



# Achieving Strategic ROI

MEASURING THE VALUE OF BIM







As an architecture firm principal, much of your time and energy goes into managing the business and fostering growth. You're always looking for ways to be more efficient and appeal to your customers. To stay ahead of the competition, many leading firms count on innovative Building Information Modeling (BIM) to help them do their work – and do it better.

But how are AEC industry leaders successfully meeting the challenge of calculating return on investment for BIM in architecture?

This e-book provides a framework outlining the various factors that leading firms have considered for calculating ROI and how BIM has added value over time, including:

- Calculating startup investment and longer-term outlays
- Assessing organization, stakeholder, and maturity dimensions of BIM ROI
- Quantifying the impact of process change







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Value and ROI



ROI Factors

Business  
Dimensions

Quantity



Strategic ROI

# Measuring the value of BIM: Achieving strategic ROI

The economic value of BIM technology is often weighed by measuring the ratio of return on investment, or ROI.

Adopting BIM processes is becoming increasingly popular at all stages of the building's lifecycle – that is, from design to construction and through operations and maintenance.

Consequently, the role of ROI in technology-decision making is shifting.

Autodesk's research on this subject suggests that leading firms seek a nuanced view of ROI to inform their strategy of investment and innovation.





## CHAPTER ONE

# Value and ROI of BIM in design, construction, and building lifecycle management

5–8







# 1. Value and ROI of BIM in design, construction, and building lifecycle management

Companies wishing to adopt BIM technology have always sought reliable factors for understanding how the technology and software transition will impact their company. After more than a decade of experience with BIM, the design and construction industry is now realizing BIM's value and financial impact.

Calculating ROI has become a necessary evaluation step prior to many capital or labor-intensive business investments, such as BIM adoption.<sup>1</sup> However, while some firms calculate a return-on-investment ratio to assess the economic benefits associated with process change, others find making this calculation too difficult or cumbersome.

The problem is that ROI analysis is often unable to represent intangible factors that are important to a project or a firm, such as avoided costs or improved

safety. In addition, the systems and staffing required to measure and track ROI can be time-consuming and costly.

Currently, no industry-standard method for BIM ROI calculation exists and many firms have not adopted any consistent measurement practices, although there is interest in doing so and belief in the potential value of ROI for BIM investment decision-making.<sup>2</sup>

<sup>1</sup> See Appendix A for details on different approaches to calculating ROI

<sup>2</sup> McGraw Hill Construction (2012) and see "Autodesk 2013 BIM ROI Customer Perception Study" in A appendix





Value and ROI



ROI Factors

Business  
Dimensions

Quantity

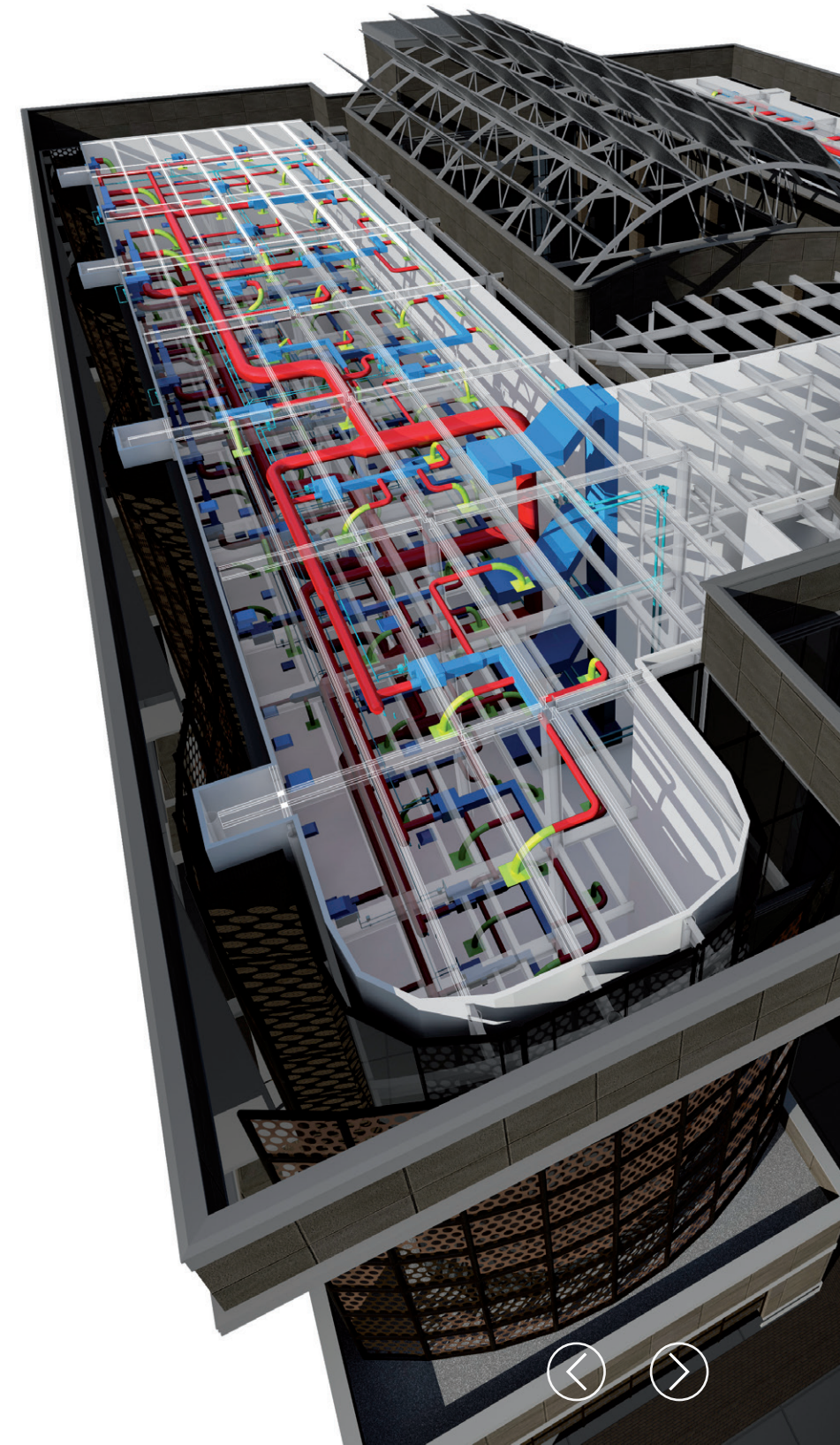


Strategic ROI

Defining the economic impact of BIM for the building design and construction industry is a challenge that has attracted significant academic research interest. This interest covers a breadth of inquiry into BIM ROI that spans the entire project lifecycle, examines various building types and considers varying levels of BIM experience while also looking at a range of calculation methods.

So how are AEC industry leaders successfully calculating ROI for BIM in design, construction, and building operations?

To provide insight into this question, Autodesk recently talked to customers in varying stages of BIM adoption.

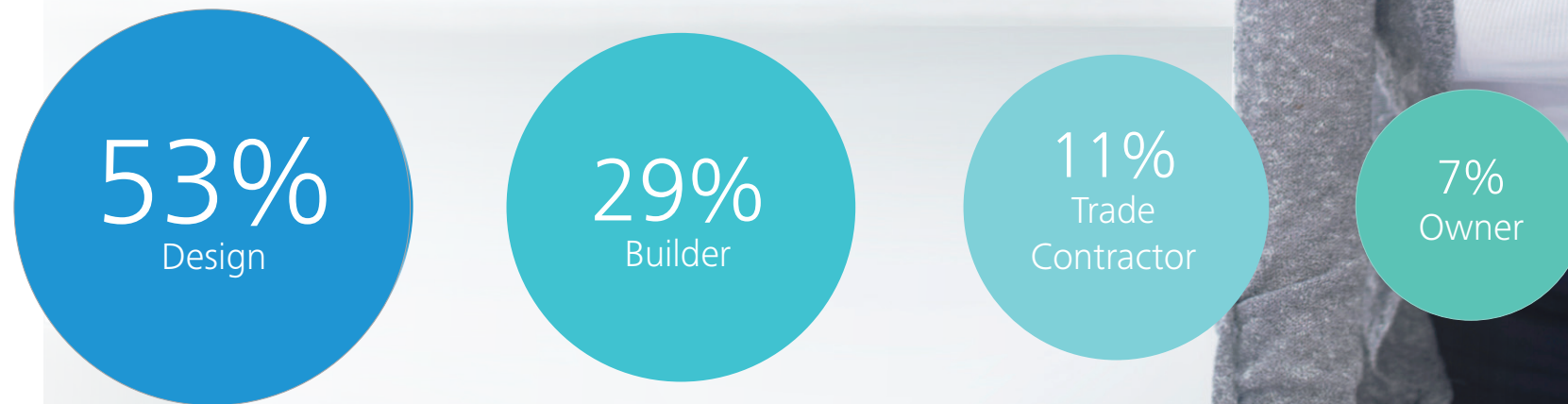






In the first phase of the Autodesk BIM ROI Customer Perception Study<sup>3</sup>, two independent research firms, King Brown Partners, Inc. and Scan Consulting, conducted 28 in-depth telephone interviews with industry professionals in design, construction, and real estate development and operations in the United States.

### BIM ROI Customer Perception Study Respondent Profile



In addition to this research, executive roundtables with groups in São Paulo, Brazil, and in the U.S. contributed data to the investigation. Participants' responses to the survey questions have been aggregated so as to preserve anonymity.





## CHAPTER TWO

# ROI factors – investments and benefits

9–14







Value and ROI



ROI Factors

Business  
Dimensions

Quantity



Strategic ROI

## 2. ROI factors – investments and benefits

### Calculating investment

This research has generated a comprehensive list of the pertinent elements of investment and the likely benefits that companies target and may incorporate into their economic calculations of ROI.

The Customer Perception Study interviews indicated that firms understand the costs associated with BIM adoption. However, there is significant variation in the practice of measuring or tracking BIM investment as a separate cost, distinct from business operations as a whole.

Investments occur at different points along a time- line of BIM adoption as firms grow more sophisticated and project use expands. Investments may be of varying duration, particularly strategic initiatives aimed at transforming the business.

#### STARTUP INVESTMENTS

- Technology platform (hardware, network, storage, and cloud capacity)
- Software capability (licenses, subscriptions)
- Training/re-training
- Communications, data-sharing infrastructure
- Workspace modifications

#### PROJECT-SPECIFIC COSTS

- Project management adaptations
- Disruptions in workflows
- Team process changes
- Accommodate data/model requirements

#### STRATEGIC OUTLAYS

- Planning initiatives
- Standards development
- Monitoring, documenting, measuring impacts
- Customization, innovation
- Additional headcount and/or new roles (e.g., BIM manager, IT support)
- Leadership and culture investments



There are three types of BIM investments:

- 1 Startup costs to ensure technology implementation is successful
- 2 Costs for tailoring BIM to a specific project
- 3 Longer-term outlays for strategic business changes

### 1 Startup costs

Although technology investment particularly in the startup phase is deemed a significant expense by over 50% of the survey respondents, it is considered unavoidable in the industry if the idea is to stay competitive and up to date.

*"BIM work requires more computing power and more networking power than traditional CAD work, and that power comes with a cost."*

Respondents cited direct labor expenses as the largest component of any project, whether it is a BIM or a traditional CAD project.

*"When we originally looked into BIM, we knew it was going to be a huge investment to train the staff on Revit – how to use it, and how to use it efficiently. There was going to be the whole ramp-up time, in which everyone would be slower than they were in AutoCAD Architecture."*



The costs of professional development, including initial training in the use of BIM products and further instruction in new work methods, must also be considered in the investment calculation.



Value and ROI



ROI Factors



Business Dimensions



Quantity



Strategic ROI





Value and ROI



ROI Factors

Business  
Dimensions

Quantity



Strategic ROI

## 2 Costs to tailor BIM to a project

As BIM use on projects proliferates, 32% of survey respondents reported that additional labor investments are needed to tailor BIM to the processes of the firm, such as by adding a BIM manager or more IT support. One electrical contractor stated, *“If there is one thing that as an industry we need to be aware of and attempt to change, then that is keeping the level of expertise proportional to the advances that are being made in the technology.”*

## 3 Longer-term outlays

Longer-term strategic outlays at the firm level, such as investing in standards development or customization, are part of the calculation. However, such costs can be difficult to quantify.

Changes to internal processes – for instance, integrating data and information in the model earlier in the design development process or incorporating modeling during preconstruction – also have to be considered to build a complete investment calculation.



During adoption and early implementation, companies also find it challenging to measure costs such as workflow disruptions and inefficiencies.





Value and ROI



ROI Factors



Business  
Dimensions



Quantity



Strategic ROI

## Quantifying benefits

Virtually all Autodesk customers interviewed about ROI agreed that BIM represents an improvement in the way buildings are designed and promises a host of benefits to project contributors and to the owner over the project's lifetime.

*"It wasn't really a financial decision... this is where everything is going. If we're going to keep up and remain competitive, we're going to have to go there."*

*"For owners, it's all about getting the building built sooner. The sooner the hospital is operating, the sooner the revenue starts. Nobody builds a building just for fun."*





Of course, calculating BIM ROI goes beyond these three types of investment. A nuanced view of return on investment for BIM considers three dimensions:

#### ORGANIZATION DIMENSION

> are benefits measured at the project level or the firm level?

#### STAKEHOLDER DIMENSION

> what specific role does the company occupy in the project ecosystem?

#### MATURITY DIMENSION

> how much depth of BIM experience does the team and the company have?

By considering BIM adoption and ROI assessment across these three dimensions, firms may be better able to understand how measurement and technology innovation can be combined strategically to inform progress toward future levels of BIM maturity.

*"BIM has allowed us to remain where we want to be in the marketplace, and as other firms embrace BIM, we want to make sure that we remain a player. I think that we have strengthened our position in terms of market share and simply being ready to do the kinds of projects we know how to do."*



Value and ROI



ROI Factors



Business  
Dimensions



Quantity



Strategic ROI





## CHAPTER THREE

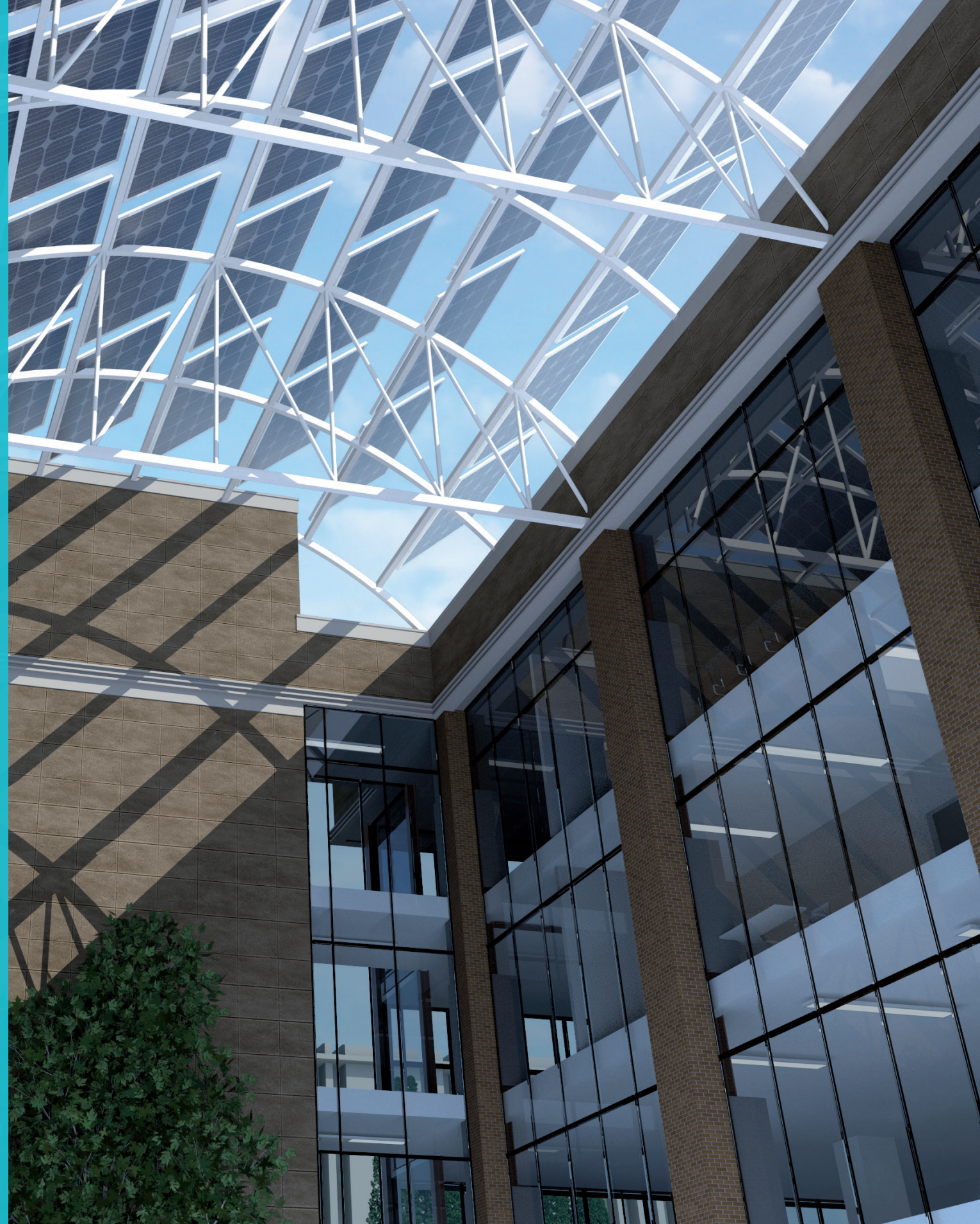
# Business dimensions of BIM ROI

3.1 Organization dimension

3.2 Stakeholder dimension

3.3 Maturity dimension

15–26







## 3.1 Organization dimension of BIM ROI



Value and ROI



ROI Factors

Business  
Dimensions

Quantity



Strategic ROI

### Project level

When companies make the decision to move to BIM, the drivers for adoption establish important objectives that impact the way returns are pursued and achieved. In some cases, customers interviewed about BIM ROI stated that adoption was driven by a client requirement on a project. In this case, a firm is likely to seek returns resulting from the success and profitability of that completed BIM-enabled project.

*"We have a great client who was willing to be part of the whole collaboration effort, so we said, 'Well, hey, this is a great opportunity!' And [BIM] allowed us to finish months ahead of schedule when comparing it to a previous similar project with this owner."*

*"The great benefit of BIM is that the owner gets a building three to four months early. It's a great benefit to the entire industry when you have a project that needs to get to the marketplace in a hurry."*



Value and ROI



ROI Factors

Business  
Dimensions

Quantity



Strategic ROI

Autodesk customers reported that BIM provided tangible, quantifiable benefits at the project level – such as fewer RFIs – along with intangible benefits, which are more difficult to quantify. These present an opportunity to efficiently pursue and analyze additional design options and increase project value through parametric design improvements.

### Reduction in waste and risk

*“We saw significant savings stemming from the design, construction, and erection of structural steel packages designed using BIM, to the point where not only do we mandate the use of BIM but we have a national account with one fabricator who uses BIM for all of our steel nationwide because the savings are so dramatic.”*

### Improved design quality

*“We’ve seen our total change order rate go from somewhere around 2.5% down to about 1.6% of construction cost through this hyper-enhanced coordination we’re able to do. It saves us a lot of time and agony in construction.”*







Value and ROI



ROI Factors

Business  
Dimensions

Quantity



Strategic ROI

### Reduction in errors

*"I anticipate being able to contain labor costs more and complete projects faster with fewer errors. As the profession matures, our BIM adoption will set us up for working on integrated project delivery projects because we will absorb the software learning curve as well as the mental learning curve of working on a different risk model. I think the long term benefit is that it sets us up to do the kind of work that we want to do economically."*

### Increased client, design, and construction team understanding and communication

*"We presented a design to 400 members using an animation generated straight out of the software. After we showed them that, it was question time, and I was bracing myself for a very long evening. They asked one question about some showers, and after that they said, 'This looks great. We know what we're getting. Let's build it.'"*

### Accelerated regulatory approval and permitting, and reduction of risk

*"Projects are all about reducing risk and I think that BIM is a tool that helps us reduce risk for the owner and that makes for a better project for the designer, for the contractor, for the client so we're all paying attention to it."*

### Improved project delivery through efficient use of resources, improved safety, and accurate timelines

*"Number one positive impact: reduction of litigation and claims. Number one, hands down."*



Value and ROI



ROI Factors

Business  
Dimensions

Quantity



Strategic ROI

## Firm level

As firms expand their application of BIM to multiple projects or widen use of BIM as a business strategy, the notion of ROI must expand to incorporate benefits at a firm level, such as opportunities for work with new clients. Throughout the BIM ROI interviews, respondents mentioned corporate improvements in workflow and team capability. Other benefits included staffing competency and retention.

*"Net fee revenue can be higher with BIM. We can now do the kind of work with 600 people that we used to do with 650."*

*"I couldn't imagine someone coming out of school now even wanting to work at a firm that's not doing BIM to a high degree. We're seeing that when we have office hires or recruits come through."*

Opportunities for business model expansion or new services, such as quality assurance or model development, are also benefits at the firm level.



Data-rich models provide opportunities for companies to offer ongoing services to clients as data is more seamlessly integrated into facility operations and maintenance.





Value and ROI



ROI Factors



Business  
Dimensions



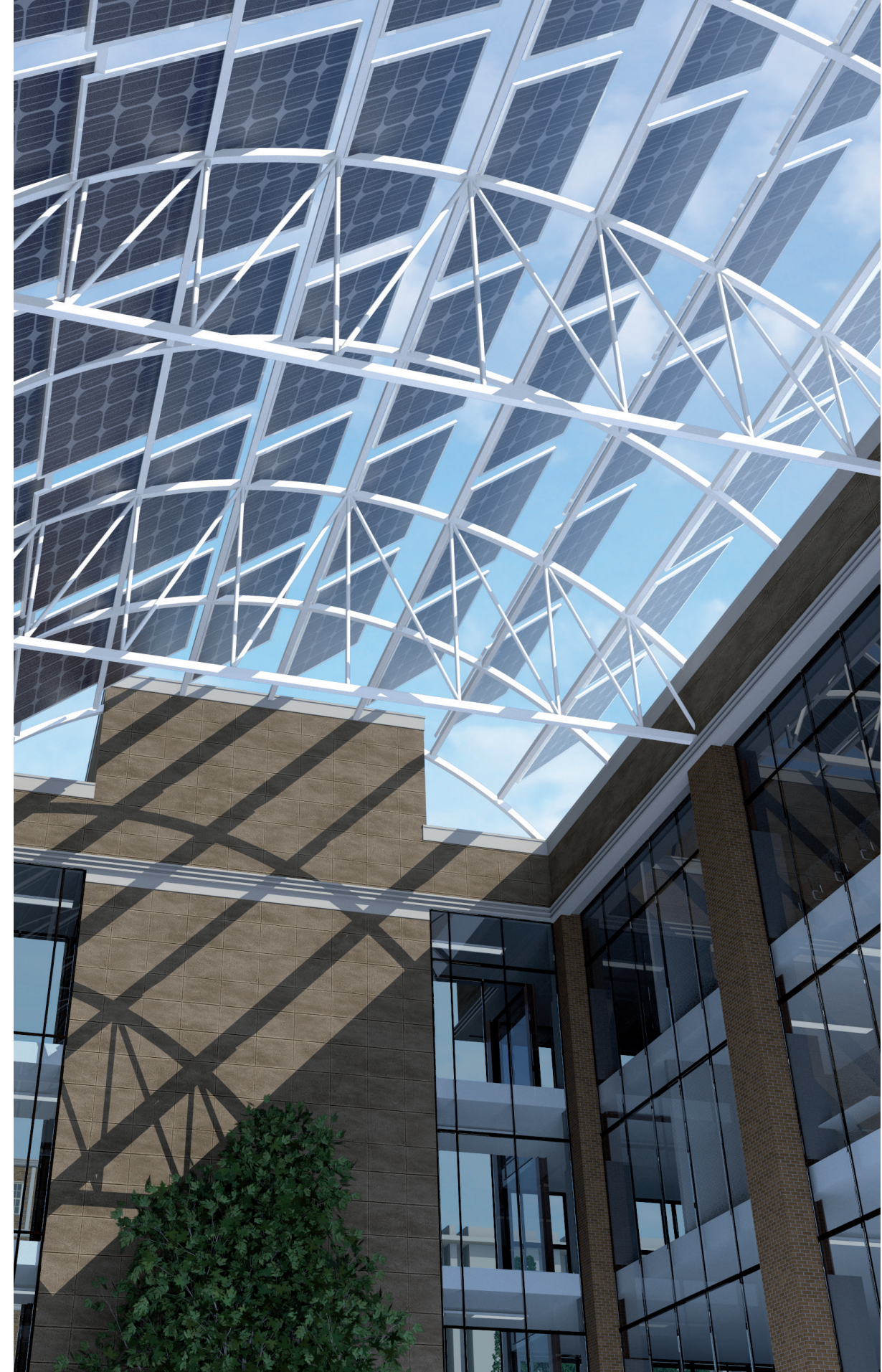
Quantity



Strategic ROI

It can be challenging to attribute returns at the firm level solely to BIM adoption. If companies continue to track business health in terms of traditional metrics such as profitability, risk factors, volume of claims/litigation, projects won or lost, or repeat business with key clients, the actual impact of BIM on these measures can be difficult to separate from other factors.

*"It's a lot more difficult to measure things like improved opportunities resulting from better outcomes. Obviously when you do well for an owner and a team and things come out good, in the end they want to have you back."*







## 3.2 Stakeholder dimension of BIM ROI

### Stakeholder roles impact assessment of BIM

Interview respondents revealed that they assess the returns of BIM differently depending on their role in a project – whether one employs BIM as a tool in design, construction, or operations affects perspective.

This is consistent with previous research, which identified different stakeholder views about value.

Alternatively, architects and engineers prioritize productivity and communication.

*“The elimination of rework is low-hanging fruit for our industry. We’re able to virtually look above the ceiling, locate what’s what, what’s clashing, and fix it virtually rather than having to fix it in the field.”*



For example, owners tend to recognize multi-party communication and improved project process and outcomes as top benefits.

Contractors list productivity and lower project cost as their top BIM benefits.<sup>4</sup>

<sup>4</sup> McGraw Hill Construction (2012)





Value and ROI



ROI Factors

Business  
Dimensions

Quantity



Strategic ROI

	Design	Construction	Owners
BIM Adoption	Widespread	Emerging, and increasingly appreciated	Many specify BIM, but few actively use or completely understand it
Key Benefits	Improved collaboration with project contributors Less rework, fewer change orders	Minimizes/eliminates a significant number of changes Improves construction management Great for quantities and materials estimating	Can shorten time to completion of project overall Enables more effective management, operations and upgrades
Associated Costs	Requires more time to fully populate the model Designers can eat up more time exploring design alternatives	Requires a change in business process and accompanying technology investment to fully realize	Uncertain at present, other than investment in the software
Interest in ROI	Not particularly helpful if tied to a decision to use BIM or not Interested in understanding hidden costs as well as possible revenue opportunities	Not directly relevant as the BIM decision is typically not theirs to make	Interested and in need of education on getting the most benefit out of BIM-designed assets
Outlook on BIM	Here to stay. Makes work more complex, but represents the "right thing to do."	Welcome improvement that should be applied to all projects	Significant potential and increasingly a standard requirement imposed upon project contributors



Value and ROI



ROI Factors



Business  
Dimensions



Quantity



Strategic ROI

Owners appear to be much more interested in ROI calculations. *“Definitely the benefit is going to the owners of the projects in terms of change orders avoided during construction,”* said one architecture firm principal. *“On the construction side, there are significant benefits, from eliminating rework to improving safety – and we’re able to give our owners an as-built model and that is very beneficial to them.”*

Like owners, designers are interested in ROI as a means to gain deeper insights into opportunities.

Many design firms were early to adopt BIM based on the perception that their firms would be better positioned to work with public entities which adopted BIM mandates.







## 3.3 Maturity dimension of BIM ROI



Value and ROI



ROI Factors

Business  
Dimensions

Quantity



Strategic ROI

### Level of BIM experience affects ROI

When moving from 2D to initial BIM implementation, firms calculate ROI to determine whether the technology investment will be worthwhile. However, once firms have moved past the initial stage of BIM adoption, ROI calculation shifts to a more nuanced tool to assess specific initiatives linked to firm strategy.

Recent research notes a correlation between different levels of BIM experience and ROI.

High ROI is reported by a majority of high maturity BIM users, yet only by 20% of the low maturity BIM users.<sup>5</sup>

*"The huge cost shifter with BIM is the way we use it to put great tools in the hands of experienced designers. Once trained, these very experienced people can do more in the same amount of time."*

<sup>5</sup> McGraw Hill Construction (2012)



Value and ROI



ROI Factors



Business  
Dimensions



Quantity

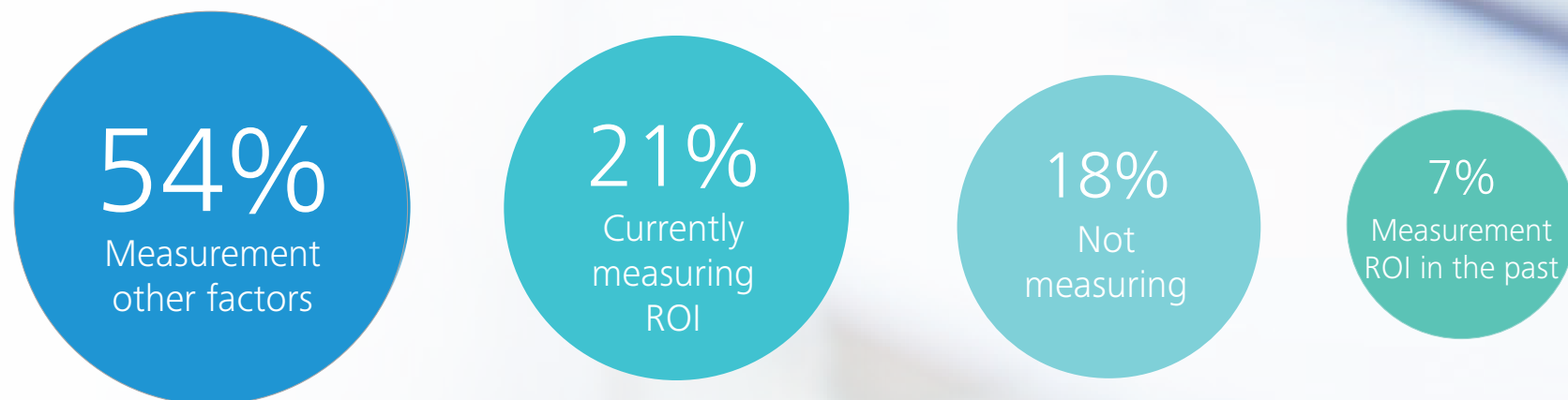


Strategic ROI

Many customers with significant BIM experience report having internal practices to measure experience, assess company competency, and provide incentive to employees to develop necessary skills.

In regions where governments have enacted policies to encourage BIM adoption, such as in the United Kingdom, experience or maturity levels are often officially defined to provide clarity and to drive practitioners to increasing levels of sophistication.<sup>6</sup>

### BIM ROI Customer Perception Study Measurement Practices







Value and ROI



ROI Factors



Business  
Dimensions



Quantity



Strategic ROI

Respondents at a more mature level of BIM actually found ROI more difficult to measure. In 7% of the most experienced firms, rigorous approaches to ROI had transformed the companies so completely to model-based processes that they no longer found the measurement of BIM to be critical to decision making.

*"For years, we painstakingly calculated ROI on every single project because we were still in that phase of trying to justify BIM," remembers one construction BIM manager. "After analyzing over 100 projects, we realized that we were achieving three to five times payback on the number of dollars we put into a project. Eventually, we got to the point where we just realized that there is a return on investment. Now, we have an inherent knowledge that there is value to BIM."*



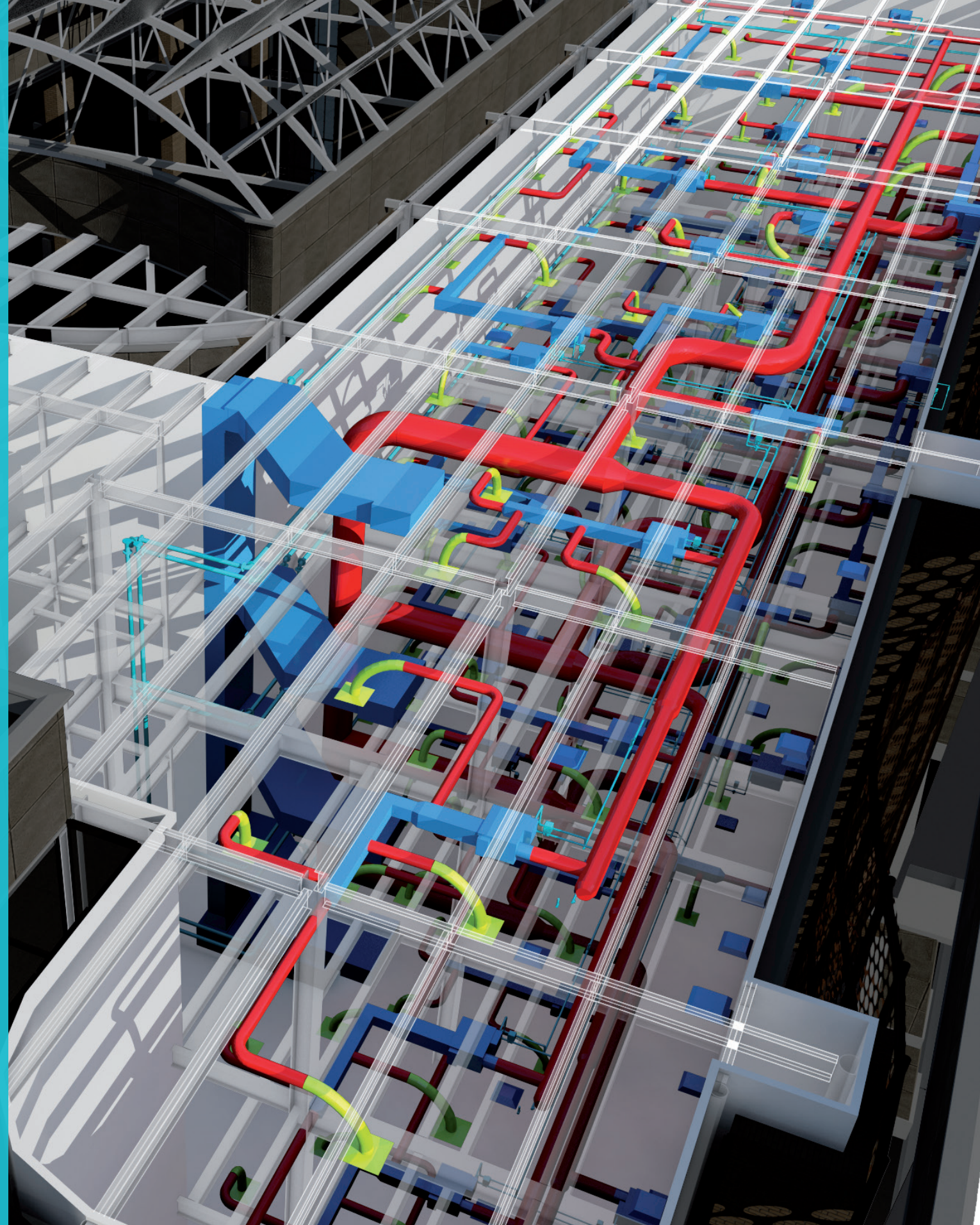




## CHAPTER FOUR

# Quantifying the impact of process change

27 – 31





# 4. Quantifying the impact of process change

## What BIM benefits are firms and ecosystems achieving?

Through conversations with design, construction, and client teams around the world, Autodesk has gained insight into individual firm benefits as well as ecosystem opportunities for return. To apply ROI to decisions about technology adoption, companies assess and prioritize opportunities to achieve returns based on a list of target BIM benefits, ranging from preconstruction to operations.

Design and Communications	Scope of Control	Preconstruction	Construction workflow	Operations/ maintenance
Well-understood scope of project design	Optimize overall design duration	Easier, quicker visualization for GCs, subs, inspectors	Team size, focus	Earlier C of O
Higher-quality facility, fewer warranty problems	Fewer and leaner RFIs, addenda ASIs	3D and 4D visualization logistics/sequencing efficiencies	Reduced costs of printing, packing, copying, shipping/receiving, distribution	Improved handover process
Design productivity, parametrically coordinated documents	Fewer design change orders	Organized, efficient document management	Lower general conditions for GC and subcontractors	Digital facility information to support maintenance efficiency
Model-based energy and sustainability analysis	Fewer owner changes	Faster, accurate prices	Reduction in project schedule	
			Reduced prices, less anticipated risk by subcontractors	
			Prefabrication and just-in-time delivery	
			Improved field safety, control, survey, crew tracking	



Value and ROI



ROI Factors



Business Dimensions



Quantity



Strategic ROI



Value and ROI



ROI Factors



Business  
Dimensions



Quantity



Strategic ROI

To assess progress and ROI, companies can apply a number of measures associated with potential benefit targets. Cost savings or reduction of effort targets lend themselves to measurement.

For example, in seeking a project outcome of “efficient use of resources” due to improved “team size and focus” during the construction phase, the firm might agree to increase the specialization of the BIM team. This would allow the firm to track the time invested in specific tasks by phase and compare the metrics to benchmarks for comparable projects in order to provide feedback on the effectiveness of the strategy.

Alternatively, a team might target the BIM benefit of “fewer, earlier, and leaner RFIs” under the Scope Control category. A process change to define responsibility and level of development for models could be combined with a measurement strategy of tracking RFIs and hours invested in responding to them.

Qualitative factors such as “project design scope understanding” or “owner comfort level” can be tracked by a score that is evaluated through a predetermined method, such as a questionnaire administered to staff and managers at key points in the project schedule.



*“The social aspect, improved delivery methods, and the reduction of litigation are huge long-term benefits. In addition to that, the opportunity to innovate is higher now than I have seen it in 30 years of construction.”*

*We have the opportunity for startling long-term benefits as we mesh innovation into our traditional process and improve it overall.”*





Value and ROI



ROI Factors

Business  
Dimensions

Quantity



Strategic ROI

Design and Communications	Process Change Options	Desired Outcomes	Potential Measures for Return
Well-understood scope of project design	Share 3D model and data among stake-holders	Design and construction bids reflect accurate scope, and the scope and geometry are more stable	<b>Saving:</b> Fewer scope changes and fewer trade contractor defaults
Higher-quality facility, fewer warranty problems	Clarify installation requirements with instructions for Construction Assembly	Design that supports construction efficiency; design with reduced errors	<b>Savings:</b> Shorter punchlist and fewer callbacks. Cost of warranty claims and other facility management issues. <b>Hours saved, avoided costs:</b> Addressing errors
Design productivity, parametrically coordinated documents	Changes in one sheet automatically reflected in all documents, Earlier More Comprehensive Coordination, Consistency from Sheet to Sheet	Efficiency in design alternative generation and coordination	<b>Hours saved:</b> Time spent developing design, documenting, coordinating. Fewer change orders and rework.
Model-based energy and sustainability analysis	Fast and efficient Energy, Daylight, wind, comfort, traffic, LEED calcs, and visuals	Achieve requirements for energy efficiency, sustainability	<b>Hours saved:</b> Time invested in design; comparative energy costs. Energy savings.
Scope of Control			
Overall design duration	Opportunities to develop additional design alternatives	Improved quality, client and occupant satisfaction	<b>Value of quality:</b> Client and occupant satisfaction surveys; project recognition
Fewer and leaner RFIs, addenda ASIs	Develop joint model strategy, clarify responsibility, level of detail, interop strategy	Efficient use of resources, expertise. Fewer delays waiting for information.	<b>Hours saved:</b> Time invested in responding to RFIs; Number of RFIs
Fewer design change orders	Fewer RFI-generated COs; fewer field issues	More in-depth design understanding; ability to resolve constructability issues	<b>Hours saved:</b> Time spent redesigning in the field. Savings: less rework
Fewer owner changes	Increase communication to owner/client to clarify project scope and methodology	Owner has comfort level with progress and program	<b>Value of quality:</b> Owner/client feedback

Table 1a: BIM benefits mapped to process change, outcomes and measures

Preconstruction	Process Change Options	Desired Outcomes	Potential Measures for Return
Easier, quicker visualization for GCs, subs, inspectors	Widen stakeholder access to diverse set of project views	Increase understanding of project specifics	<b>Value of deliverables:</b> Visualizations created, employed; stakeholder assessment of visualization usefulness
3D and 4D visualization logistics/sequencing efficiencies	Test and clarify logistics and sequencing of construction methodology, safety and systems	Improve understanding of design and systems; construction field efficiencies	<b>Value of score:</b> Design and systems understanding feedbackSavings: reduced rework
Organized, efficient document management	Conduct meetings electronically with digital markup, comments, review	Efficient use of professional labor	<b>Hours saved:</b> Time invested in recording and documenting decisions, communication
Faster, accurate prices	Establish measurement practices, automate counting for estimating	Analyze more options; increase accuracy in estimation; use resources efficiently	<b>Savings:</b> Reduced price fluctuations and wasted resources
Construction Workflow			
Team size, focus	Increase specialization of BIM team	Efficient use of resources, expertise	<b>Hours saved:</b> Time invested in specific tasks by phase
Reduced costs of printing, packing, copying, shipping/receiving, distribution	Reduce emphasis on paper deliverables	Efficient documentation and information transmission; team all knows current scope	<b>Savings:</b> Cost of duplication and shipping/receiving
Lower general conditions for GC and subcontractors	Reduce contingency by accurately anticipating scope	Efficient use of resources, expertise	<b>Savings:</b> Variations in scope, cost avoidance
Reduction in project schedule	Reduced dependence on fluctuating scope documentation	Reduced risk, reduce rework.	<b>Savings:</b> Amount of time-variable Finance costs
Reduced prices, less anticipated risk by subcontractors	Process to mock up crew overlap and sequencing	Reduce claims and liens	<b>Savings:</b> Lower prices at bid, claims and liens
Prefabrication and just-in-time delivery	Digital monitoring of supply chain and materials	Schedule timeliness, Early move-in achieved	<b>Days Savings:</b> Milestone achievement (+/- days)
Improved field safety, control, survey, crew tracking	Improved planning, increased monitoring	Predictability, Reduced risk	<b>Savings:</b> Layout and control savings, field issues, accidents
Operations/Maintenance			
Deliver earlier C of O	Eliminate need to maintain redundant site access	Schedule timeliness, early move-in achieved	<b>Savings:</b> Need for second facility, handover expenses
Improved handover process	More efficient transfer of information to owner		
Digital facility information to support maintenance efficiency	More efficient data interoperability to streamline owner facility management transition	Data transition	<b>Hours:</b> labor to build up facility data store <b>Savings:</b> lower maintenance costs

Table 1b: BIM benefits mapped to process change, outcomes, and measures





## CHAPTER FIVE

# Strategic ROI – conclusion and key takeaways

32 – 36





Value and ROI



ROI Factors

Business  
Dimensions

Quantity



Strategic ROI

## 4. Strategic ROI – conclusion and key takeaways

### What we've learned

This examination of BIM ROI suggests that firms that have deployed BIM find that, despite challenges in making an accurate calculation, measuring the return on their BIM investment is an important practice that can have relevance beyond determining whether or not to adopt a technology innovation.

Of the customers who participated in the research effort, 75% responded that their firms were quantitatively assessing the impact of BIM. However, only 21% were literally measuring ROI. The rest were measuring other factors, such as the ability to complete projects with smaller teams or shorter schedules.

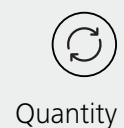




## BIM added value

There remains a strong interest in applying ROI to assess specific BIM advances once firms have achieved the first level of maturity. Interestingly, 7% of the firms mentioned moving beyond the need to calculate ROI for BIM after evolving to a higher level of BIM maturity, echoing the observation that technology becomes invisible once it becomes ubiquitous.

The practice of targeting benefits, tracking investments over time, and measuring returns helps firms select judiciously from a portfolio of technology/process initiatives, and to plan for strategic business change. In addition, firms agree that ROI can be a strategic tool for internal stakeholders in advocating for process change or to demonstrate the potential value of a new method to internal teams, managers, or employee groups.





## Who benefits?



Value and ROI

Firms with extensive BIM experience observe that a nuanced and sophisticated application of ROI is becoming a factor in working successfully with building owners as that influential group becomes increasingly aware of BIM, realizes the benefits of BIM-enabled project delivery, and grasps the potential for process change in building operations and maintenance.



ROI Factors

Service providers understand that strategic applications of ROI can serve to demonstrate competency to clients, to increase value through data-driven decision making, and to provide competitive differentiation.



Business Dimensions

Firm leaders can create their own roadmap for process change by developing a strategic BIM ROI practice – a commitment to measurement, benchmarking, retaining information in accessible formats for comparison purposes, and conducting ongoing evaluations of key performance indicators.



Quantity



Strategic ROI

As opposed to merely being a mechanism for go/no-go decisions, a strategic ROI discipline can support the prioritization and internal socialization of process change initiatives and improved business performance.





## Key takeaways

- > **Recognize**  
that practices for measuring and assessing ROI vary widely. While 21% of firms surveyed are committed to ROI-based BIM decision making, 53% of firms interviewed seek to apply ROI to BIM, yet find it challenging, and the highly experienced 7% of firms have moved beyond ROI.
- > **Employ ROI measurement**  
to aid in assessing the value of different options, in advocating with internal and external stakeholders and with clients as your firm expands use of BIM to new applications.
- > **Apply a framework**  
of three dimensions for BIM return – organization, stakeholder, and maturity – as your firm develops its road map for BIM-enabled services.
- > **Launch an internal regime**  
of measurement for current projects to create the necessary platform for ROI and BIM maturity evolution going forward.

Value and ROI



ROI Factors



Business Dimensions



Quantity



Strategic ROI





Value and ROI



ROI Factors

Business  
Dimensions

Quantity



Strategic ROI

## Conclusion

By employing ROI to assess BIM initiatives aimed at improving the performance of individuals and teams, firms can prioritize investments for organizational effectiveness<sup>8</sup> to support sustained business improvement or implement models to assess BIM maturity<sup>9</sup> and increase competency levels.<sup>10</sup> Establishing the firm's orientation within the three dimensions of BIM, ROI suggests a set of promising measures for initial implementation and a potential road map for future development. Important strategic factors for firms include:

- > the competency of employees
- > collaborative culture, and
- > capability of teams.

For business leaders who want to find out even more, academic research provides recommendations and frameworks to devise optimization strategies stretching from initial BIM adoption to more sophisticated maturity levels.<sup>7</sup>

<sup>7</sup> Qian (2012)

<sup>8</sup> Lawler III and Worley (2006)

<sup>9</sup> National BIM Standard (2012)

<sup>10</sup> Succar (2009)





BIM represents an improvement in the way buildings are designed and promises a host of benefits to project contributors and to the owner over the project's lifetime.

While some firms are reluctant to invest in BIM because of the initial startup costs and longer-term outlays as well as the difficulty of calculating BIM ROI, the Autodesk BIM ROI Customer Perception Study has shown that nearly all architecture firms that do take the time to calculate ROI using a nuanced approach are experiencing clear benefits today.

Importantly, the need for investment changes over time as firms grow more sophisticated and project use expands, which is why firms need to consider a variety of factors in their calculation.



Value and ROI



ROI Factors

Business  
Dimensions

Quantity



Strategic ROI

## Appendix A

### Measuring value of BIM reference articles

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# References

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Erin Rae Hoffer is an architect with 25 years of experience in technology and practice. Erin presents and writes on strategic industry change through technology. Erin is a member of the AIA’s National Committee on Codes and Standards, co-chair of the Boston Society of Architect’s Building Systems Committee. She also chairs the Energy Cluster of the Mass Tech Leadership Council.

Prior to joining Autodesk in 2006, Erin led higher ed tech groups for Harvard, MIT and other institutions. She was a high tech product manager for several software start-up companies. She is a LEED Accredited Professional and member of the AIA and CSI with a Master in Architecture from UCLA, an MBA from the MIT Sloan School of Management, and a Ph.D. from Northeastern University. Erin is a registered architect.

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