

Accelerating Digital Transformation Through BIM

Regional Focus:

France



Premier Partner

AUTODESK



Research Partners



Introduction

Digital transformation is sweeping the globe, and the design and construction industry is no exception. Since 2009, Dodge Data & Analytics has been conducting quantitative research about the use and value of design and construction technologies. As adoption has steadily expanded over that time, so have users' capabilities, expectations and creativity at applying digital technologies in innovative ways to derive the most value from the underlying data being captured, created and shared across the project lifecycle.

Autodesk has partnered with Dodge on many of those efforts over the years and has now done so again for a major global *SmartMarket Report* titled [Accelerating Digital Transformation Through BIM](#), which spans four continents and gathers the experiences of contractors, architects, civil engineers, and MEP and structural engineers who are currently using BIM to determine:

- Where they are in their process of digital transformation and how BIM is contributing value to that evolution.
- How they are deploying BIM and in what ways they are leveraging the data from models and processes to improve decision-making and effectively power integrated digital workflows among project team members.

About This SmartMarket Insight Report

As can be expected in any comprehensive global research, there are interesting variations in findings among the geographic areas studied. To help practitioners better understand the specific dynamics of how technology is being deployed in their region, Dodge and Autodesk have created a series of *SmartMarket Insight* reports specifically about each region's findings. This *SmartMarket Insight* report focuses on France and includes:

- A section showing key highlights of responses from BIM users in France.
- A section providing a summary of key findings from the full global study for context and reference.

Readers of this *SmartMarket Insight* are encouraged to also explore the full [Accelerating Digital Transformation Through BIM SmartMarket Report](#) to gain a complete understanding of how BIM is driving digital transformation throughout the entire global design and construction industry, and learn from the case studies, interviews and articles that supplement the data findings in that report. The report also explores the growing use of emerging digital technologies and practices in several categories, including design intelligence tools, innovative construction methods, jobsite technologies and smart building technologies.

Digital Transformation Trends in the Findings

Several key themes emerge from the global survey.

- A company's BIM intensity (i.e., the percentage of their projects where they use BIM) correlates directly to the progress of their digital transformation, the degree to which they report enjoying benefits from BIM and the ROI (return on investment) they believe their company is receiving on its investments in BIM.
- An even more pronounced correlation appears related to active use of BIM data for analysis and digital workflows. Companies conducting a higher number of the 22 data-related activities studied often report even greater positive experiences from BIM than those doing most of their work in BIM. And of course, the combination is a powerful and reliable formula for success.
- All respondents were asked to evaluate where they believe their company is on its journey of digital transformation. While the report shows that there are some variations in the responses between company-types and regions studied, there are more commonalities than differences as the entire industry moves toward a more efficient, connected and productive digital future.

Dodge thanks Autodesk for its ongoing support of important research on the digital transformation of the global design and construction industry.



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Stephen A. Jones leads DD&A's Industry Insights Research division. He is active in numerous industry organizations and frequently speaks at industry events around the world. Before DD&A, Jones was vice president with Primavera Systems (now part of Oracle), a global leader in project management software. Prior to that, he was principal and a Board of Directors member with Burt Hill, a major A/E firm (now merged with Stantec).



Donna Laquidara-Carr, Ph.D., LEED AP
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Donna Laquidara-Carr currently provides editorial direction, analysis and content to DD&A's *SmartMarket Reports*. Prior to this position, she worked for nearly 20 years with DD&A's Dodge division, where she gained detailed insight into the construction industry.

Data: France

Introduction

The 96 respondents from France make up 11% of the total number of participants in the study. Most of them, 83 respondents, identify themselves as BIM users, and they account for 13% of total BIM users in the study. About three quarters of the French users are designers (architects, engineers and consultants), while about one quarter are contractors. This report highlights the responses from these respondents to better understand BIM use and value in France.

Use of BIM

BIM users in France were asked about the share of projects on which they use BIM currently and expect to do so in the next two to three years. The chart at upper right compares the share of French BIM users who use it on 50% or more of their projects with the global average. Currently, the share of French users using BIM at that intensity is a little lower than the global average. However, with 45% using BIM at that rate, BIM use is relatively common in France.

As the chart also reveals, the expected use of BIM at that intensity in France in two to three years continues to lag behind global averages, despite dramatic growth of that share of users expected in France. This is because BIM users overall are predicting dramatic growth in the intensity of their BIM use, and the level in France corresponds to the overall global acceleration.

Collaboration With BIM

As many previous Dodge Data & Analytics studies have demonstrated, use of BIM yields the greatest benefits when many players across the project team are engaged with it and use it to collaborate. Therefore, the study examines the degree to which data is shared and the expectations for its use across the project team.

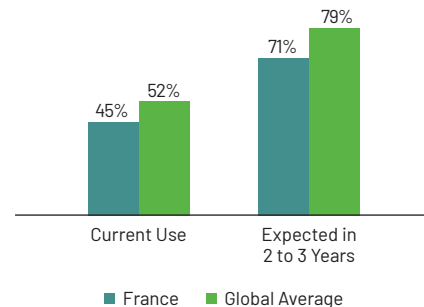
USE OF A COMMON DATA ENVIRONMENT

Respondents in France were asked about whether they use a common data environment (CDE) to exchange data with the project team, and those who do so were asked to rate the value of its use on a five-point scale, from no value to very high value. Their responses are compared with the global averages in the chart at lower right.

- Use of a CDE in France is much higher than the global average. In fact, with 88% who report using one, it is clearly a common practice in France.
- The degree to which they believe it adds value in improving the performance of the project team is about on a par with the global average.

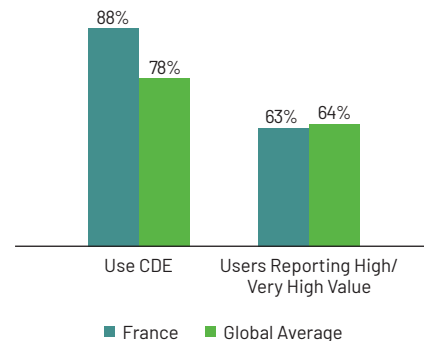
Use of BIM on 50% or More of Projects

Dodge Data & Analytics, 2021



Common Data Environment: Use and Value in Improving Performance of Project Team

Dodge Data & Analytics, 2021



France

It may seem surprising that the ubiquitous use of a CDE does not yield a greater estimation of its value. However, this may be in part due to it now being standard practice for many respondents, which makes it harder to estimate the value than when an approach is new or emerging.

EXPECTATIONS FOR BIM USE ACROSS THE PROJECT TEAM

Respondents in France were asked about their expectations for other project team members to fully be able to use BIM software. Their responses are compared with the global averages in the chart at right.

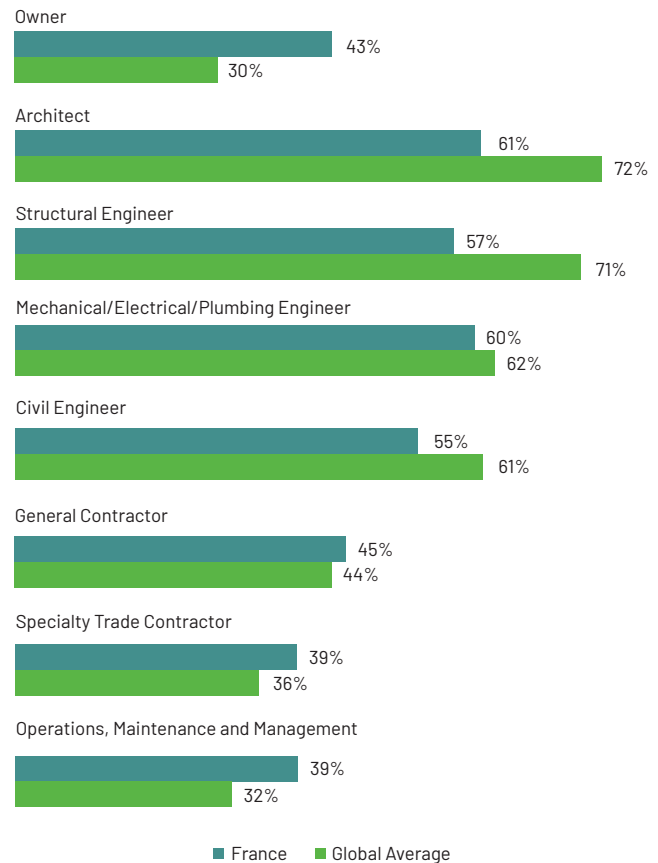
- French respondents have the highest expectations for BIM proficiency among designers, with the highest share expecting full use of BIM from architects and MEP engineers, and slightly fewer from structural and civil engineers.
- However, despite their general enthusiasm, the share anticipating use of BIM by architects, structural engineers and, to a lesser degree, civil engineers, is lower than the global share with those expectations.
- They exceed global averages, though, in the share who expect owners and operations, maintenance and management staff to have BIM skills.
- Their expectations for contractors are roughly on a par with those for owners and operational staff, and also with the global averages.

Respondents were also asked about their level of satisfaction with the BIM skills they encounter for each of the project team members.

- Nearly two thirds of French respondents (60%) are satisfied with the BIM skills of architects, the group with generally the highest level of satisfaction.
- Over half are satisfied with the BIM skills of structural engineers as well, but the share who are satisfied with the BIM skills of the rest of the design team and contractors is below 50%.
- 41% report that they are satisfied with the skills of general contractors, and 36% with those of specialty trade contractors.
- While only 40% are satisfied with the BIM skills of owners and operational staff, that is higher than the global average.

Share Expecting That Project Team Members Will Be Able to Fully Use BIM Software

Dodge Data & Analytics, 2021



France

Use of Data-Driven BIM Activities

In addition to being asked about their use of a BIM process, respondents were asked about their use of specific data-driven BIM activities. Twenty-two total activities were included in the survey, although respondents were only asked about those that they are likely to use.

CURRENT USE OF DATA-DRIVEN ACTIVITIES

The top activities utilized in France are shown in the chart at right, contrasted with the overall share globally who use them.

- The top activity in France is making a space utilization plan, employed by nearly half of the respondents. It is far more common activity in this country than it is in every other country/region in the study except North America.
- The remaining top nine activities are used by between 30% and 39% of the BIM users in France.
 - There is strong representation in the top 10 of contractor/construction activities like preparation of shop, fabrication or installation drawings, spatial coordination/clash detection, construction process presentation (in static 3D and in dynamic 4D), explanation of the construction process for owners and surrounding residents, and part interference checks.
 - Of these, part interference checks and presentation of the construction process in dynamic 4D are far more commonly used in France than they are globally.
 - In addition, two design practices are also widely used: various design checks and energy analysis. Of these, energy analysis is much more widely used in France than in any other region.
 - One planning practice, preparation of building confirmation application documents, is far more widely used in France than the global average.

ANTICIPATED FUTURE USE OF DATA-DRIVEN ACTIVITIES

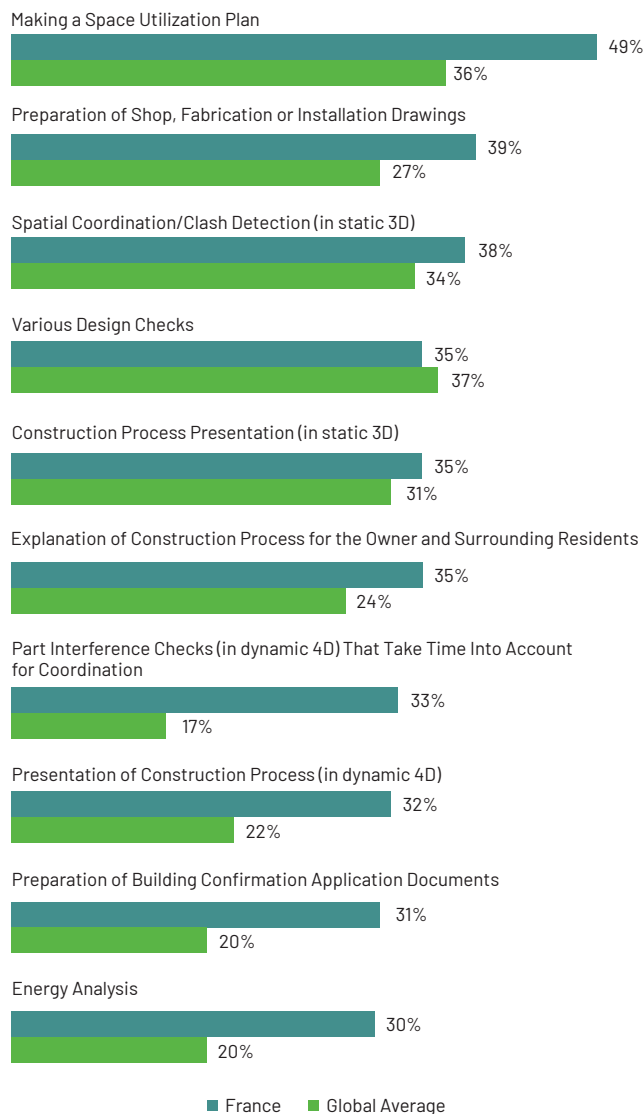
Respondents were also asked about the top activities not in use now that they plan to use in the next two to three years. In France, the following items were selected by 20% or more:

- Safety analysis of the building
- Lighting analysis
- Material management by classification code
- Constructability evaluation
- Calculation required for sustainability
- Enabling factory production and prefabrication
- Energy analysis

Interestingly, many of these options are utilized more widely in the design phase, suggesting more design activities may be utilized in France in the future.

Top 10 Data-Driven BIM Activities in France

Dodge Data & Analytics, 2021



France

Top BIM Benefits

The study included a thorough look at the benefits that BIM users gain from its use. Each was asked to rate the degree to which they experienced potential benefits on a five-point scale, from none to very high.

- Designers (architects, engineers and consultants) were asked to rate 22 benefits in four categories—business, sustainability, risk reduction and operational efficiency.
- Contractors were asked to rate a different list of 22 benefits in five categories—business, quality, cost, schedule, and health and safety.

The most highly rated benefits among designers are shown in the chart at upper right. Since the number of contractors using BIM who responded to the survey in France did not exceed the minimum statistical threshold of 30, a table with their top benefits is shown at lower right, all of which were rated at a high/very high level by 59% or more of these contractors.

BIM BENEFITS EXPERIENCED BY DESIGNERS

Over 60% of French designers experience the 10 benefits shown at a high/very high level. Within this tight cluster of responses, there are two clear groupings.

- Half of the benefits were selected by 66% or more. They include benefits in multiple categories:
 - Risk reduction benefits include reduced errors and rework and improved project forecasting. Of these, while the share that selected improved project forecasting is consistent with many other regions/countries like Scandinavia, Germany and Australia/New Zealand, France is the second highest region to experience a high level of reduced errors and rework, second only to Australia/New Zealand.
 - Process benefits also account for two of the top five, including improved team collaboration and improved data handover.
 - Improved design quality, classified as a business benefit, is also widely reported.
- Half of the benefits were selected by 61% to 64% of respondents. All five fall into the categories of business and risk reduction benefits.

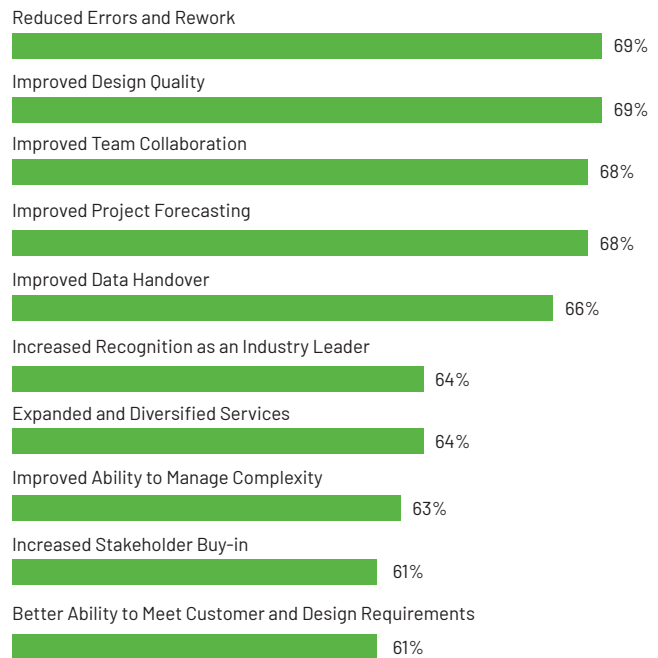
BIM BENEFITS EXPERIENCED BY CONTRACTORS

The top contractor benefits cover a broad spectrum.

- Cost benefits account for two out of the top three: improved subcontractor qualification and reduced nonrecoverable costs.

Top 10 BIM Benefits Experienced at a High/Very High Level by Designers in France

Dodge Data & Analytics, 2021



Top Benefits Rated High/Very High by Contractors in France

Dodge Data & Analytics, 2021

Improved Subcontractor Qualification
Reduced Incident Frequency Rate
Reduced Nonrecoverable Costs
Reduced Environmental Impact
Improved Handover Experience
Reduced Number of Manhours Onsite
Reduced Defects at Handover
Increased Bid Efficiency
Improved Resource Planning

France

- Health and safety benefits experienced at a high/very high level by French contractors include reduced incident frequency rate, reduced environmental impact and reduced number of manhours onsite. France excels above global averages in each of these, with the highest share of any country/region reporting reduced incident frequency rate and the second highest reporting reduced environmental impact and reduced manhours onsite at such a high level.

BIM Investments and ROI

INVESTMENTS IN BIM

The top BIM investments expected to be made in the next two years in France are developing internal and external collaborative BIM procedures and processes and BIM training. The findings for each are on a par with the global averages.

PERCEIVED BIM ROI

Respondents were asked about the degree to which they believe they are experiencing a positive ROI from their BIM investments. The responses in France are largely on a par with those globally, with most experiencing a positive ROI, and a relatively even split between those who report that the ROI is less than 25% and those who find it to fall between 25% and 49%. The share of projects on which the formal ROI of BIM is being measured is slightly lower in France than globally, but still relatively consistent with the overall findings in the study.

Digital Transformation

BIM is a critical component of a company's process of digital transformation, but it is also one of many potential technologies and approaches emerging in the design and construction industry that promise to improve project and business outcomes.

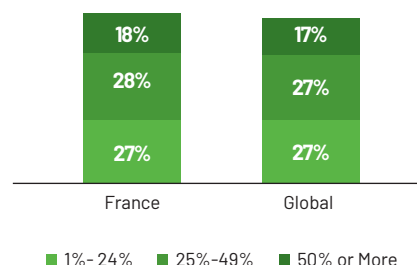
STAGE OF DIGITAL TRANSFORMATION

To better understand where the design and construction industry stands in terms of its process of digital transformation, respondents were asked to place themselves at one of five points along a spectrum, from haven't started yet to having achieved full digitalization. The chart at lower right shows how the responses from France compare with the overall study findings. These responses include both those of BIM users and nonusers.

- The largest share of respondents from France are in the middle of their transformation process.
- The findings are generally consistent with the global averages.

BIM Users Experiencing Positive ROI From Their BIM Investments

Dodge Data & Analytics, 2021



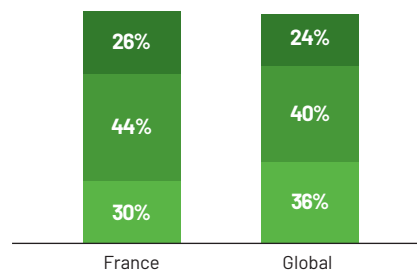
Share of Projects With Formal Measurement of ROI on BIM

France: 33%

Global: 36%

Stage of Digital Transformation

Dodge Data & Analytics, 2021



■ Haven't Started Yet/In Early Stages ■ Right in the Middle of Our Effort ■ Approaching/Already Achieved the Goal

France

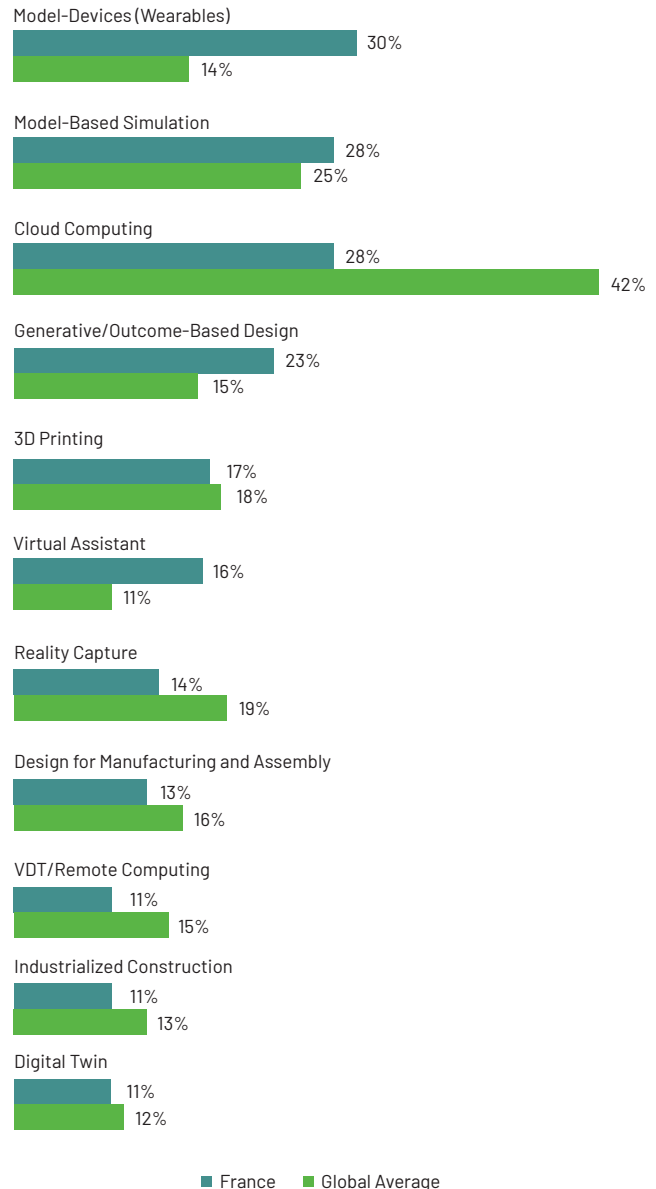
USE OF EMERGING TECHNOLOGIES/APPROACHES

The study also included 17 emerging technologies/approaches associated with digital transformation and asked respondents to indicate which ones they are using now. The chart at right shows the technologies and approaches used in France by over 10% of respondents, contrasted with the share reporting their use globally.

- Wearable model-devices are the most widely used technology in France. This is also the only technology for which France exceeds nearly all the other regions in use, second only to Japan.
- Other technologies in which France notably exceeds to the global average include generative/outcome-based design and virtual assistants. Less use in France than globally is apparent for cloud computing and reality capture.
- For many of these technologies and approaches—such as model-based simulation, 3D printing, design for manufacturing and assembly, industrialized construction and digital twins—France is very close to the global average for use, which corresponds with the finding that France is in the middle of the pack in its advancement of digital transformation.
- Respondents were also asked about the technologies/processes they intend to begin to use in the next two to three years that they are not using now.
 - The only technology that more than one quarter in France expect to use in the near future is virtual assistant. Interest in this technology is higher in France than in other regions. Given its already strong level of use, France is likely to become a leader in use of this tool.
 - Fewer than 20% in France expect to use any of the other technologies and approaches, but those expected to be used by more than 15% include model-based simulation, reality capture technologies, 3D printing, AI/machine learning and design for manufacturing and assembly,

Top Emerging Technologies/Approaches in Use in France

Dodge Data & Analytics, 2021



Data: Summary of Global Findings

Global Summary Introduction and BIM Usage/Skills

Introduction to Global Summary

The next four pages provide highlights of the findings of the full global study, titled *Accelerating Digital Transformation Through BIM SmartMarket Report*.

BIM Usage and Skills

The chart at bottom left shows how many BIM users, by company-type, currently use it on most of their projects compared with how many plan to be doing so within two to three years. Findings clearly forecast significant growth by all.

Engagement With BIM Data

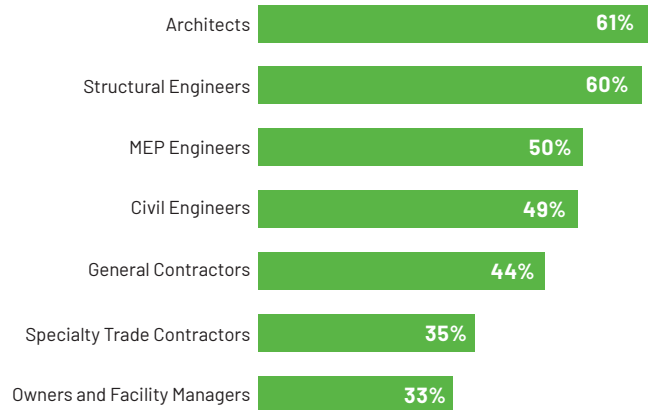
The research evaluated usage of 22 activities that leverage BIM data for improved decision-making and digital workflows. The chart at bottom right shows two levels of engagement with that full set of activities by company-type and size.

Satisfaction With BIM Skill Levels

The chart at right shows how many BIM users are currently satisfied with the level of BIM skills they encounter from each company-type shown. The findings point to a broad industry need to enhance BIM skills across the project team.

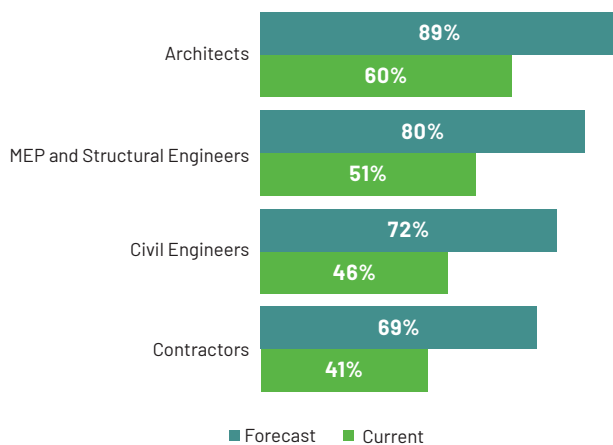
All BIM Users' Satisfaction With BIM Skills of Each Type of Project Team Member

Dodge Data & Analytics, 2021



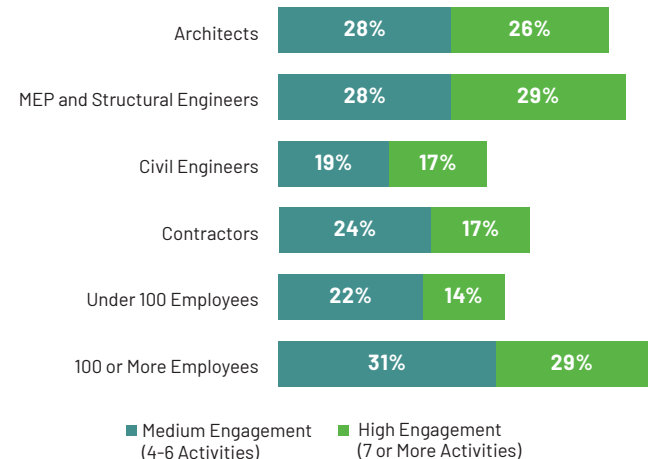
Current BIM Usage on 50% or More of Projects Compared With Forecast (2-3 Years)

Dodge Data & Analytics, 2021



Engagement With Data-Related Activities by Company-Type and Size

Dodge Data & Analytics, 2021



Summary of Global Findings

Use of a Common Data Environment and BIM Benefits

Common Data Environment

Nearly all BIM users use a common data environment to exchange data with their project teams, with contractors reporting the greatest value from its use.

Benefits of BIM

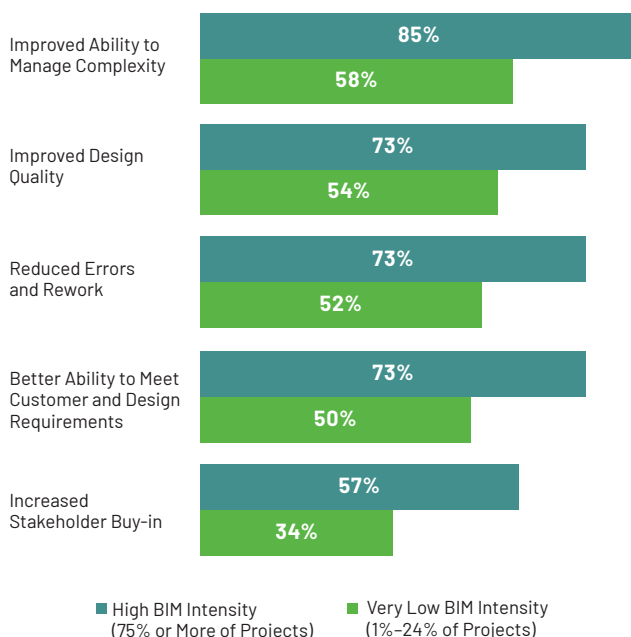
The survey examined BIM users' experience with 41 separate benefits received from their use of BIM.

The findings reveal a strong correlation between BIM intensity and the experience of BIM benefits. The charts at bottom show the top five benefits reported by designers (architects and engineers) and contractors, comparing the percentages doing 25% or less of their work with BIM to those doing more than 75%.

The compelling differences shown in these charts provide an explanation for the findings on the previous page about the dynamic pace at which current users are planning to increase their BIM intensity. More BIM means more benefits.

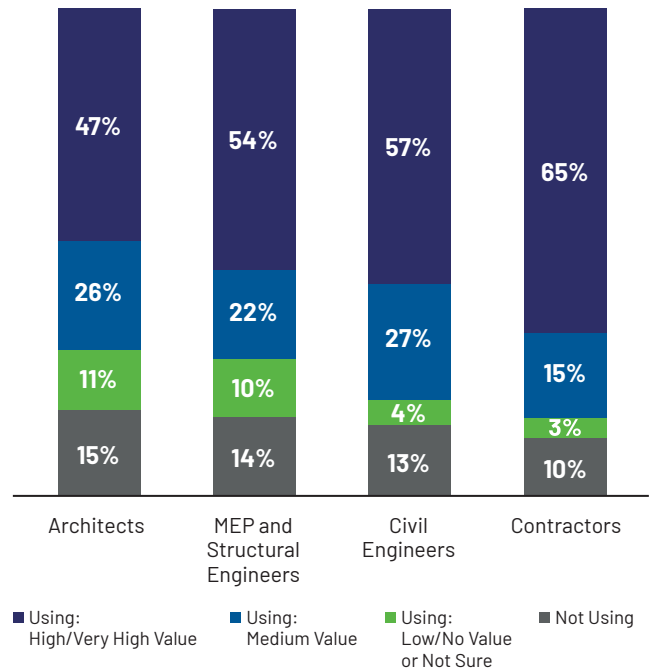
Impact of BIM Intensity on Top Five BIM Benefits for Architects and Engineers

Dodge Data & Analytics, 2021



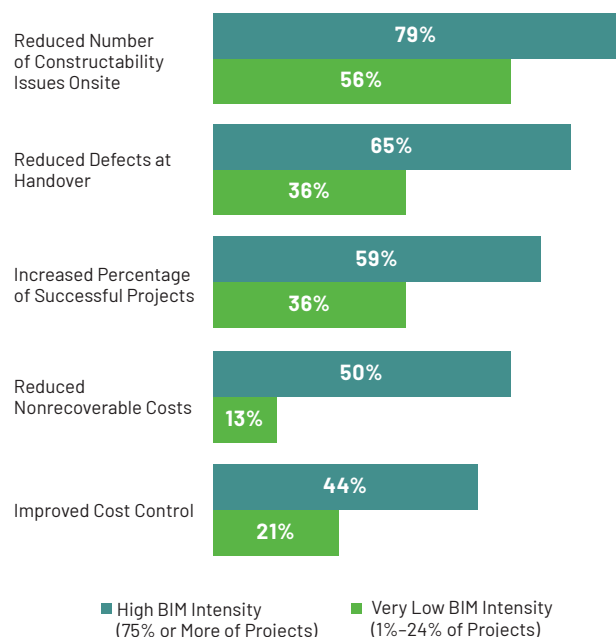
Use and Value of a Common Data Environment by Company-Type

Dodge Data & Analytics, 2021



Impact of BIM Intensity on Top Five BIM Benefits for Contractors

Dodge Data & Analytics, 2021



Summary of Global Findings

Perceived ROI of BIM

There is no standard, globally accepted way to measure the ROI (return on investment) of BIM. In studies of BIM users over the last 12 years, Dodge has asked them to select which of seven percentage ranges they best believe represents their company's ROI on its BIM investments to that point. This is referred to in Dodge reports as the perceived ROI on BIM. The charts on this page combine several of the seven range options into three broad ROI tiers.

Perceived ROI by Company-Type and Region

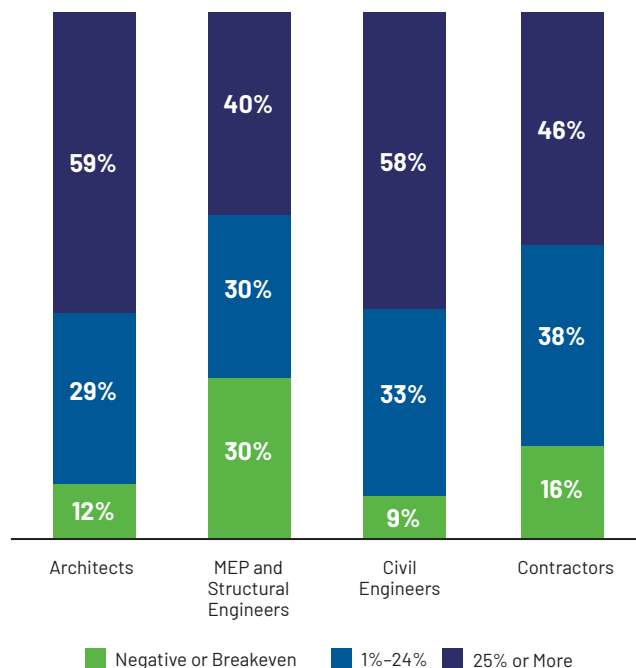
The chart at right shows this analysis by company-type. While architects report somewhat higher ROI than contractors, civil engineers differ notably from MEP and structural firms. This points to a need to focus on helping these professionals engage more successfully with BIM.

The chart at bottom shows the analysis by region and provides the overall response as a baseline for comparison.

- 48% or more report a good (at least a 25%) ROI in every region studied except North America, which also shows the highest number at negative or breakeven (31%).
- This contrasts sharply with France and UK/Ireland, where no users report negative or breakeven.

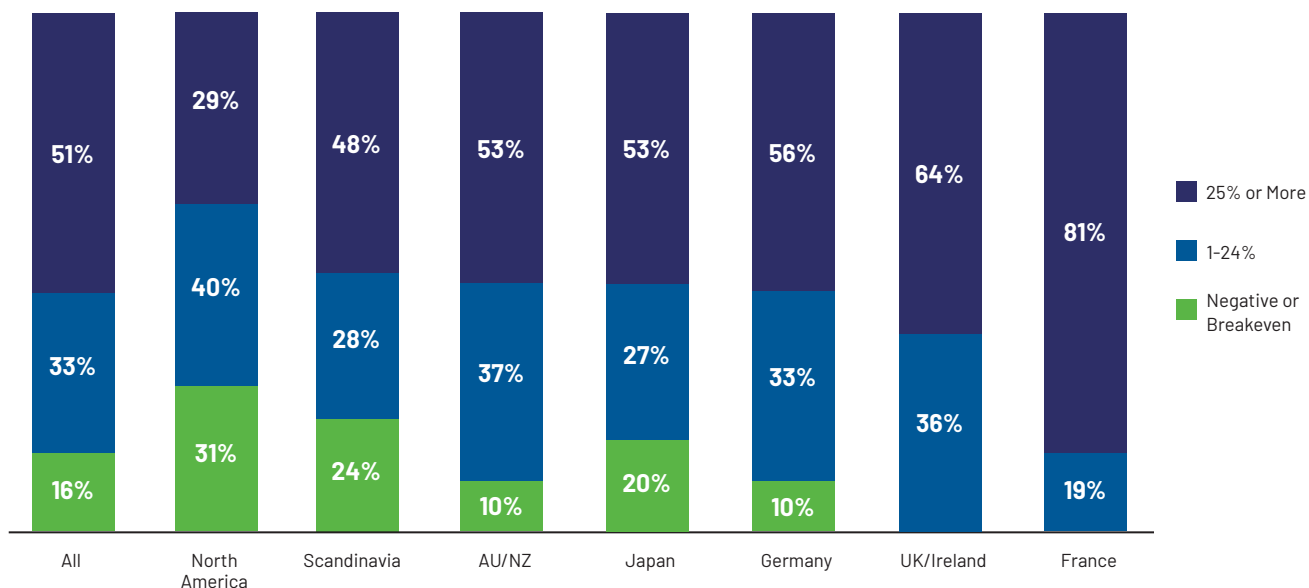
Perceived ROI of BIM by Type of Company

Dodge Data & Analytics, 2021



Perceived ROI of BIM by Region

Dodge Data & Analytics, 2021



Summary of Global Findings

Digital Transformation

While the overall global design and construction industry is clearly going through a comprehensive digital transformation, the pace varies widely by company. All respondents to this survey (BIM users as well as nonusers) were asked to assess where they believe their company is in its digital journey from one of four stages shown in the charts on this page.

BIM Users' Progress on Digital Transformation

The chart at right focuses just on BIM users. It compares all BIM users with those using BIM on at least 75% of their projects (high BIM intensity). The findings show how more BIM use correlates directly with overall digital transformation.

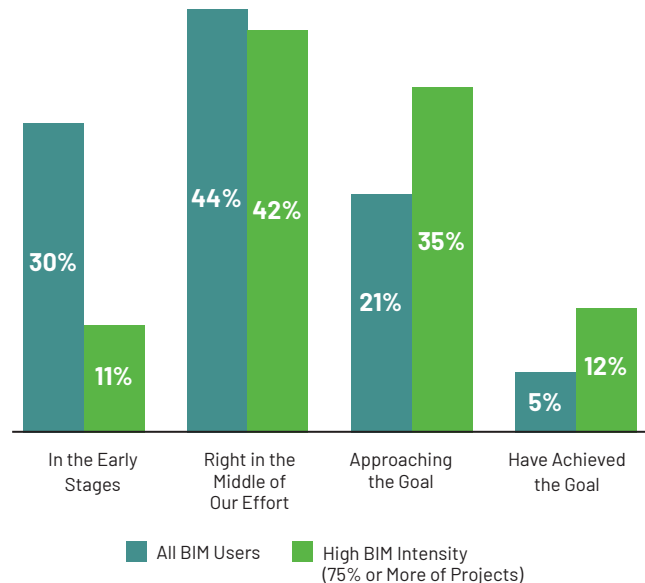
All Respondents' Progress on Digital Transformation by Region

Digital transformation is impacting all companies in the industry whether they are currently using BIM or not. The chart at bottom shows the averages of how all respondents from each region studied believe their transformation is progressing. The aggregate of all responses is also shown for comparison.

While there are variations, in general each region is fairly close to the average for all, suggesting that there is more commonality than difference in everyone's path toward our exciting digital future.

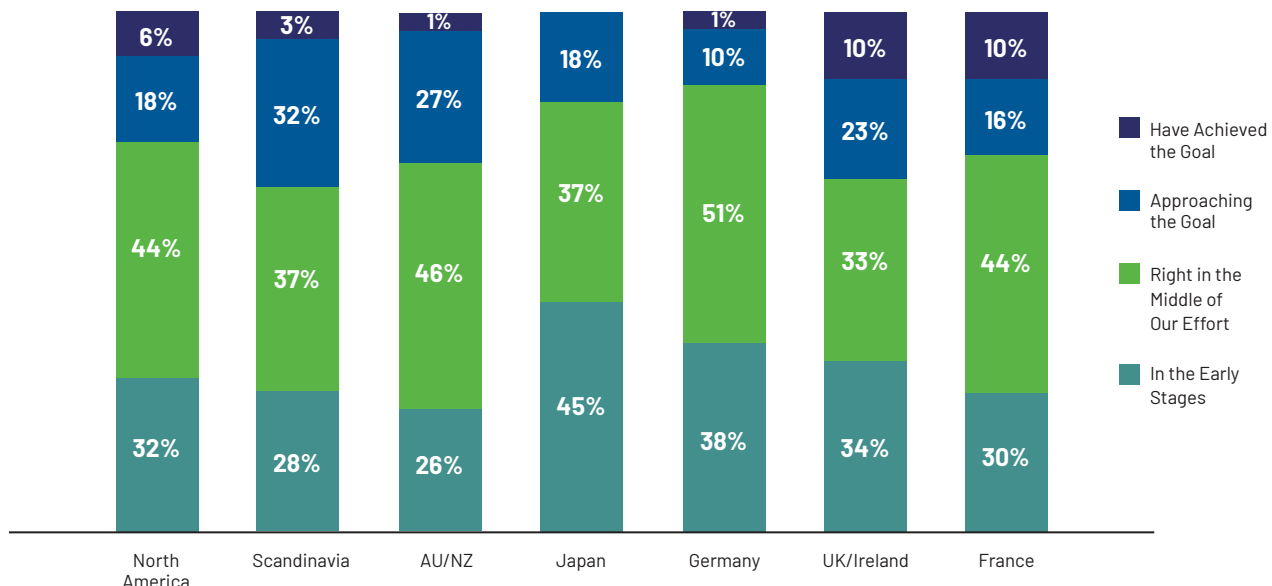
BIM Users' Reported Progress on Digital Transformation

Dodge Data & Analytics, 2021



All Respondents' Reported Progress on Digital Transformation by Region

Dodge Data & Analytics, 2021



Methodology

This global study was conducted to assess the extent to which BIM has been embraced in major regions of the world, including the experience of those who have used BIM in terms of related activities they employ, the benefits they receive, the ROI they get from BIM, the BIM engagement they expect and experience from other team members on projects. The study also examined digital transformation in general, and the current and future use of emerging technologies and processes in particular.

This research was administered online from October 2020 to March 2021. The survey data was collected from the Dodge Data & Analytics Architect and Contractor Panels, the Dodge Database of construction professionals and memberships of partnering associations (AMCA, Australian Constructors Association, CIBSE, CICES, CINOV, COMIT, GBC Finland, GBCA, Norwegian GBC, Planen Bauen 4.0, RICS, RIL, USGBC and UNSFA). The Dodge Data & Analytics Architect and Contractor Panels contain representative samples of architects and contractors across the US. The panelists are identified by many categories, including size, region, types of projects undertaken and specialty.

Respondent Profile

REQUIREMENTS

Respondents were required to be employed by an architecture firm, site design firm, construction company, engineering firm or consulting company, and located in Australia, Canada, France, Germany, Japan, New Zealand, Scandinavia, UK or the US.

BIM USERS

Most of the analysis focuses on respondents who report that their

company uses BIM. In total, 641 respondents report using BIM in this study, including 83 in France.

The following definition was provided for BIM to identify those using it: Building Information Modeling (BIM) is a process that begins with the creation of an intelligent 3D model and enables document management, coordination and simulation during the entire lifecycle of a project (plan, design, build, operation and maintenance).

BIM USER PROFILES

The responses of BIM users in the global study include a cross section of types of job roles and company sizes.

• Types of Job Roles:

- Architect: 37%
- Construction Professional: 32%
- Civil Engineer: 12%
- Building Engineer (structural, mechanical, electrical, plumbing): 10%
- Consultant: 5%
- Other: 5%

• Size of Company by Number of Employees:

- Very Large (500 or more): 23%
- Large (100 to 499): 30%
- Midsize (50 to 99): 17%
- Small (Fewer Than 50): 29%
- Prefer Not to Answer: 1%

Seventy percent of the BIM users primarily work on vertical buildings and 30% on infrastructure projects.

Finally, the study also explores the differences in responses among BIM users in the seven regions/countries included in the study. Because of a high number of smaller companies in the responses from North America, weighting was applied to make the proportion of North American respondents in varying size categories (by number of employees) match those of respondents located in regions other

than North America.

- North America: 34%
- France: 12%
- Australia/New Zealand: 12%
- Scandinavia: 11%
- Germany: 10%
- Japan: 10%
- UK/Ireland: 10%

DIGITAL TRANSFORMATION

The questions on digital transformation include responses from BIM users and nonusers. 843 total responses were received on the stage of digital transformation, with 96 from France, and 576 were asked about the technologies/processes they use and plan to adopt, with 64 from France for this question.

Resources

Organizations, websites and publications to help you get smarter about BIM and digital transformation.



Dodge Construction Network

Main Website:

www.construction.com

Dodge Construction Central:

www.construction.com/products

Market & Competitive Intelligence:

www.construction.com/products/construction-market-data

Sweets:

www.construction.com/products/sweets

SmartMarket Reports:

www.construction.com/toolkit/reports

ACKNOWLEDGEMENTS:

We would like to thank Autodesk for their ongoing partnership with Dodge to bring intelligence about BIM and the digital transformation of the design and construction industry.

We thank all of our research partners for their participation in the survey process to help make sure the industry is better informed. These include the Air Conditioning & Mechanical Contractors' Association (AMCA), Australian Constructors Association (ACA), the Chartered Institution of Building Services Engineers (CIBSE), the Chartered Institution of Civil Engineering Surveyors (CICES), Federation CINOv, COMIT (Construction Operation & Maintenance through Innovative Technology), Finnish Association of Civil Engineers (RIL), Green Building Council of Australia (GBCA), Green Building Council Finland, Norwegian Green Building Council, Planen Bauen 4.0, Royal Institution of Chartered Surveyors (RICS), US Green Building Council (USGBC) and UNSFA (L'Union des Architectes).

We thank all those who shared their insights and experiences, including the thought leaders featured in this report and those who provided us with case studies or shared their insights in our feature articles.



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Research Partners

Air Conditioning & Mechanical Contractors'

Association: **www.amca.com.au**

Australian Constructors Association:

www.constructors.com.au

Chartered Institution of Building Services

Engineers: **www.cibse.org**

Chartered Institution of Civil Engineering

Surveyors: **www.cices.org**

Federation CINOv: **www.cinov.fr/la-federation-cinov**

COMIT (Construction Operation & Maintenance through

Innovative Technology): **www.comit.org.uk**

Green Building Council of Australia:

<https://new.gbca.org.au>

Green Building Council Finland: **<https://figbc.fi/en>**

Norwegian Green Building Council:

<https://byggalliansen.no>

Planen Bauen 4.0: **<https://planen-bauen40.de>**

RIL (Finnish Association of Civil

Engineers): **www.ril.fi/en/ril.html**

Royal Institution of Chartered Surveyors: **www.rics.org/uk**

US Green Building Council: **www.usgbc.org**

UNSFA (L'Union des Architectes): **www.unsfa.fr**

Other Resources:

BIMForum: **bimforum.org**

buildingSMART International: **www.buildingsmart.org**

Construction Innovation Hub:

<https://constructioninnovationhub.org.uk>

Global BIM Network: **www.globalbim.org**

Lean Construction Institute: **leanconstruction.org**

National Institute of Building Sciences Building Information

Management (BIM) Council: **www.nibs.org/bimc**

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