thorough."

— Jack Bednarz, Chief Engineer, Electrified Hardware, **BorgWarner**

/ SIMULATION CHALLENGES

- First-time quality in a fast-moving market
- Take full advantage of simulation benefits
- Cross-discipline collaboration

The company's engineering leadership wanted to make sure they were able to take full advantage of their simulation capabilities – both from a compute and team member perspective – to achieve their first-time quality goals. Their use of multiphysics simulation collaboration between mechanical and electrical engineers was not as robust as they would like, and they suspected a streamlined workflow would pay dividends.

Customer pressure to show simulation results for suggested engineering improvements was another driving factor.

/ SIMULATION SOLUTION

- Increase compute capabilities
- Train more engineers to increase up-front simulation
- Automate simulation
- Implement materials intelligence

Through the assessment, BorgWarner learned how much time and costs could be saved by expanding their use of simulation earlier in the product development process.

Based on the assessments, BorgWarner increased its computing capacity and received training on how to automate many of its simulation processes. Specific projects were kicked off to introduce the simulation capabilities to engineers who needed to get up to speed on automation and cross-discipline workflows.

/ BORGWARNER ASSESSMENT BENEFITS

- Automation of analysis expected to **cut development time by 50% or more**
- A **30% increase in use and re-use of simulation** thanks to automation, better data sharing, and documentation
- Increased computing power expected to r**educe simulation run times by 25%**
- Meeting first-time quality goals of **an initial 25% reduction in design turns**
- A short-term goal of **reducing prototypes and upfront testing by 10%**

“The launch of an electric vehicle is a complex, fast-paced process that is in high demand,” says Jack Bednarz, Chief Engineer, Electrified Hardware for BorgWarner. “So, there's a lot of motivation to get it done right the first time. And that's really the biggest advantage of the assessment that I see. You want the big picture of using simulation upfront to make sure that the first-time quality is better.”

Assess Your Digital Transformation

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ANSYS, Inc.
Southpointe
2600 Ansys Drive
Canonsburg, PA 15317
U.S.A.
724.746.3304
ansysinfo@ansys.com

When visionary companies need to know how their world-changing ideas will perform, they close the gap between design and reality with Ansys simulation. For more than 50 years, Ansys software has enabled innovators across industries to push boundaries by using the predictive power of simulation. From sustainable transportation to advanced semiconductors, from satellite systems to life-saving medical devices, the next great leaps in human advancement will be powered by Ansys.

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