The Definitive Digital Twin Primer: Delivering on the Next Generation of Product Lifecycle Management

Findings and analysis from the survey of **small to mid-market (SMB) Consumer Products and Retail** executives who are involved in the product lifecycle management in organizations in the US, UK and Germany.
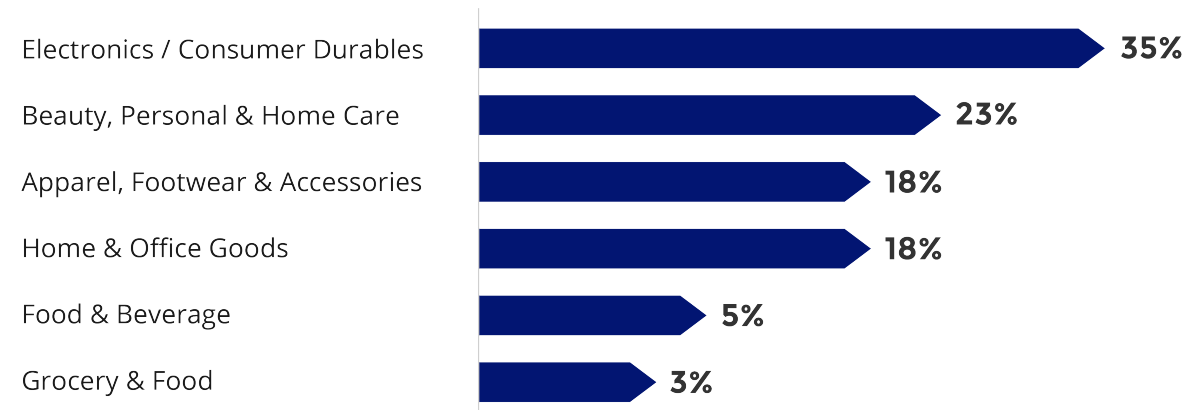
IN PARTNERSHIP WITH

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SIEMENS

Research Demographics.

78%

DIRECTOR LEVEL OR ABOVE

30%
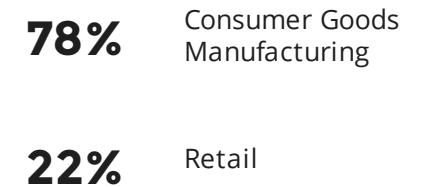
>10 PRODUCTION & PACKAGING LOCATIONS

Incisiv conducted a quantitative survey of **40 consumer product and retail executives** in the **US** spanning key business functions such as PLM, engineering, design, R&D, sourcing and operations.
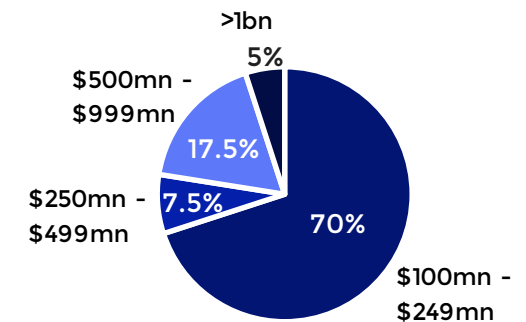
31%	**23%**	**15%**	**10%**	**10%**	**10%**
Product Lifecycle Management	Research & Development	Operations	Sourcing	Design	Engineering
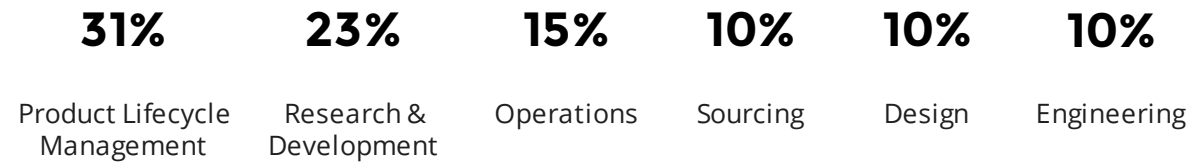
These **40 consumer product and retail executives** in the **US** represent a wide array of retail formats.

Electronics / Consumer Durables	35%
Beauty, Personal & Home Care	23%
Apparel, Footwear & Accessories	18%
Home & Office Goods	18%
Food & Beverage	5%
Grocery & Food	3%

Representation of **40 consumer product and retail executives** in the **US.**

78% Consumer Goods Manufacturing

22% Retail

Respondent annual revenue

>1bn
5%

$500mn - $999mn
17.5%

$250mn - $499mn
7.5%

$100mn - $249mn
70%

Research Demographics.

90%

DIRECTOR LEVEL OR ABOVE

46%

>10 PRODUCTION & PACKAGING LOCATIONS
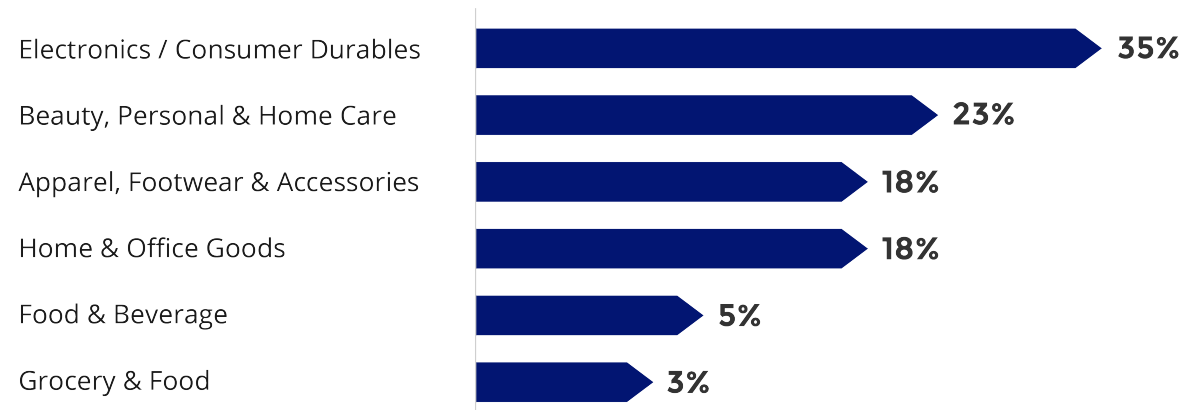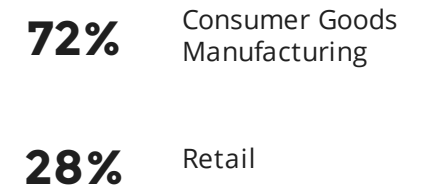
Incisiv conducted a quantitative survey of **50 consumer product and retail executives** in the **UK & Germany** spanning key business functions such as PLM, engineering, design, R&D, sourcing and operations.

46%	**20%**	**10%**	**10%**	**8%**	**6%**
Product Lifecycle Management	Research & Development	Operations	Sourcing	Design	Engineering
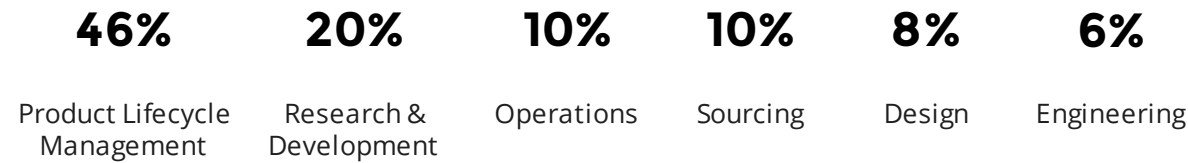
These **50 consumer product and retail executives** in the **UK & Germany** represent a wide array of retail formats.

Electronics / Consumer Durables	**35%**
Beauty, Personal & Home Care	**23%**
Apparel, Footwear & Accessories	**18%**
Home & Office Goods	**18%**
Food & Beverage	**5%**
Grocery & Food	**3%**

Representation of **50 consumer product and retail executives** in the **UK & Germany**.

72% Consumer Goods Manufacturing

28% Retail

Respondent annual revenue

- >1bn **4%**
- $500mn - $999mn **22%**
- $250mn - $499mn **18%**
- $100mn - $249mn **56%**
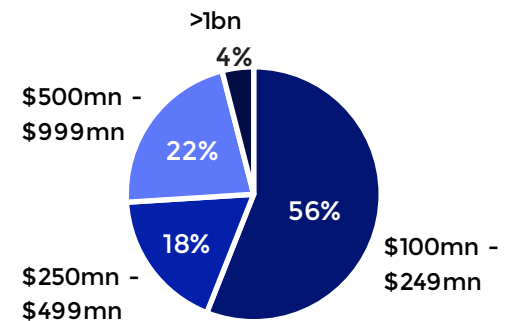
The need for rapid, innovative new product development is stronger than ever.

More than 50% of companies indicate that the creation of new products, services or business models will be their key strategy to generating organic growth over the next 3 years[1].

More than **25%** of total revenue and profits across industries comes from the launch of new products.[1]

The largest consumer product companies invest an average of **$1.4 billion** **(typically 2%-3% of net sales)** in research and development each year to launch new products.[1]

Nearly **3 in 4** of executives say new product development is a top-three priority for their organizations.[2]

From the Industry:

40% of 3M's revenue in 2017 came from products that did not exist before 2012.

Consumer products and retail companies have a poor track record of successful new product introductions.

Competitive pressures and shopper expectations have driven the stakes for new product development higher than ever.

Failure rate for new product launches in CP and Retail

exceed 60%,

putting a drag on profitability.

75%

of consumer products and retail products fail to earn more than $7.5 million during their first year.

Less than 3%

of new consumer products and retail products exceed first year sales of $50 million, considered a benchmark of a successful launch.[3]
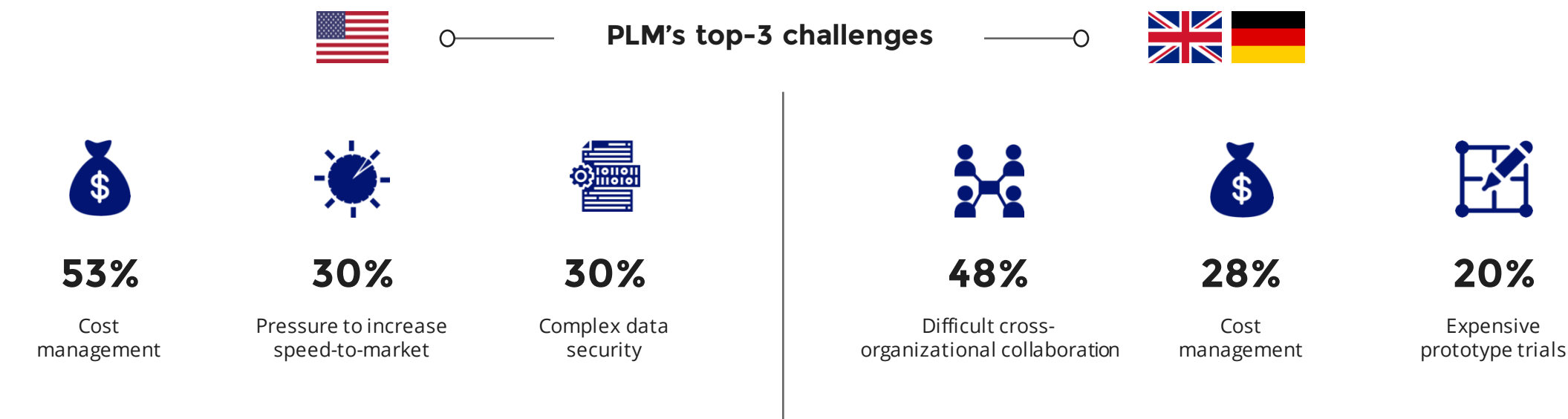
From the Industry:

H&M

Recently announced they were sitting on $4.3 billion in unsold inventory – highlighting a poor product development strategy.

Complexity of **product lifecycle management** (PLM) drives considerable friction for companies**.**

Stakes are higher than ever to bring innovative and differentiating new products to market

Ever evolving consumer expectations and an increasingly competitive environment are forcing consumer products and retail companies to bring products to market faster. To adapt, the industries are increasingly adopting solutions in the PLM and synchronous technology space (e.g. in the apparel industry for product designing, creating and editing 3D prototypes and models).

While these solutions help to simplify the product lifecycle, retailers and consumer products companies still face considerable challenges around cost management, cross-organizational collaboration and speed to market.

PLM's top-3 challenges

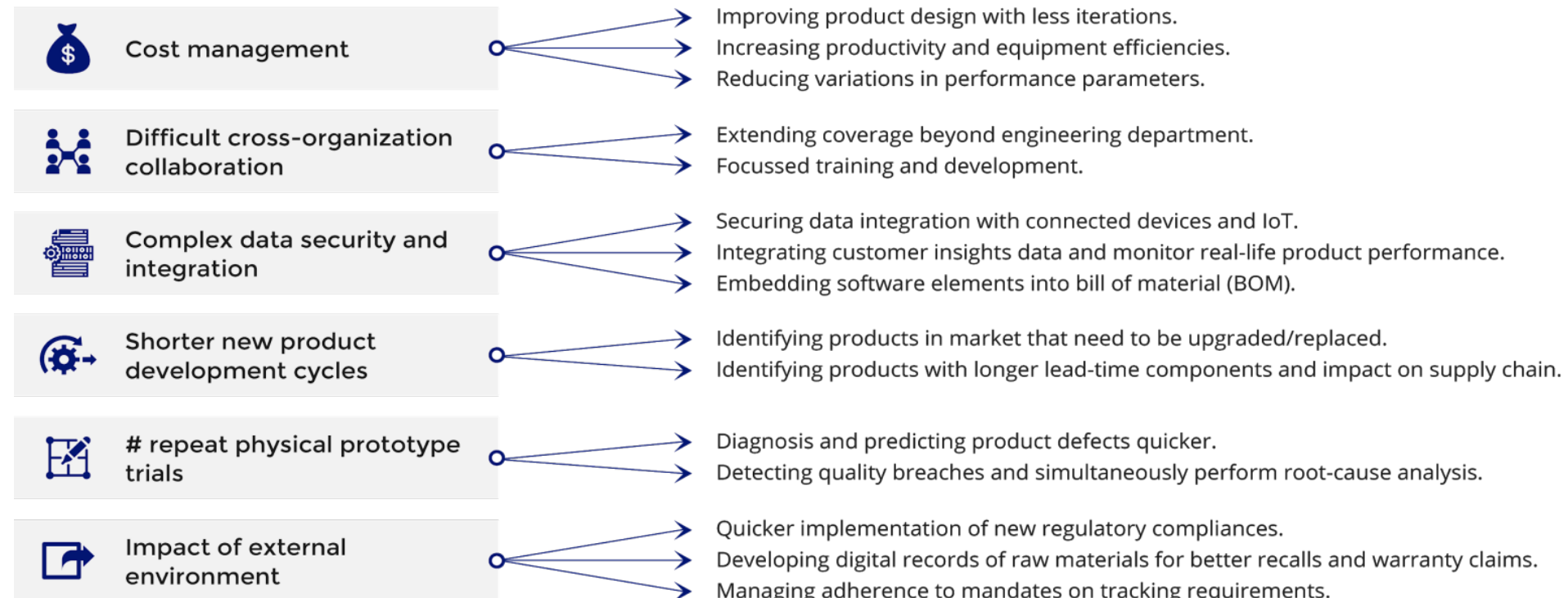| **53%**	**30%**	**30%**	**48%**	**28%**	**20%**
Cost management	Pressure to increase speed-to-market	Complex data security	Difficult cross-organizational collaboration	Cost management	Expensive prototype trials

Base: % of all respondents

Digital Twin holds promise to address the key challenges around **PLM**.

The Digital Twin is a virtual replica of a physical asset or process that connects to and receives data from the latter. Digital Twin technology enabled by real-world data simulates an actual operating environment and helps companies confidently understand, predict and optimize performance prior to physical deployment.

Top challenges in PLM

Challenge	
💰	Cost management
👥	Difficult cross-organization collaboration
🖥	Complex data security and integration
⚙	Shorter new product development cycles
📐	# repeat physical prototype trials
➦	Impact of external environment

Digital Twin addresses these challenges by

Improving product design with less iterations.
Increasing productivity and equipment efficiencies.
Reducing variations in performance parameters.

Extending coverage beyond engineering department.
Focussed training and development.

Securing data integration with connected devices and IoT.
Integrating customer insights data and monitor real-life product performance.
Embedding software elements into bill of material (BOM).

Identifying products in market that need to be upgraded/replaced.
Identifying products with longer lead-time components and impact on supply chain.

Diagnosis and predicting product defects quicker.
Detecting quality breaches and simultaneously perform root-cause analysis.

Quicker implementation of new regulatory compliances.
Developing digital records of raw materials for better recalls and warranty claims.
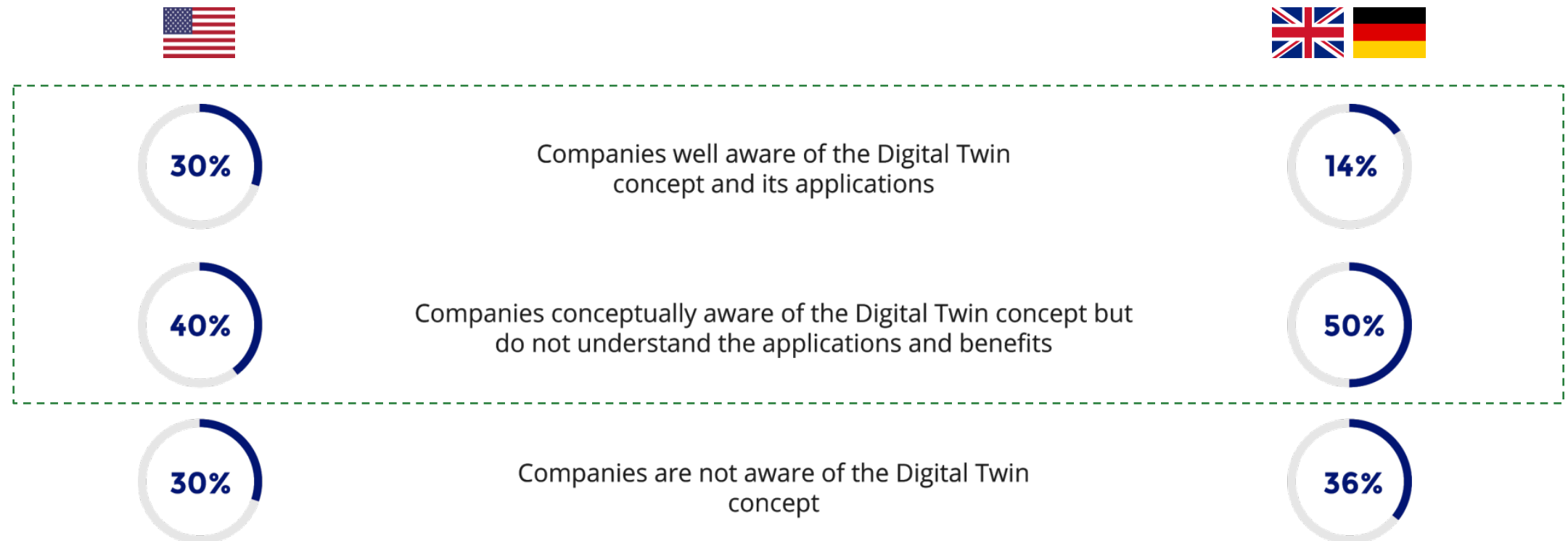Managing adherence to mandates on tracking requirements.

Less than a **third of companies** understand the true application and benefit of Digital Twin technology.

While most companies are aware of the concept, they do not understand its applications and benefits.

Even though the concept was first launched as a solution in 2002, it has only recently gained traction as the costs and use-cases for smart and connected devices (IoT and cloud technologies) are gaining acceptance. In addition, as costs for storage and computational speed have come down, the costs for Digital Twin solutions have followed suit. As a consequence, the business case for Digital Twin becomes stronger.

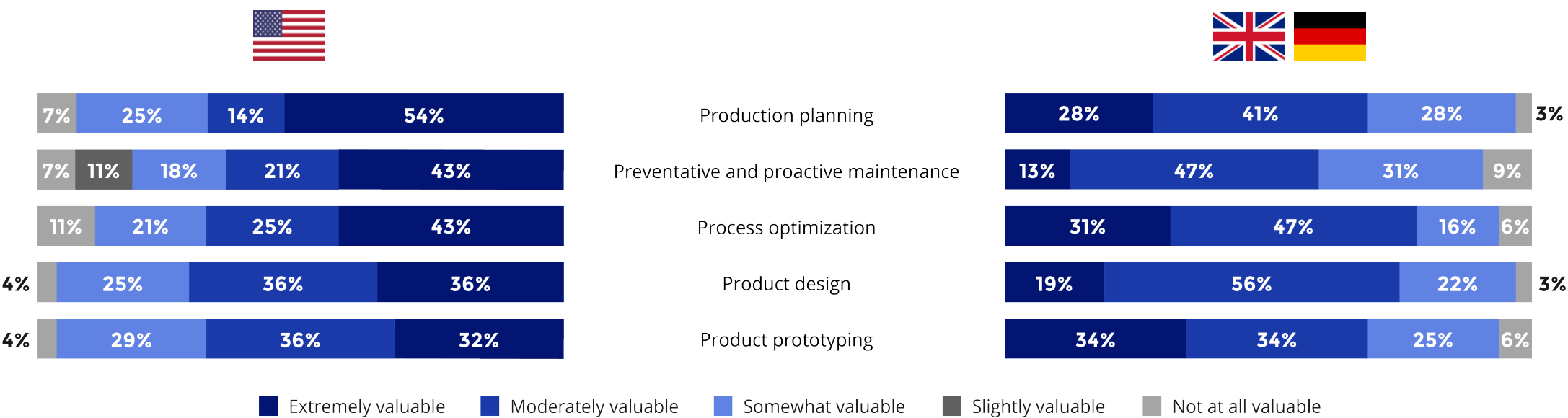| 🇺🇸		🇬🇧 🇩🇪
30%	Companies well aware of the Digital Twin concept and its applications	**14%**
40%	Companies conceptually aware of the Digital Twin concept but do not understand the applications and benefits	**50%**
30%	Companies are not aware of the Digital Twin concept	**36%**

Companies aware of Digital Twin believe that it holds promise across the product lifecycle.

While perceived value across PLM areas vary, both North American and European companies see benefits through all PLM processes.

US companies in retail and consumer products are more aware of the benefits of Digital Twin technology and believe that it has greater potential impact on PLM processes across the board. Production planning, process optimization and preventative & proactive maintenance show to have the most relevance for Digital Twin in the US while product prototyping was the most relevant for European retailers and consumer product companies.

Rate the relevance/perceived value of Digital Twin concept on the following aspects on a scale of 1-5 (5 indicates extremely valuable and 1 indicates not at all valuable)?

	🇺🇸						🇬🇧 🇩🇪			
Production planning	7%	25%	14%	54%		28%	41%	28%	3%
Preventative and proactive maintenance	7%	11%	18%	21%	43%	13%	47%	31%	9%
Process optimization	11%	21%	25%	43%		31%	47%	16%	6%
Product design	4%	25%	36%	36%		19%	56%	22%	3%
Product prototyping	4%	29%	36%	32%		34%	34%	25%	6%

■ Extremely valuable ■ Moderately valuable ■ Somewhat valuable ■ Slightly valuable ■ Not at all valuable
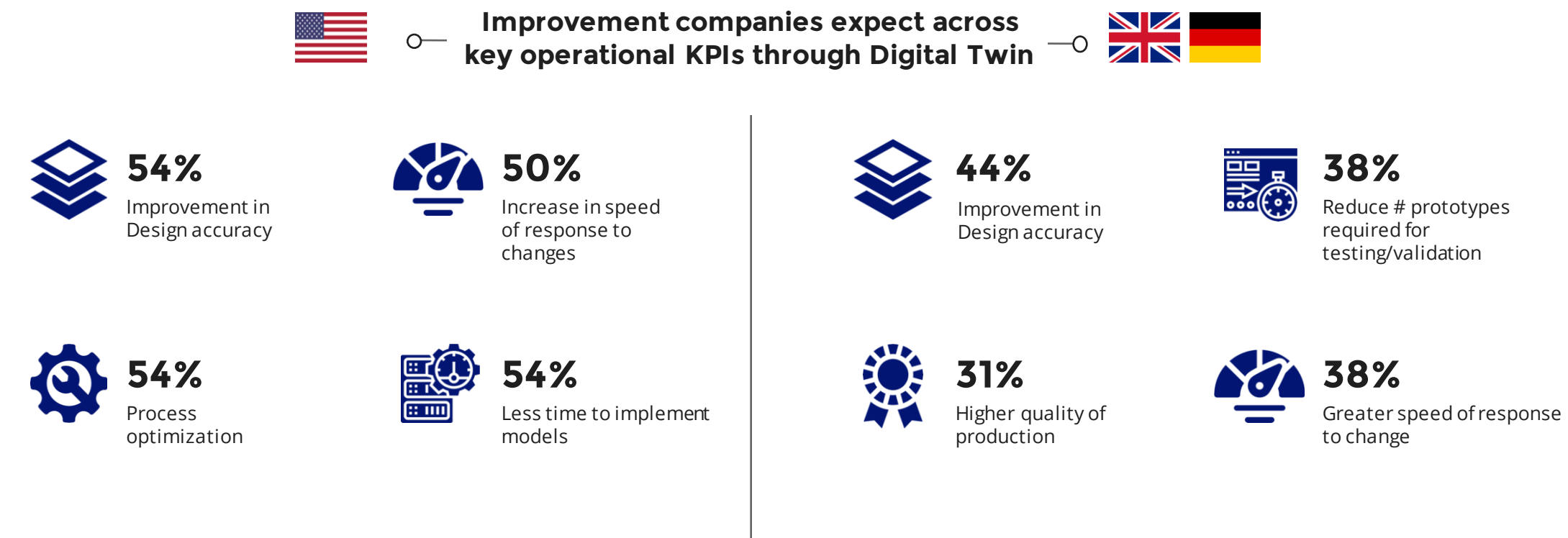
Base: % of all respondents aware of Digital Twin concept

Digital Twin has the potential to **significantly improve operational KPIs**.

Companies aware of the concept in the US are more optimistic than Europe and see slightly different benefits.
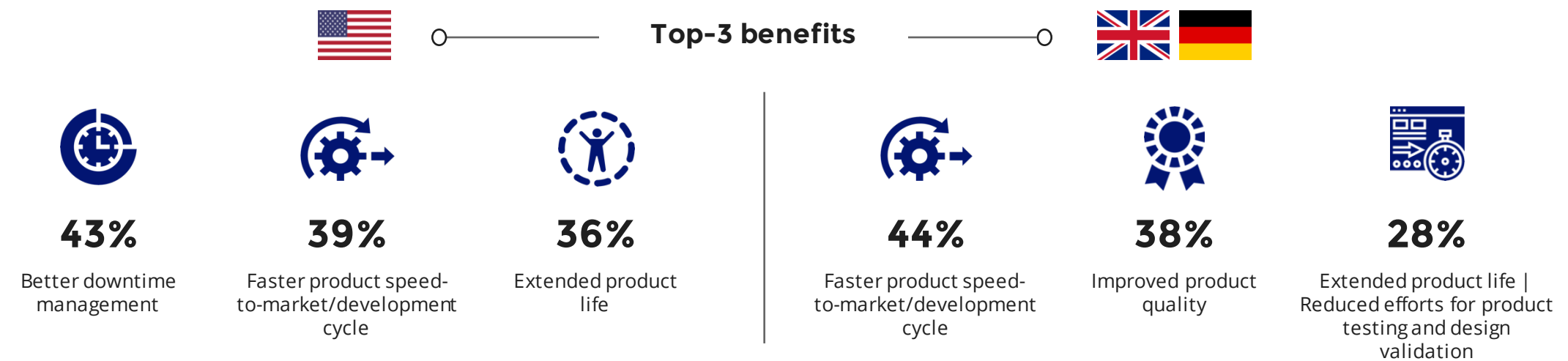
Digital Twin creates new connections between the physical and digital world. This will lead to new collaboration opportunities among physical world product experts and data scientists, creating the potential for significantly improved business results.

Improvement companies expect across key operational KPIs through Digital Twin

54%
Improvement in Design accuracy

50%
Increase in speed of response to changes

44%
Improvement in Design accuracy

38%
Reduce # prototypes required for testing/validation

54%
Process optimization

54%
Less time to implement models

31%
Higher quality of production

38%
Greater speed of response to change

Base: % of all respondents aware of Digital Twin concept

Speed to market and extended product life drive interest in Digital Twin.

The value derived with the adoption of Digital Twin will depend upon the monetization models that will be utilized.

Top-3 benefits

43%
Better downtime management

39%
Faster product speed-to-market/development cycle

36%
Extended product life

44%
Faster product speed-to-market/development cycle

38%
Improved product quality

28%
Extended product life | Reduced efforts for product testing and design validation

From the Industry:

asics

Reduced number of physical prototypes and time needed for new product development by 30-35%.
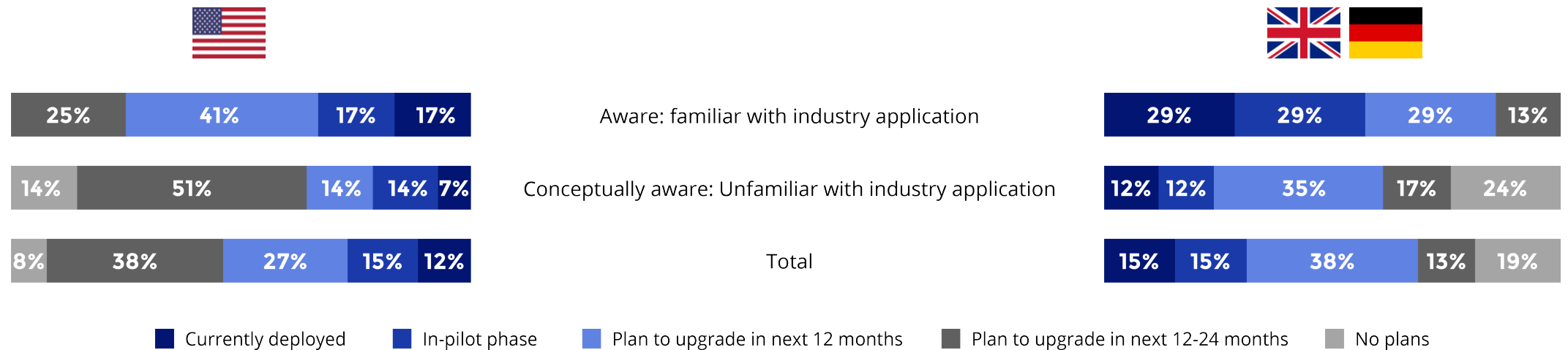
FABER AIR MATTERS

Integrated engineering department data with ERP for accurate and reliable management of drawings and technical data.

ARGOLF® PUTTERS

Introduced new products in a market dominated by big brands with digitized production process, and improved shop-floor productivity.

Base: % of all respondents aware of Digital Twin concept

Adoption outlook looks promising for companies who understand the true applications of Digital Twin.

Digital Twin adoption looks promising for near-future, assisted by increased adoption of IoT and sensory technologies for inventory management and workflow optimization.

US:
- Aware: familiar with industry application: 25% | 41% | 17% | 17%
- Conceptually aware: Unfamiliar with industry application: 14% | 51% | 14% | 14% | 7%
- Total: 8% | 38% | 27% | 15% | 12%

UK & Germany:
- Aware: familiar with industry application: 29% | 29% | 29% | 13%
- Conceptually aware: Unfamiliar with industry application: 12% | 12% | 35% | 17% | 24%
- Total: 15% | 15% | 38% | 13% | 19%

Legend: Currently deployed ■ In-pilot phase ■ Plan to upgrade in next 12 months ■ Plan to upgrade in next 12-24 months ■ No plans
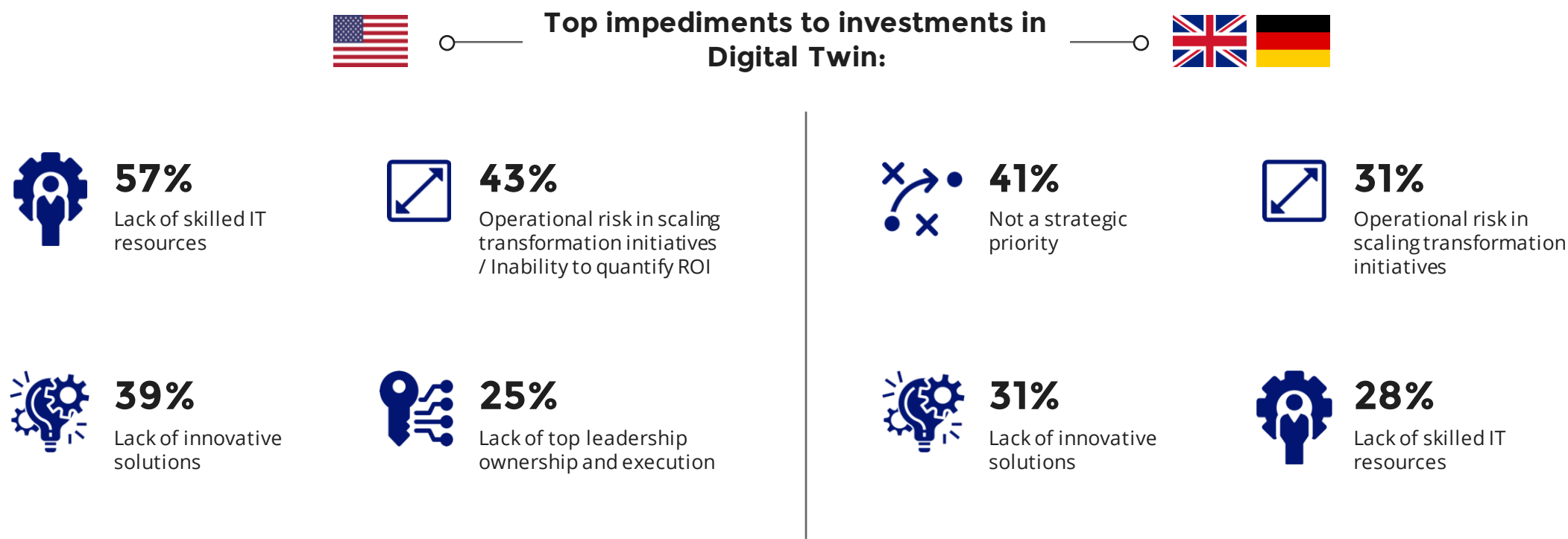
While current adoption is low in relation to PLM systems in general, 58% of companies who understand Digital Twin and its applications will be in pilot or implementing in the next 12 months, confirming their belief in the concept. Only 28% of companies who have a conceptual understanding of the concept are in pilot or will be in pilot in the next 12 months.

In the UK and Germany, a higher percentage of companies have deployed Digital Twin and another 58% of them that understand its value are in pilot or plan to implement in the next 12 months.

Base: % of all respondents aware of Digital Twin concept

Cultural and technology debt continues to hamper IT investment**.**

The importance of product development for established retail and consumer products is greater than ever, yet investments in IT lag.

Barriers to investment don't change dramatically across technology solution areas. Lack of IT resources and operational risks in scaling initiatives speak to a culture that doesn't prioritize the value of IT. However, for European companies, the fact that their #1 investment impediment is that it is not a strategic priority says that further education is needed to prove the benefits of Digital Twin.
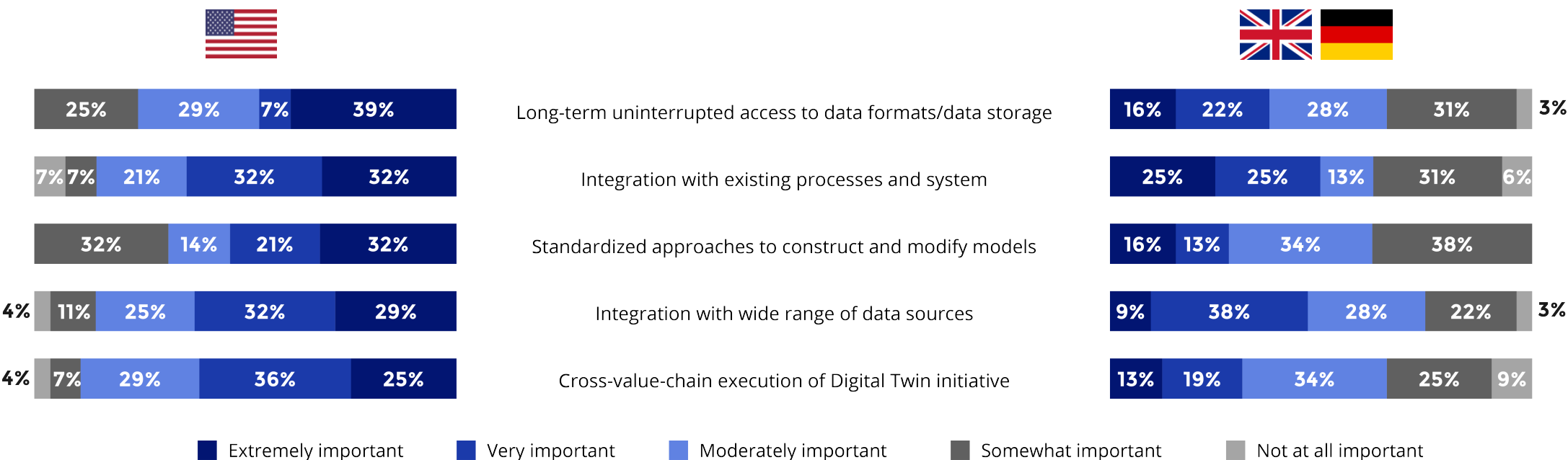
Top impediments to investments in Digital Twin:

57%
Lack of skilled IT resources

43%
Operational risk in scaling transformation initiatives / Inability to quantify ROI

41%
Not a strategic priority

31%
Operational risk in scaling transformation initiatives

39%
Lack of innovative solutions

25%
Lack of top leadership ownership and execution

31%
Lack of innovative solutions

28%
Lack of skilled IT resources

Base: % of all respondents aware of Digital Twin concept

Operational and system readiness is critical for the successful execution of Digital Twin.

Uninterrupted access to data, standardized procedures and established integrations with existing processes are prerequisites for successful execution.

Most respondents place high importance on system readiness for successful execution of a large initiative as the Digital Twin which would need cross-department coordination and strong IT and management support.

According to you, how important are the following aspects in the successful execution of 'Digital Twin' in PLM?

🇺🇸 US	Aspect	🇬🇧🇩🇪 UK/DE
25% / 29% / 7% / 39%	Long-term uninterrupted access to data formats/data storage	16% / 22% / 28% / 31% / 3%
7% / 7% / 21% / 32% / 32%	Integration with existing processes and system	25% / 25% / 13% / 31% / 6%
32% / 14% / 21% / 32%	Standardized approaches to construct and modify models	16% / 13% / 34% / 38%
4% / 11% / 25% / 32% / 29%	Integration with wide range of data sources	9% / 38% / 28% / 22% / 3%
4% / 7% / 29% / 36% / 25%	Cross-value-chain execution of Digital Twin initiative	13% / 19% / 34% / 25% / 9%

■ Extremely important   ■ Very important   ■ Moderately important   ■ Somewhat important   ■ Not at all important

Base: % of all respondents aware of Digital Twin concept

Key recommendations for the advancement of Digital Twin technology in consumer products and retail**.**

Companies aware of applications of Digital Twin see the value, so priority should be to boost education of the solution and build business case.

Obtain base case education on the use-cases of Digital Twin	**Establish clear business case for Digital Twin considering strategic business objectives**	**Start small**
• Educate business users about the relevance of Digital Twin. • Demonstrate ROI through real-life case examples.	• Establish clear budgetary allocations (CapEx/OpEx) and projected benefits (efficiency, effectiveness, customer service, etc). • Leverage industry best practices to estimate ROI.	• Pilot the concept for 1-2 products (preferably one net new product and one mature product). • Weigh-in the inherent risks against the economic value, that are associated with costs, security, privacy and integration.
Involve cross functional teams across the program: assessment, business case development and pilot	**Overcome challenges of IT skills and business availability**	
• Deploy cross-functional team for business case development, change management and implementation. • Designate CXO/VP level owner for the initiative for clear communication of strategic intent. • 61% of companies believe strategic objectives can be achieved by more collaboration across functions paired with quick decision-making.[4]	• Deploy cloud-based systems. • Engage with technology partners for innovation. • 50% of companies rate their technology partners as their most important innovation collaborators.[4]	

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References.

1. McKinsey
   [Mastering three strategies of organic growth](), 2017
   [How to make sure your next product or service launch drives growth,]() 2017

2. BCG
   [Innovation and Product Development]()

3. Schneider & Hall
   [Why Most Product Launches Fail, Harvard Business Review](), 2011

4. PWC
   [PWC Innovation Benchmark Report](), 2017