

CAD TRENDS 2022 In Manufacturing

Manufacturing Report



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Contents

- CAD Trends 2022 in Manufacturing (Page 5)
- Trends Overview (Page 11)
- Usage and Future Potential (Page 17)
- 19 Trends (Page 21)
- Preferred Licensing Model (Page 88)
- Additional Research Findings (Page 91)



About The Business Advantage Group



International B2B market research, data and business development consulting practice specialising in CAD/CAM industry research since 1992



Specialists in hybrid research and consulting solutions to solve complex business problems

30+ professional, multi-lingual staff with CAD, CAM, IT and High-Tech sector experience

Successfully completed over 2,400 research assignments across 100+ countries

Maintain database of over 1 million CAD users and decision-makers worldwide



Business Advantage Key Service Areas



1 Market Research

- Market Sizing and Trends
- New Market Opportunities
- Segmentation
- Brand Positioning/Strategy
- Image and Awareness
- Competitor Analysis
- Channel Partner Research
- Product Development
- UX Research Recruitment



2 Data Services

- Building Databases
- Data Acquisition
- Cleansing and Enhancing
- Updating and Management
- Data Analysis and Profiling
- Data Provision



3 Consulting

- Corporate Strategies
- Marketing Strategies
- Distribution Strategies
- Customer Loyalty
- Mergers and Acquisitions



4 Sales Development

- Partner Recruitment
- In-depth Company Profiling
- Lead Generation
- Webinar Attendance
- Target Name Research
- Account Based Marketing



CAD TRENDS 2022 in Manufacturing

Introduction

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Looking to the Future

Purpose

- Future planning is key for any business
- We want to assist you with future planning

Methodology

- Web survey managed from our offices in London and San Francisco, drawing respondents from several data sources including our in-house data repository of over 1,000,000 CAD/CAM users and decision-makers
- Sample of 557 CAD users and decision-makers across a range of company sizes and manufacturing industries worldwide took part

Key Topics

- 19 topics related to the MANUFACTURING sector and their perceived importance, and actual and future usage were captured, enabling us to identify key trends in the CAD MANUFACTURING sector now and over the next five years





Key Topics: CAD Trends

A series of questions were asked about each CAD Trend to get a better understanding of Awareness, Perceived Importance, Current and Future Usage, Benefits and more



Awareness

Q: Which of the following leading trends are you familiar with or have heard of?

A prompted list was shown, and respondents were asked to select all response options that apply



Perceived Importance

Q: Thinking about your core business functions, to what extent do you see each of these as an important trend to your company?

A rating scale of 1 to 10 used where 1 is 'not at all important' and 10 is 'extremely important' to your company



Current and Future Usage

Q: Thinking about these trends again what do you/your company already use in-house at the moment? and...

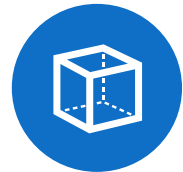
...plan on using in-house within the next 12 months?

... plan on using in-house within the next 3-5 years?





We covered 19 CAD Trends this year



3D Modelling



Cloud Based
CAD



3D Printing



Mobile Access
to CAD



Simulation/CAE



Collaborative
Design



PLM



PDM



Augmented
Reality



2D Drafting



CAM



Virtual
Reality



Machine
Learning



Artificial
Intelligence



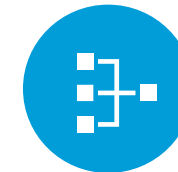
Generative
Design



Design
Automation



Model Based
Definition
(MBD)



Systems Level
Management
(SLM)

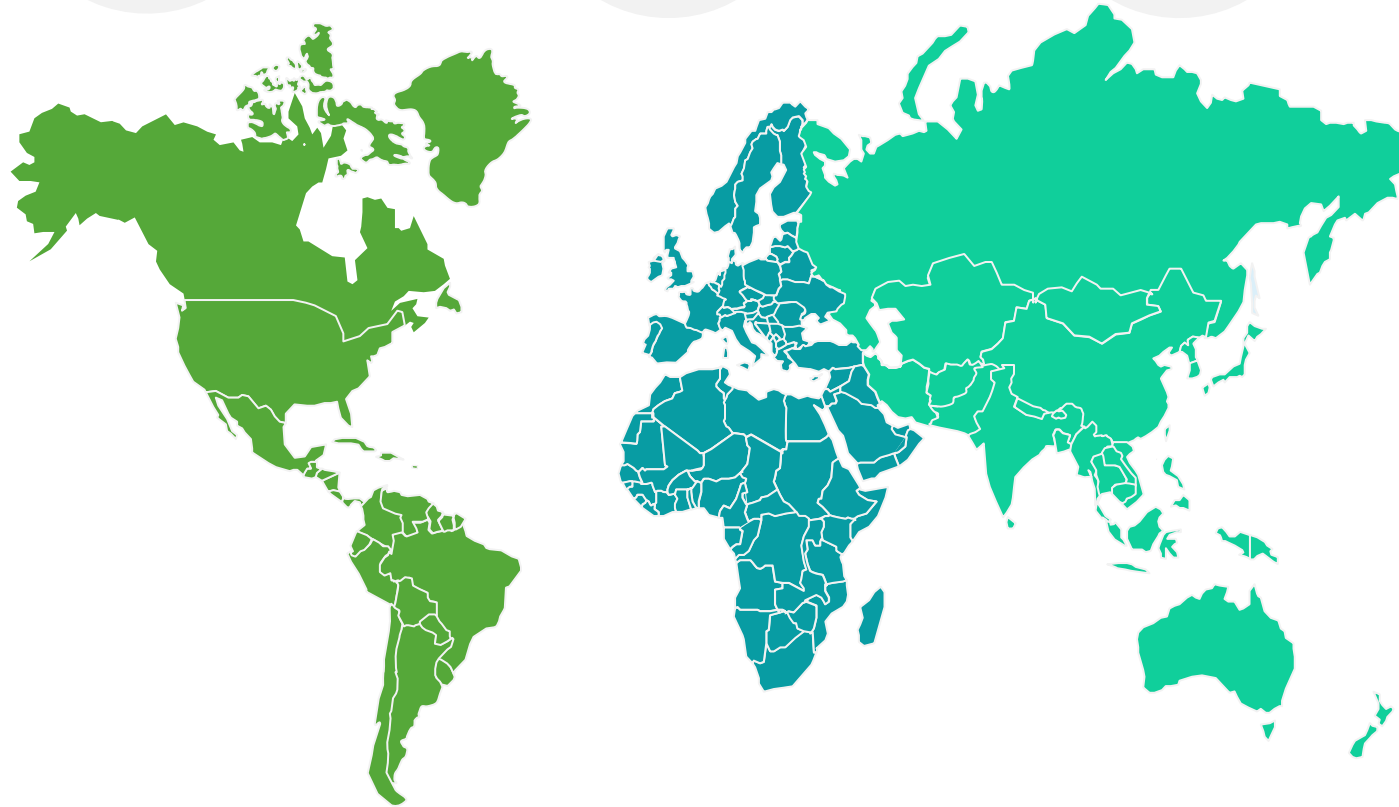
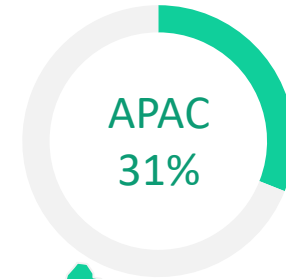
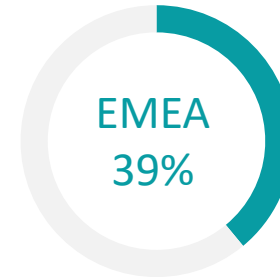


Digital Twins

New Trends

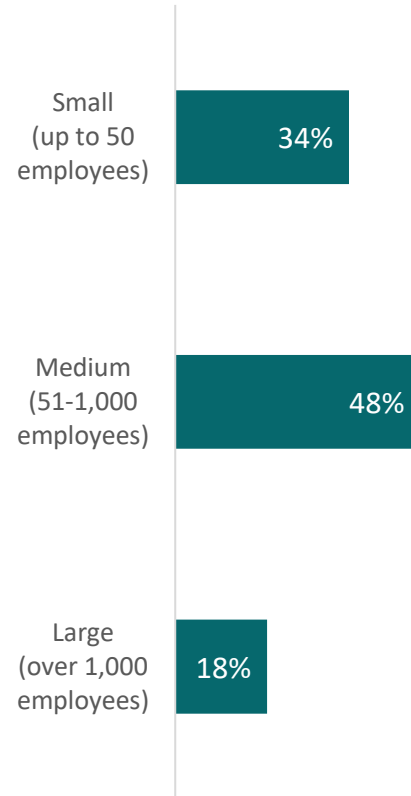


557 responses
from around
the globe

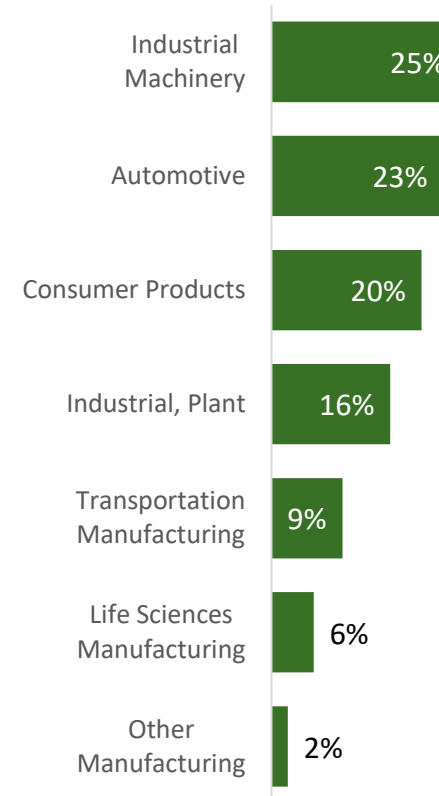


Participants cover the manufacturing sector. Range of job functions. Small to large companies

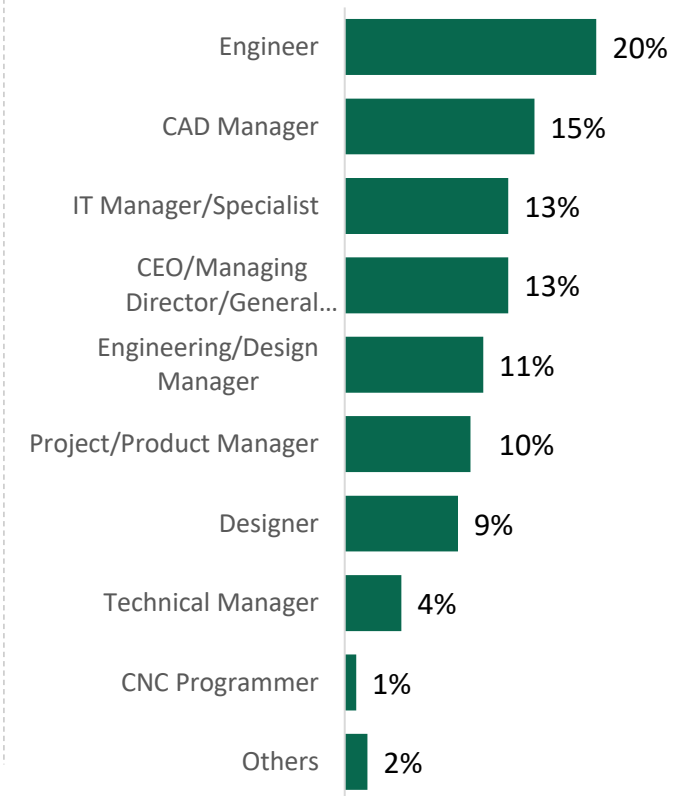
Company size



Sector



Job Titles/Roles





TRENDS OVERVIEW

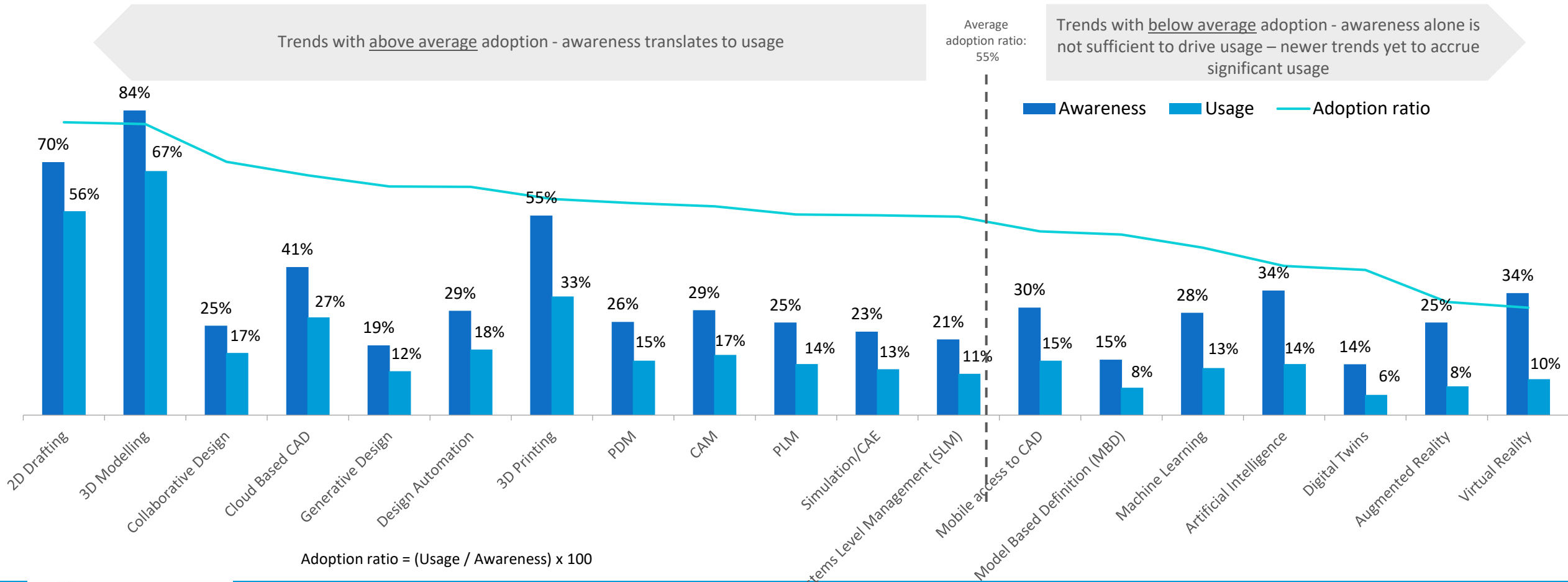
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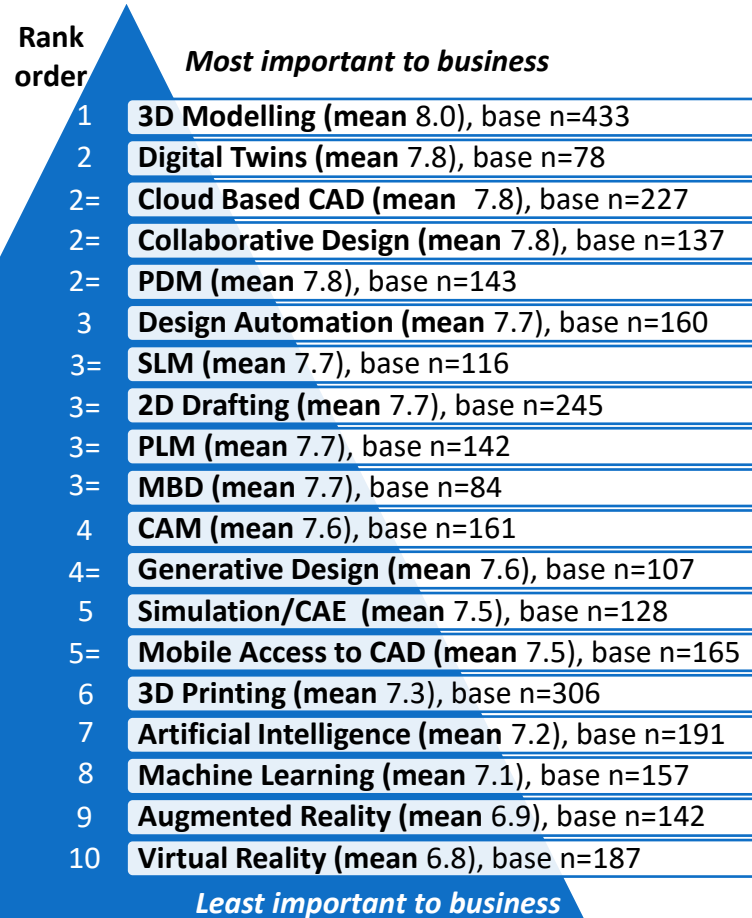
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Trends Snapshot

AWARENESS AND CURRENT USAGE



Current Trends – Importance Snapshot



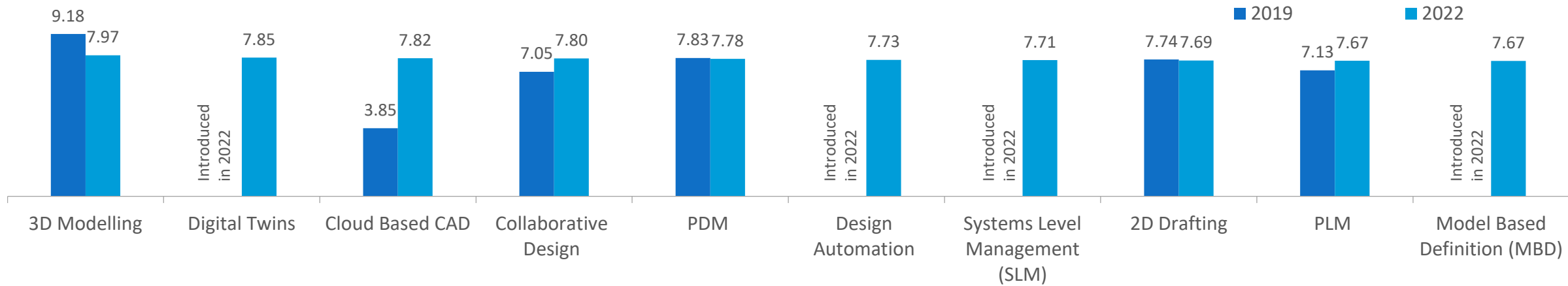
- At an overall level, some CAD trends are more important to particular sectors, regions and company types including...
 - 3D Modelling in Americas, Transportation industry, and Large companies
 - Digital Twins in Americas, Consumer Products, and Small companies
 - Cloud Based CAD in APAC, Medium companies, and other manufacturing sectors
 - Collaborative Design in Americas, Transportation industry, and Medium companies
 - PDM in Americas, Consumer Products, Small companies
 - Design Automation in Americas, Transportation industry, and Medium companies
 - SLM (Systems Level Management) in Americas, Industrial Machinery, and Large companies
 - 2D Drafting in Americas, Small companies
 - PLM in Americas, Consumer Products, and Small companies
 - Model Based Definition (MBD) in Americas, Industrial Machinery, and Small companies
 - CAM in EMEA, Transportation industry, and Medium companies
 - Generative Design in Americas, Transportation industry, and Medium companies
 - Simulation/CAE in Americas, Industrial Machinery, and Large companies
 - Mobile Access to CAD in Americas, Transportation industry, and Large companies
 - 3D Printing in APAC, Transportation industry, Medium companies
 - Artificial Intelligence in Americas, Transportation industry, and Medium companies
 - Machine Learning in Americas, Industrial Machinery, and Medium companies
 - Augmented Reality in Americas Medium companies and other manufacturing sectors
 - Virtual Reality in Americas, Transportation industry, and Medium companies



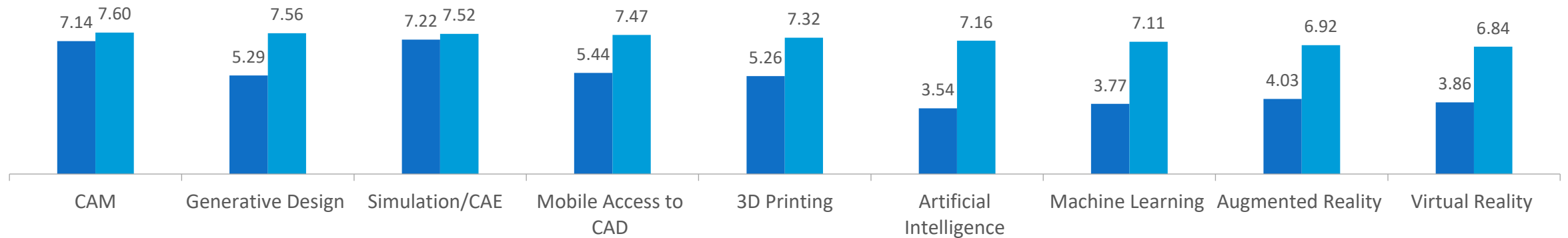
Absolute Importance Over Time

Generative Design, Artificial Intelligence, Machine Learning, Virtual Reality are showing the biggest Year-On-Year uplift in Importance

TOP 10 Trends



Other Trends

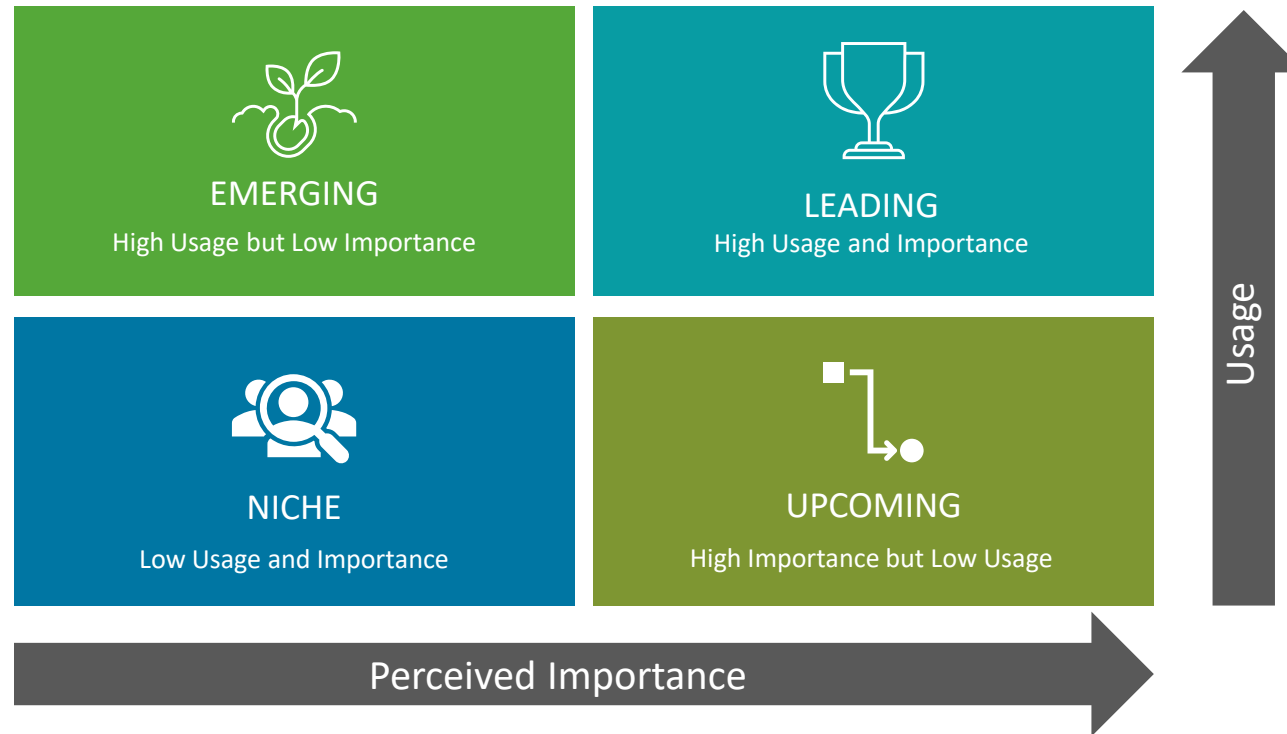


Note: Data sorted in descending order by Absolute Importance mean scores in 2022

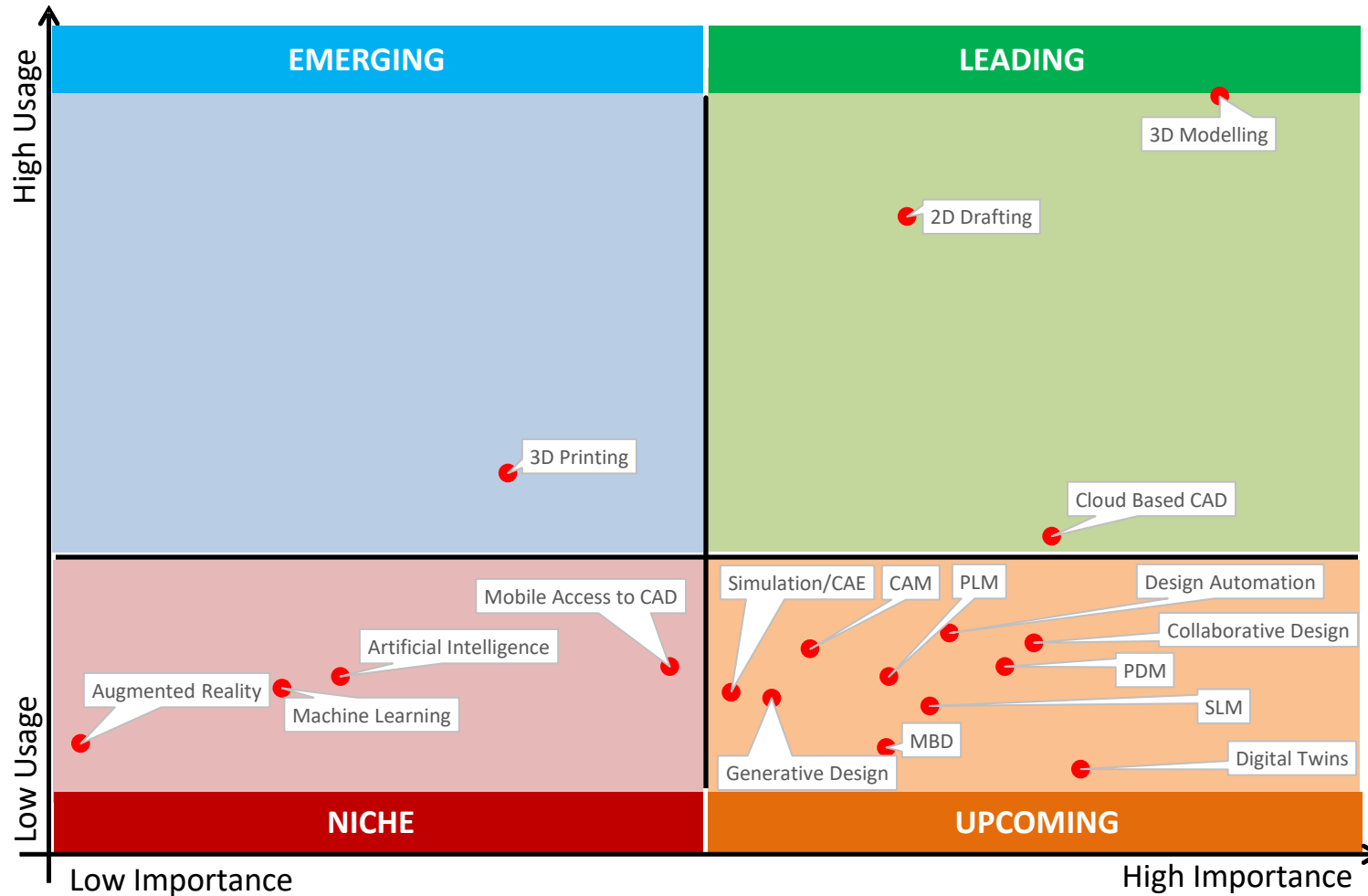


Mapping Usage vs. Importance

To better understand the CAD trends, we have compared the perceived importance with usage, categorizing them into quadrants: Emerging, Leading, Niche and Trailing



Mapping Usage vs. Importance



- This chart plots perceived importance of trends against current usage
- The market is still strongly focused on 3D Modelling and 2D Drafting
- Cloud Based CAD has become a leading trend
- Growing significance of technology such as 3D Printing



USAGE AND FUTURE POTENTIAL

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Mapping Future Potential

To identify opportunities in the manufacturing CAD market, our focus turns to ranking trends by their **growth potential** over the next 5 years

Trends which are currently the most important to users are reaching market saturation, as they have very high current usage and therefore relatively little scope to further expand their use

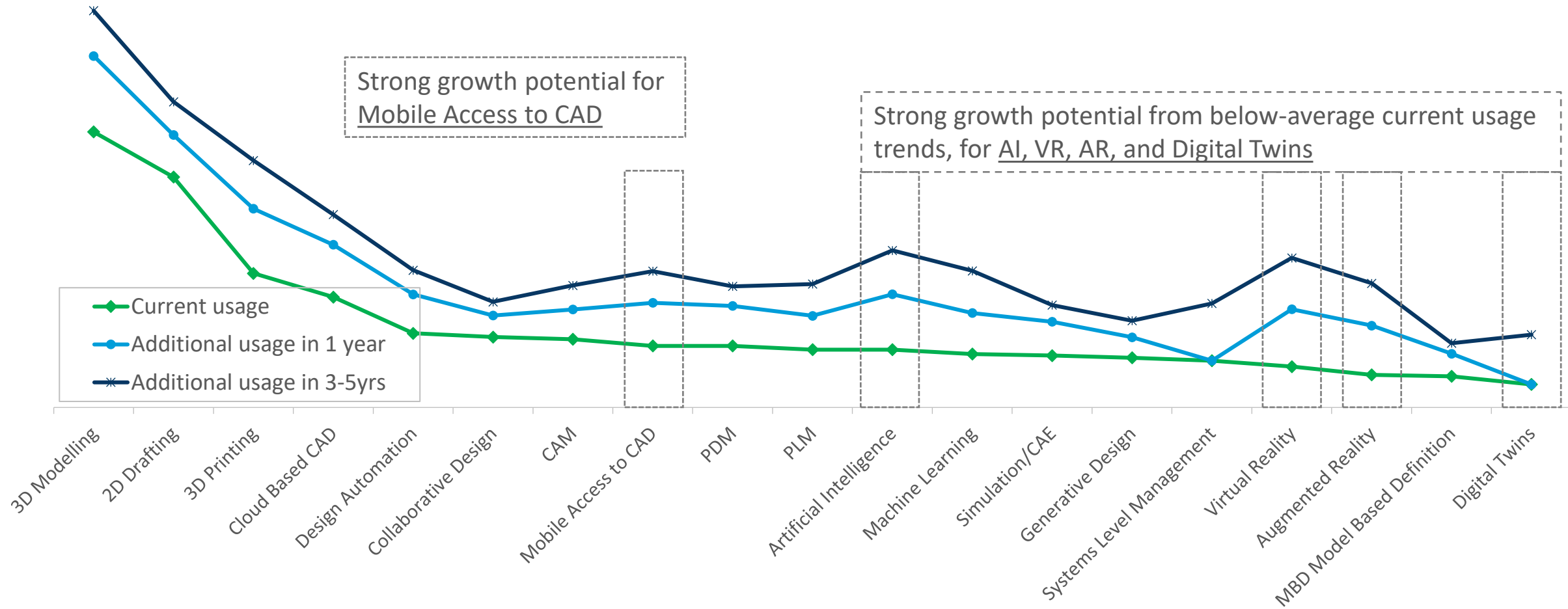
Although current usage and perceived importance are still relatively low for what have been termed the more “niche” trends, they are where the highest future growth opportunities exist

The following slides explore these trends in order of their growth potential ratio over the next 3-5 years, whilst also highlighting where they sit in the importance rankings



Looking to the Future

PREDICTED FUTURE USAGE (2022-2027)



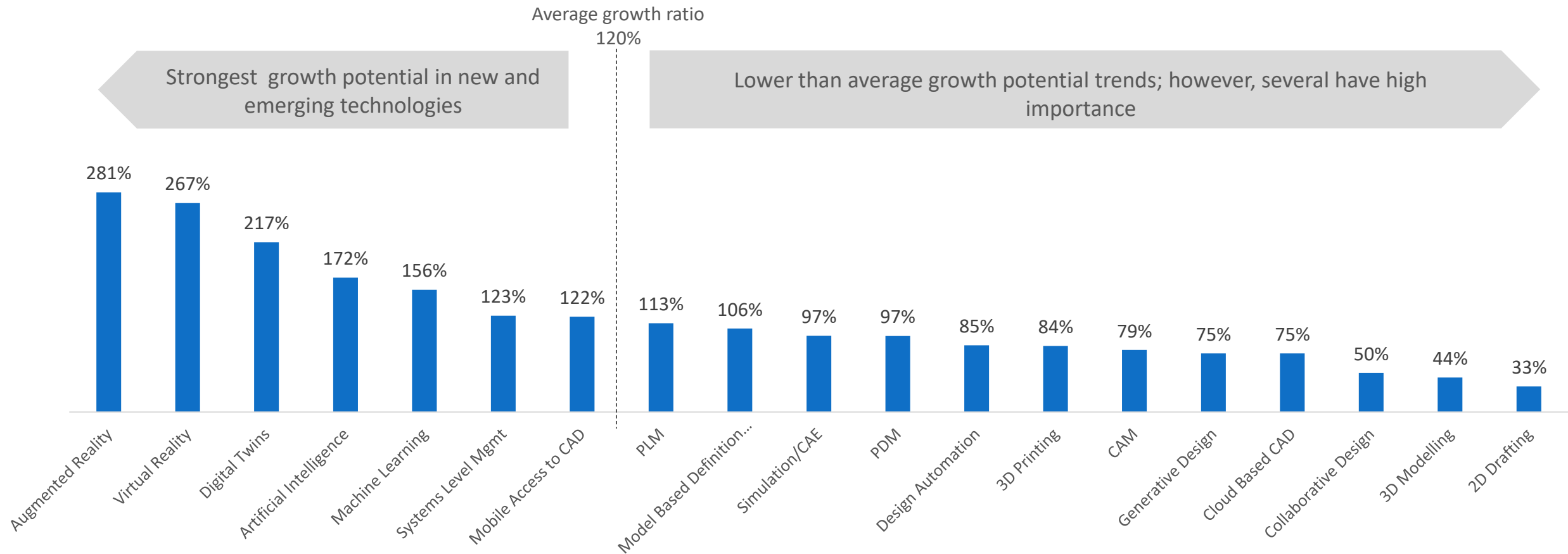


Future growth potential

$$\text{Growth Potential Ratio} = \left[\frac{\% \text{ Using in 3-5 yrs.} - \% \text{ Using now}}{\% \text{ Using Now}} \right] \times 100$$

Strongest growth potential in new and emerging technologies

Lower than average growth potential trends; however, several have high importance





Augmented Reality

Use of non-geometrical data to augment a CAD model view with the direct or indirect physical, real-world environment

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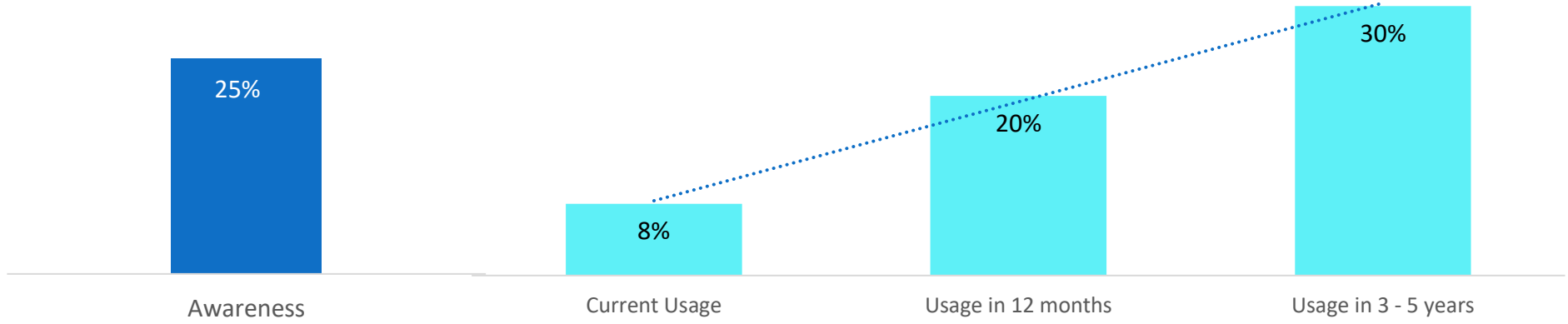


Augmented Reality

Usage of Augmented Reality

Importance mean score: 6.92
Current Usage: 8%

Lowest current usage and importance, but highest future growth potential



- Awareness**
 - Significantly higher awareness of Augmented Reality in the US and significantly lower awareness in APAC. Significantly higher awareness amongst large companies
- Importance**
 - Importance of Augmented Reality rated significantly lower in EMEA region and lowest in the Transportation industry sector. Highest importance amongst medium sized companies
- Current Usage**
 - Current usage of Augmented Reality is higher in Consumer Products industry sector and lower in medium companies
- Planned Usage**
 - Planned usage of Augmented Reality in the next 12 months is significantly lower in APAC
 - Planned usage of Augmented Reality in the next 3-5 years is significantly higher in large companies (low base)



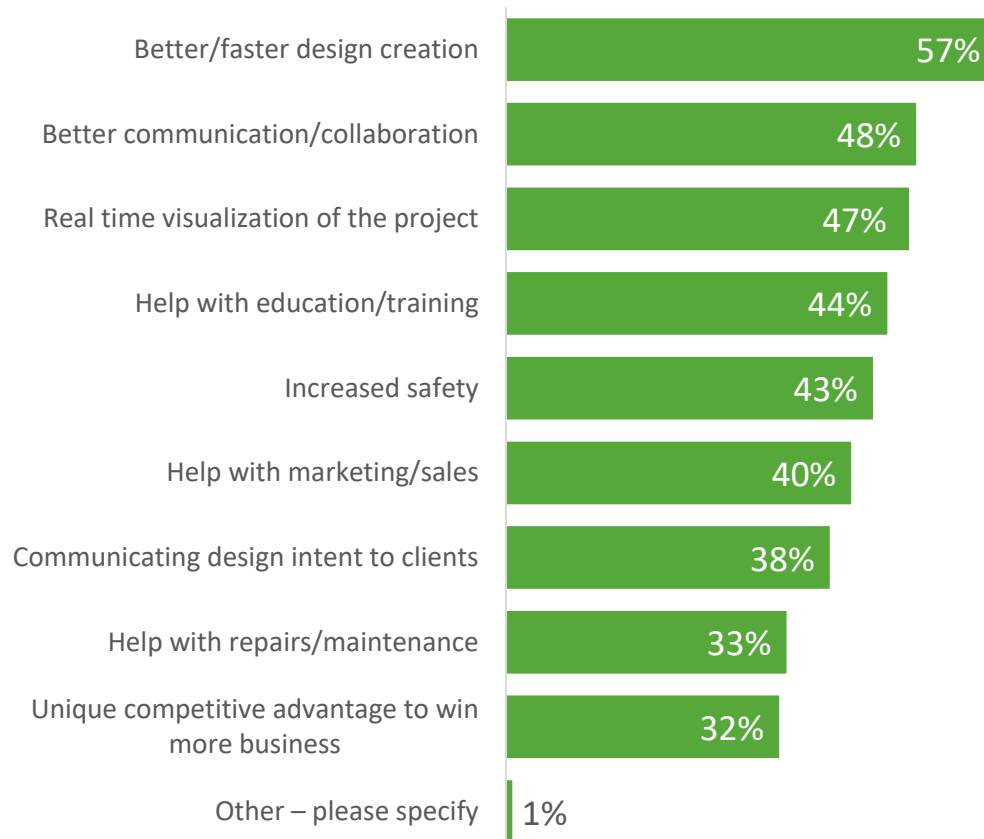
Augmented
Reality



Benefits of Augmented Reality

Importance Mean Score: 6.9

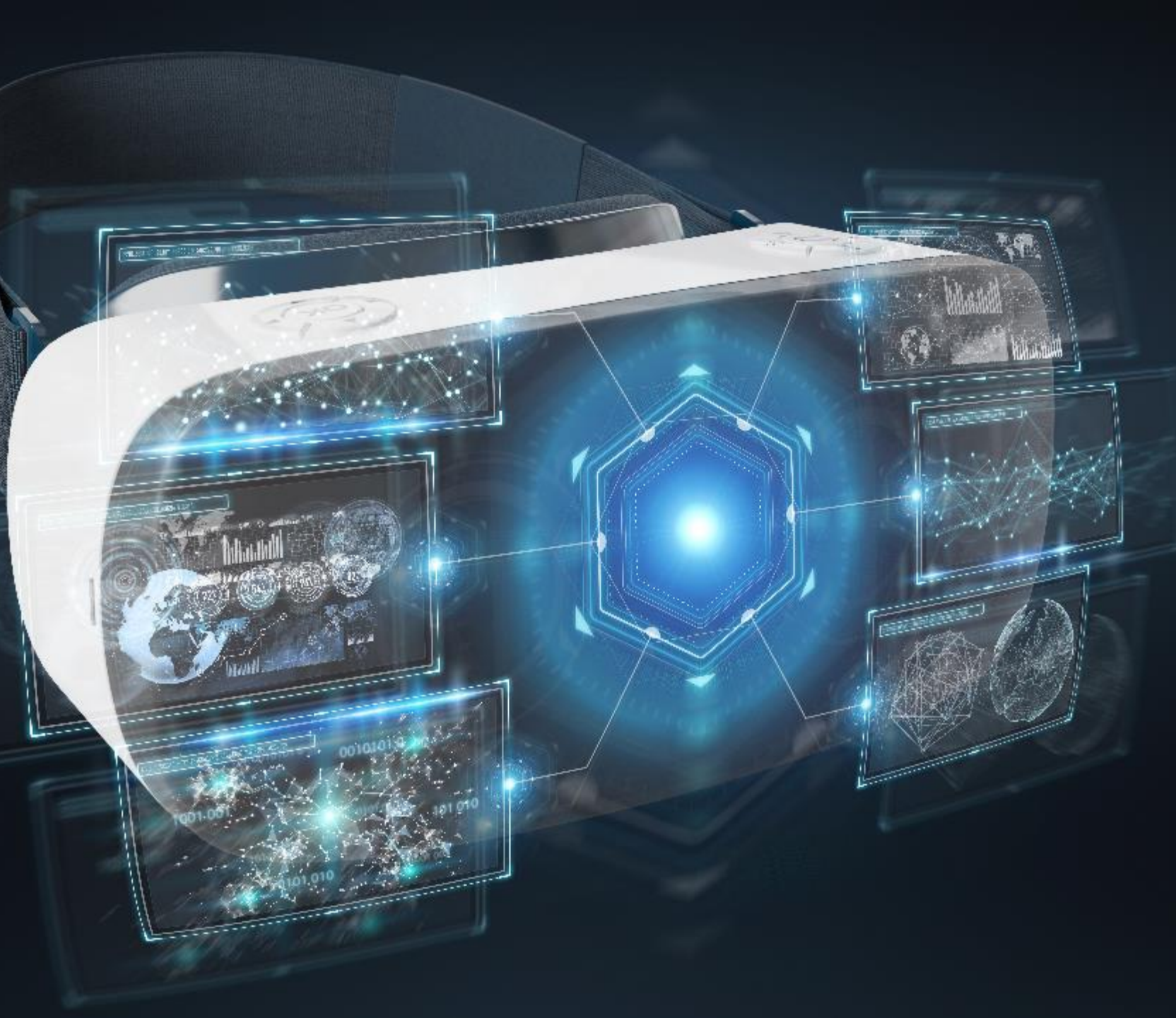
Benefits of AR



Better/faster design creation and increased safety mentioned significantly more in the APAC region

Consumer products industry reports higher benefits of help with education/training and better communication





Virtual Reality

Computer-generated
experience taking place
within a simulated
environment

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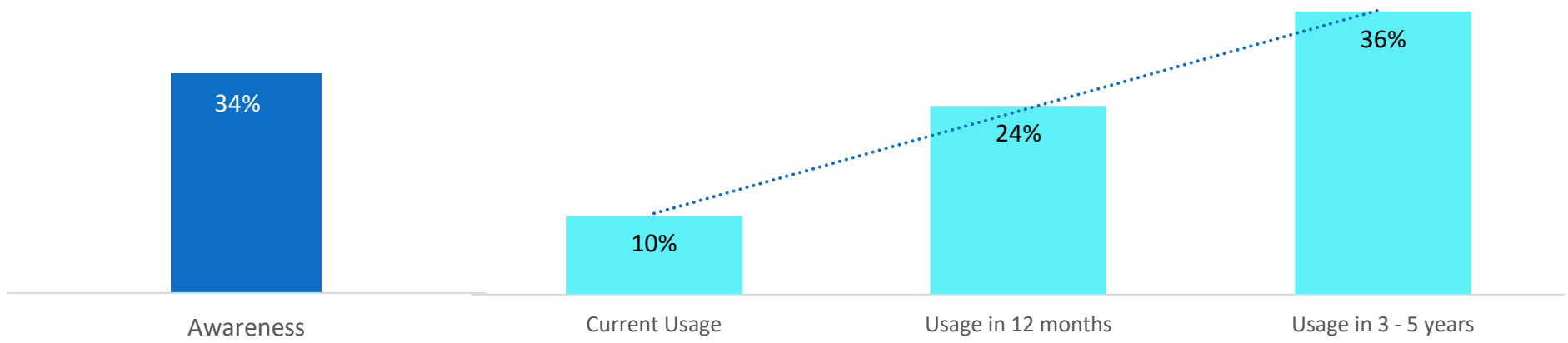


Virtual Reality

Usage of Virtual Reality

Importance mean score: 6.84
Current Usage: 10%

Low current usage and lowest importance, but high future growth potential



- Awareness**
 - Significantly higher awareness of Virtual Reality in the US, and significantly lower in medium sized companies
- Importance**
 - Importance of Virtual Reality rated the lowest in the EMEA region and highest in Americas. Highest importance in the Transportation industry sector and amongst medium sized companies
- Current Usage**
 - Current usage of Virtual Reality is lowest in EMEA (low base)
- Planned Usage**
 - Planned usage of Virtual Reality in the next 12 months is significantly lower in EMEA
 - Planned usage of Virtual Reality in the next 3-5 years is significantly higher in the Industrial Machinery sector





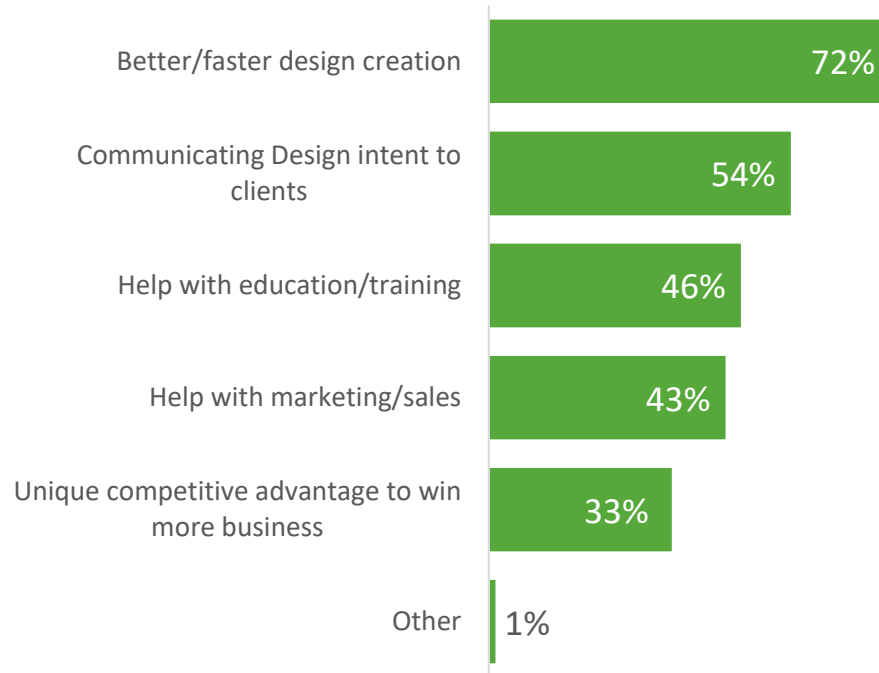
Virtual
Reality



Envisaged Benefits of Virtual Reality

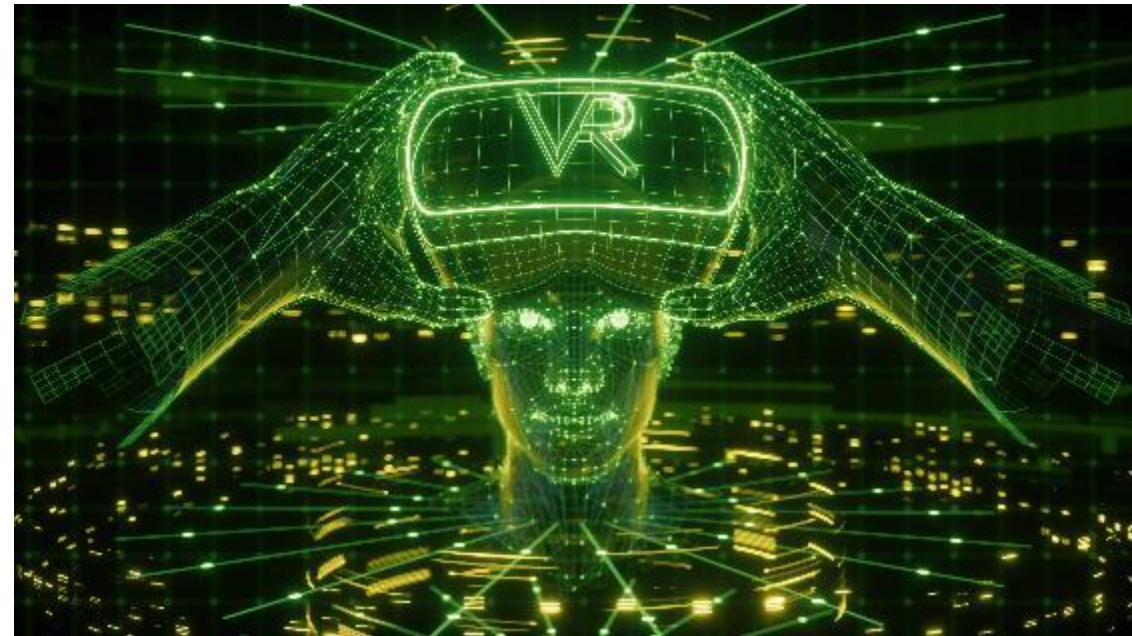
Importance Mean Score:6.84

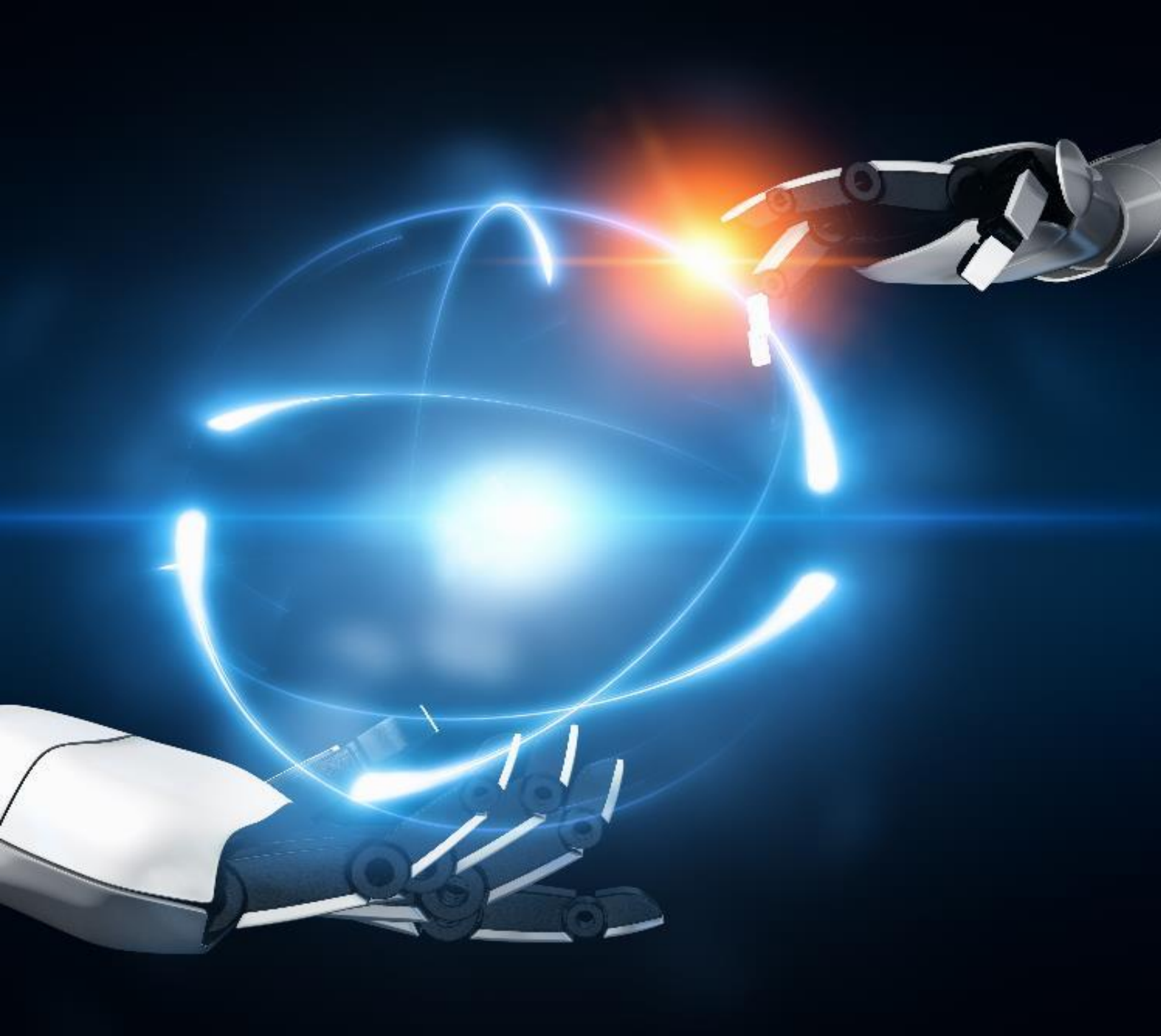
Benefits of Virtual Reality



Consumer products sector sees the greatest benefits of virtual reality in helping with marketing and sales

Education/training benefits recognised by Other manufacturing industry sector





Digital Twins

A virtual representation that serves as the real-time digital counterpart of a physical object or process

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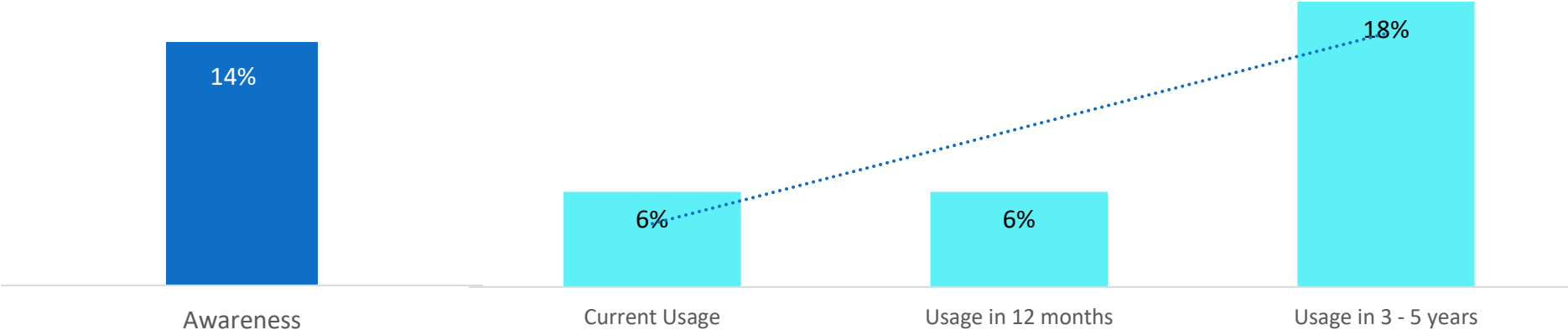


Digital Twins

Usage of Digital Twins

Importance mean score: 7.85
Current Usage: 6%

Lowest current usage, but high importance and future growth potential



Awareness

- Lowest awareness of Digital Twins in APAC, and small companies

Importance

- Importance of Digital Twins rated significantly higher in the Americas rather than EMEA region and higher in transportation and consumer products sectors and lowest in medium-size companies

Current Usage

- Current usage of Digital Twins is lowest in medium companies (low base)

Planned Usage

- No significant differences by industry sector, company size or geography





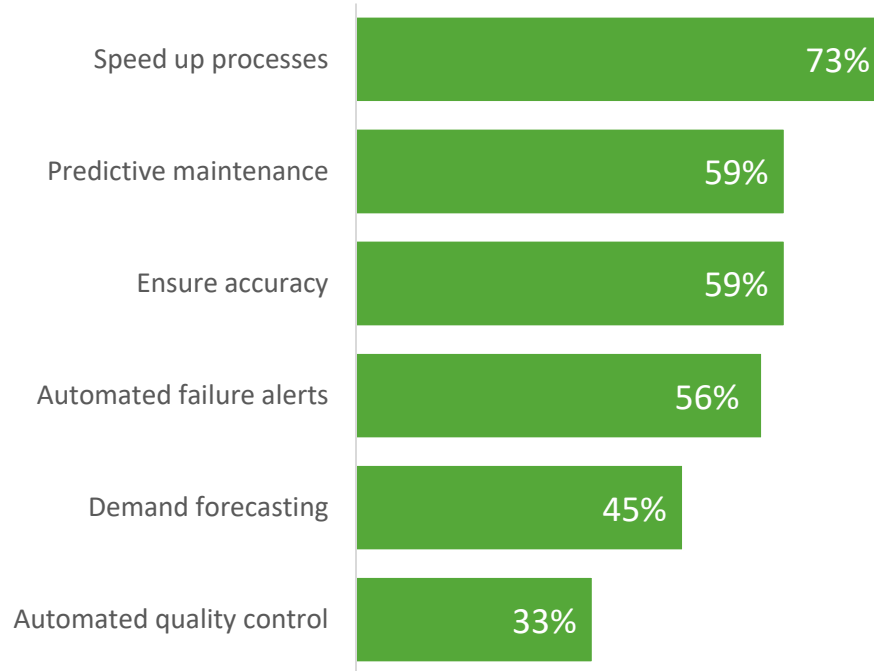
Digital Twins



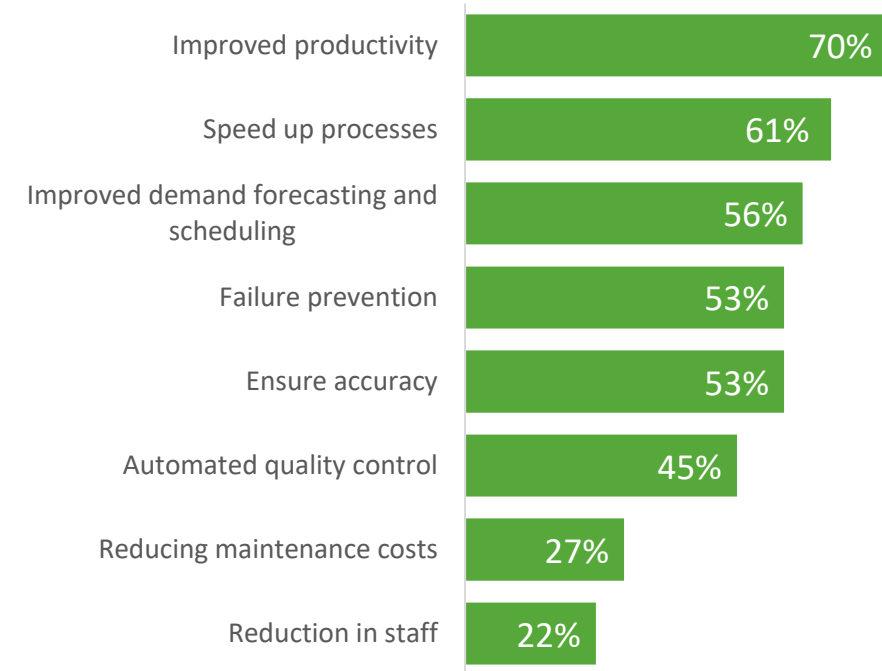
Usage and Benefits of Digital Twins

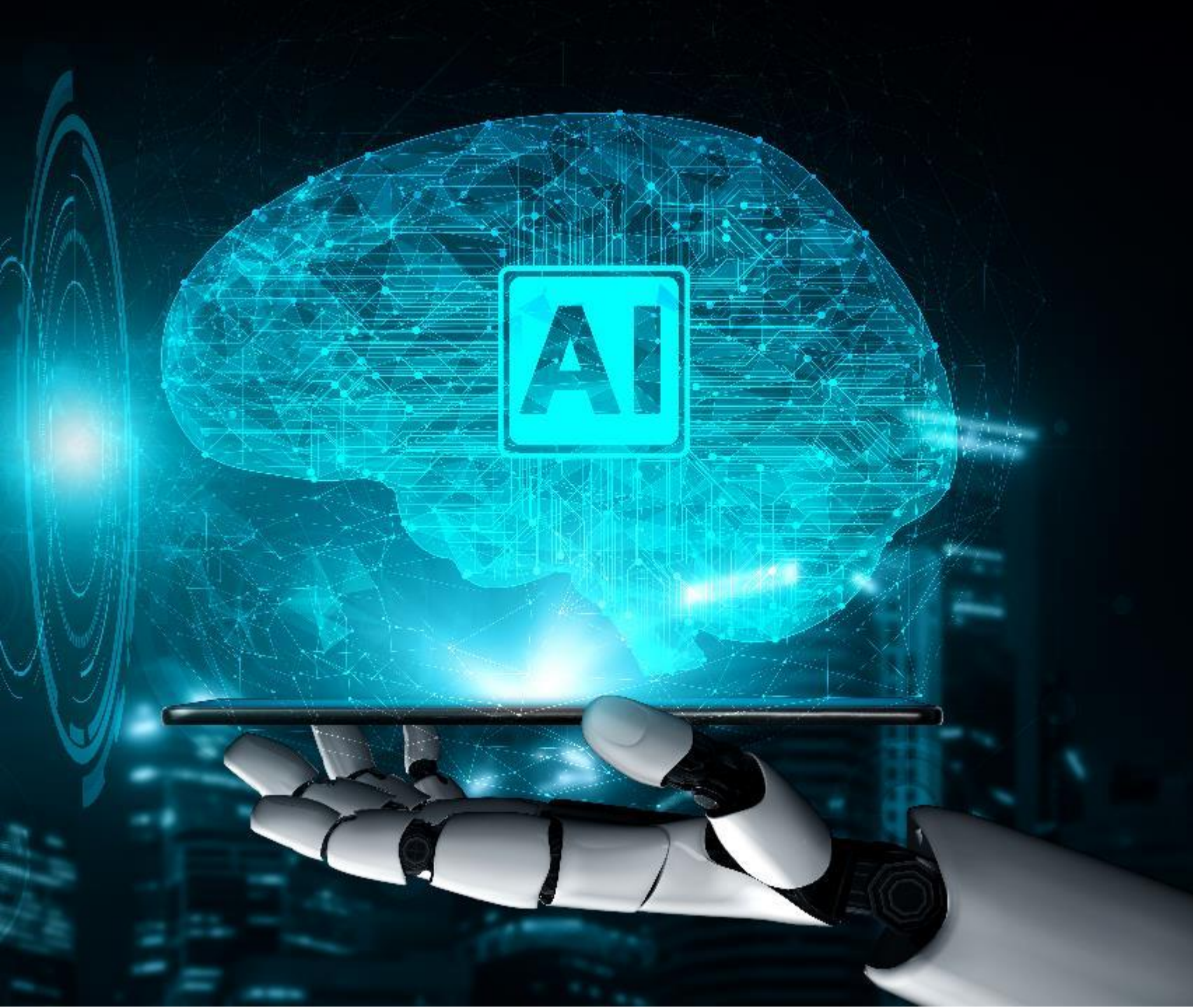
Users/planned users are using digital twins to speed up processes. A key benefit of using digital twins is the improvement in productivity

Usage/Planned Usage of Digital Twins



Benefits of Digital Twins





Artificial Intelligence

The simulation of intelligent behavior in computers

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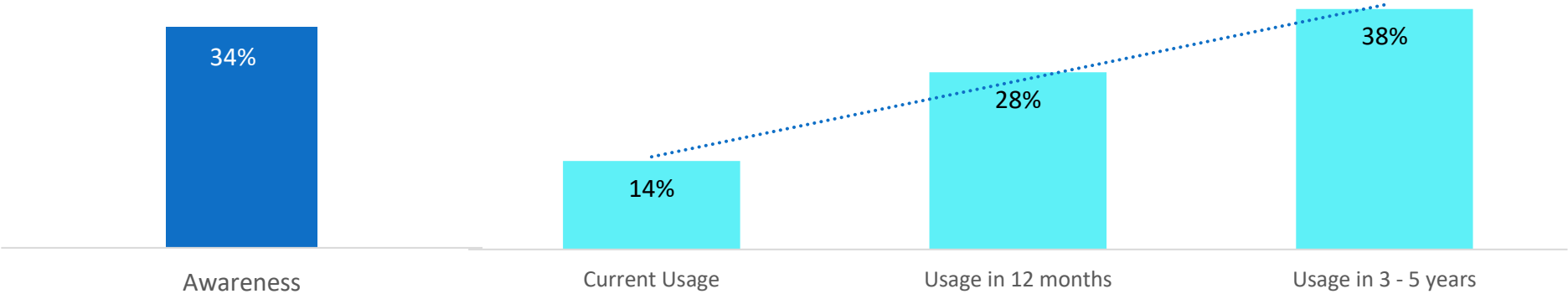
Artificial Intelligence



Usage of Artificial Intelligence

Importance mean score: 7.16
Current Usage: 14%

Medium current usage and low importance, but high future growth potential

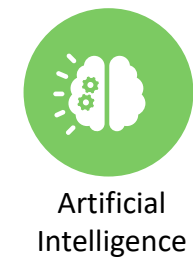


- Awareness** • Significantly higher awareness of Artificial Intelligence in consumer products and machinery sectors and significantly lower in medium companies
- Importance** • Importance of Artificial Intelligence rated highest in the Americas region with a score of 7.48 and lowest in small companies (6.67)
- Current Usage** • Current usage of Artificial Intelligence is lower in EMEA and highest in the Consumer Products sector and amongst large companies
- Planned Usage** • Planned usage of Artificial Intelligence in the next 12 months is lower in APAC
- Planned usage of Artificial Intelligence in the next 3-5 years is significantly lower in medium companies (low base)



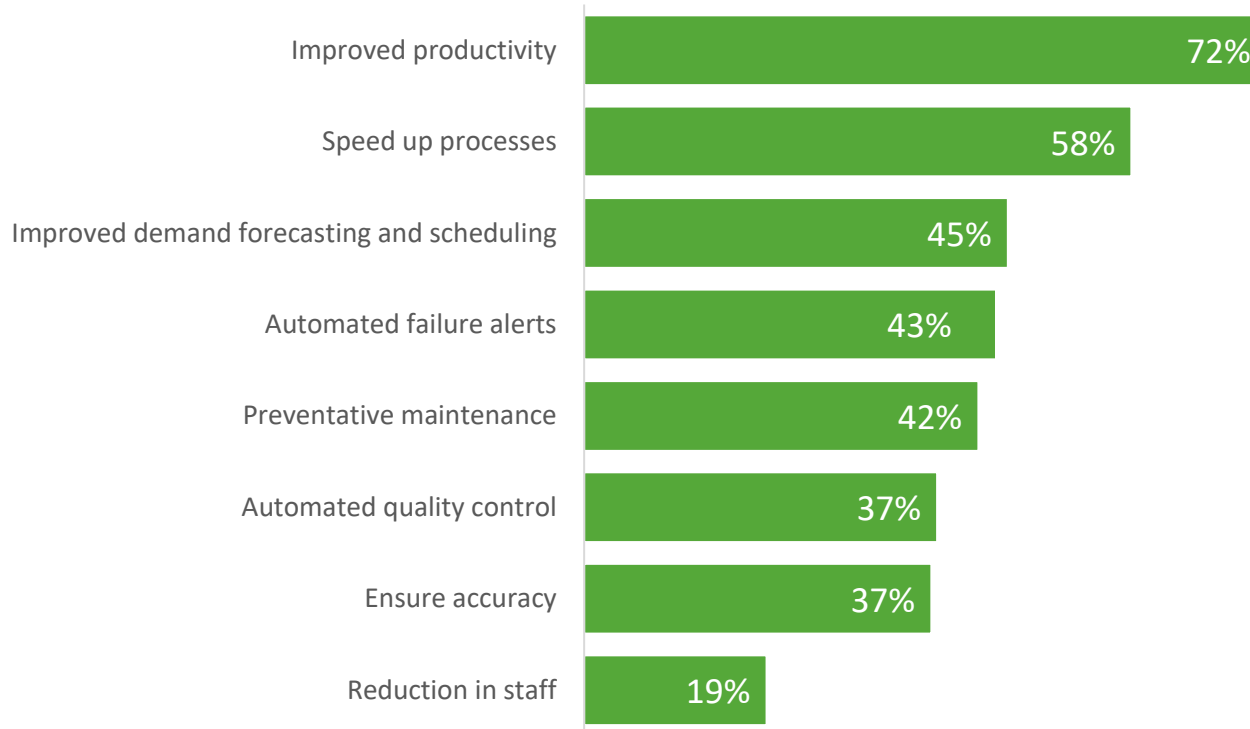
Envisaged Benefits of Artificial Intelligence

Improved demand forecasting and scheduling is a key benefit identified in the APAC region, and by those in a CAD Manager role



Americas see the benefit of using Artificial Intelligence to reduce staff

Benefits of Artificial intelligence





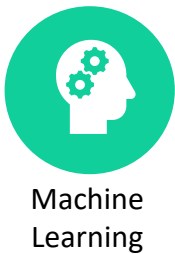
Machine Learning

An application of artificial intelligence (AI) that provides the ability for systems to automatically learn and improve from experience without being explicitly programmed

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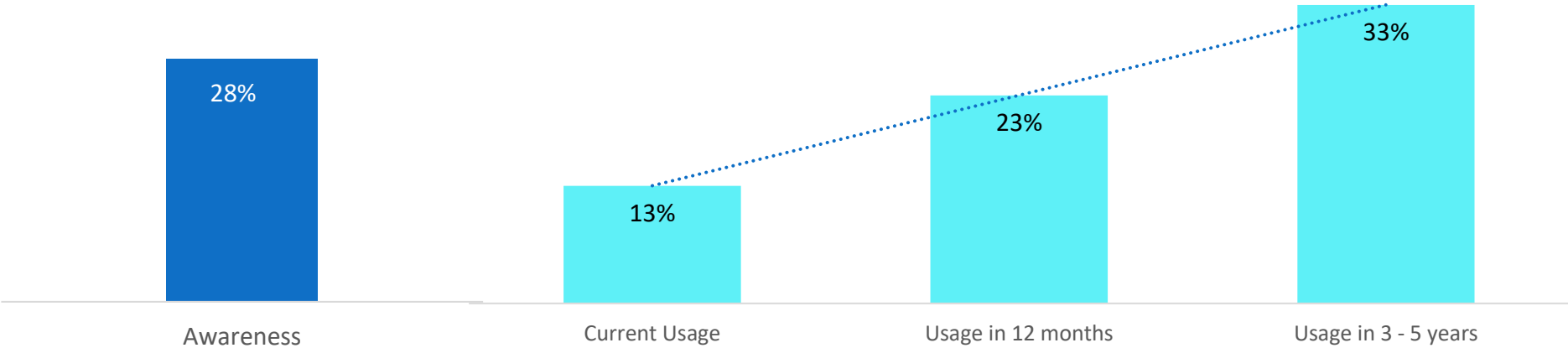
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Usage of Machine Learning

Importance mean score: 7.11
Current Usage: 13%

Medium current usage and low importance, but high future growth potential



- Awareness** • Significantly higher awareness of Machine Learning in the US, lowest awareness in APAC, and significantly lower in transportation sector, and significantly higher in large companies
- Importance** • Importance of Machine Learning rated significantly lower in EMEA (6.48) and highest in the Americas region with a score of 8.39. Lowest importance in the Transportation sector (6.97) and amongst small companies
- Current Usage** • Current usage of Machine Learning is higher in Americas, lower in the Transportation sector. Usage is higher in large companies (low base)
- Planned Usage** • Planned usage of Machine Learning in the next 12 months is higher in the Americas region

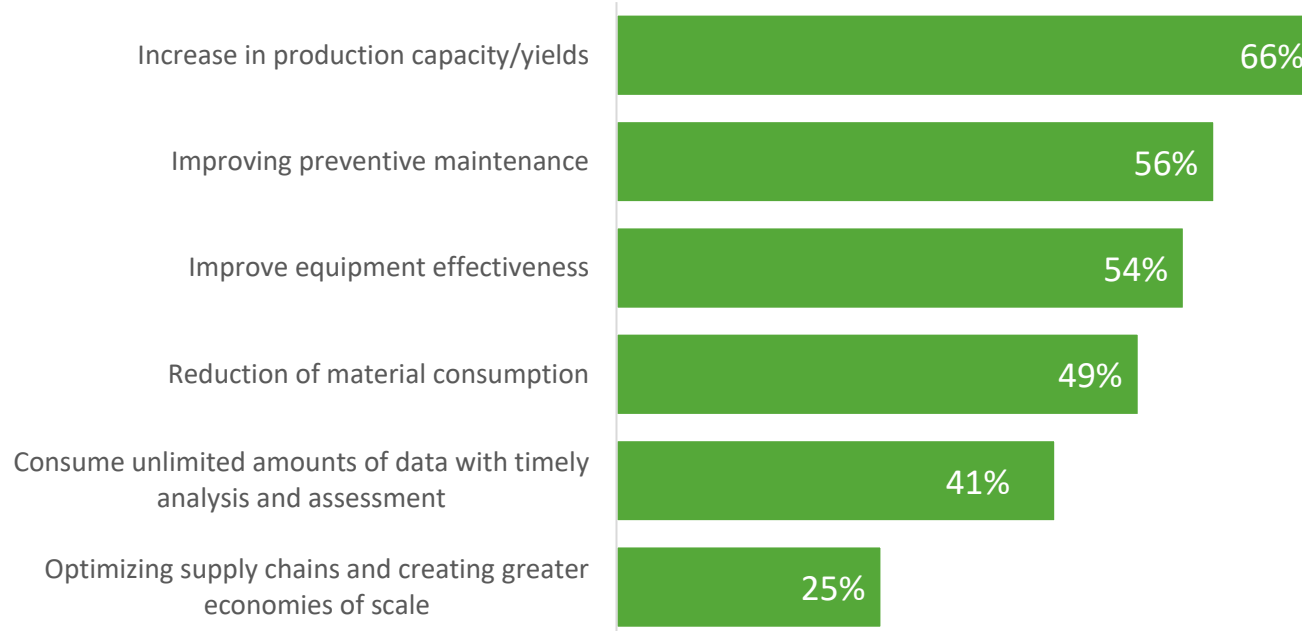


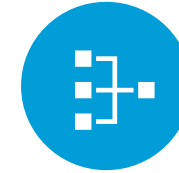
Machine
Learning

Envisaged Benefits of Machine Learning

Reduction of material consumption recognized particularly in the Americas region, and by consumer products industry sector. Improvements in preventative maintenance are particularly relevant to those in an IT role. Those in a managerial role recognize the potential to improve equipment effectiveness

Benefits of Machine Learning





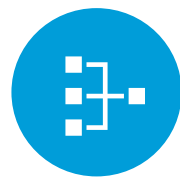
Systems Level Management (SLM)

Storing/retaining the assumptions and reasoning used to develop a model

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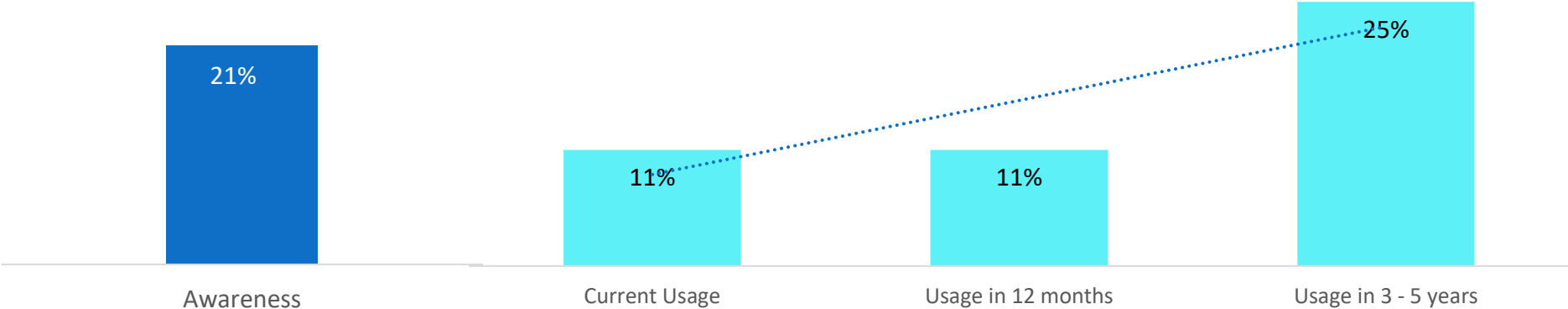


Systems Level Management

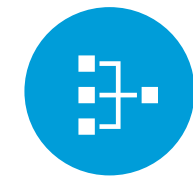
Usage of Systems Level Management (SLM)

Importance mean score: 7.71
Current Usage: 11%

Low current usage, but high importance and future growth potential



- Awareness**
 - Lowest awareness of SLM in APAC, highest awareness amongst large companies
- Importance**
 - Importance of SLM rated the highest in the Americas region with a score of 8.1 in the Industrial Machinery sector (8.06) and amongst large companies
- Current Usage**
 - Current usage of SLM is highest in the Americas and amongst large companies
- Planned Usage**
 - No significant differences by industry sector, company size or geography



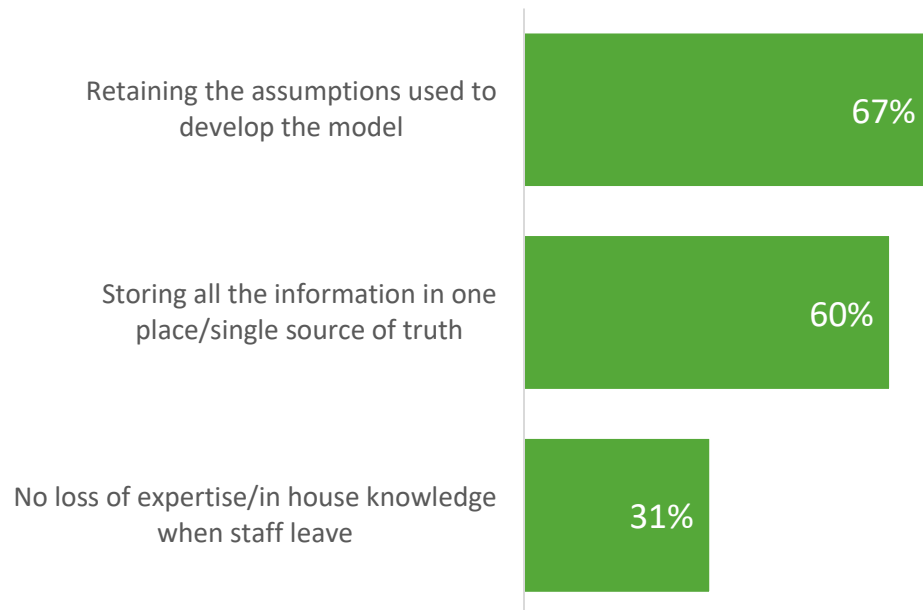
Systems Level
Management



Envisaged Benefits of Systems Level Management

Retaining the assumptions used to develop the model is a key benefit recognized across all industry sectors, company sizes and regions

Benefits of Systems Level Management





Mobile Access to CAD

Mobile access to CAD via
laptops/tablets/mobile phones

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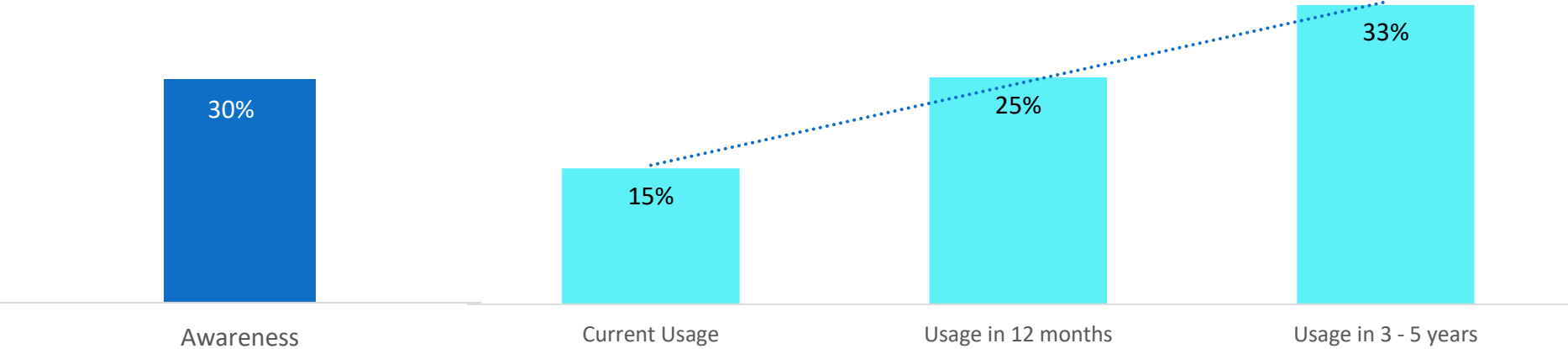
Mobile Access
to CAD



Usage of Mobile Access to CAD

Importance mean score: 7.47
Current Usage: 15%

Medium current usage and importance, but high future growth potential



- Awareness**
 - Highest awareness of Mobile Access in Americas, lowest awareness amongst Transportation sector and medium-size companies
- Importance**
 - Importance of Mobile Access rated the highest in France and Germany and lowest in APAC and medium-size companies
- Current Usage**
 - Current usage of Mobile Access is higher in the US and lower in the Automotive sector and amongst large companies
- Planned Usage**
 - Planned usage of Mobile Access in the next 12 months is higher in Americas and small companies





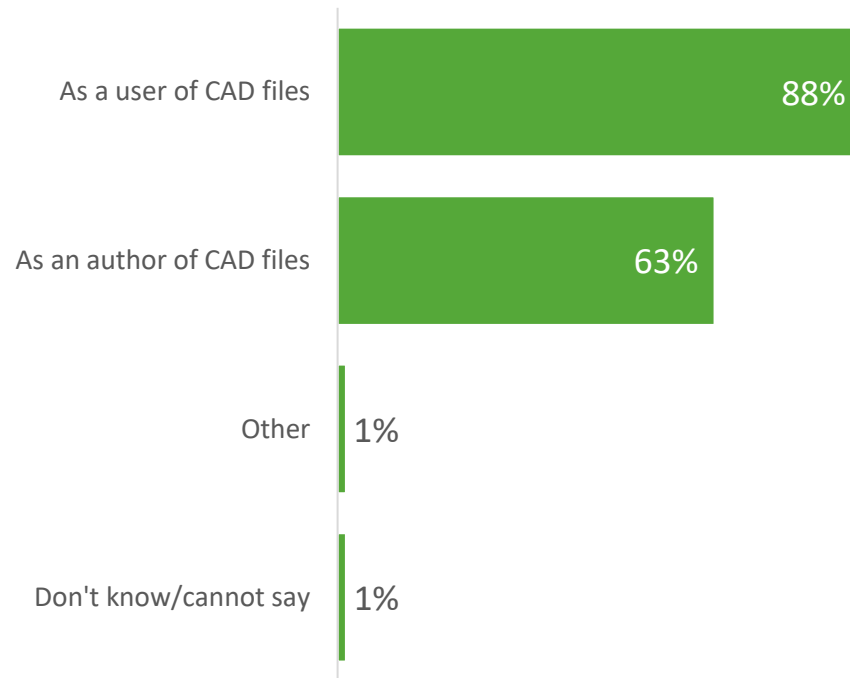
Mobile Access
to CAD



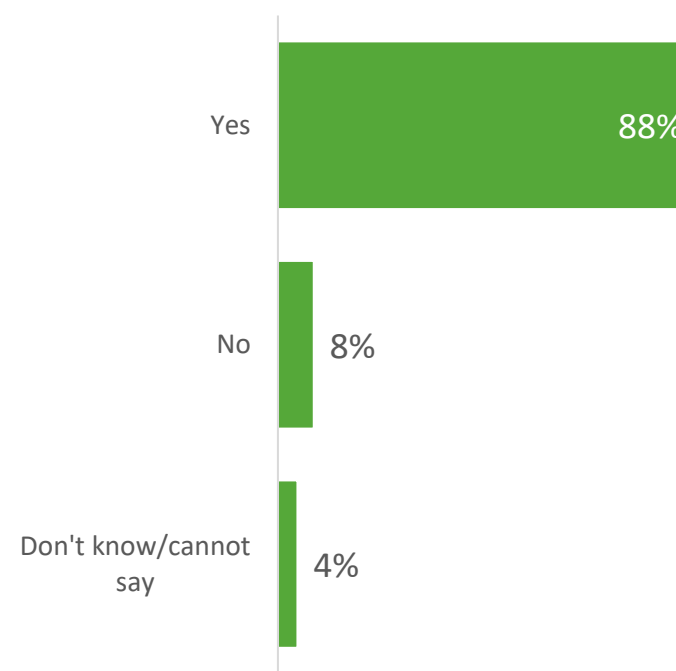
Usage of Mobile Access to CAD

Medium and large companies more likely to be authors of CAD files. Those not collaborating between factory floor and office are more likely to be in EMEA region

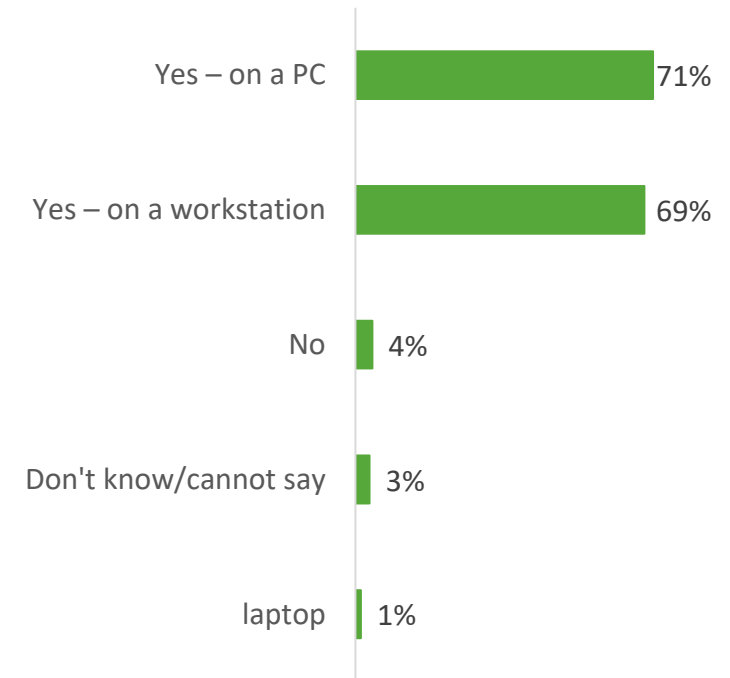
Usage of Mobile Access to CAD



Used to collaborate between field and the office or factory floor and office?



Plan to use Mobile Access to CAD on other platforms?





PLM **(Product Lifecycle** **Management)**

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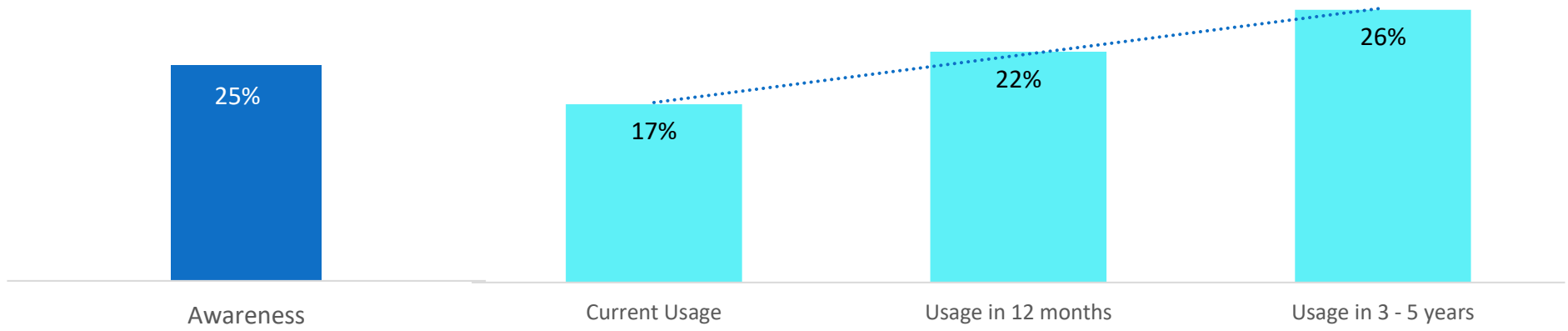


PLM

Usage of PLM

Importance mean score: 7.67
Current Usage: 17%

Medium current usage and medium future growth potential, but high importance



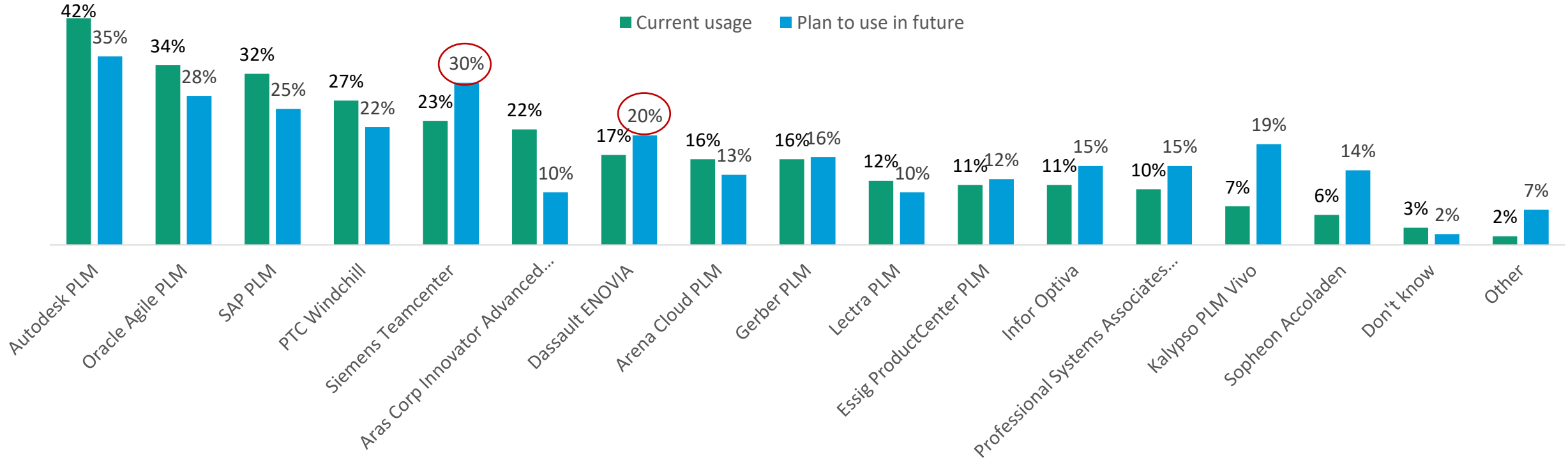
- Awareness**
 - Highest awareness of PLM in EMEA, highest awareness amongst large companies
- Importance**
 - Importance of PLM rated the highest in the Americas region and in consumer products sector with a score of 8
- Current Usage**
 - Current usage of PLM is higher in EMEA
- Planned Usage**
 - No significant differences by industry sector, company size or geography





PLM Brand Current and Future Usage

Importance mean score: 7.7



Key
segments
driving
usage

- Oracle Agile significantly more usage in Consumer goods industry
- Autodesk PLM reports higher usage in the APAC region
- High future planned usage of Siemens Teamcenter, Dassault ENOVIA, Kalypso and Sopheon
- Significantly higher planned future usage of SAP in the Americas region





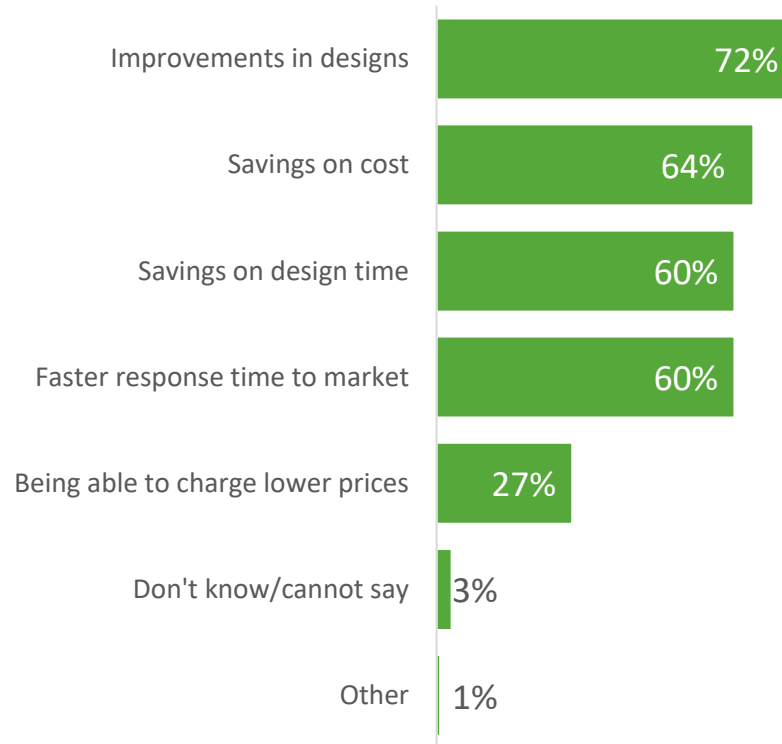
PLM



PLM Benefits and User-friendliness

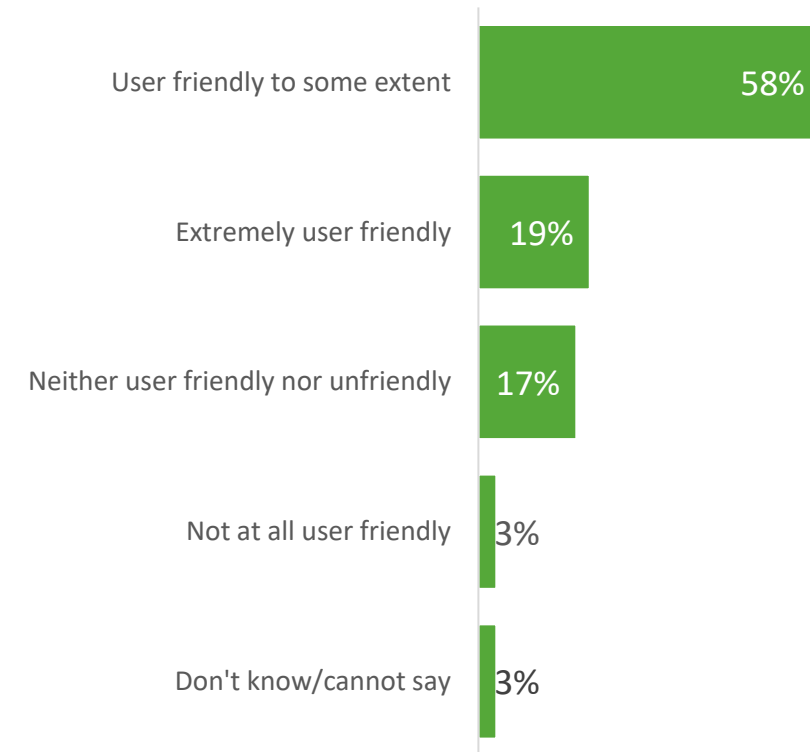
Savings on costs and faster response time to market reported significantly higher in the Americas region

PLM Benefits



PLM User-friendliness

(for non-engineers doing graphics-intensive work with PLM)





Model Based Definition (MBD)

Product and manufacturing
information placed directly onto 3D
model geometry

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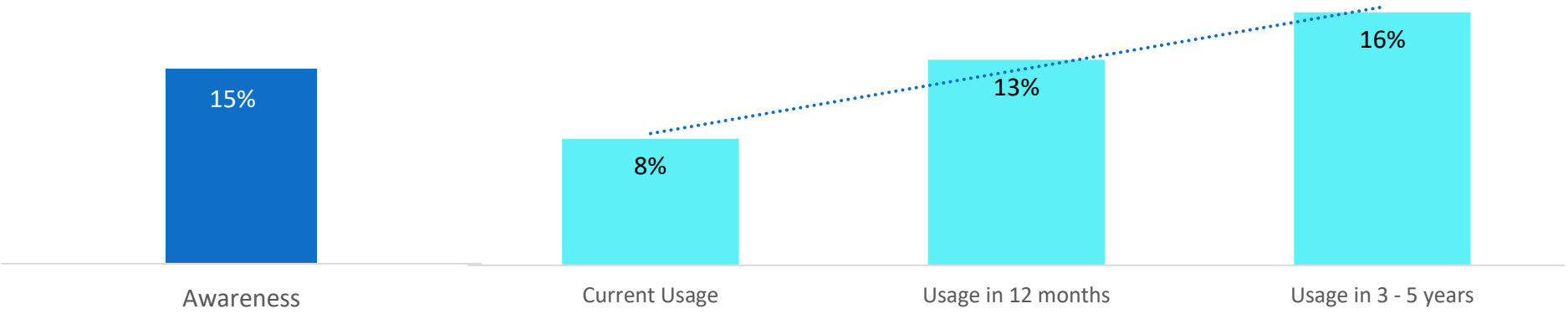


Model Based
Definition
(MBD)

Usage of Model Based Definition (MBD)

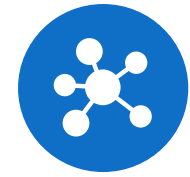
Importance mean score: 7.67
Current Usage: 8%

Lowest current usage and medium future growth potential, but high importance



- Awareness** • Lowest awareness of MBD in the Transportation sector, highest in Large companies
- Importance** • Importance of MBD rated the highest in the Americas region with a score of 8.12 and in the Industrial Machinery sector (8.25) and amongst small companies
- Current Usage** • Current usage of MBD is higher in large companies (low base)
- Planned Usage** • Planned usage of MBD in the next 12 months is lower in EMEA (low base)





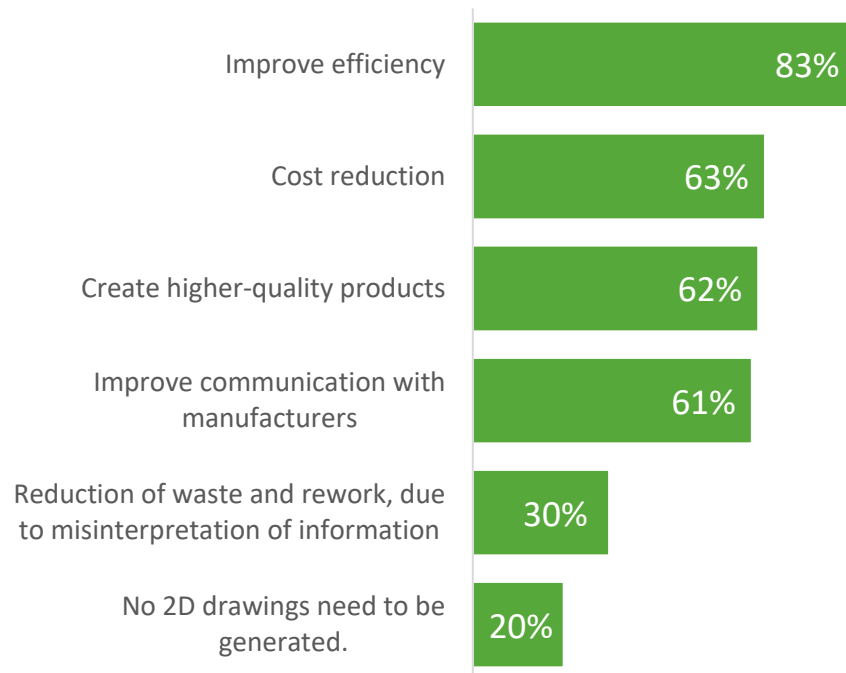
Model Based
Definition
(MBD)

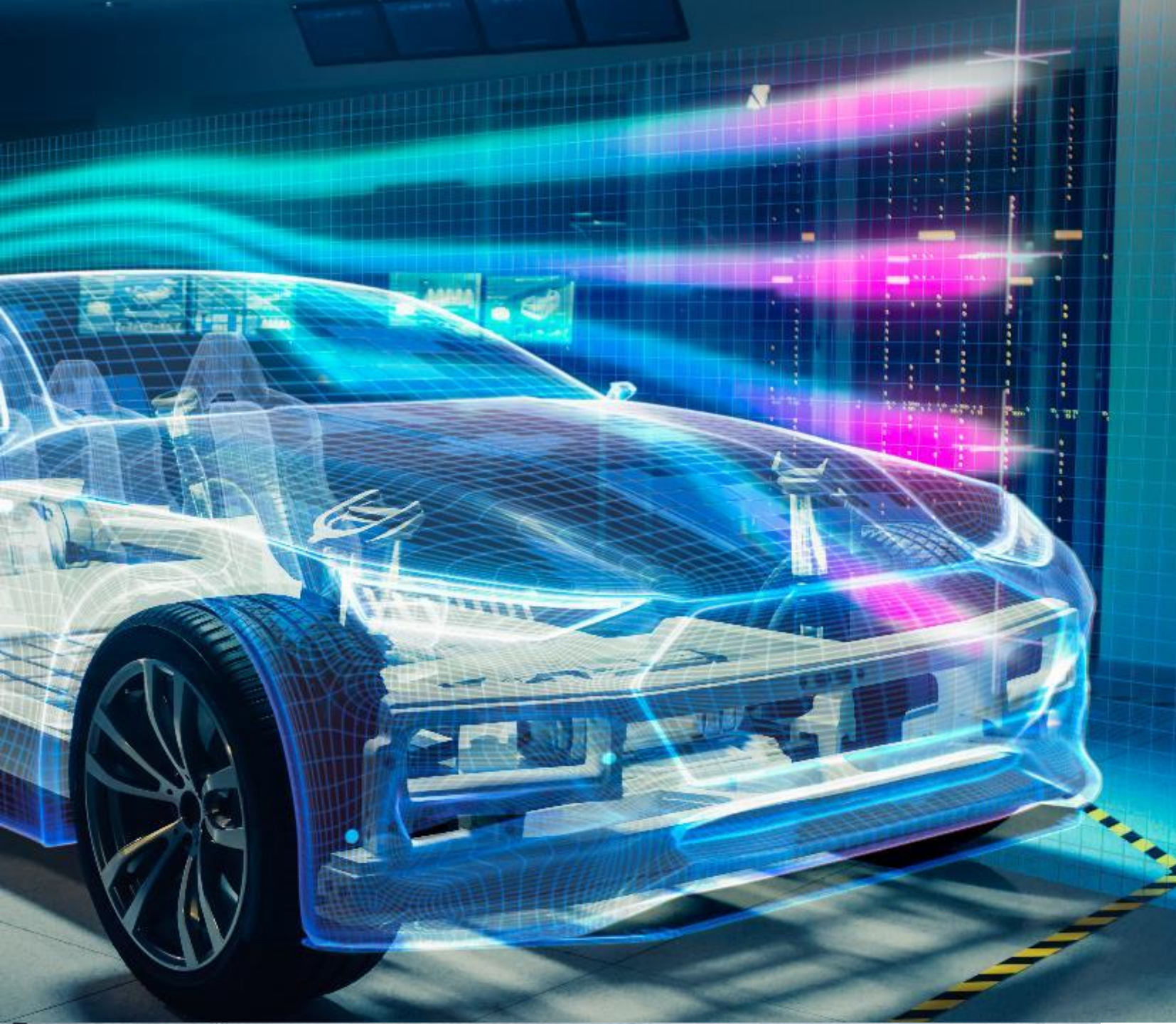


Benefits of Model Based Definition (MBD)

Improving efficiency, cost reduction, and the creation of higher quality products are seen as the main benefits in using Model Based Definition (MBD) in the future

Benefits of Model Based Definition (MBD)





Simulation/ CAE

The prediction of real-world behavior
or performance of a design, usually
with Simulation/CAE software
(Computer Aided Engineering)

Manufacturing Report

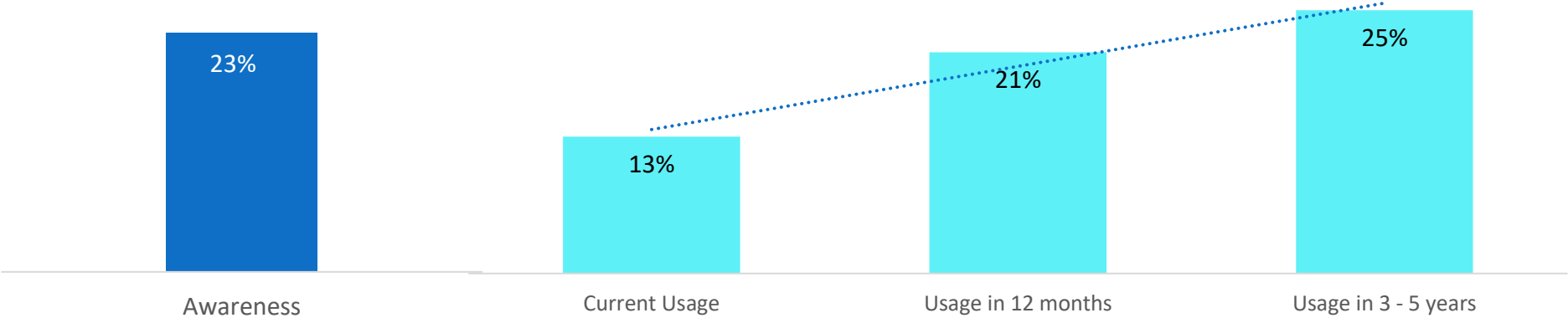


Business Advantage
intelligence insight innovation

Simulation Usage

Importance mean score: 7.52
Current Usage: 13%

Medium current usage, medium importance and future growth potential



- Awareness**
 - Highest awareness of Simulation/CAE in the US, and significantly higher than APAC. Significantly lower awareness in Medium-size companies
- Importance**
 - Importance of Simulation/CAE rated the highest in the Americas region with a score of 7.83 and lowest in medium companies
- Current Usage**
 - Current usage of Simulation/CAE is significantly higher in large companies
- Planned Usage**
 - Planned usage of Simulation/CAE in the next 12 months is higher in small companies





Simulation/CAE

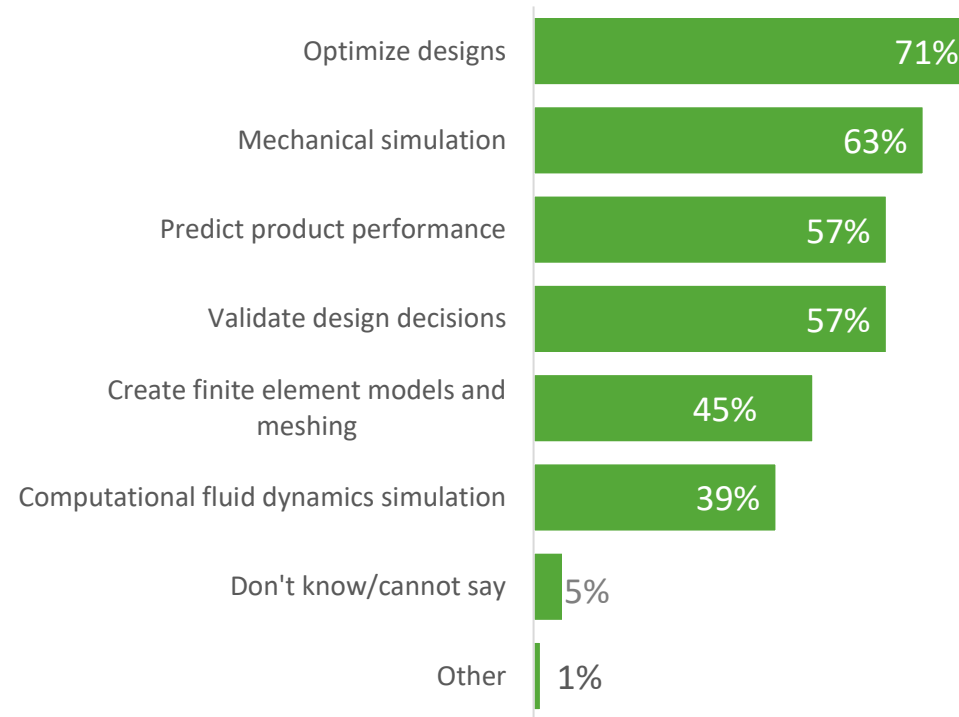


Simulation/CAE Usage

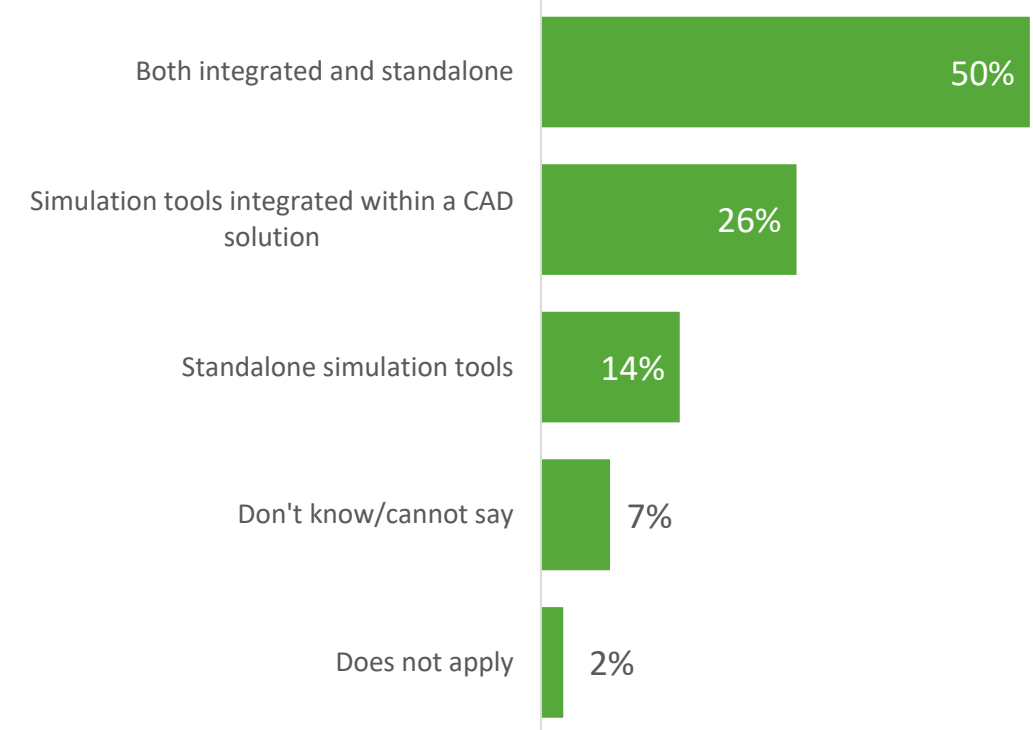
Creation of finite element models and meshing significantly higher in Industrial Machinery sector

Use of integrated simulation with CAD and standalone more widely used in APAC region

Uses of Simulation/CAE software



Integration/Standalone Simulation



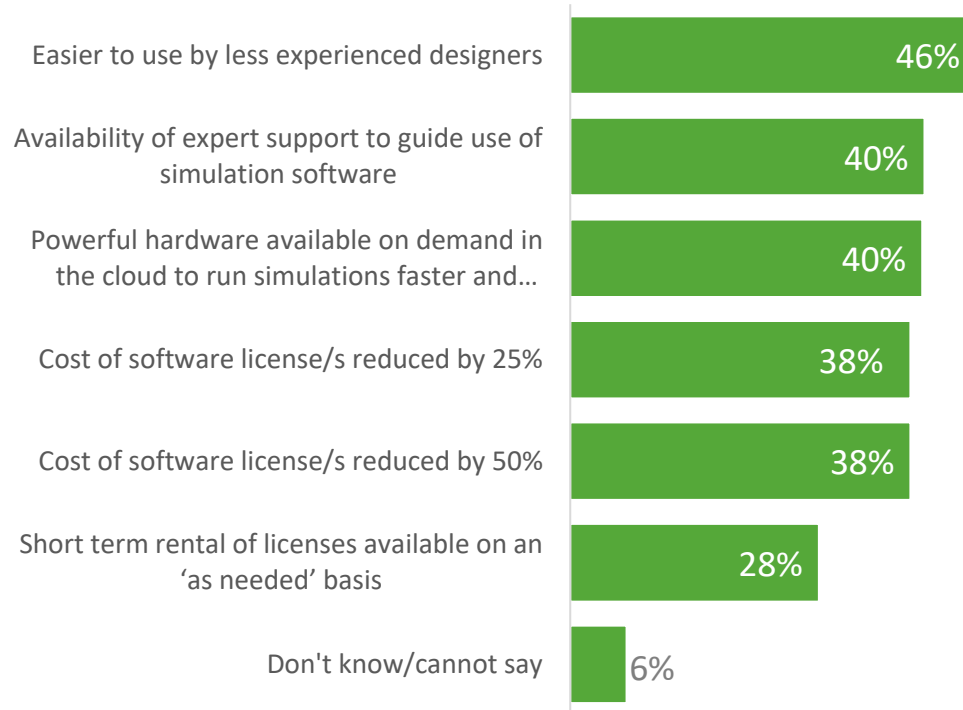


Simulation/CAE

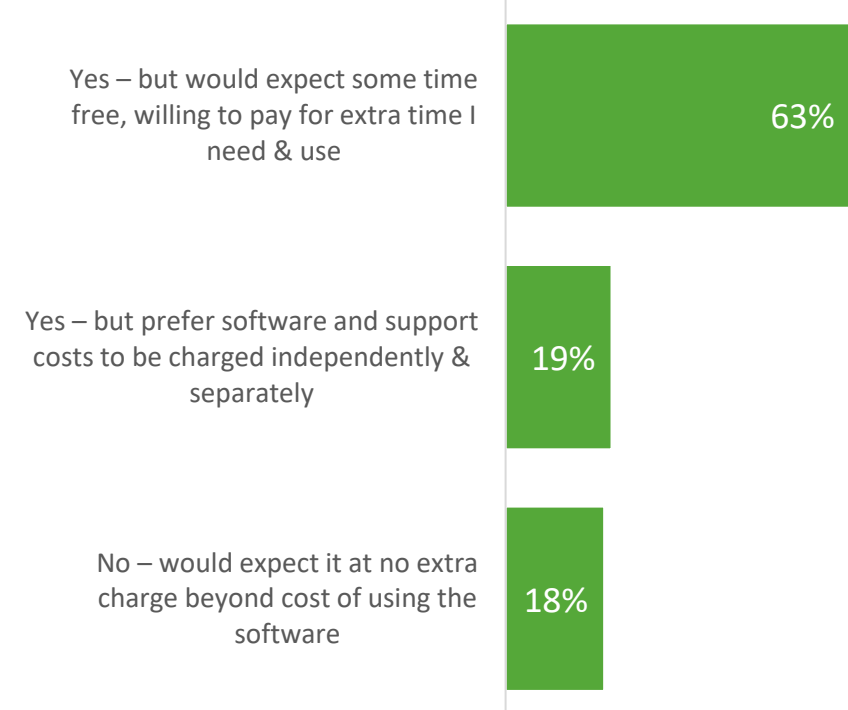
Drivers to Use Simulation/CAE

Powerful hardware available on demand in the cloud to run simulations faster and cheaper than possible in-house is motivating for those in the APAC region. More in the APAC region would expect some free support time but are willing to pay for extra time used

Drivers to use Simulation



Willingness to pay for expert support





PDM **(Product Data** **Management)**

Manufacturing Report



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intelligence insight innovation

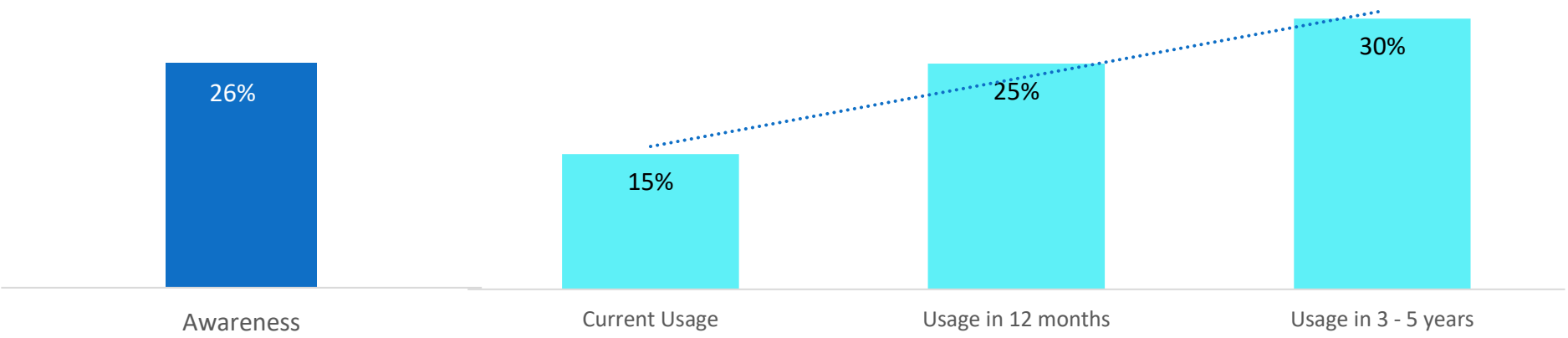


PDM

Usage of PDM

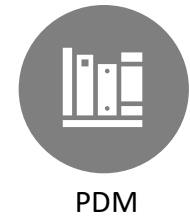
Importance mean score: 7.78
Current Usage: 15%

Medium current usage and medium future growth potential, but high importance

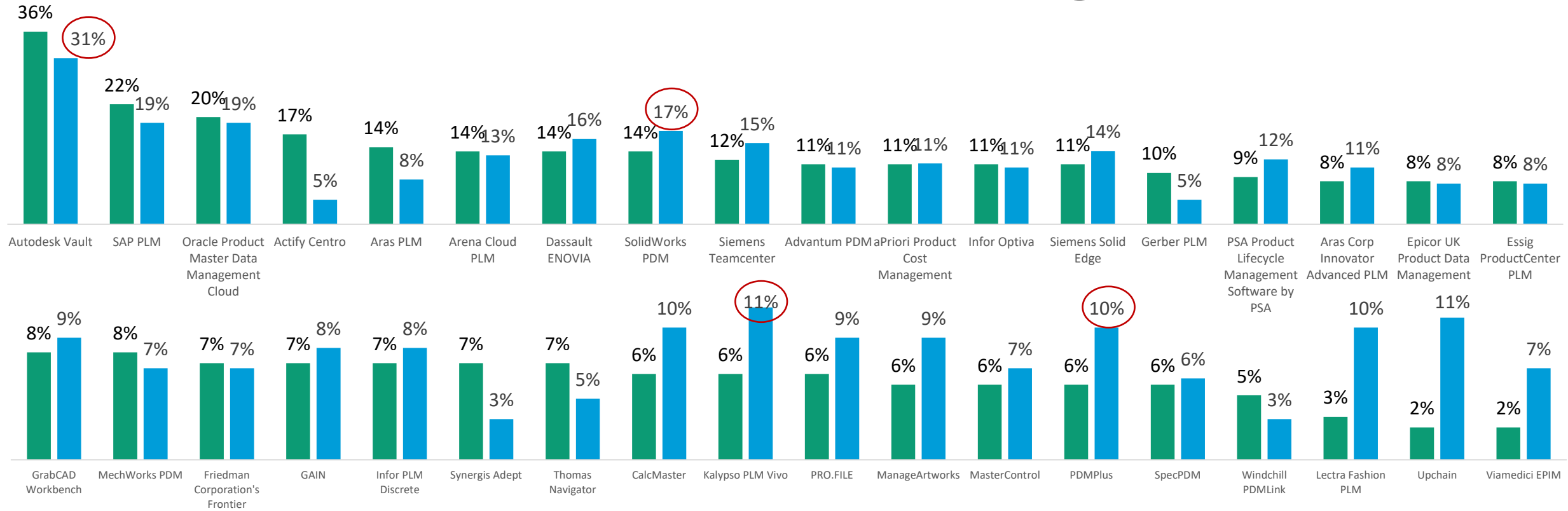


- Awareness**
 - Highest awareness of PDM in Americas, and significantly lower awareness in medium-size companies
- Importance**
 - Importance of PDM rated the highest in the Americas region with a score of 7.98 and in the Consumer Products sector with a score of 8.27
- Current Usage**
 - Current usage of PDM is lowest in EMEA and highest in large companies (low base)
- Planned Usage**
 - Planned usage of PDM in the next 12 months is higher in Americas and large companies (low base)





PDM Brand Current and Future Usage



Key
segments
driving
usage

- Significantly higher usage of Oracle in the Americas region and amongst transportation manufacturing companies
- Higher planned future usage of Arena Cloud PLM in small companies





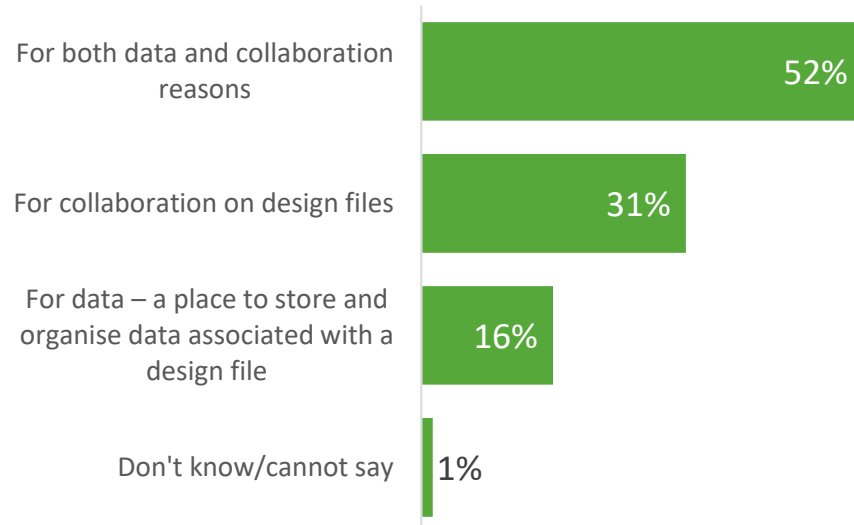
PDM



PDM Usage (cont..)

Automotive sector uses PDM for collaboration significantly more than other industries. Large companies use PDM significantly more for a place to store and organize data

Main Reason for Using PDM





Design Automation

Use of tools to improve productivity such as configurators, custom scripts, or other tools that might be used to reduce the time taken to complete a design

Manufacturing Report



Business Advantage
intelligence insight innovation

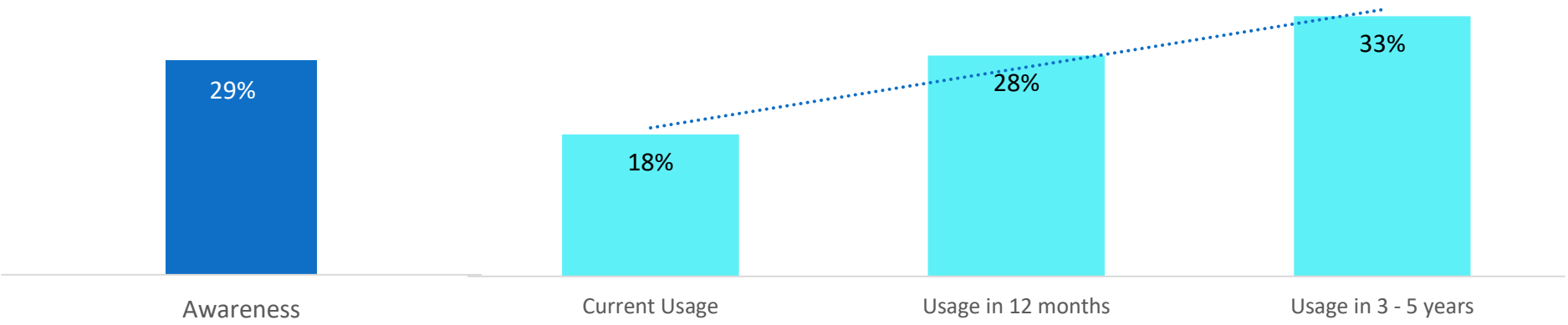


Design Automation

Usage of Design Automation

Importance mean score: 7.37
Current Usage: 18%

High current usage and importance, but medium future growth potential



- Awareness** • Significantly lower awareness of Design Automation in small companies
- Importance** • Importance of Design Automation rated significantly lower in EMEA with a score of 7.27, highest in transportation sector, and highest in medium companies
- Current Usage** • Current usage of Design Automation is lowest in EMEA and small companies
- Planned Usage** • Planned usage of Design Automation in the next 12 months is higher in EMEA and medium companies (low base)

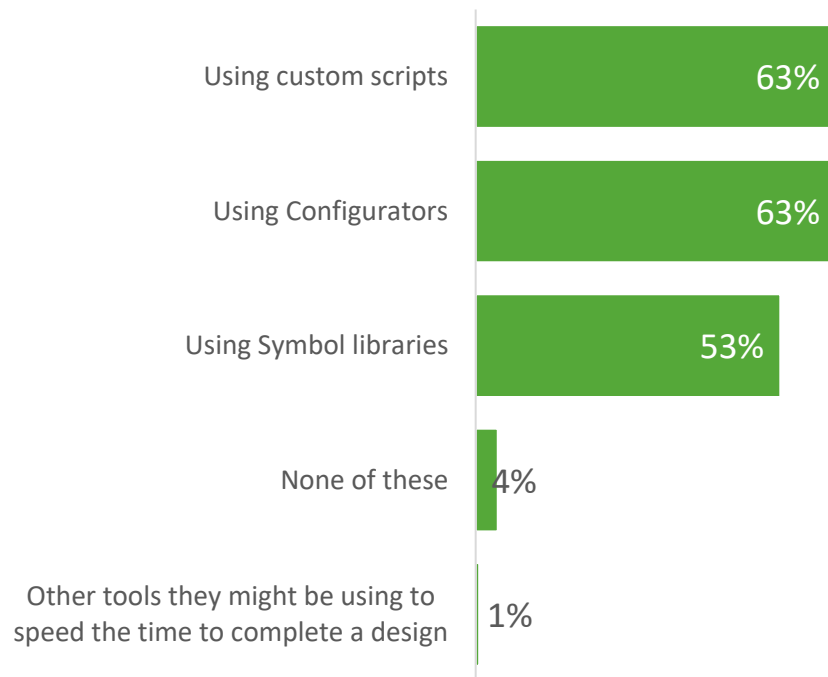


Design
Automation

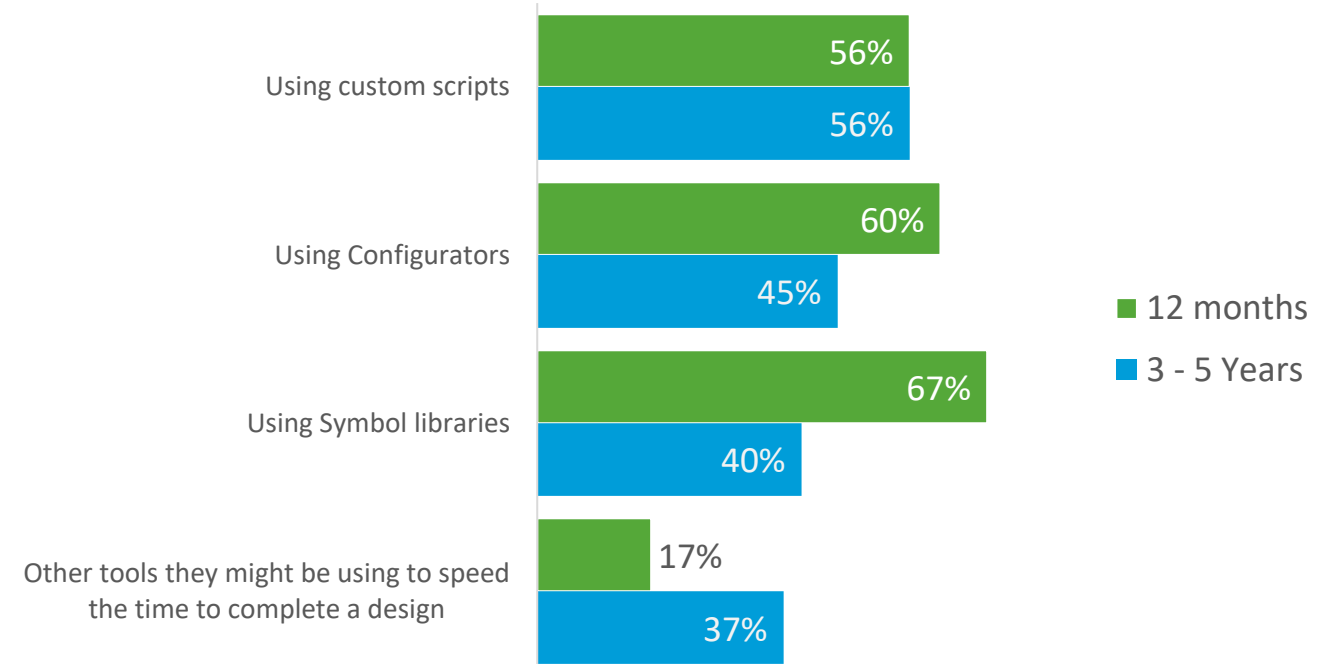
Design Automation Usage

Use of symbol libraries significantly higher in America's region, use of configurators is highest amongst large companies

Current Usage



Future Usage

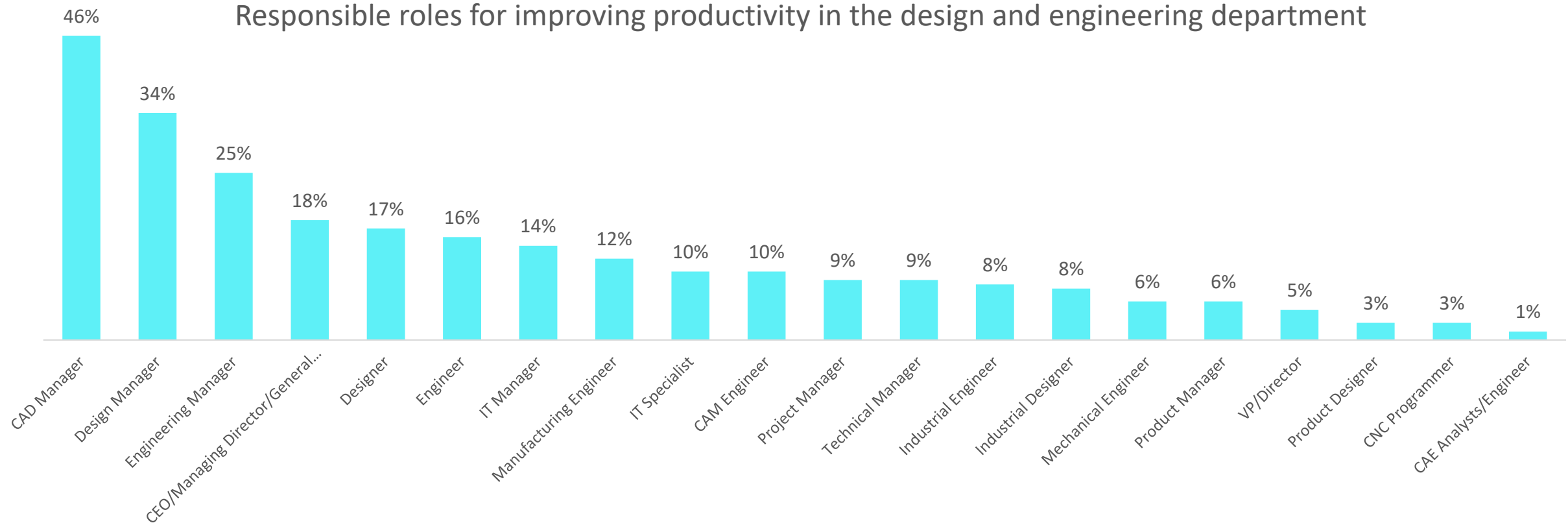


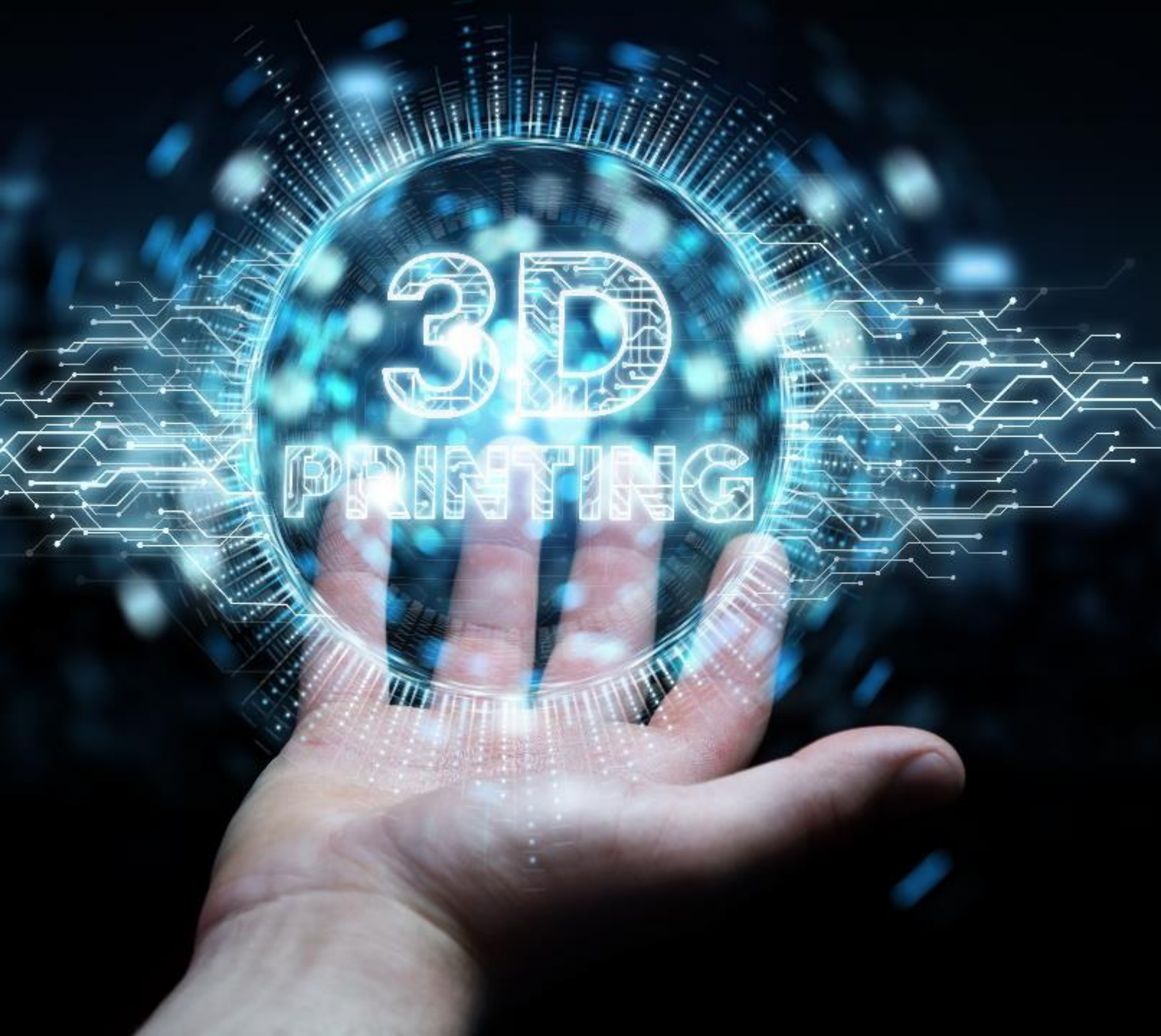
Design
Automation

Productivity Improvement by Key Roles

CAD Manager, Design Manager and Engineering Manager are responsible for productivity improvement in design and engineering departments

Responsible roles for improving productivity in the design and engineering department





3D Printing

Manufacturing Report



Business Advantage
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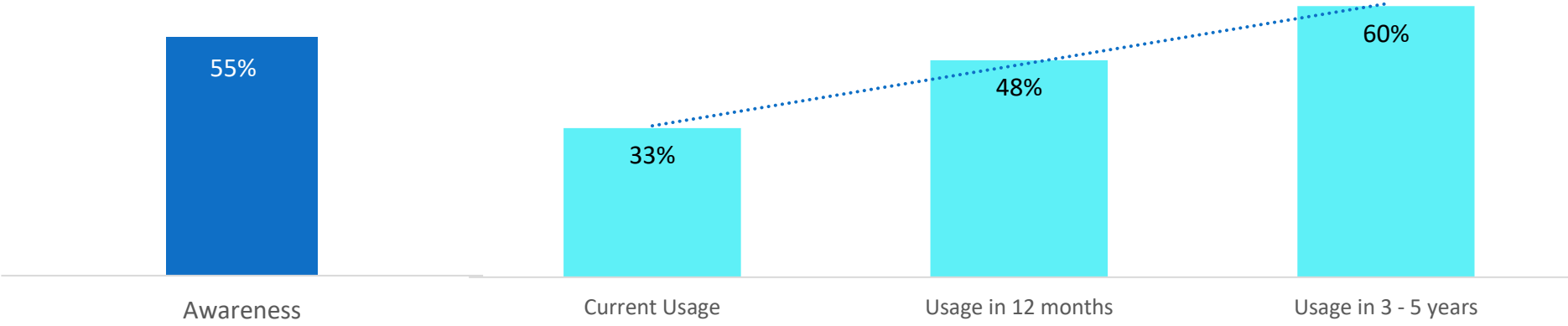


3D Printing

Usage of 3D Printing

Importance mean score: 7.32
Current Usage: 33%

High current usage, medium importance, and medium future growth potential



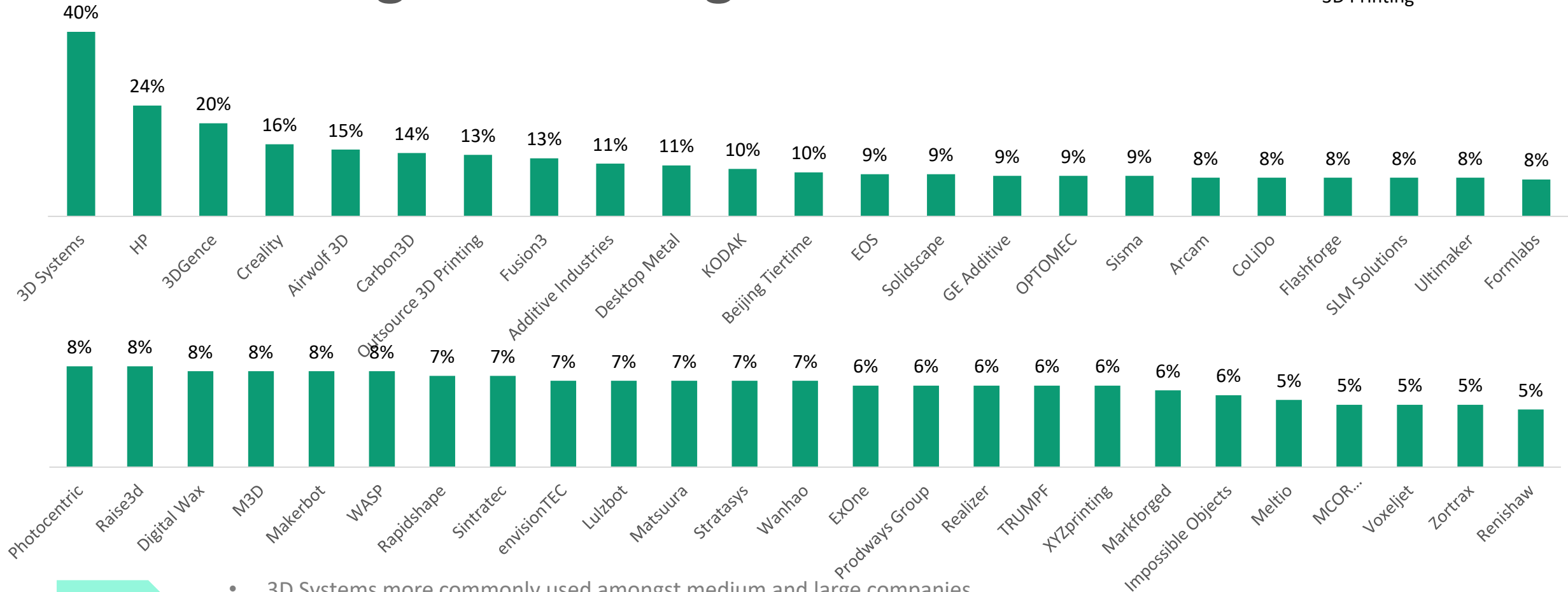
- Awareness** • Highest awareness of 3D printing in the US, lowest awareness in the EMEA region and amongst the Transportation sector
- Importance** • Importance of 3D printing rated the lowest in EMEA and significantly higher in medium-size companies
- Current Usage** • Current usage of 3D printing is significantly higher in APAC (Japan) and significantly higher in the Industrial Machinery sector and small companies
- Planned Usage** • Planned usage of 3D printing in the next 12 months is higher in America and in Consumer Products and lowest in Large companies



3D Printing



3D Printing Brand Usage



Key
segments
driving
usage

- 3D Systems more commonly used amongst medium and large companies
- Arcam and Desktop Metal used primarily by large companies
- Fusion3 significantly more usage amongst Transportation sector
- Higher usage of Kodak amongst Consumer Products industry





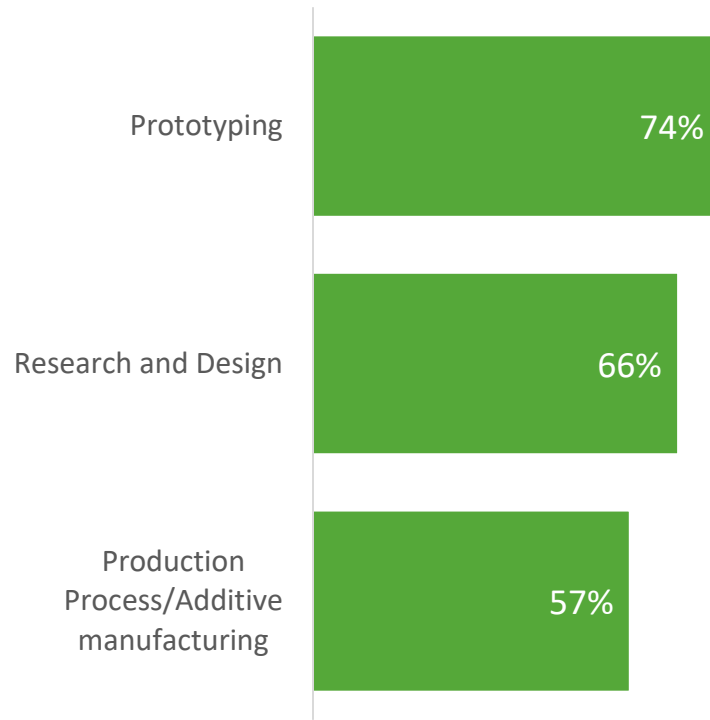
3D Printing



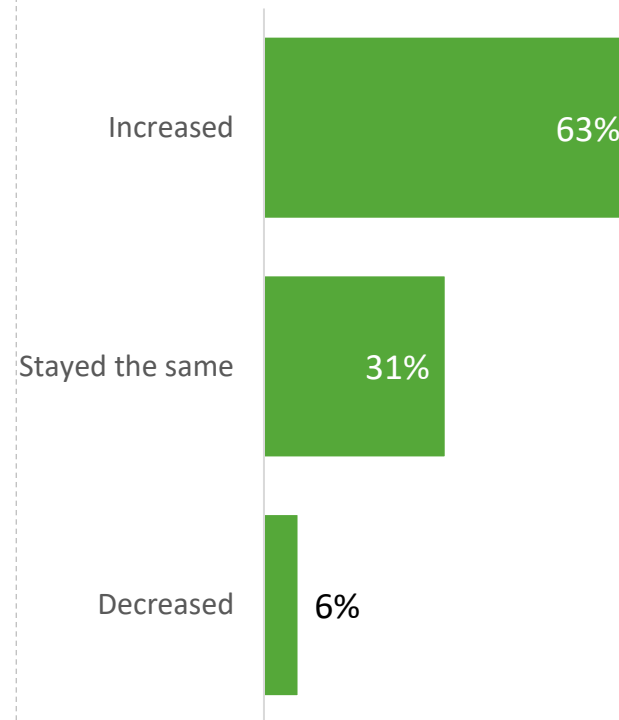
3D Printers Usage and Benefits

Large companies have found the benefit of faster time to market using 3D Printing.
Savings on design time most notable in USA, improvements in design are mentioned most frequently by medium companies

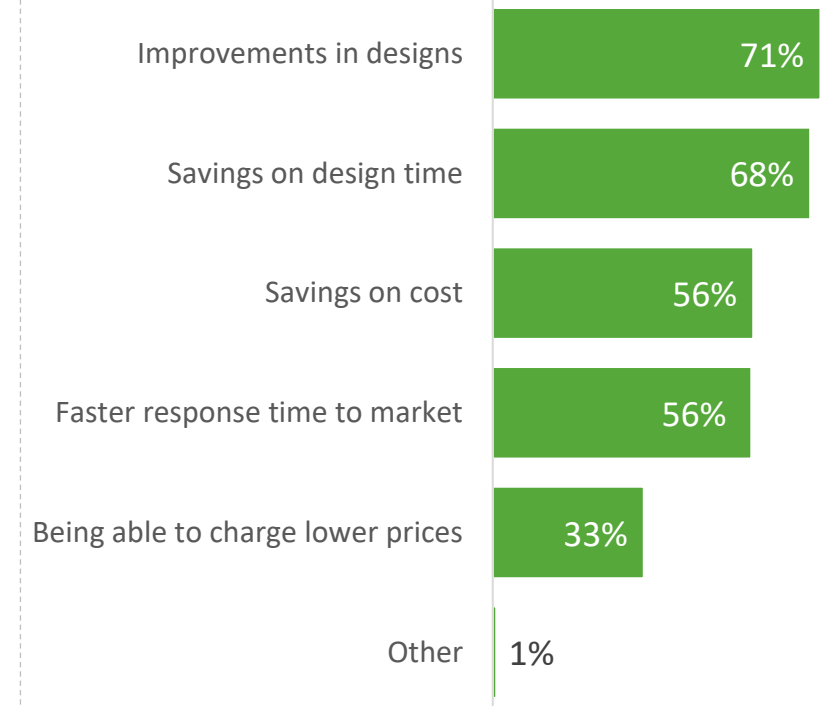
How 3D Printers are Used



Usage Over Past 12 Months



Benefits and Productivity changes





CAM

Manufacturing Report



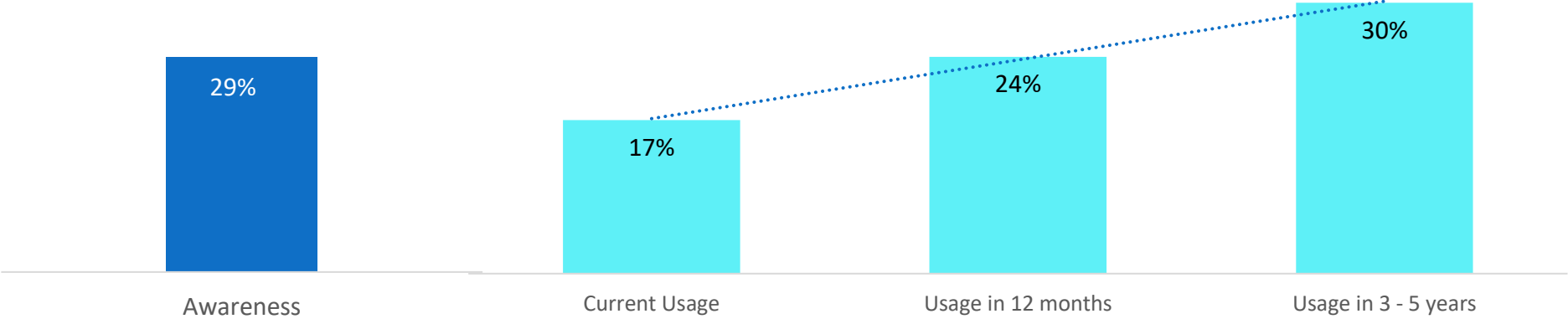
Business Advantage
intelligence insight innovation



Usage of CAM

Importance mean score: 7.6
Current Usage: 17%

Medium current usage and importance, but low future growth potential



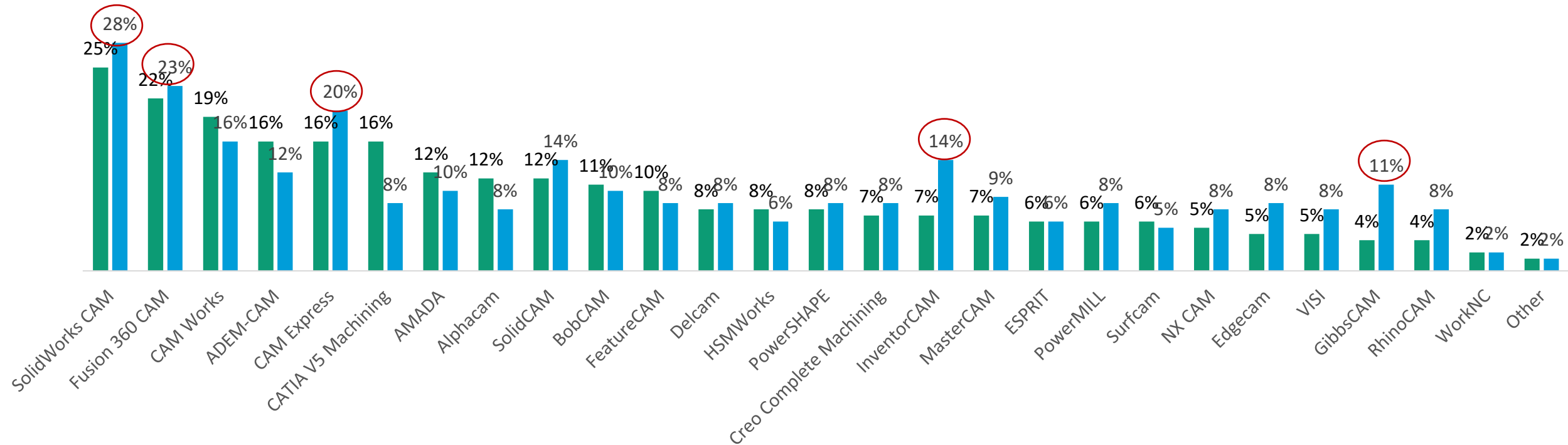
- Awareness** • Significantly lower awareness of CAM reported in Americas when compared to APAC, and significantly higher in the Industrial Machinery sector
- Importance** • Importance of CAM rated the lowest in the Americas region and highest amongst the Transportation sector and amongst medium-sized companies
- Current Usage** • Current usage of CAM is higher in APAC
- Planned Usage** • Planned usage of CAM in the next 12 months is significantly higher in APAC and large companies (low base)





CAM Brand Current and Future Usage

Importance mean score: 7.6



Key
segments
driving
usage

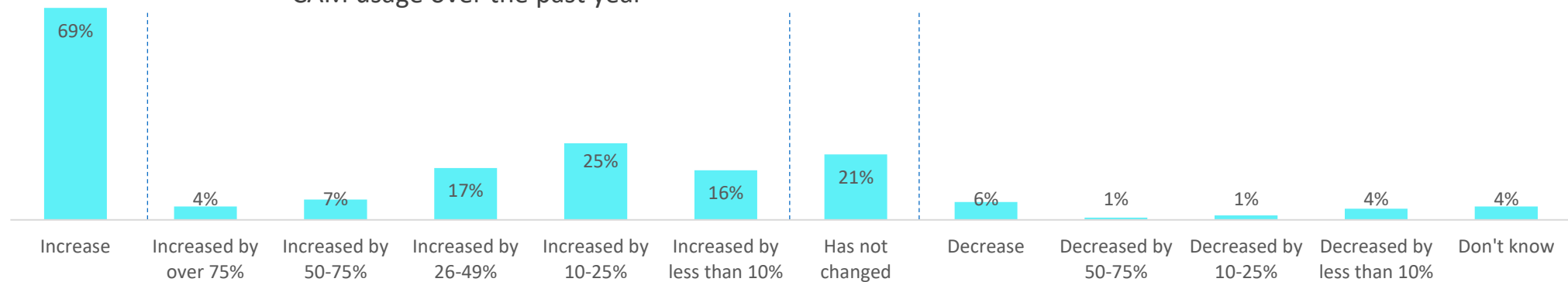
- Higher usage of CAD Works in Americas regions
- Predicted increase in usage of CAM Express amongst small companies



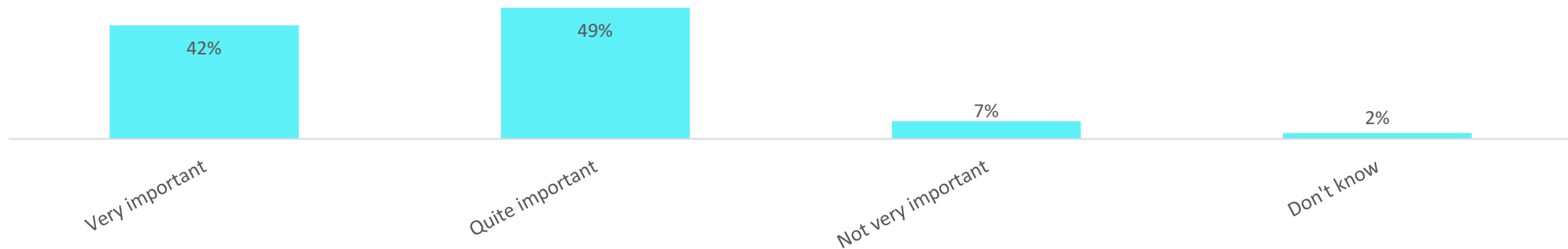
CAM Usage (cont..)

Automatically generated CAM machine instructions considered to be very important particularly in the Americas region

CAM usage over the past year



Importance of automatically generated CAM machine instructions

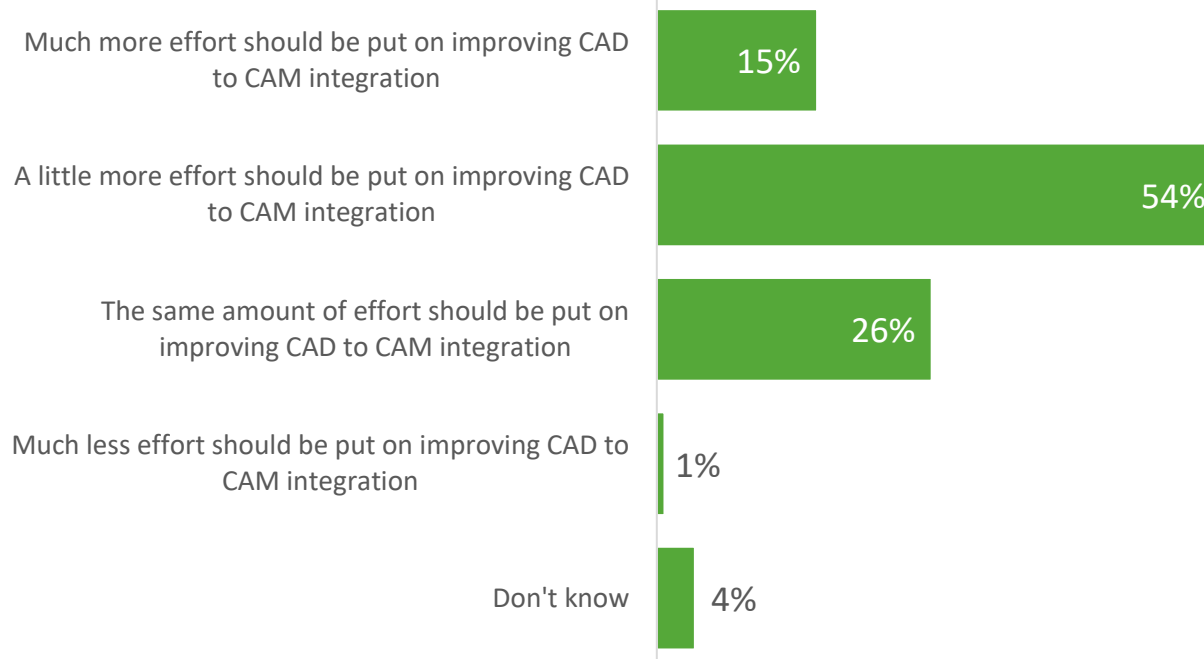




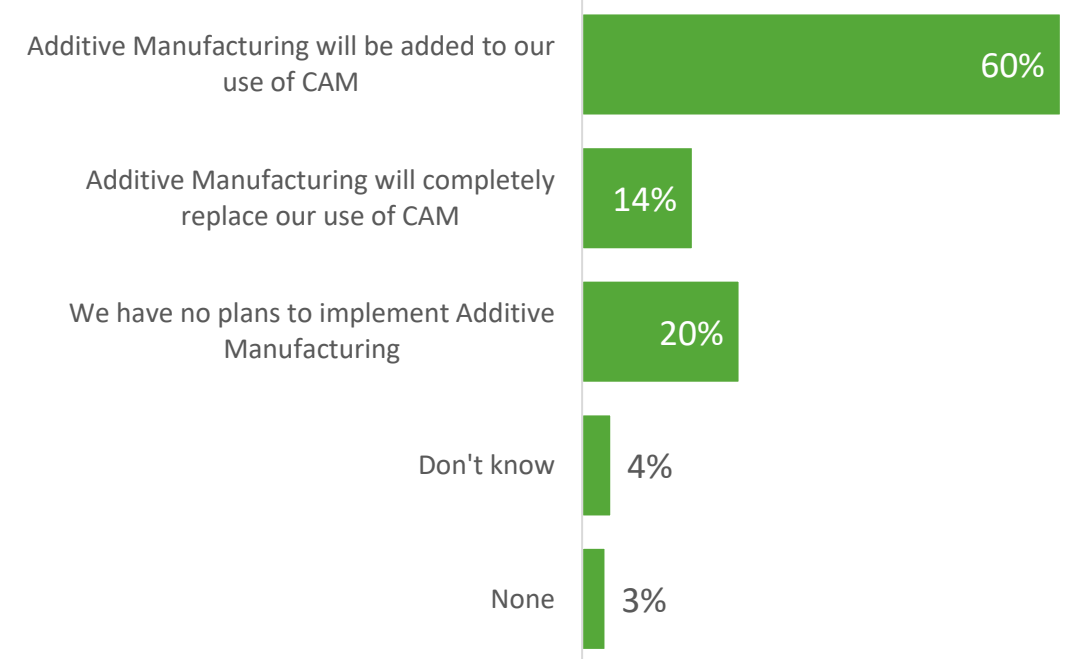
CAM Improvements and Impact of 3D Printing

Generally, respondents consider that there should be more effort to improve CAD to CAM integration. The majority will use additive manufacturing in the next 1 – 3 years

Perceptions on vendor efforts to improve CAD to CAM Integration



3D printing impacts on CAM Usage in the next 3 years





Generative Design

Use of software to generate optimum forms for products and buildings based on design parameters

Manufacturing Report



Business Advantage
intelligence insight innovation

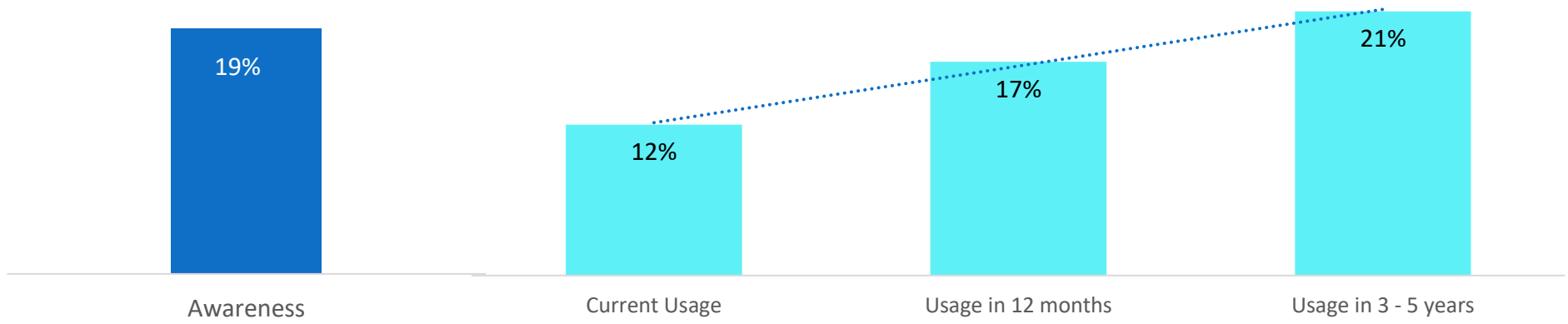


Generative Design

Usage of Generative Design

Importance mean score: 7.56
Current Usage: 12%

Low current usage, medium importance, and low future growth potential



- Awareness** • Lowest awareness of Generative Design in APAC, and in the Transportation sector. Highest awareness in large companies
- Importance** • Importance of Generative Design rated the highest in the Transportation sector and lowest in small companies
- Current Usage** • Current usage of Generative Design is highest in Americas and amongst large companies
- Planned Usage** • Planned usage of Generative Design in the next 12 months is higher in large companies

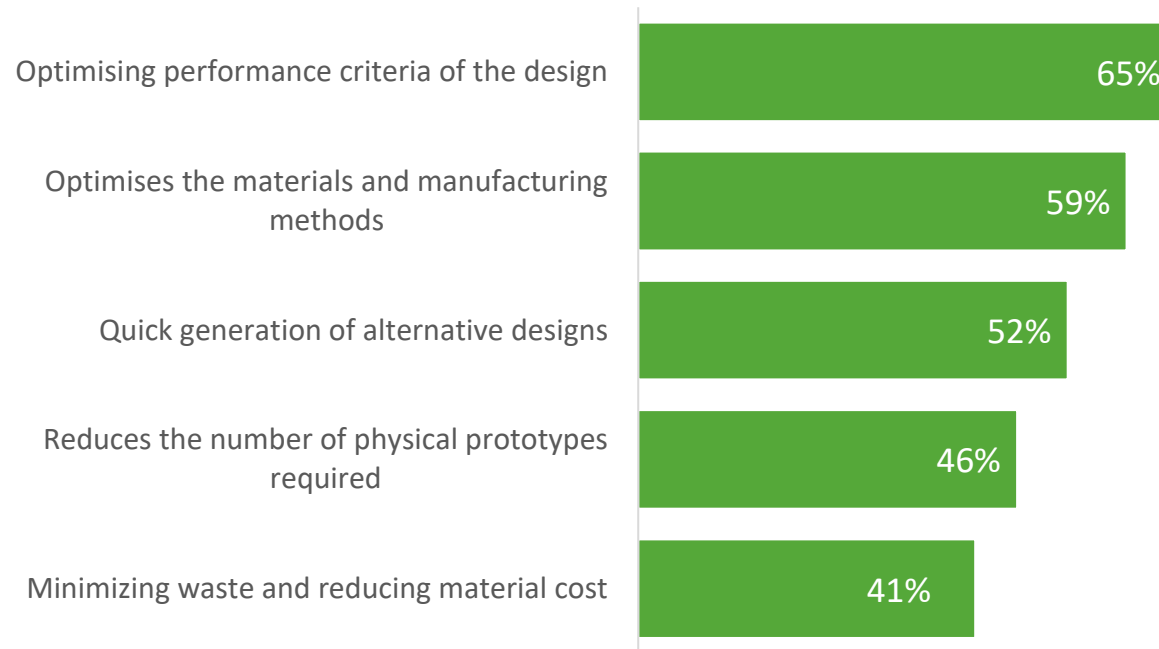


Generative
Design

Envisaged Benefits of Generative Design

Minimizing waste and reducing material cost recognized by Consumer Products and Other Manufacturing sector. Optimising performance criteria of the design is particularly relevant to medium and large companies. Those in a CAD manager role see main benefit of generative design as reducing the number of physical prototypes required

Benefits of Generative Design





Cloud Based CAD

Manufacturing Report



Business Advantage
intelligence insight innovation

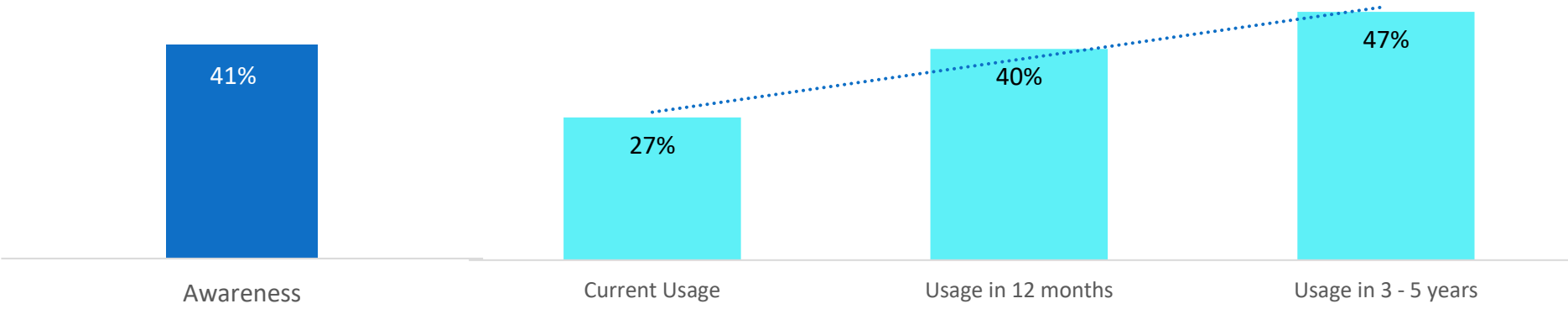


Cloud Based CAD

Usage of Cloud Based CAD

Importance mean score: 7.82
 Current Usage: 27%

High current usage and importance, but low future growth potential



- Awareness**
 - Lowest awareness of Cloud Based CAD in EMEA (specifically in the UK), highest awareness in APAC
- Importance**
 - Importance of Cloud Based CAD rated the highest amongst medium-size companies and lowest in EMEA
- Current Usage**
 - Current usage of Cloud Based CAD is higher in APAC (Japan and India) in the Consumer Products sector
- Planned Usage**
 - Planned usage of Cloud Based CAD in the next 12 months is significantly higher in Australia



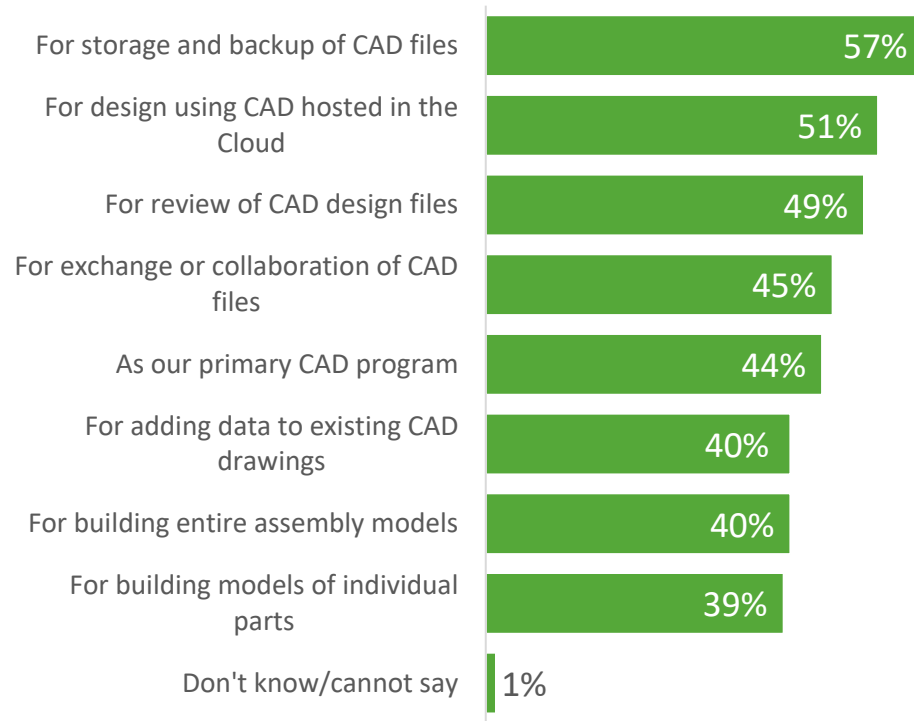


Cloud Based
CAD

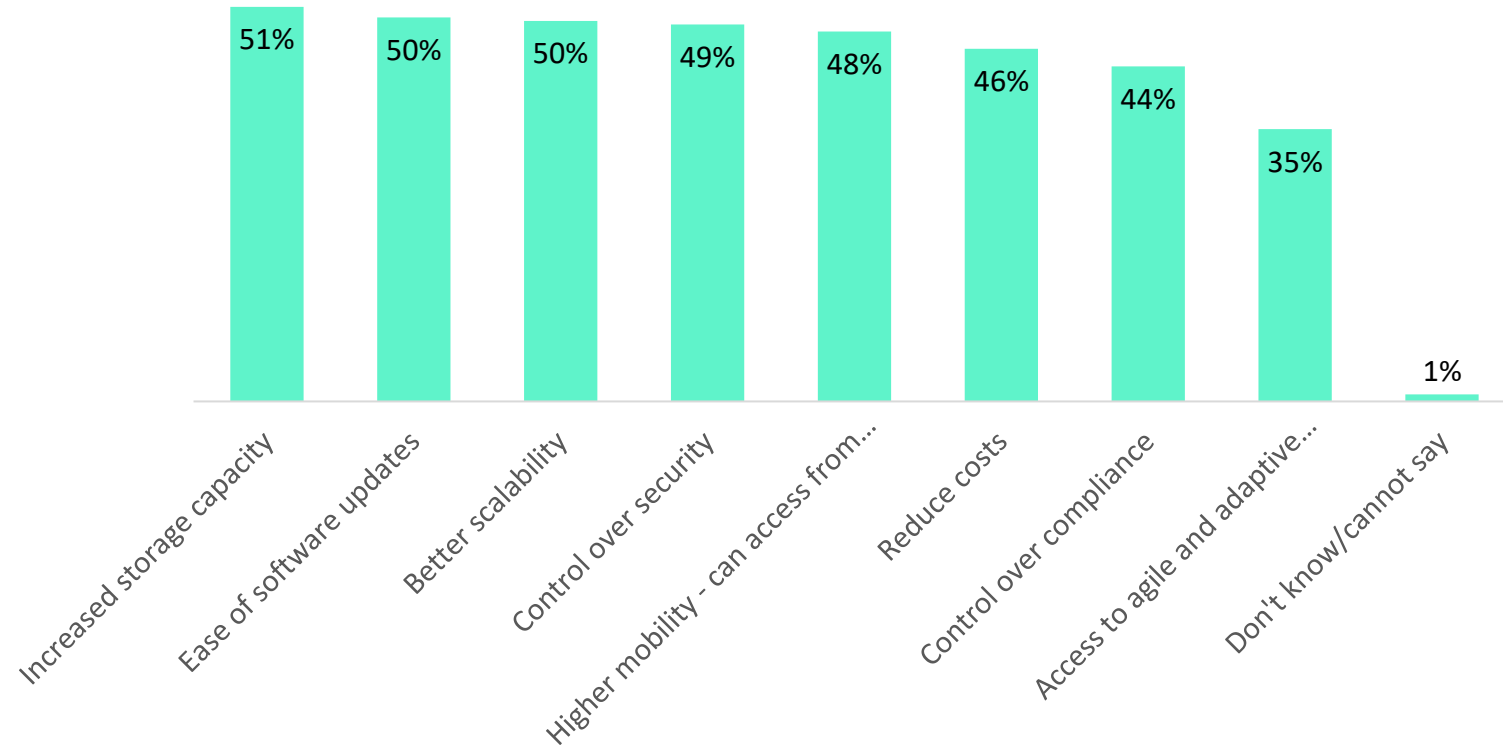
Usage and Benefits of Cloud Based CAD

Use of Cloud Based CAD for exchange or collaboration and storage and backup significantly higher in USA

How Cloud Based CAD is Used



Benefits and Productivity Changes





Collaborative Design

Team of people working on one design

Manufacturing Report



Business Advantage
intelligence insight innovation

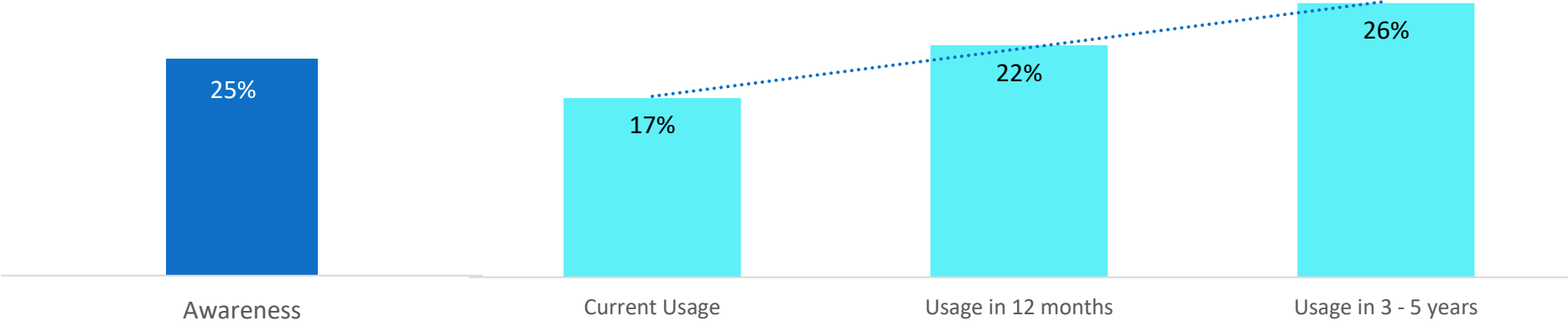


Collaborative Design

Usage of Collaborative Design

Importance mean score: 7.8
Current Usage: 17%

Medium current usage and low future growth potential, but high importance



- Awareness** • Lowest awareness of Collaborative Design in EMEA, highest awareness amongst large companies
- Importance** • Importance of Collaborative Design rated the highest in the Americas region with a score of 8.17 and in medium-sized companies
- Current Usage** • Current usage of Collaborative Design is highest in large companies
- Planned Usage** • No significant differences by industry sector, company size or geography



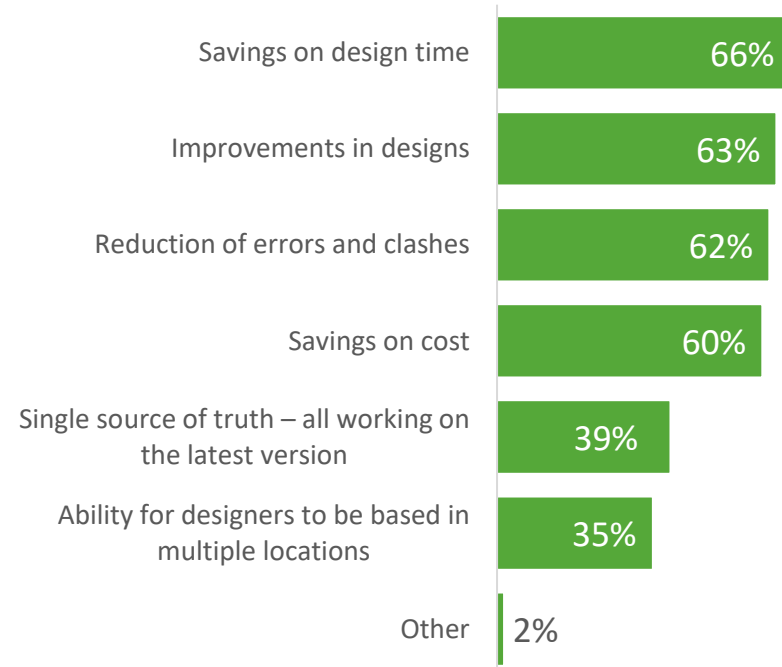
Collaborative
Design



Collaborative Design Benefits

Importance Mean Score: 7.8
Rank order 2

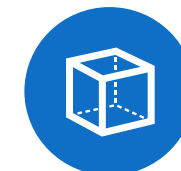
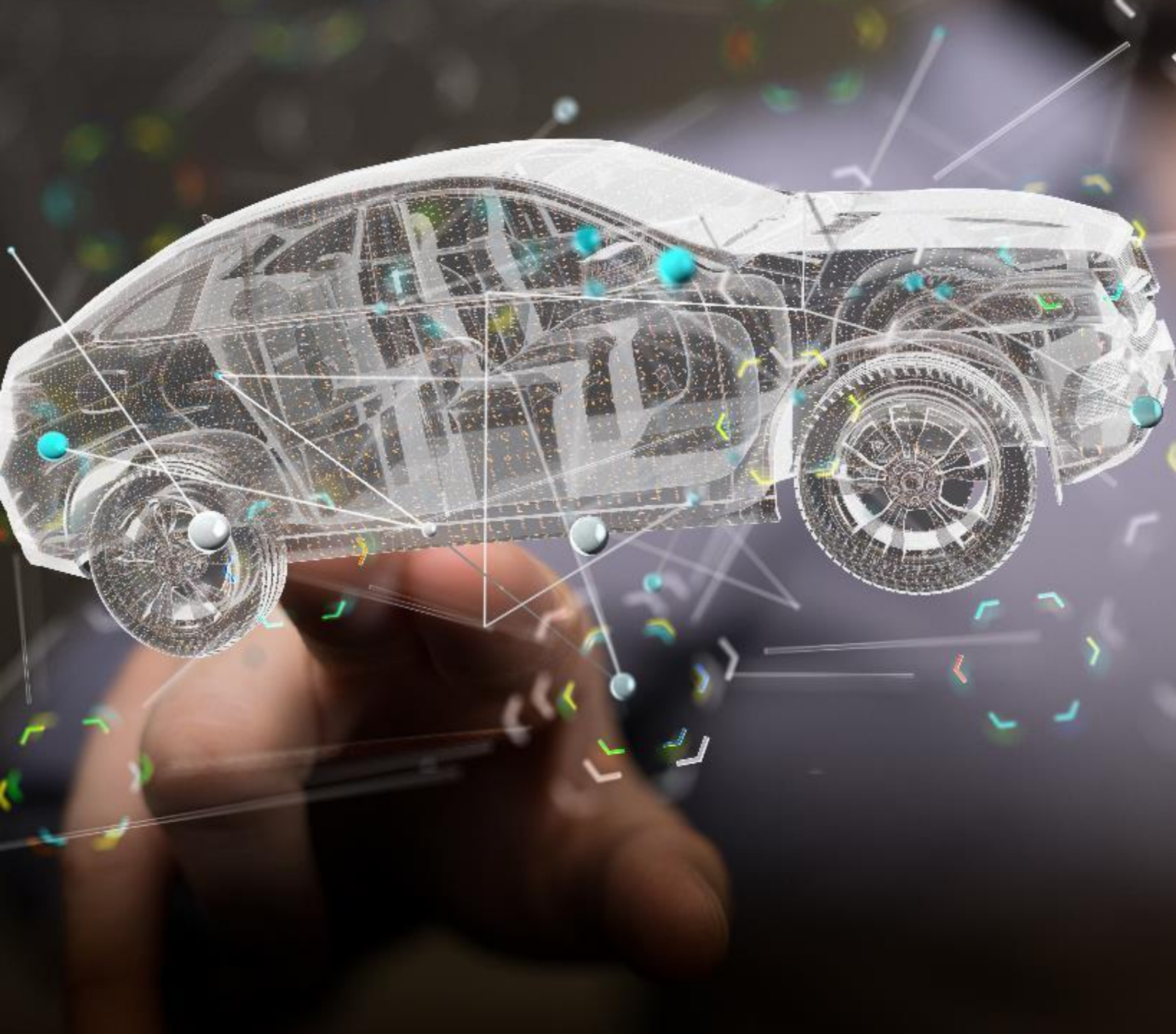
Benefits of Collaborative Design



Savings in design time through Collaborative Design significantly higher in Americas and within Industrial Machinery sector

Savings on cost due to Collaborative Design reported significantly higher in APAC and Americas than EMEA





3D Modelling

Manufacturing Report

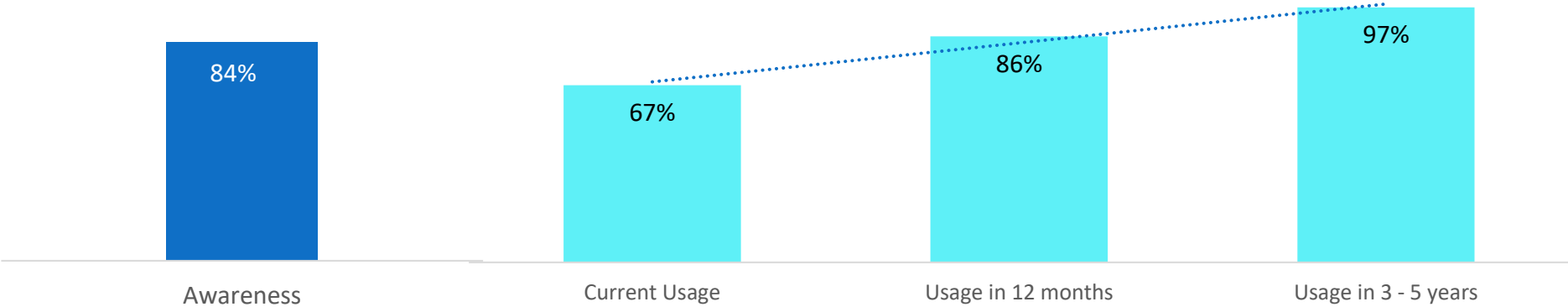


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Usage of 3D Modelling

Importance mean score: 7.97
Current Usage: 67%

Highest current usage and importance, but low future growth potential



- Awareness

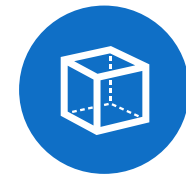
 - Lowest awareness of 3D modelling in China, highest awareness amongst the Industrial Machinery sector
- Importance

 - Importance of 3D modelling rated the highest in the Americas region with a score of 8.39
- Current Usage

 - Current usage of 3D modelling is higher in both medium and large sized companies
- Planned Usage

 - Planned usage of 3D modelling in the next 12 months is significantly higher in Japan





3D Modelling

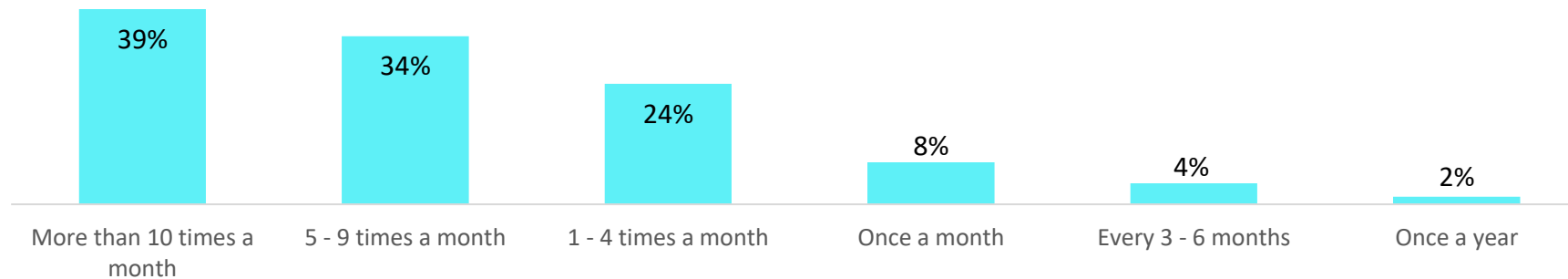


Usage of 3D Models

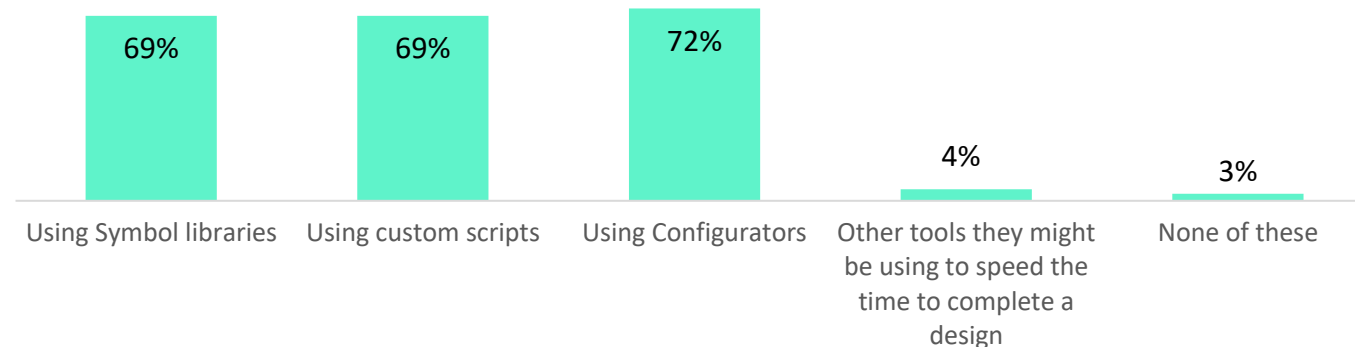
Importance mean score: 7.97

Rank order 1

Frequency of searching for and downloading ready-made 3D models



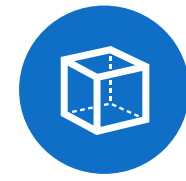
3D Modelling Automation



Q7a How often do you typically search for and download ready-made 3D models to increase productivity (save time by downloading components rather than drawing from scratch) in your organization? Base: 262

Q7e What are you/your company doing to automate common 3D modeling tasks so that you can improve productivity? Base: 189





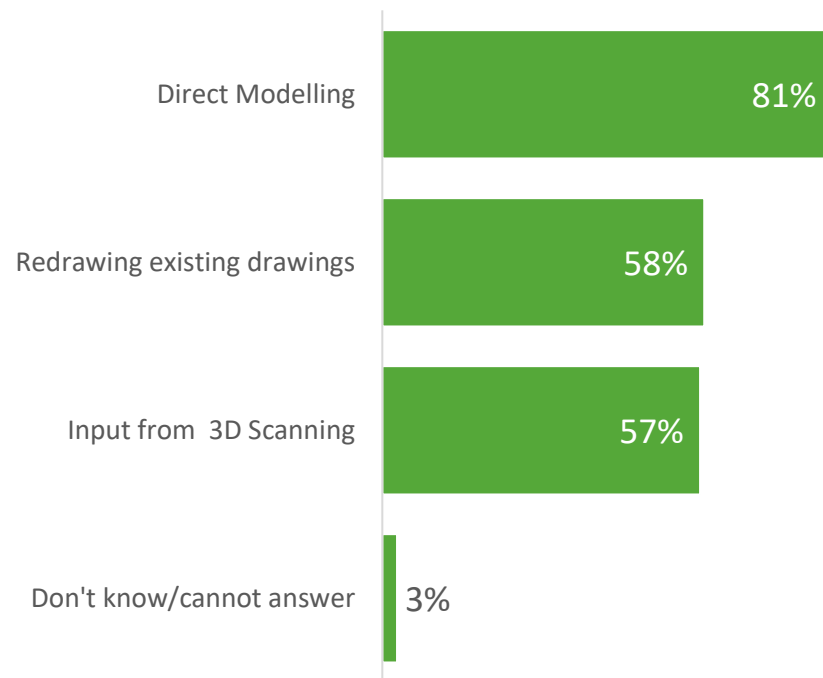
3D Modelling



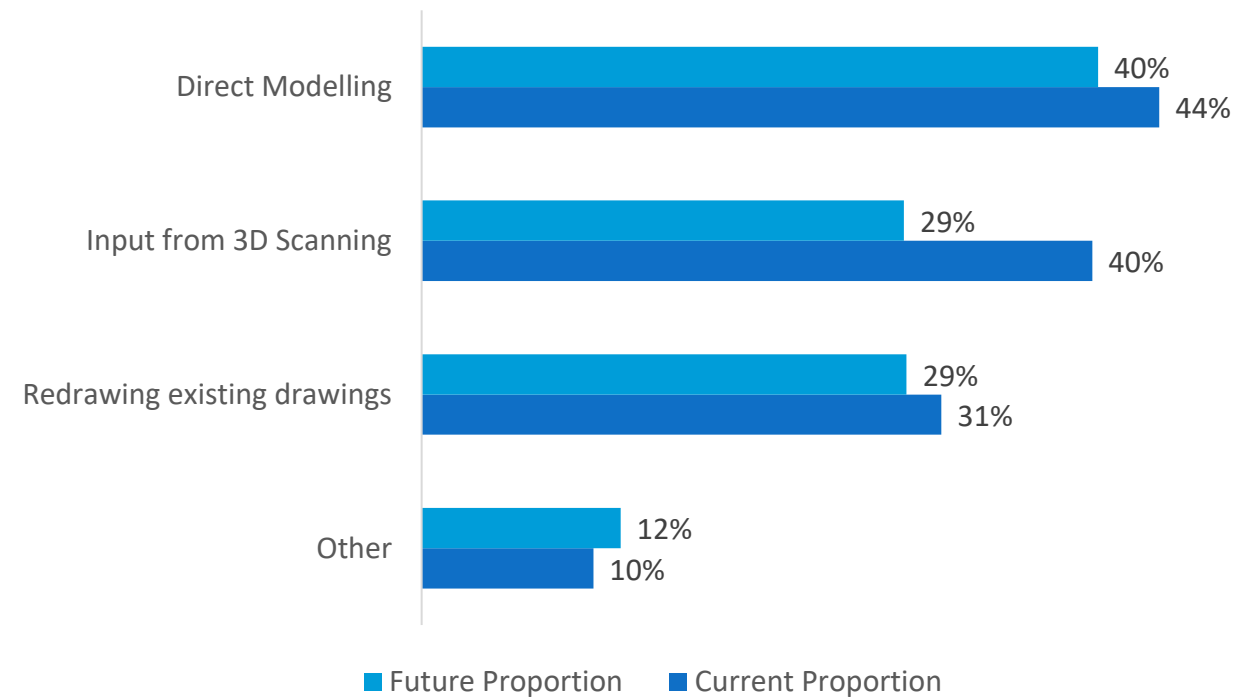
Methods of Creating 3D Models

Direct modelling is the main method used currently to create 3D models, but the proportion using this method is expected to decline in the future

Current methods of creating 3D models



Current and future proportion of each method of creating 3D models





2D Drafting

Manufacturing Report



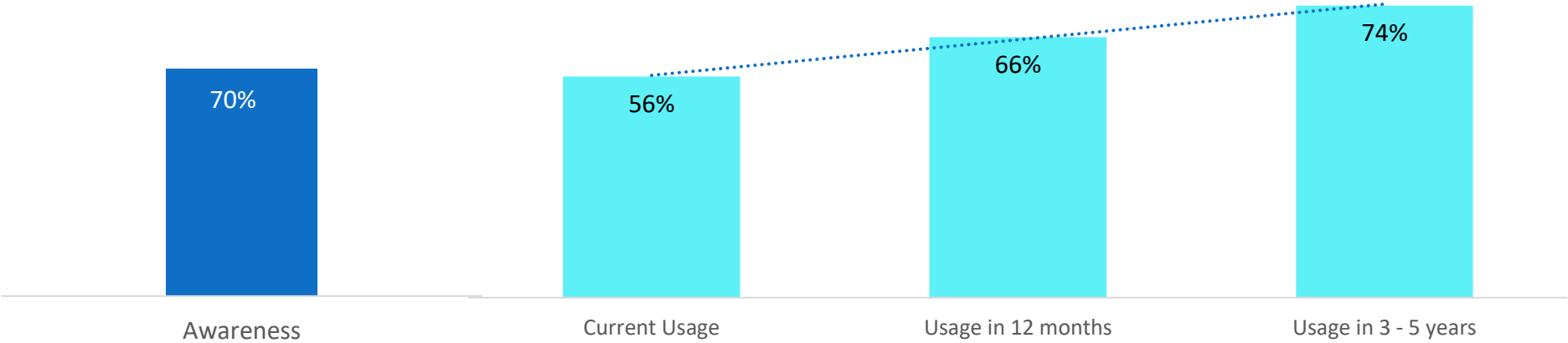
Business Advantage
intelligence insight innovation



Usage of 2D Drafting

Importance mean score: 7.69
Current Usage: 56%

High current usage and importance, but lowest future growth potential



- Awareness**
 - Significantly lower awareness of 2D in APAC, and significantly lower amongst the Transportation sector. Significantly lower awareness in medium-sized companies
- Importance**
 - Importance of 2D Drafting rated the highest in the Americas region and lowest in large companies
- Current Usage**
 - Current usage of 2D Drafting is significantly higher in Italy, significantly lower in APAC, significantly lower in the Transportation sector and amongst medium-sized companies
- Planned Usage**
 - Planned usage of 2D Drafting in the next 12 months is lower in Americas and large companies (low base)



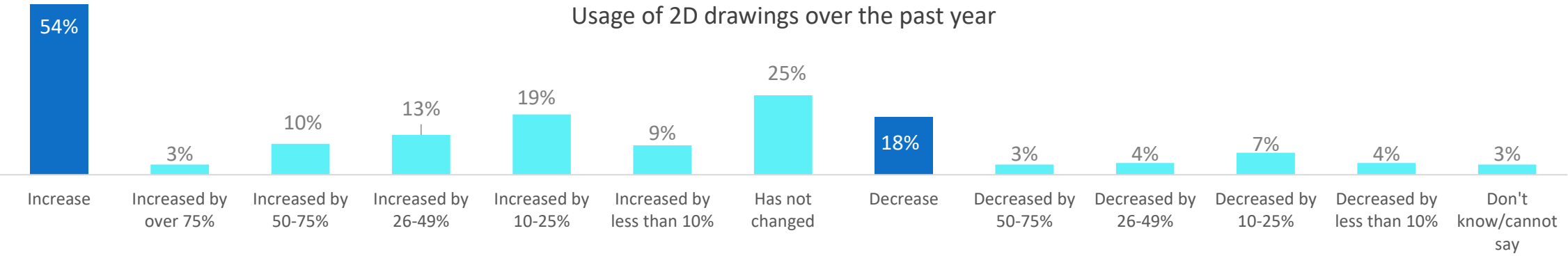


2D Drafting

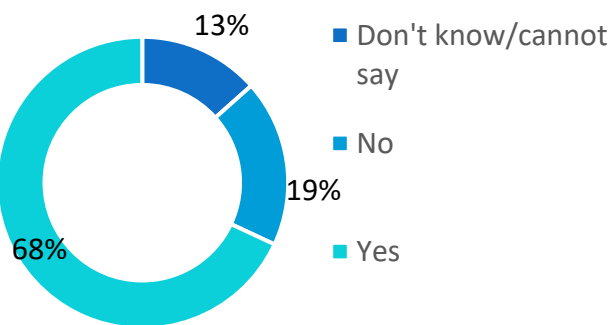


2D Design Usage and Automation

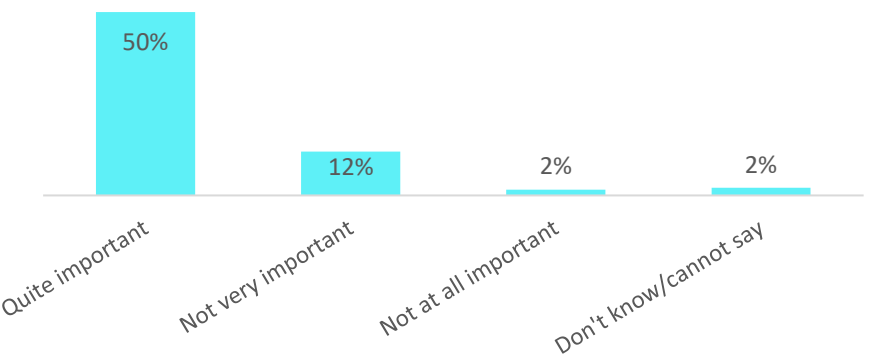
Importance mean score: 7.69



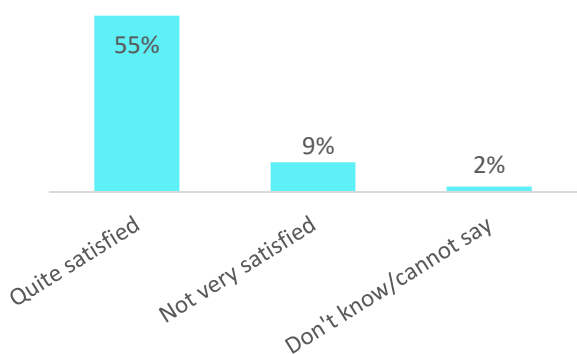
Using or planning to use automatically generated 2D Drawings from 3D models



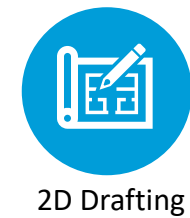
Importance of automatically generated 2D Drawings from 3D models



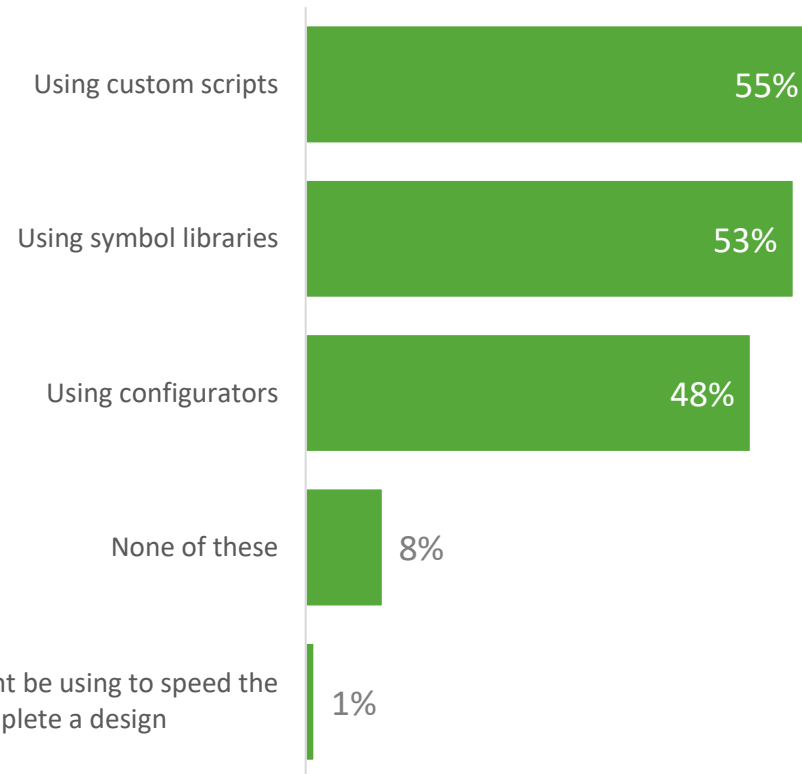
Satisfaction with automatically generated 2D Drawings from 3D models



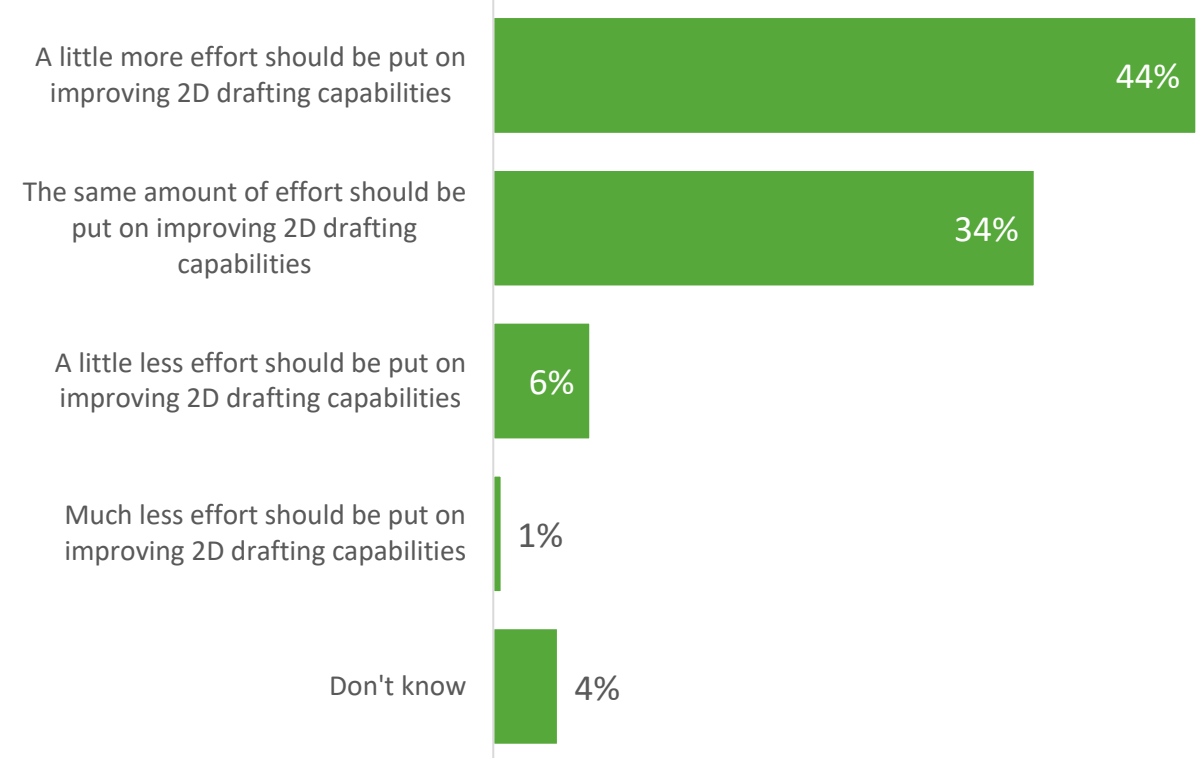
2D Drawing Automation & Vendor Commitment

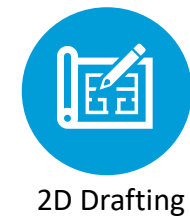


How users increase 2D drawing productivity



Effort vendors should put into improving 2D drafting





2D Drafting



Proportion of 2D vs 3D usage



39% of design work
produces 2D drawings



35% of design work
produces 3D models



35% of design work
produces both 2D and
3D models

- Proportion of 2D usage higher amongst Industrial/Process Plant and Extraction and Industrial Machinery sectors
- 2D least used in Automotive Manufacturing sector
- 3D used for a higher proportion of work in Consumer Products, Industrial Machinery and Other Manufacturing sectors



License
Agreement



Preferred Licensing Model

Manufacturing Report



Business Advantage
intelligence insight innovation



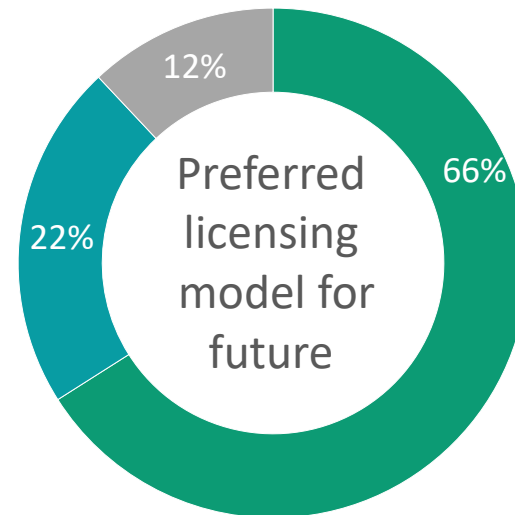
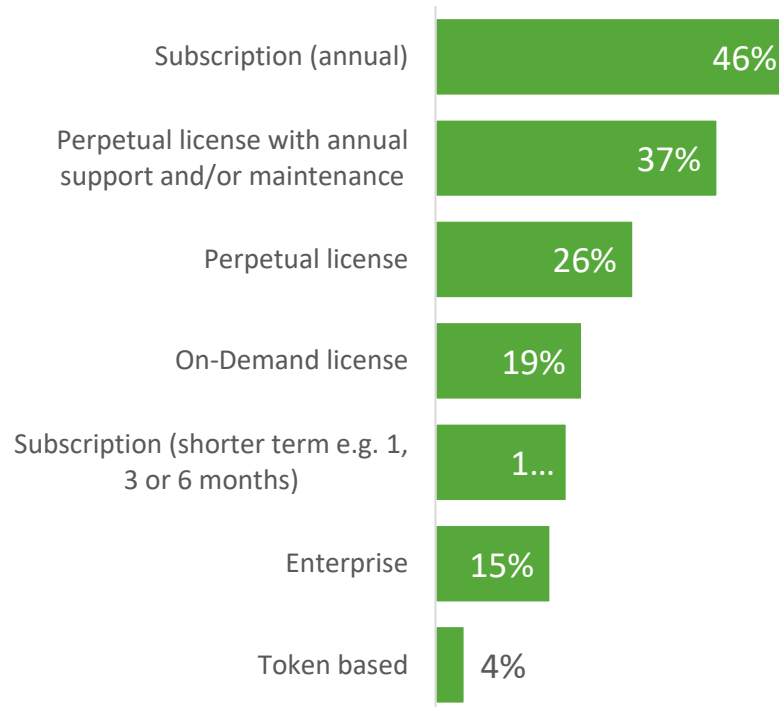
Preferred
Licensing
Model



CAD Software Licensing

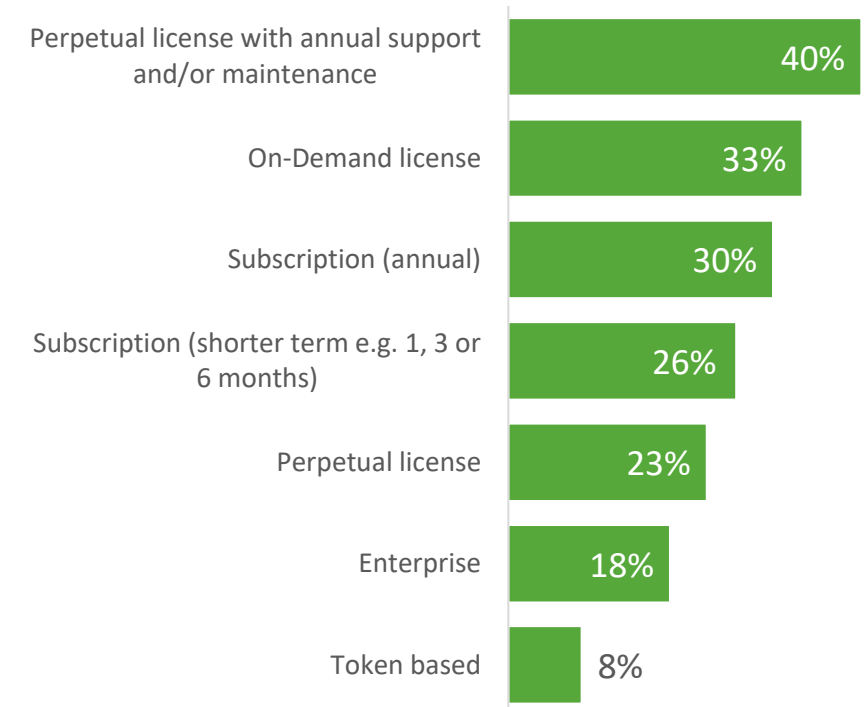
More companies now report the use of an annual subscription across all regions

Current licensing model



- Keep the same license
- Change to a different type of licence
- Don't know/cannot say

Future changes in type of license



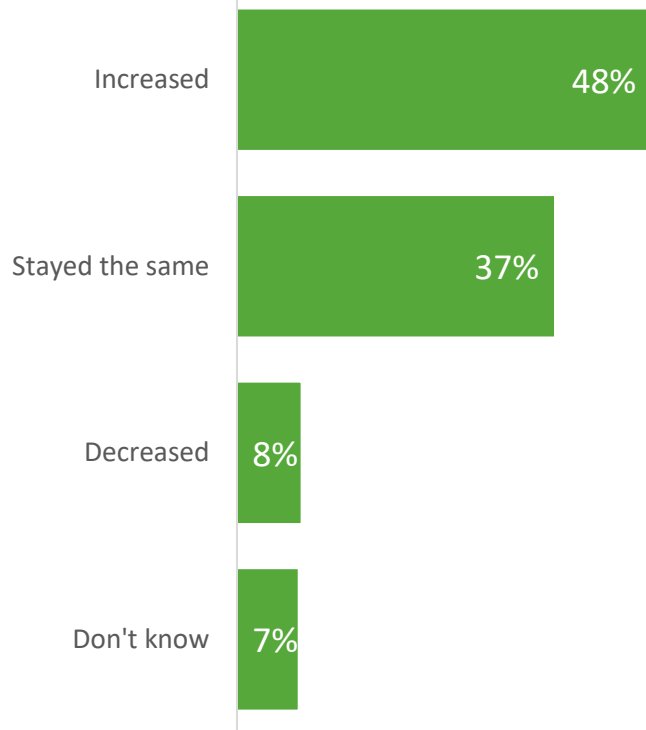


Preferred
Licensing
Model

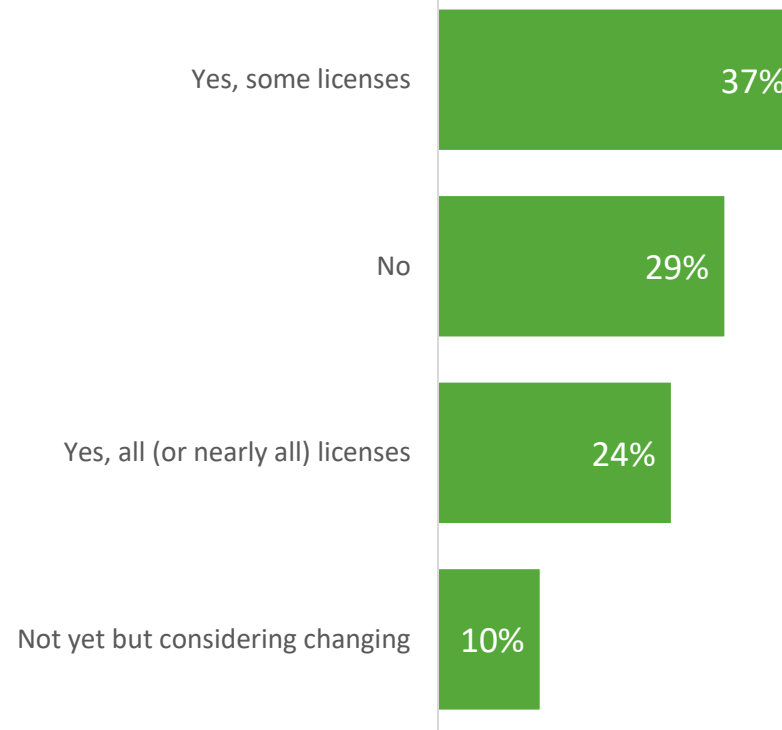
Licensing Costs and Switching Licenses

Perception of an increase in license costs over last 12 months particularly in Americas and APAC over half have changed their primary CAD software as a result of changes to a subscription model or named user model

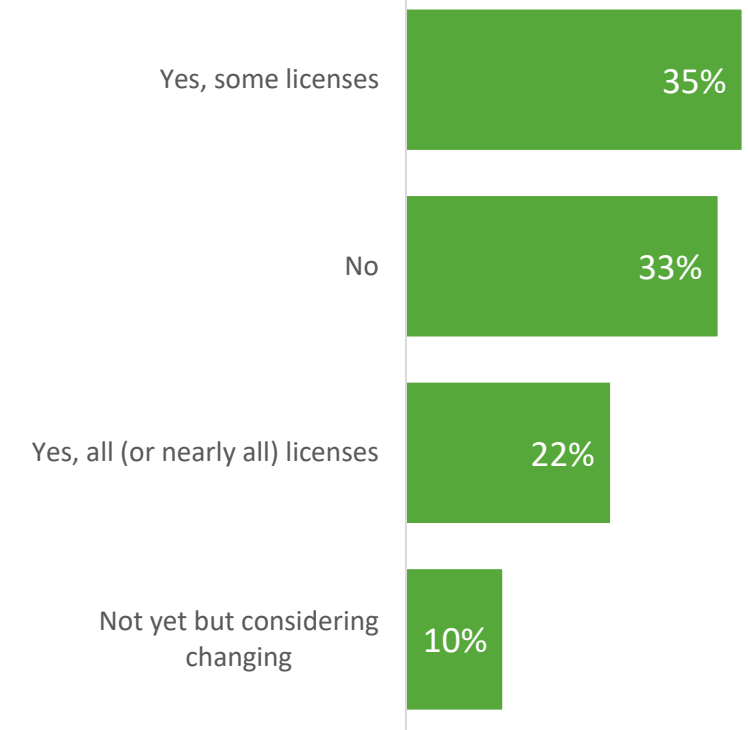
Cost of license change over last 12 months



Switched vendor due to subscription model only



Switched vendor due to a named user model





Additional Research Findings

- upgrades**
- challenges**
- hardware**
- marketing**

Manufacturing Report



Business Advantage
intelligence insight innovation

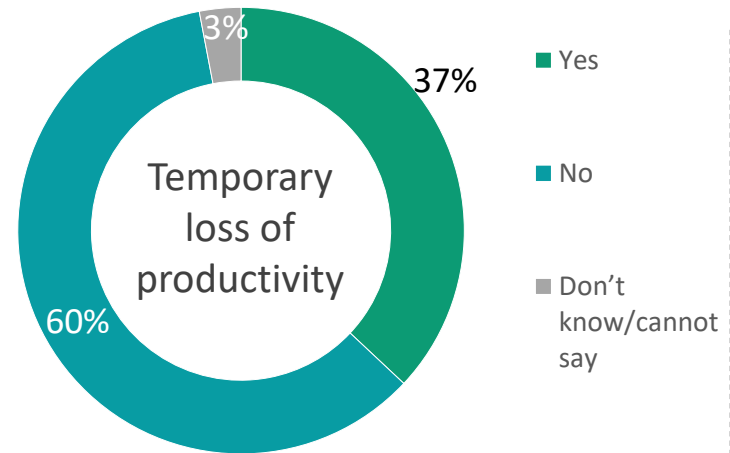
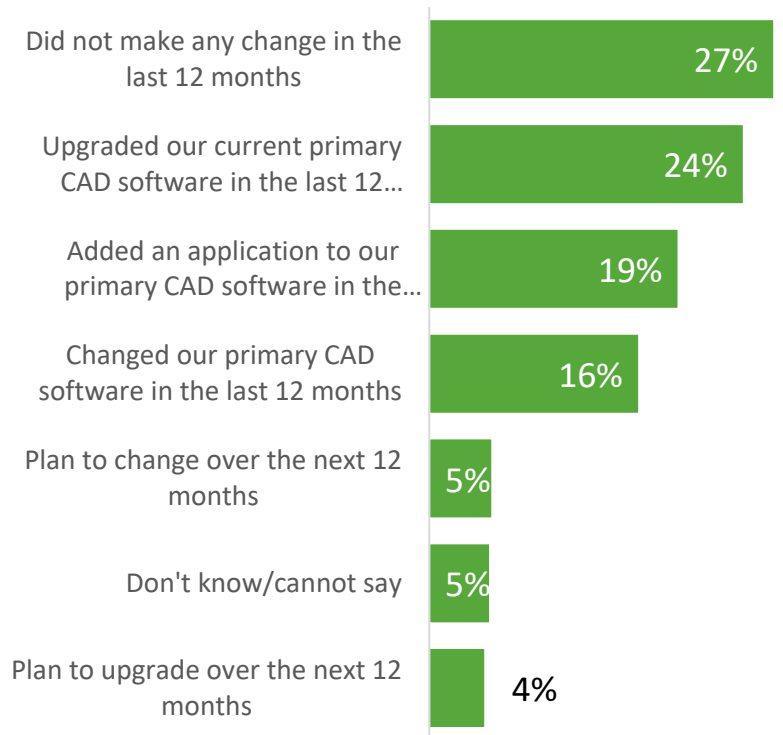


Additional
Research
Findings

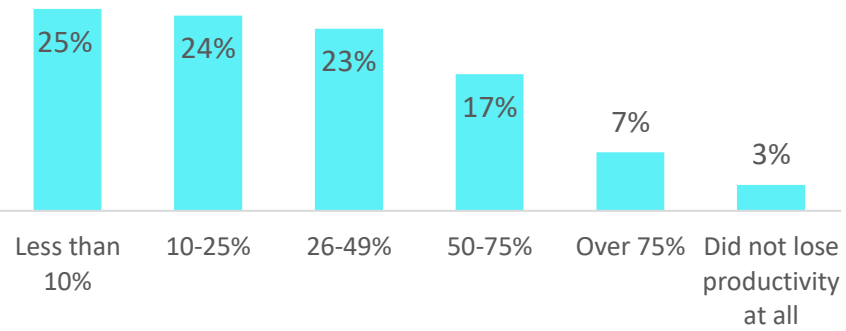
Changing and Upgrading CAD Solution

Over half (59%) have made a change to their CAD software in the last 12 months

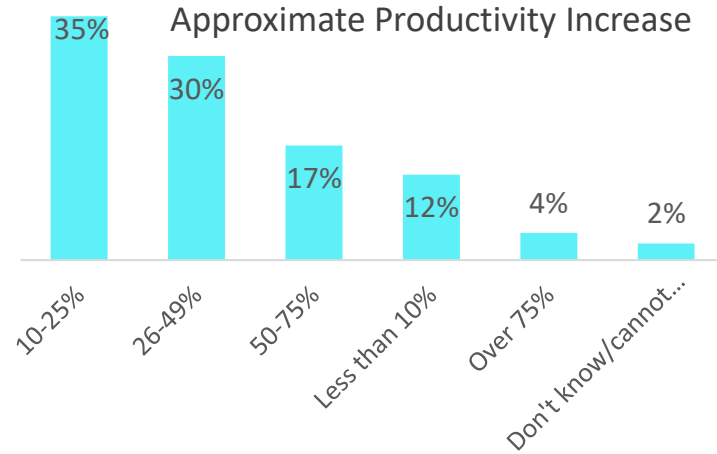
Recent change or upgrade



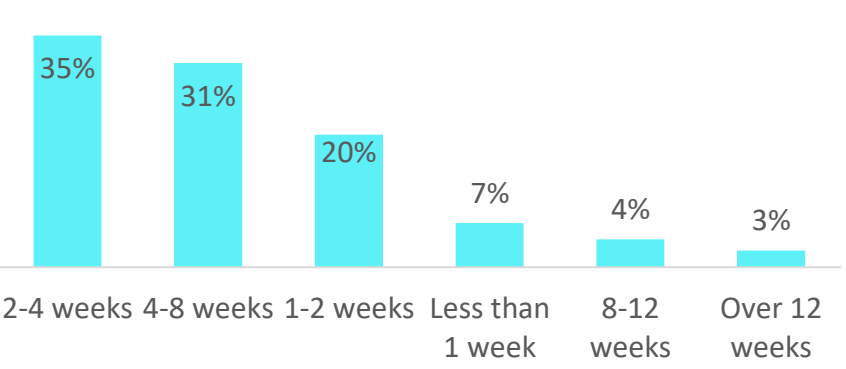
Approximate Productivity Loss in Transition Phase



Approximate Productivity Increase

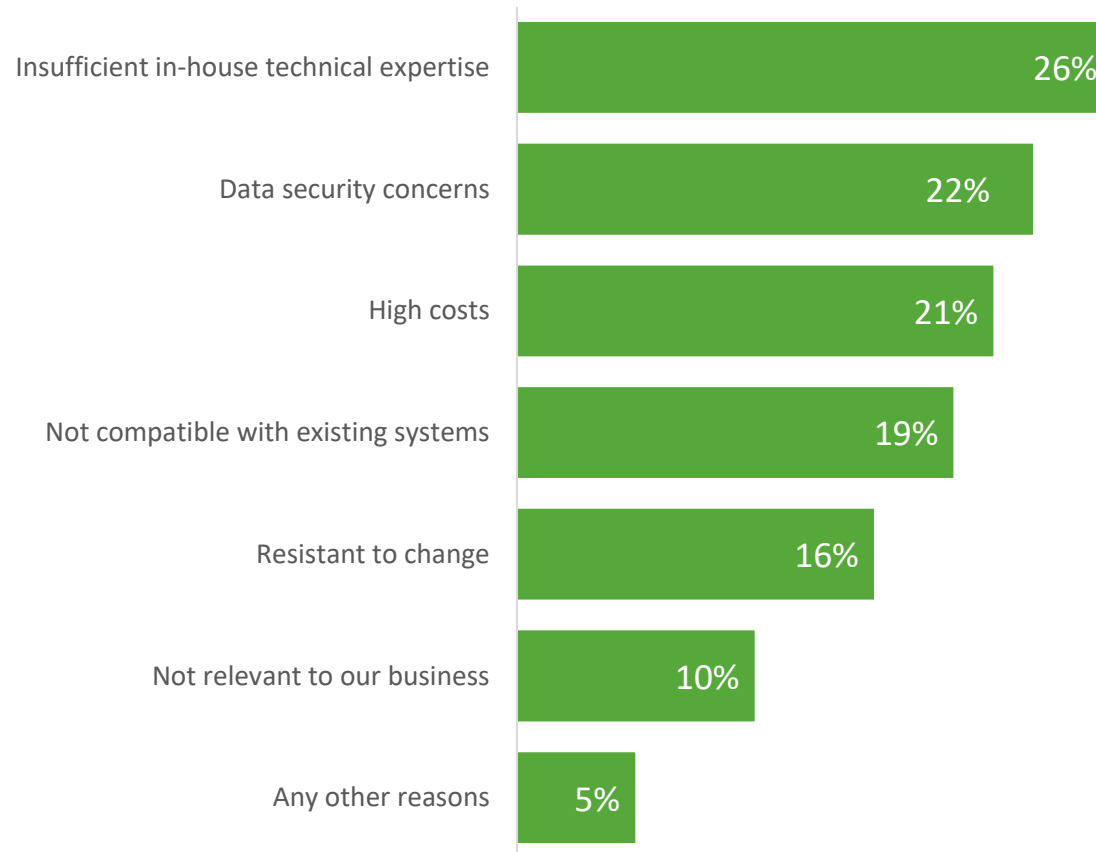


Productivity Loss Over Time



Challenges Preventing Adoption of New Technology

26% of respondents don't adopt new technology that is important to them because of a lack of in-house technical expertise





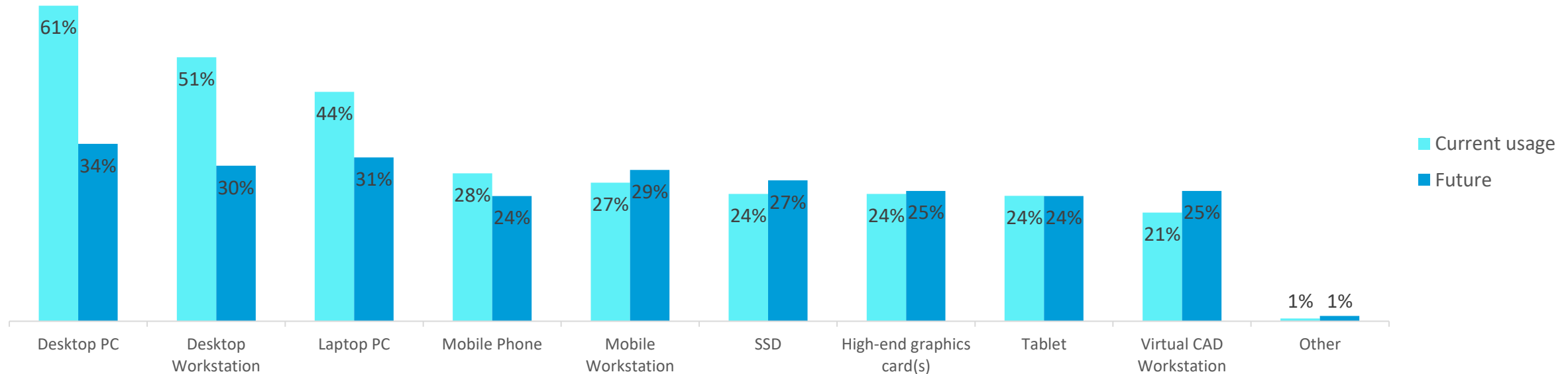
Additional
Research
Findings



Usage of Hardware

Use of Virtual CAD Workstations forecast to increase, reduction of Desktop PC and Workstations anticipated

Hardware Current and Future Usage

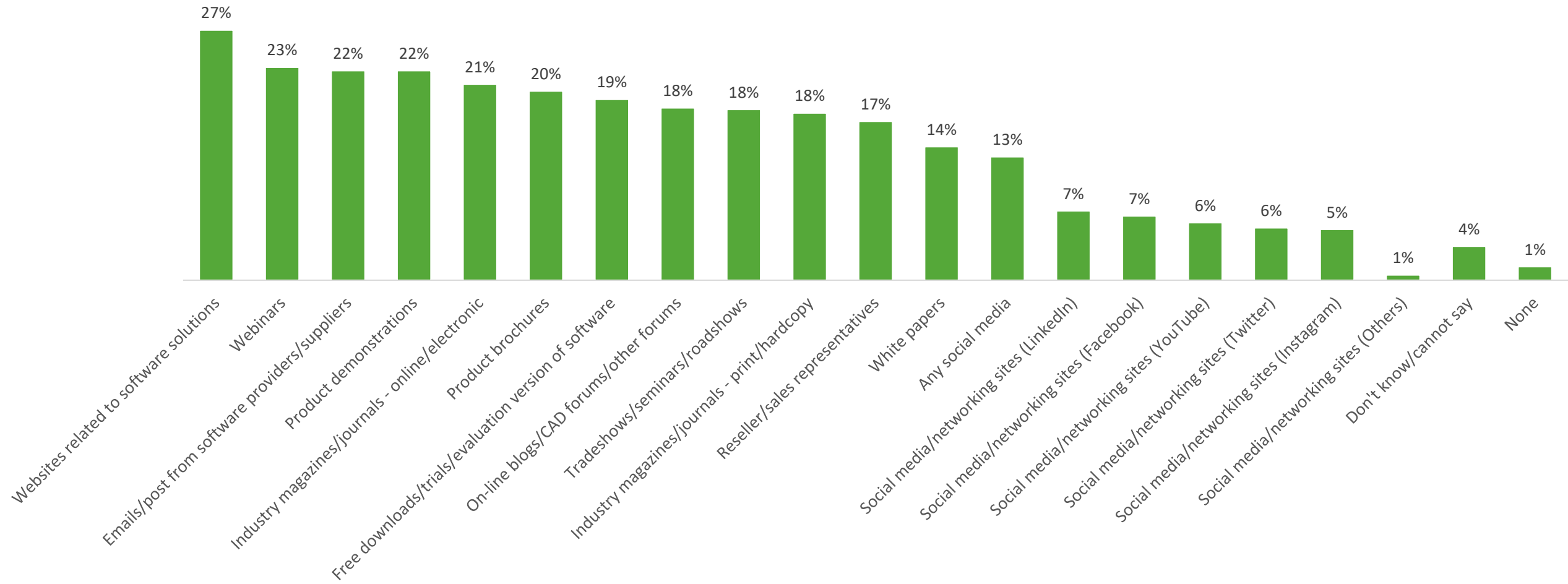




Additional
Research
Findings

Sources of CAD Related Information

69% use digital sources of information





Additional
Research
Findings



Social Media in Focus

YouTube, Facebook and LinkedIn are the most used platforms amongst the CAD/CAM audience



13% Use social media to stay up to date with the latest developments in the CAD industry



7%



6%



7%



5%



6%





Contact: The Business Advantage Group

International B2B Research Specialist (CAD/CAM/CAE/PDM/PLM Sectors)

Please get in touch for further information or customised reporting



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