INCREASE INNOVATION AND IMPROVE INDUSTRIAL DESIGN WITH SOLIDWORKS INDUSTRIAL DESIGN SOFTWARE

White Paper

SUMMARY

Growing your company's market share is inextricably linked to product innovation and a strong brand identity, which requires the adoption of modern industrial design. In an increasingly competitive global market, product development companies need flexible industrial design tools that allows you to express your creativity, talent, and passion, as well as synchronize design communication with customers, suppliers, and engineering in a collaborative, interactive way to accelerate time-to-market and build effective product differentiation. SOLIDWORKS® Industrial Designer software provides the visual, collaborative, and social-enabled design environment that today's industrial designers need to develop innovative, distinctive concepts which seamlessly integrate with downstream product development processes and incorporate greater input from key product development partners.

EFFECTIVE INDUSTRIAL DESIGN DEMANDS A MORE COLLABORATIVE, STREAMLINED PROCESS

"Nothing is more powerful than an idea whose time has come," Victor Hugo once wrote. However, as industrial designers know, efficiently transferring innovative ideas and concepts from the mind onto paper, into a solid model, into a 3D-printed prototype, or into an actual product, presents challenges that ultimately determine when, and if, a product idea's time has come. Industrial design is the foundation for both innovation and differentiation in product development; and you, as an industrial designer, play a major role in creating the design aesthetics that can make or break a product's success.

As the market for new products continues to become increasingly global—not just in terms of customers but also through the appearance of disruptive, unanticipated competitors—shortening time-to-market has become more critical than ever. Thus, solutions that make your industrial design efforts more efficient, collaborative, and effective are imperative for ensuring that industrial design efforts result in successful, winning products. Although industrial designers have had access to many concept development tools—ranging from hand-sketching and clay modeling to computer drawing and surfacing software—these tools tend to offer single-point, non-integrated solutions that lead to distinct industrial design silos of activity and a fractured, disjointed, and non-collaborative product development process, resulting in unnecessary delays and costs.

What you, as an industrial designer, truly need is an integrated, synchronized design solution that enables you to collaboratively transform ideas for new product concepts into reality. You need an industrial design environment that offers better, integrated tools for sketching, visualizing, and modeling new concepts, allowing you to increase your focus on design aesthetics by stripping away the many ancillary tasks associated with single-point solutions. You need the freedom to quickly create multiple industrial design concepts in a short amount of time, and solicit and evaluate stakeholder input and feedback in real time, before integrating your industrial design data with product design, engineering, and manufacturing systems. You need an industrial design solution that facilitates workflows and concept reviews through a social-network-like communications link with collaborators. In short, you need SOLIDWORKS Industrial Designer software, an industrial design solution whose time has come.
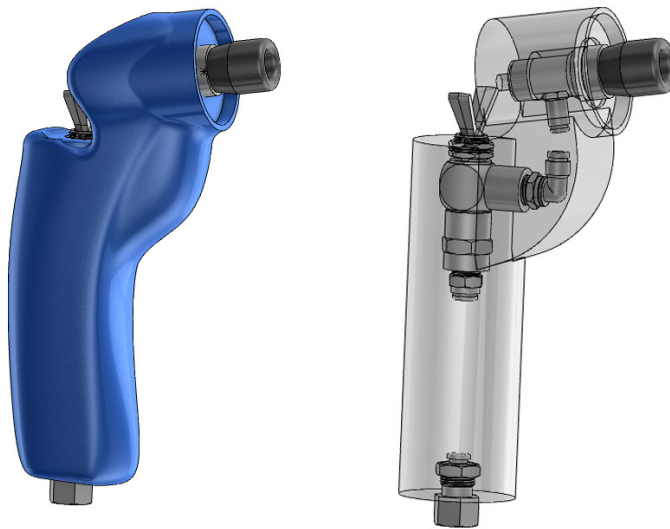
BEST PRACTICES FOR INDUSTRIAL DESIGN

How will an integrated, collaborative industrial design platform help you improve your performance as an industrial designer? By facilitating best practices for industrial design and enhancing the overall value, impact, and contribution of industrial design to the product development and manufacturing enterprise.

Industrial design does not take place in a vacuum, nor is it relegated merely to the initial stages of product development. To be successful, industrial design needs to be threaded throughout the three primary pillars of product development:

- Product Planning and Strategy
- Design and Engineering
- Prototyping and Tooling

Industrial design plays a vital role throughout each of these stages, with the ultimate goal of carrying a design's look, feel, and personality all the way to market. That's the common characteristic of good industrial design practices: the ability to create and maintain a product's design aesthetics, brand identify, and market differentiation throughout the entire development process—from initial concept development through production preparation—in an integrated fashion, precluding rework and duplicated effort.

Planning and Strategy

The responsibility for transforming an amorphous product idea into a tangible design concept for further development rests with you, the industrial designer. In order for you to create design concepts that spark an emotional response from consumers, convey a consistent brand identify, provide solutions to actual customer needs, and meet engineering and manufacturing requirements, you need to obtain as much insight into the potential product's use, consumers, and market as you can. The following best practices help industrial designers synthesize consumer, product, and market intelligence into workable ideas, so you can tap your creativity to produce compelling industrial design concepts.

- Analyze Market Research
- Define Product Scope
- Establish Design Parameters
- Create Look and Feel – Brand Identity
- Develop Concept Sketches
- Produce Concept Images

Design and Engineering

Once you've created a range of possible industrial design concepts, it's time to select one particular approach for further development and engineering as a manufactured product. While some may believe that the handoff of an industrial design concept to mechanical designers and engineers constitutes the end of industrial design—and some product development organizations operate this way—industrial design continues to have a role to play in ensuring that design modifications required to meet performance and manufacturing requirements do not obscure or ruin industrial design aesthetics. The following best practices allow industrial designers to continue to make critically important contributions to product development and engineering, particularly when integrated, social-connected solutions facilitate iterations with mechanical designers and engineers.

- Create Surface Geometry
- Apply Surface Geometry to 3D Solid Model
- Conduct Design Reviews
- Address Performance/Manufacturability Issues

Prototyping and Tooling

After completion of the mechanical design and engineering of a product, industrial design continues to serve an important purpose during production planning prior to manufacturing. Fully appreciating industrial design aesthetics—accounting for both the tactile response and intangible aspects of an actual 3D shape—usually requires the production of an actual physical prototype. Evaluations of rapid prototypes, as well as manufacturability issues, often result in the need for design modifications, which can also affect changes to the original industrial design concept. The following best practices enable industrial designers to continue to maintain design aesthetics all the way through manufacturing. By using an integrated industrial design package, changes required as a result of prototyping and/or manufacturability concerns can be made more quickly, because you won't have to start over and can output optimized design concepts in formats that support rapid prototyping, tooling development, and actual production.

- Rapid Prototyping
- Output Production Data (BOMs, Quality Control Documentation)
- Tooling Design

With an integrated, social-enabled industrial design solution, you can more efficiently perform these best practices and maintain the industrial design elements that elicit emotional responses from consumers, build product satisfaction, and generate brand loyalty. In addition to utilizing industrial design tools that help you balance the interplay of form, scale, and feel, SOLIDWORKS Industrial Designer software lets you collaborate with downstream functions in an integrated manner, which facilitates refinement of initial ideas into viable product concepts by outputting industrial design data in a format that has utility for downstream design, engineering, and manufacturing systems.

THE INDUSTRIAL DESIGN WORKFLOW – CREATING AND COMMUNICATING MULTIPLE CONCEPTS QUICKLY AND EFFECTIVELY

As an industrial designer, you know that inspiration can come from many places and that revolutionary product ideas often evolve—going through stages of modification and refinement—based on inputs, insights, and intelligence gained from various sources, including consumers, distributors, marketers, engineers, and manufacturing personnel. To be effective, industrial designers cannot operate on an island. You need design tools that not only support a more efficient concept creation process but also connect you to a streamlined industrial design workflow with collaboration, communication, iteration, and integration with downstream processes at its heart.

Developing Concepts

After acquiring and assessing the general product specifications and consumer use cases, industrial designers need to explore as many design concepts as possible in the allotted time. This is the point at which the initial magic happens, and industrial designers need a range of powerful sketching, modeling, and surfacing solutions to convey concept ideas to the rest of the product team. The ability to create complex, organic concepts in a single 3D environment—rather than moving back and forth between multiple single-point solutions—streamlines and facilitates the development of initial industrial design concepts, allowing more ideas to be explored and resulting in a more refined product concept.
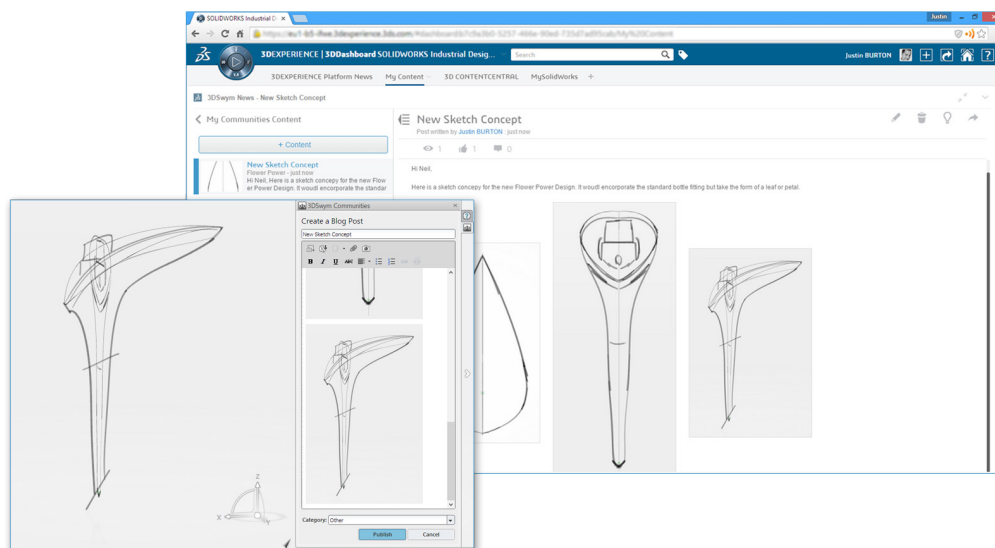
Focus on Concepts without Distraction of Ancillary Tasks

For industrial designers, once you are in the creative "zone" of concept development, the last thing you need are distractions that disrupt your focus or impede your ability to overcome time crunches. Even mundane, rudimentary tasks like writing and sending an email, moving from one modeling package to another, or taking a customer telephone call or meeting, can take you out of the creative "zone" and ulimately limit your final product design. Working in a single, collaborative 3D design environment, which minimizes or eliminates associated ancillary tasks, will remove many of these distractions, enabling you to focus your energy, creativity, and passion on creating as many innovative design concepts in the shortest time as you possibly can.

Design Differentiation through Brand Identity

Developing industrial design concepts that carry your company's brand identity and differentiate your products from existing or competitive offerings requires communication before, during, and after the concept development phase. To create designs that spark an emotional response from consumers or customers, you first need to thoroughly understand their needs, desires, and preferences, before you can utilize creative modeling tools to differentiate industrial designs, while maintaining your unique brand identity. As part of the product development process you need to validate some of the assumptions that you initially made by collecting user feedback to initial concepts and incorporating it into the development of subsequent concepts. This interactive, collaborative process will help you produce industrial designs that stand out from and beat the competition.

Prioritizing Concepts through Collaboration

After you've created as many industrial design concepts as you can in the available time, how do you go about prioritizing concepts for future development? Traditionally, the selection of industrial design concepts occurs during a concept review meeting. However, by incorporating a social and collaborative aspect to the conceptual phase of industrial design, you can easily obtain and consider feedback and insights during the concept creation process as opposed to after the fact. You can save time and effort, as well as influence initial concept creation in positive ways, and more importantly, take advantage of these inputs at the right time. By prioritizing concepts early in the process, you can devote more time to developing concepts that have merit instead of continuing down design avenues that lead nowhere.

Sharing and Communicating Concepts

Once you've created a set of industrial design concepts, how do you efficiently share them and effectively communicate them with all the key internal and external product audiences? Historically, the methods used to present industrial designs have ranged from physical mockups to artist's renderings to computer-generated photorealistic images. Sharing and communicating design concepts in these formats traditionally requires getting all of the people involved in the process in the same place at the same time, which in itself can be challenging. Other options, such as composing emails or conducting an online conference are also time-consuming. How much more efficient could you be operating within an industrial design workflow in which sharing and communicating concepts to key audiences didn't require you to do anything?
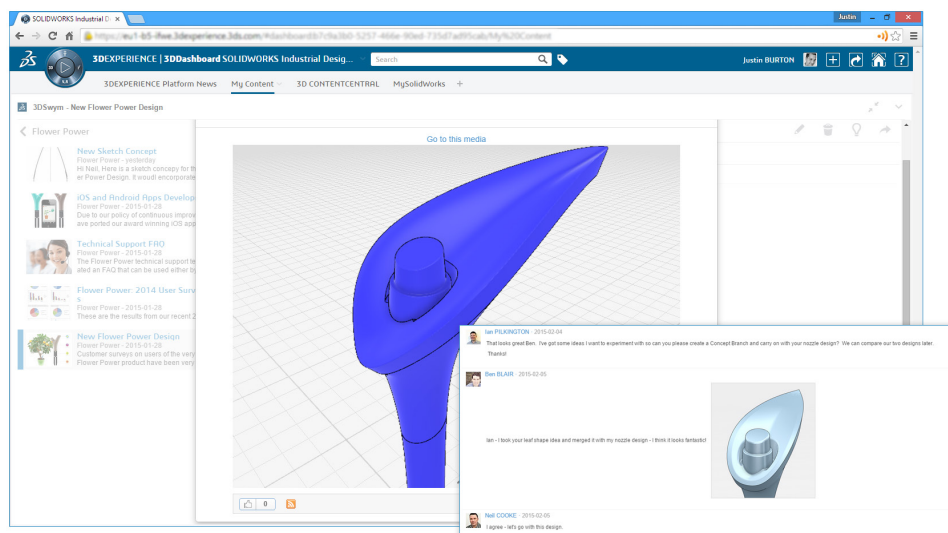
The Social Aspect of Industrial Design

As an industrial designer, understanding the mindset of the customer is critically important to what you do. Social innovation occurs when the voices, expertise, and insights of key players in a market space form a single, dynamic community, which influences, guides, and fosters the development of innovative industrial designs. Social innovation is so vital to the development of successful industrial designs that most leading manufacturers have formal voice of the customer programs. Accurately capturing the customer point of view is a social, iterative process, demanding a social-networked approach to industrial design that allows you to manage and control these communications, so vital information and innovative ideas don't get lost.

The Power of Parametrics

Most industrial designers are familiar with design tools ranging from sketching to freeform modeling to surfacing software. However, solely using a conventional surfacing package to create concepts can result in incomplete designs that lack important features requiring additional cleanup. For example, try making a hole cut in a traditional surfacing package. Many industrial designers have long sought a way to marry surface and parametric modeling to eliminate downstream product development tasks. The ability to turn on design parameters—rules and constraints that define and clarify the relationship between design intent and design response— allows you to visualize how a change to a specific design feature will ripple throughout the rest of your design, as well as adapt one concept into other concepts from a common, in-process starting point. By adding parametric modeling to your design toolbox, you'll gain a valuable resource for both creating and refining industrial design concepts, as well as delivering more complete, fully featured designs that help compress downstream workflows.

Delivering Usable Industrial Design Data

While the final product of your efforts is an industrial design concept, the manner by which you deliver the final concept plays a role in either speeding or slowing the products overall time-to-market. If your industrial design is essentially an image, or comprised of only surface geometry, it will need to be recreated or reworked in CAD software to support further development, a process that takes additional time. On the other hand, if your industrial design concept is an actual geometric model file, modifying it for importing and repurposing in other design, engineering, rapid prototyping, and manufacturing applications can save time and accelerate time-to-market.

SOLIDWORKS INDUSTRIAL DESIGNER – NEW CLOUD-BASED PLATFORM FACILITATES AND ACCELERATES INDUSTRIAL DESIGN

Dassault Systèmes took the specific challenges, goals, and workflows related to industrial design into account during the development of SOLIDWORKS Industrial Designer software. This flexible, cloud-based, single modeling environment leverages the power of the **3D**EXPERIENCE platform to facilitate innovation through social-enabled collaboration during the industrial design concept development process. By matching the software's architecture, appearance, and functionality to best practices in industrial design, the software streamlines industrial design workflows, making your concept development efforts more efficient, strategic, and effective. Here's how:

A Single Sketching, Freeform Modeling, and Collaboration Environment

SOLIDWORKS Industrial Designer software brings all of the tools, capabilities, and functionality that industrial designers need—to synthesize the emotional responses and needs of users with product differentiation and branding requirements—into a single, integrated modeling environment. You can take advantage of comprehensive yet intuitive modeling capabilities, social-network-like, real-time communication tools, and transparent data management solutions. The software's cloud-based, thick-client architecture enables industrial designers to leverage these tools from anywhere with web access, so you can work whenever and wherever inspiration strikes. The flexibility to work locally, communicate globally, and save automatically accelerates the industrial design process. Because you can access and perform all tasks related to industrial design anytime, from anywhere, and from within a single application, the entire process becomes faster, more collaborative, and more effective.
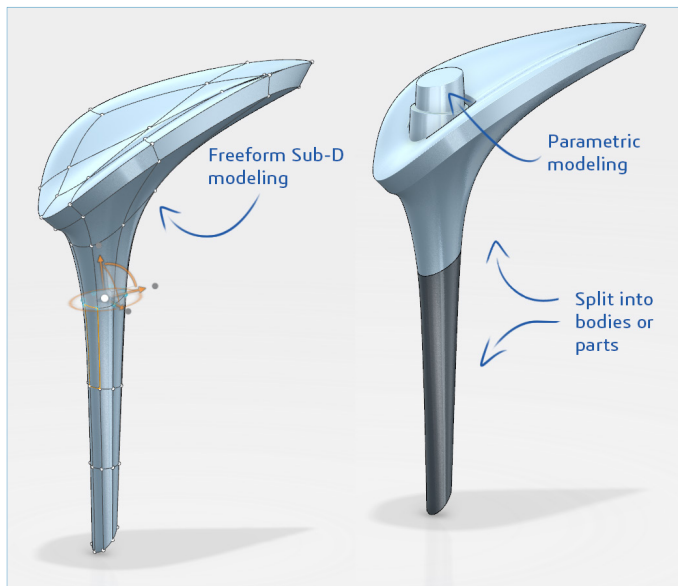

Modeling Freedom and Flexibility

Because industrial designs are becoming more sophisticated and complex, you need a range of powerful sketching, modeling, and surfacing tools—within a single, readily accessible design environment—to create, capture, and communicate innovative industrial design concepts. SOLIDWORKS Industrial Designer software gives you web access to a comprehensive set of industrial design modeling capabilities, including freehand sketching, freeform (Sub-Division, geometry push/pull) modeling, surface modeling, and parametric modeling. You can work in 2D or 3D, and enjoy the freedom and flexibility to use the modeling techniques that best match your specific needs. You can use freeform Sub-D modeling for rapid shape development; then, mix parametric features in with Sub-D models to add greater detail. You can even tap Direct Edit capabilities to add push-pull behavior to parametric design data.

Instinctive Creation of Innovative Concepts

SOLIDWORKS Industrial Designer software is designed to make the development of innovative industrial design concepts more instinctive and the completion of industrial design workflows more productive. The software combines the capabilities of traditional industrial design modeling tools into a single, integrated design environment while eliminating the limitations of working in separate, single-point solutions. Because the software lets industrial designers focus on concept creation rather than tool management and incorporate real-time collaboration instead of after-the-fact concept reviews, it provides the workspace and platform that allows your creative talents to shine. The instinctive character of the software makes industrial designers more productive, resulting in the increased innovation necessary for product and manufacturing success.

Drive Collaboration with Social Tools

By establishing a new communications paradigm, SOLIDWORKS Industrial Designer software brings the power of social innovation to industrial design. Your ability to effectively collaborate with customers, consumers, suppliers, and colleagues is a critical requirement for effective industrial design workflows. The software's cloud-based, web-centric architecture incorporates a social network framework, which facilitates secure team-wide communications. Using a standard web browser, members of your collaborative industrial design team can view, critique, annotate, mark up, and offer comment on industrial design concepts and variations from any digital device, whether it be a desktop, laptop, tablet, or smartphone. This capability eliminates the physical and technical barriers to industrial design collaboration, engages your customers in a rich, social design experience, provides you with a unique selling proposition, and helps drive innovation by allowing you to incorporate the insights and feedback of customers, consumers, suppliers, and colleagues into industrial design concept development.
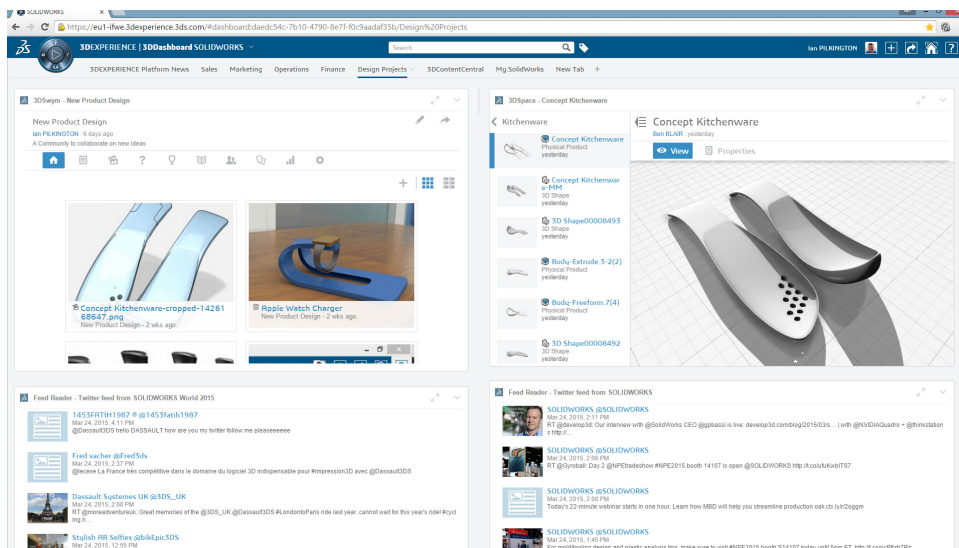
Transparent Management of Industrial Design Data

With SOLIDWORKS Industrial Designer software, you don't have to worry about managing industrial design data because the software does it for you. SOLIDWORKS Industrial Designer software automatically and transparently captures, retains, and manages all data related to industrial design in a database that resides in the cloud, making data management one of many distracting ancillary tasks with which industrial designers no longer need concern themselves. Using SOLIDWORKS Industrial Designer software, all industrial design activity is stored in a tagged archive that is accessible at any time, from anywhere. Every industrial design concept that you create—the successes, the failures, and the innovations waiting to be uncovered—are safeguarded for future use, allowing product development organizations to retain and continue to leverage your valuable industrial design contributions.

BOOST INDUSTRIAL DESIGN PRODUCTIVITY AND IMPACT WITH SOLIDWORKS INDUSTRIAL DESIGNER SOFTWARE

Industrial design drives innovation and differentiation in product development, making it a strategically critical function for product and manufacturing success in an increasingly global marketplace. To make your industrial design efforts more efficient and effective, you should incorporate best practices for industrial design, adopt collaborative industrial design workflows, and utilize the full range of industrial design concept development and modeling tools required to create as many industrial design concepts in as short a time as possible. You, as an industrial designer, have major roles to play both in creating the design aesthetics that lead to successful products and in adopting the industrial design workflows that shorten time-to-market.

By developing the SOLIDWORKS Industrial Designer industrial design modeling and collaboration system, Dassault Systèmes has innovated the first integrated, social-enabled, single modeling environment that is designed to satisfy the specialized needs, requirements, and goals of industrial designers. Leveraging the Dassault Systèmes **3D**EXPERIENCE platform, SOLIDWORKS Industrial Designer software provides the tools that you need to create, model, visualize, communicate, evaluate, and capture innovative industrial design concepts—all within a cloud-based, web-centric application. SOLIDWORKS Industrial Designer software makes industrial design workflows more instinctive, less constraining, and more productive, which enables manufacturing enterprises to stimulate and drive innovation and differentiation in product development, resulting in the development and introduction of successful products.

To learn more about how SOLIDWORKS Industrial Designer software can improve your approach to industrial design, visit www.solidworks.com or call 1 800 693 9000 or 1 781 810 5011.

Our **3D**EXPERIENCE® platform powers our brand applications, serving 12 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3D**EXPERIENCE® Company, provides business and people with virtual universes to imagine sustainable innovations. Its world-leading solutions transform the way products are designed, produced, and supported. Dassault Systèmes' collaborative solutions foster social innovation, expanding possibilities for the virtual world to improve the real world. The group brings value to over 190,000 customers of all sizes in all industries in more than 140 countries. For more information, visit **www.3ds.com**.

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