



UNREAL
ENGINE

PUSHING THE BOUNDARIES OF POSSIBILITY IN MANUFACTURING

A report on the future of real-time technology by

Epic Games and **Forrester Consulting**



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Time to get real:

The game-changing nature
of real-time technology



Epic Games has come a long way since we launched Unreal Tournament in the late 1990s—and the pace of change has not slowed. Today, Unreal Engine is used by thousands of people around the world to develop cutting-edge visualizations, not just in gaming but for business applications, too.

“We are working with architects, manufacturers, media and entertainment companies, and designers to transform their businesses through real-time technology.

“The opportunity is huge, so we’ve partnered with leading global analyst Forrester to explore where things might be heading—and how real-time technology is already being used to fuel creativity and drive efficiency.



Marc Petit,
General Manager, Unreal Engine Enterprise



Real-time technology for manufacturing

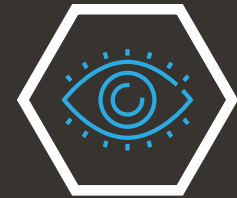
REAL-TIME ENGINES HAVE THE POTENTIAL TO REINVENT THE MANUFACTURING INDUSTRY, ENABLING:



IMMERSIVE DESIGN AND
ENGINEERING REVIEWS



EFFECTIVE HUMAN
FACTORS ANALYSIS



REAL-TIME EXPERIENCES FOR
CONCEPT PRESENTATION



DATA VISUALIZATION OF
SIMULATION RESULTS



CREATIVE CONCEPTUAL
DESIGN IN VR



INTERACTIVE TRAINING AND
MAINTENANCE GUIDES

A market view from Forrester Consulting¹

The pace of change continues to accelerate. Over the last few years, real-time rendering solutions have emerged as a vital component helping to overcome the complexity, sophistication, and demand of enterprise workloads.

Significant innovation in interactive graphics software has been fundamental to this change. These advances are bringing about a new age of visualization, where game-engine technology is being used to produce photorealistic virtual experiences prior to execution of designs.

Today's designers and visualization specialists are moving away from slower, iterative, traditional offline methods of rendering in favor of adopting real-time workflows. The result has been a game changer for many industries, driving efficiency and boosting creative choices.

¹Taken from the Forrester Consulting study "Real-time rendering solutions: unlocking the power of now", commissioned by Epic Games

What is real-time rendering?

Real-time rendering is the ability to produce visualizations—such as animation, designs, or graphics—virtually instantly. That means making tweaks to a design and seeing the results immediately, without having to wait for rendering time.

59%

of decision makers say they are likely to adopt real-time technology within the next 12 months, with that figure rising to 68% in the manufacturing sector.

69%

agree that the growth and complexity of computing workloads means more computing power is needed to get their jobs done.

83%

of firms are saving at least 25% of time compared to previous processes.

65%

say that due to the hypercompetitive market, the need to reduce the time taken to create high-fidelity rendered images/animations is greater than ever before.



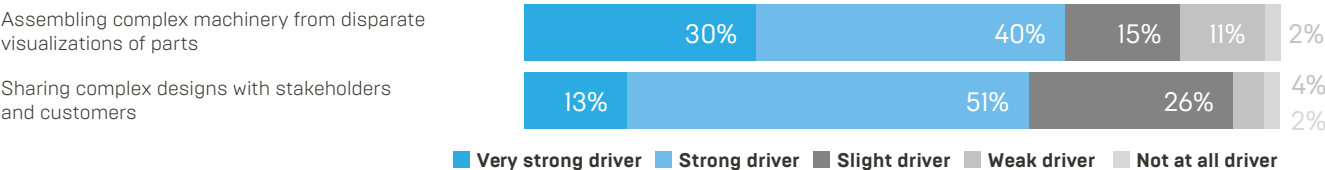
Vintage Harley-Davidson modeling by Amir Glinik www.3d-files.co.il. Garage Courtesy of Harley-Davidson

The opportunity in manufacturing

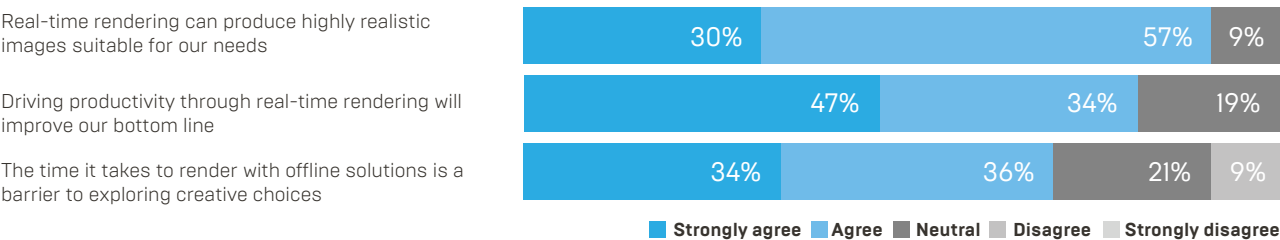
More and more, we're seeing manufacturers turn to real-time technology to speed up, simplify, and enhance their design experience. Efficiency is at the heart of the growing trend towards real-time design practices in the manufacturing world.

Many brands are abandoning expensive and time-consuming traditional design approaches that still rely on iterating with resin models and costly physical design prototypes. Instead, they're turning to new techniques that incorporate remote collaboration, 3D visualization, virtual reality, and on-the-fly customization powered by real-time engines.

Which of the following business imperatives would drive your organization to adopt real-time rendering solutions?



How much do you agree with the following statements?





How Audi is delighting customers with real-time technology

Image courtesy of Audi

Audi's four-ring logo and "Vorsprung durch Technik" strapline are known the world over. Regarded as a pioneering, boundary-pushing vehicle manufacturer, it is one of several high-profile automotive companies adopting real-time technology.

Here, Thomas Zuchtriegel—Head of AR/VR Data, Process & Technology at Audi Business Innovation GmbH—discusses how the company is using real-time technology to visualize vehicles in showrooms and online, and talks about the advantages brought by Unreal Engine.

"We use Unreal Engine to visualize all cars and all options to a high-quality standard. The goal is to help our sales

teams **simplify the sales process** by showing the customer their desired car—even if it is not physically there.

"At the moment, it is deployed in almost **1,000 dealerships in 23 markets** around the world, from Canada to Australia. We can display the entire car range for all markets globally. For example, showing right-hand drive in the UK, or the A6L model that is exclusive to China.

"We needed to create an automated pipeline to get all our cars into Unreal Engine. The time to market is pretty short and, with millions of options per car line, the complexity is high. **The materials also needed to look correct and feel as realistic as possible.**



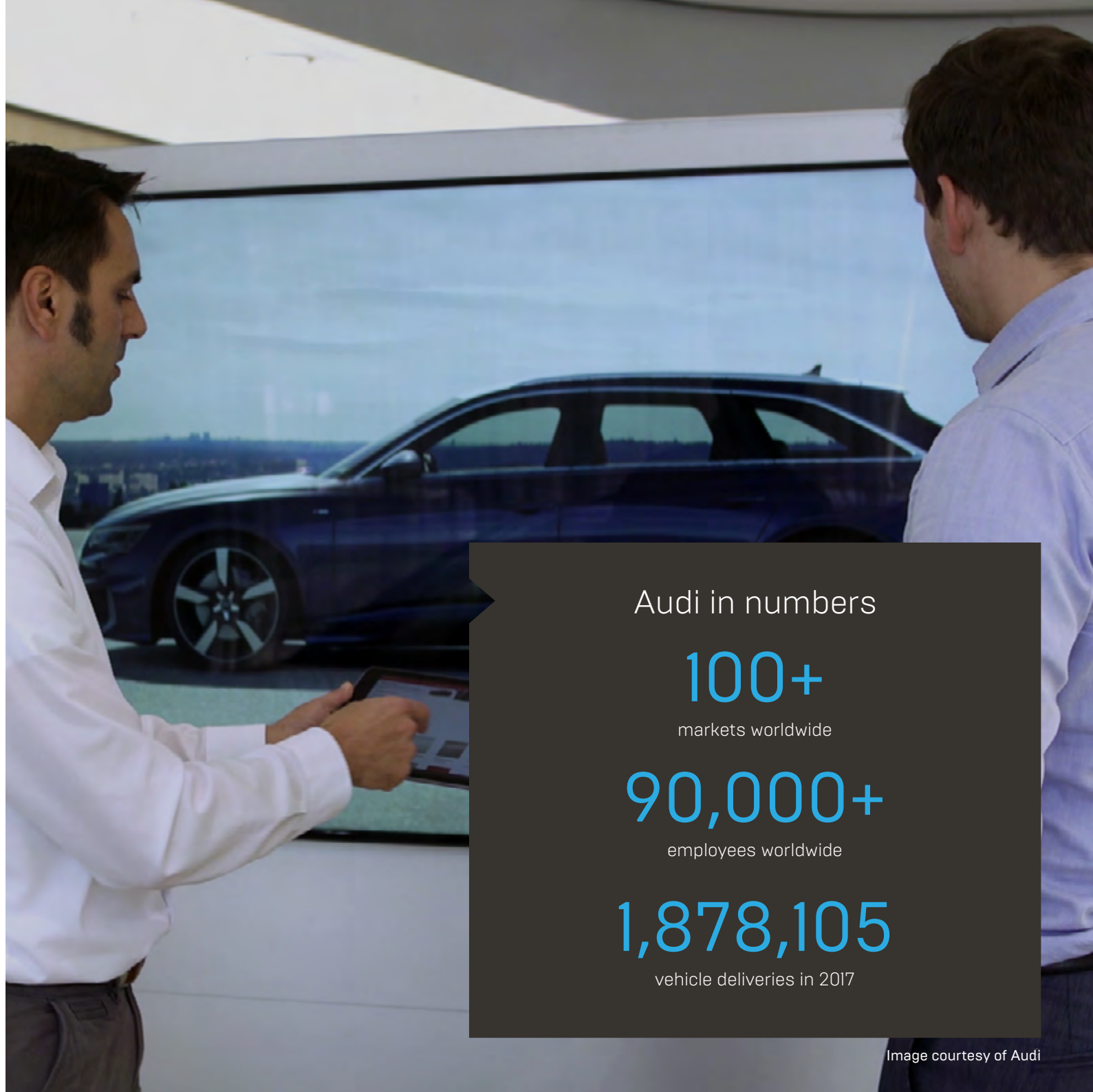
Image courtesy of Audi

"We at Audi Business Innovation developed a pipeline that is going to be used within multiple marketing and sales departments that are dealing with product visualization.

"Using Blueprint, we were able to connect our automated importer right into the heart of Unreal Engine. For the first time we have dynamic lighting in our visualizations—we do not need to bake shadows anymore. **The light and material behavior is better than anything else we have seen so far.**

"**We saved time, and therefore money,** with our automated import process and with dynamic lighting, but there is still a lot of room for improvement. We want to raise the bar. We want to show all cars and all options on all channels within one day—fully automated from design to the customer.

"Beyond the digital retail use case, we intend to use Unreal Engine within our website for the car configurator—to enable the user to see each car from any perspective, and to delight them with an amazing interactive experience."



Audi in numbers

100+

markets worldwide

90,000+

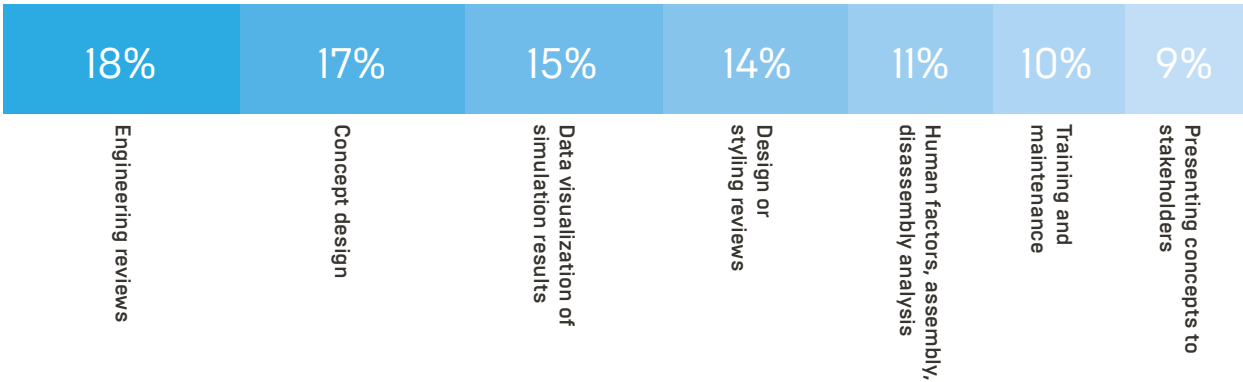
employees worldwide

1,878,105

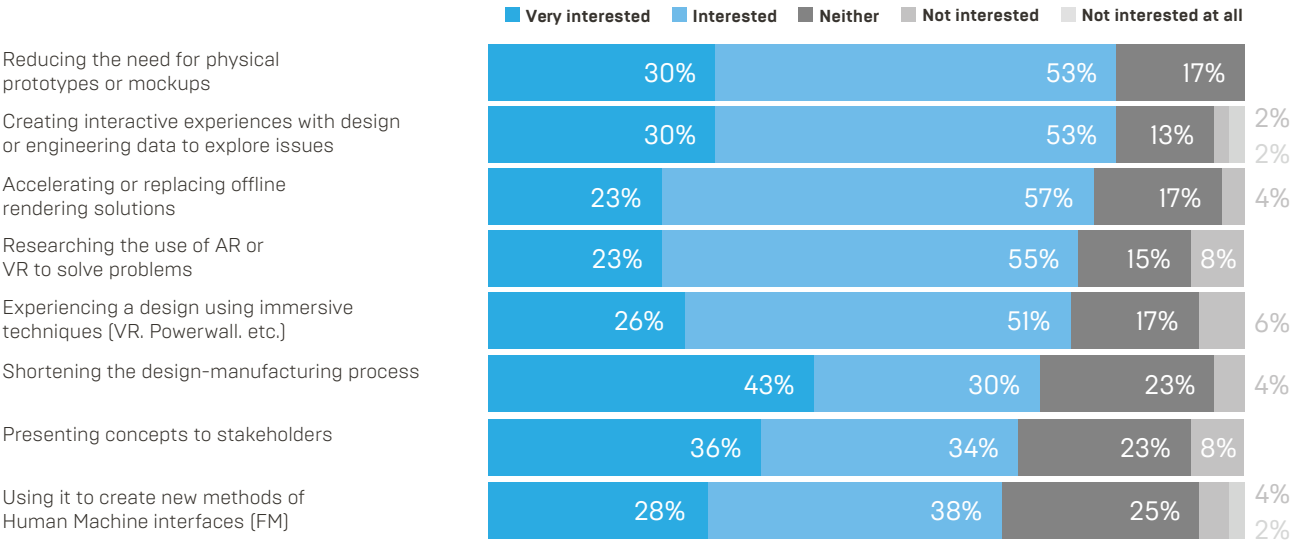
vehicle deliveries in 2017

The future of real-time technology in manufacturing

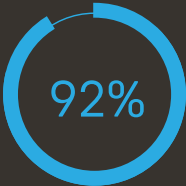
The areas that manufacturing firms are currently using real-time rendering for:



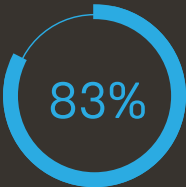
The real-time applications manufacturing companies are most interested in:



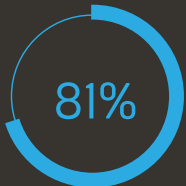
believe that real-time rendering is important to **reduce design errors** before products are built



feel that experiencing the design of a product using immersive technology is **important to their design process**



say being able to reduce the need for physical prototypes or mockups is a **key driver for interest in adopting real-time tech**



say they save at least 25% of time compared to previous process



Introducing Unreal Engine

A comprehensive real-time
visualization solution

Created by Epic Games, Unreal Engine is the world's most open and advanced real-time 3D creation platform. While it continues to serve its original purpose as a state-of-the-art game engine, it has evolved to serve additional industries including automotive and transportation, architecture, film and television, broadcast and live events, and training and simulation.

One such evolution is Datasmith, a workflow toolkit included with Unreal Engine that simplifies the import, preparation, and aggregation of CAD, CAID, and visualization data from packages such as CATIA, Alias, VRED, and DELTAGEN, drastically reducing iteration time for creating stunning interactive experiences, still images, and videos.

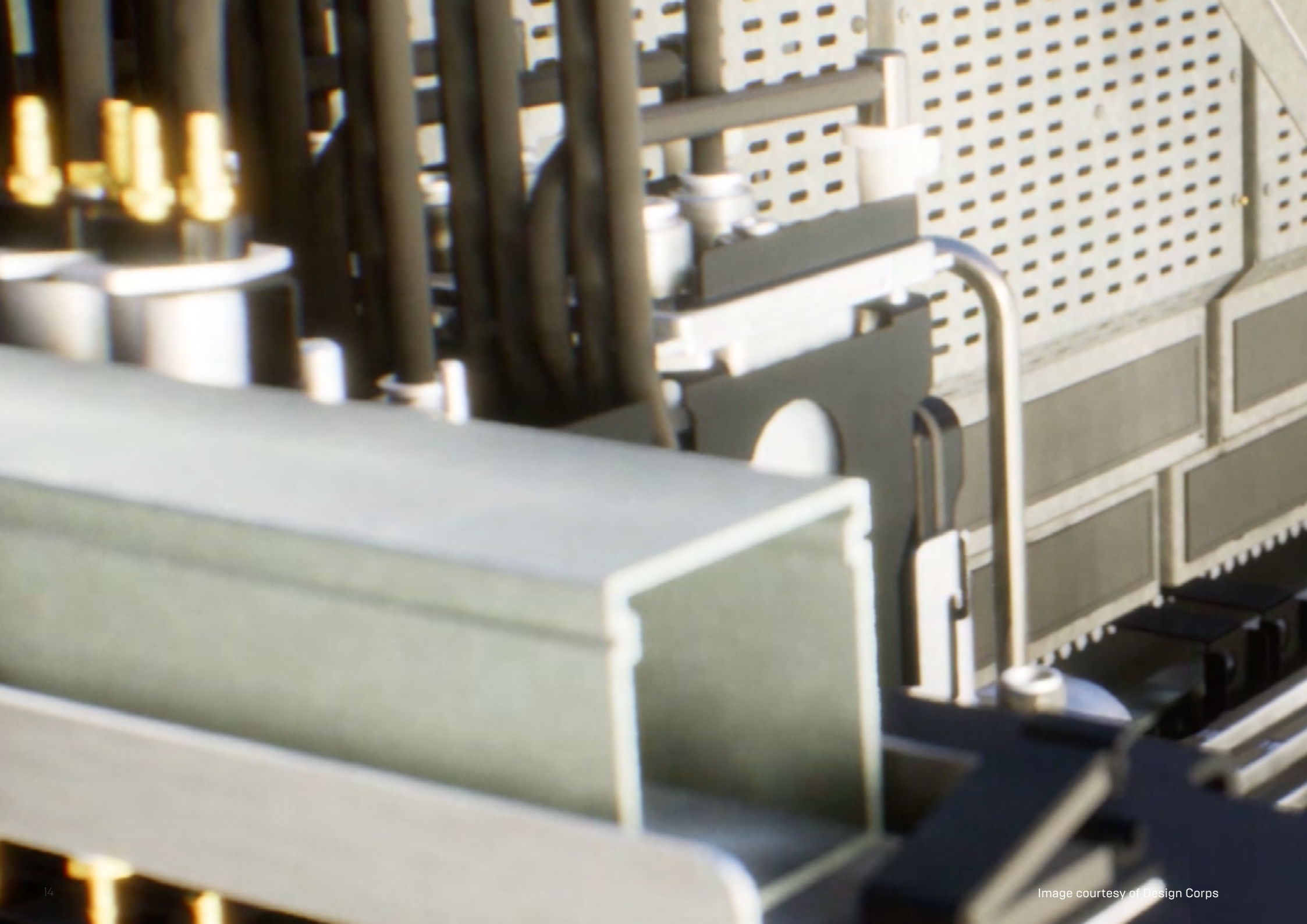
Find out more and sign up for free at
www.unrealengine.com





“The new technology helps to display our surfaces earlier in a different stage, and to see what is happening in different surroundings. If you sit inside the car and see it virtually, you can see very fast how shadows are working on the surfaces, how the light is really exploring our surfaces, and that helps us to shorten the process and react earlier to what we see in the virtual world.”

Christian Bauer,
Head of MINI interior design at the BMW Group
about their VR collaborative environment
implemented with Unreal Engine





Research methodology

These findings are drawn from a study conducted by Forrester Consulting on behalf of Epic Games in 2018.

The study involved an online survey of 168 decision makers with a knowledge of real-time engine technology across key industries including media and entertainment, manufacturing, and architecture in the USA and UK. The findings provide a nationally representative view of the adoption of real-time technology in these markets.



FORRESTER®

Epic Games, Inc.
620 Crossroads Blvd.
Cary, NC 27518
USA
Tel +1 919 854 0070

Epic Games
Westbury House
15a Bury St
Guildford, Surrey
GU2 4AW, UK

www.unrealengine.com

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