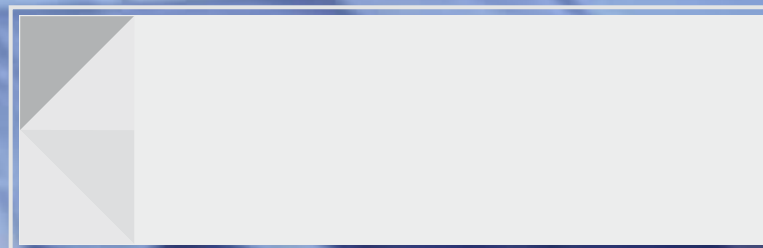
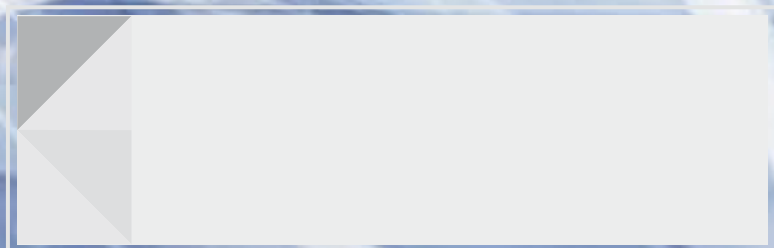
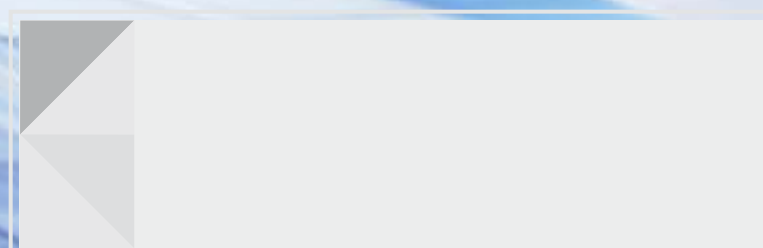
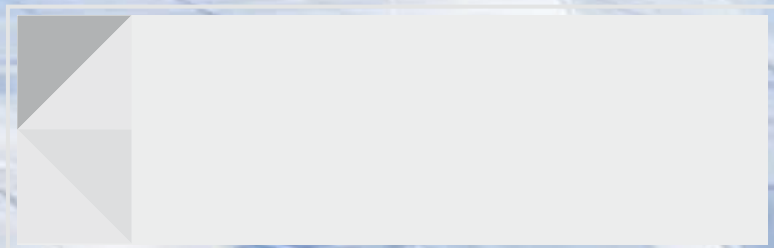
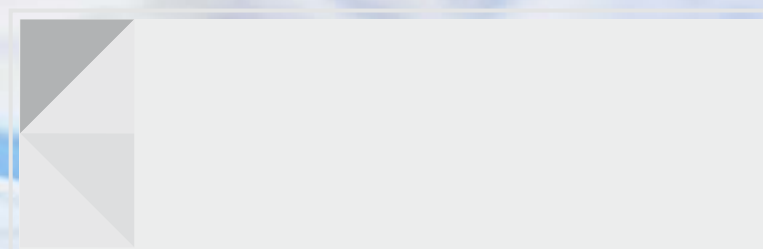
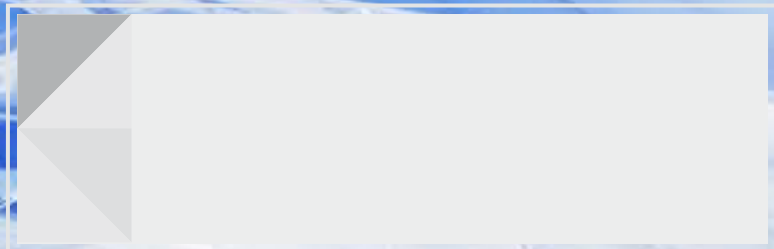


Measuring the value of BIM: Achieving Strategic ROI





Measuring the value of BIM: [Achieving strategic ROI](#)

The economic value of Building Information Modeling (BIM) technology in the lifecycle of buildings—[from design to construction and through operations and maintenance](#)—is often weighed by measuring the ratio of return to investment, or ROI.

With the accelerated adoption of BIM processes becoming the norm throughout the building lifecycle, the role of ROI in technology decision making is shifting.

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



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

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

Since the advent of BIM technology, companies that adopt BIM have sought to understand the impact of technology and software transition in terms of quantitative and qualitative factors. As BIM adoption continues to accelerate, the design and construction industry can claim more than a decade of experience realizing the value and financial impact of BIM. The long history and solid credibility of ROI has made it a necessary evaluation step prior to many capital or labor-intensive business investments, such as BIM adoption.¹

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 labor-intensive. Many note that rigorous economic measurement is often challenged by project complexity and uniqueness.

With all of its strengths, 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 in themselves. There is no industry-standard method for BIM ROI calculation, 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.²

¹ See Appendix A for details on different approaches to calculating ROI

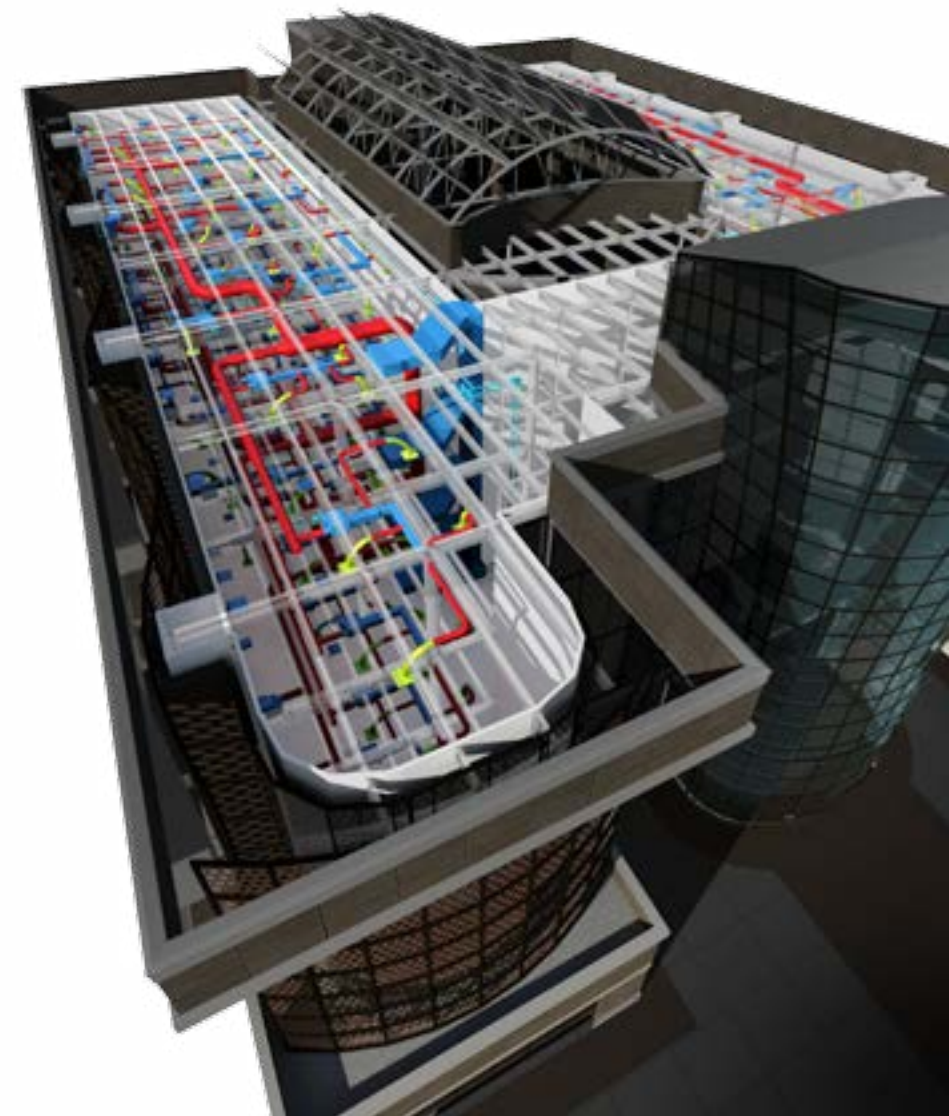
² McGraw Hill Construction (2012) and see "Autodesk 2013 BIM ROI Customer Perception Study" in A appendix

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

The challenge of defining the economic impact of BIM for the building design and construction industry has attracted significant research interest. In addition to measuring industry perception of ROI through surveys and interviews³, studies have included detailed inspections of financial results from case study projects⁴, and in-depth studies of specific corporate initiatives⁵. This body of work represents a breadth of inquiry into BIM ROI that spans across the project lifecycle, examines various building types, considers varying levels of BIM experience, and looks at a range of calculation methods.

How are industry leaders responding to the tension between the strong conviction in the value of ROI and the challenges in calculating investment/return ratios for BIM in design, construction, and building operations?

To provide insight into this question, Autodesk recently engaged in conversations with customers in varying stages of BIM adoption by contracting two independent research firms: King Brown Partners, Inc., and Scan Consulting.



³ McGraw Hill Construction (2012) and Berckerik-Gerber and Rice (2010)

⁴ Azhar et al (2008), Shen and Issa (2010), Giel and Issa (2013), and Bryde et al (2012) 5

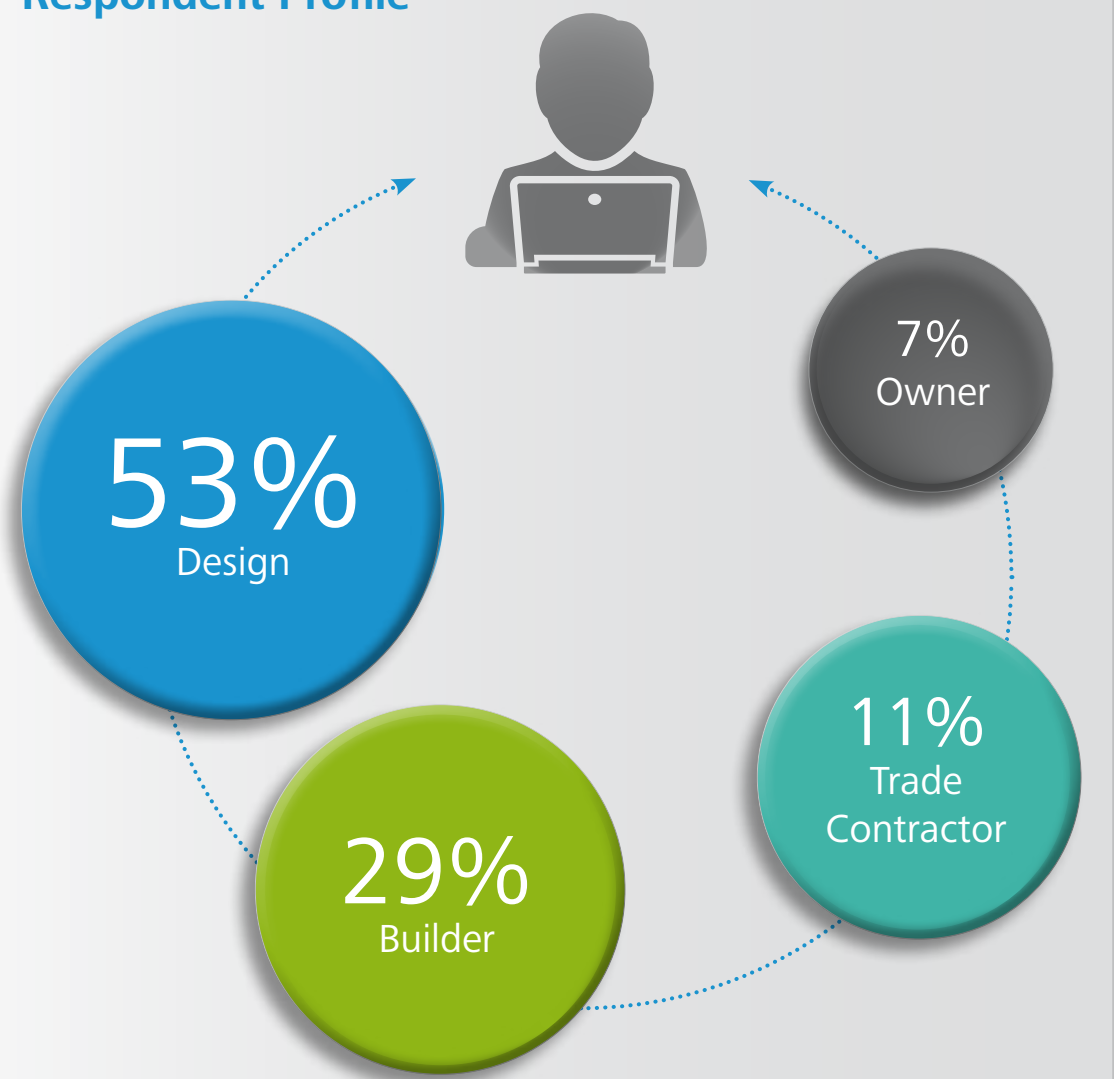
⁵ Barlish and Sullivan (2012), Giel et. al (2010), Giel and Issa (2013)

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

In the first phase of the Autodesk BIM ROI Customer Perception Study⁶, King Brown Partners 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.

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.

BIM ROI Customer Perception Study Respondent Profile



⁶ Autodesk BIM ROI Customer Perception Study, King Brown Partners and Scan Consulting (2013)



ROI factors—investments and benefits

ROI factors—investments and benefits

Calculating investment

Taken together, these studies provide 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 Autodesk BIM ROI 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 timeline 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

ROI factors—investments and benefits

There are three types of BIM investments: 1) startup costs to implement technology; 2) expenses of tailoring innovation to a specific project; and 3) longer-term outlays supporting strategic business changes.

Startup costs

Particularly in the startup phase, technology investment is deemed a significant expense by over 50 percent of the survey respondents, yet is considered an unavoidable price of remaining competitive and current in the industry. As an associate VP in an architecture firm noted, “BIM work requires more computing horsepower and more networking horsepower than traditional CAD work, and that horsepower comes with a cost.”

Direct labor expenses are seen as the largest component of any project, but are not believed to be appreciably different for BIM-centric versus traditional CAD projects. Firms are aware that the costs of professional development, which include initial training in the use of BIM products and further instruction in new work methods, must also be considered in the investment calculation.

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

ROI factors—investments and benefits

“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,” said a contract manager/developer.

Costs to tailor BIM to a project

As BIM use on projects proliferates, 32 percent of survey respondents reported that additional labor investments are needed to tailor BIM to the processes of the firm (for example, the addition of a BIM manager, more IT support). An electrical contractor stated, “If there is one thing that as an industry we need to be aware of and attempt to change, that is keeping the level of expertise commensurate with the advances that are being made in the technology.”



ROI factors—investments and benefits

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. Also, companies find it challenging to measure costs such as workflow disruptions and inefficiencies during adoption and early implementation. Efforts required to change internal processes—in other words, to integrate data and information in the model earlier in the design development process or to incorporate modeling during preconstruction—must likewise be considered to build a complete investment calculation.

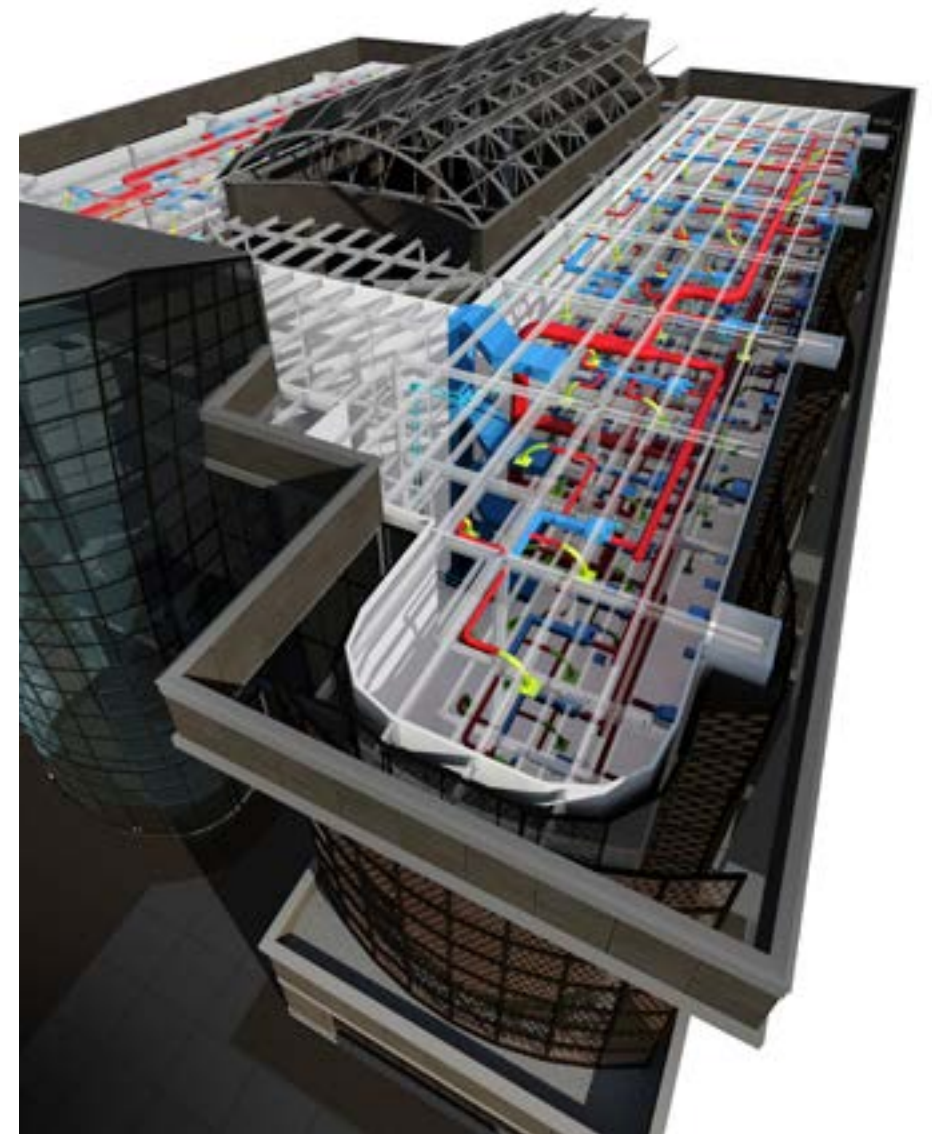
Companies find it challenging to measure costs such as workflow disruptions and inefficiencies during adoption and early implementation.

ROI factors—investments and benefits

Quantifying benefits

Case study research and the Autodesk BIM ROI Customer Perception Study have identified many benefits that support the calculation of financial return.⁷ 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, it was like, 'This is where everything is going. If we're going to keep up and remain competitive, we're going to have to go there.'" said the VP of an architecture firm. "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," a designer noted.



⁷ McGraw Hill (2007-2012), Barlish and Sullivan (2012), Qian (2012), Bryde et al (201103), Bercerik-Gerber and Rice (2010).

ROI factors—investments and benefits

A nuanced view of return on investment for BIM considers three dimensions:

Organization dimension—

whether benefits are measured at the project level or the firm level


Stakeholder dimension—

what specific role the company occupies in the project ecosystem

Maturity dimension—

the depth of BIM experience of the team and the company

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.”

– Principal of a Design Firm



Business dimensions of BIM ROI

Business dimensions of BIM ROI

-----> Organization dimension of BIM

Organization dimension of BIM

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. As one construction professional shared, “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 it [BIM] allowed us to finish months ahead of schedule when comparing it to a previous similar project with this owner.”

The VP of a trade contracting firm noted that “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.”

Business dimensions of BIM 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 but include the opportunity to efficiently pursue and analyze additional design options and increase project value through parametric design improvements:

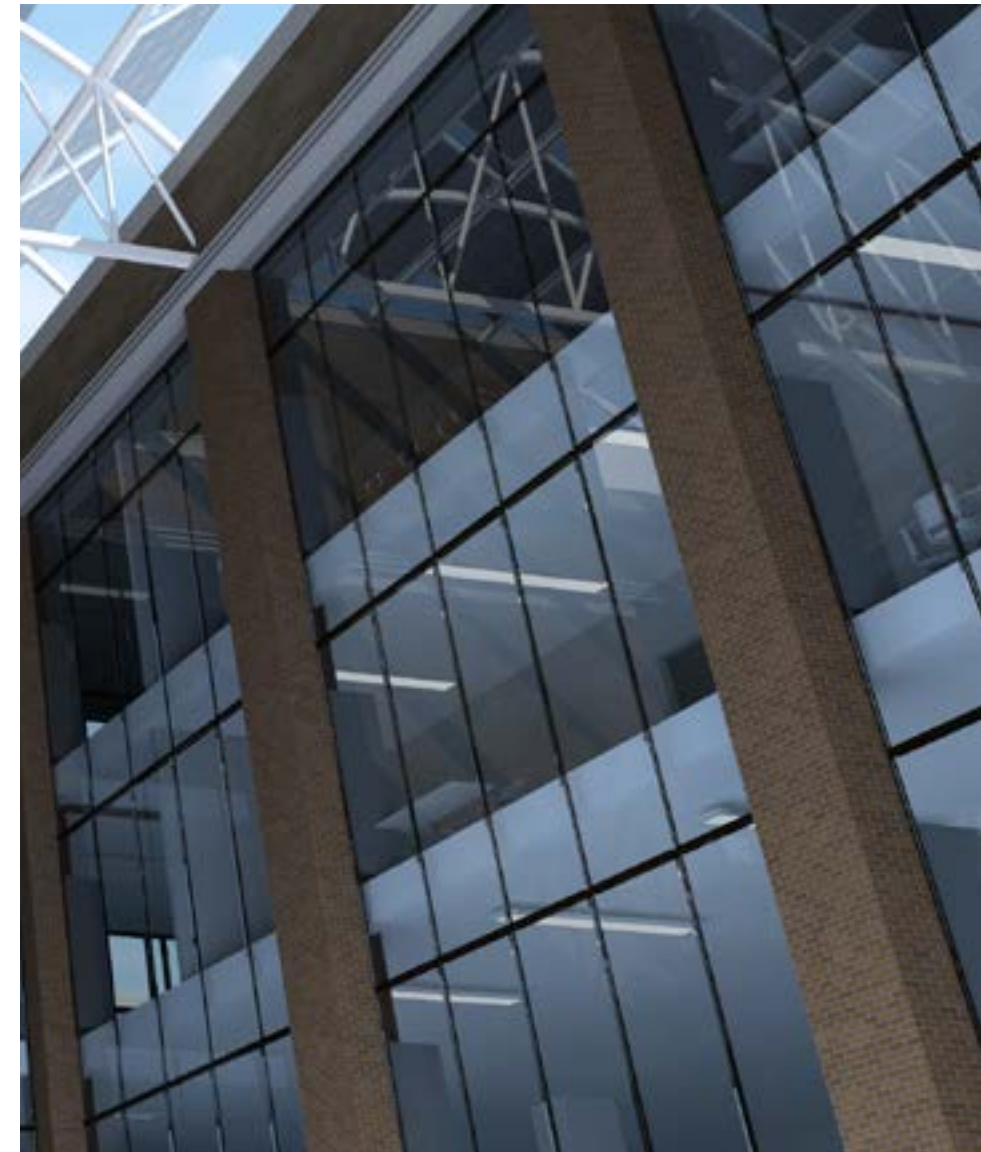
-----> **Reduction in waste and risk**

“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 percent of construction cost down to about 1.6 percent of construction cost through this hyper-enhanced coordination we’re able to do. It saves us a lot of time and agony in construction.”

– Principal at an architecture firm.



Business dimensions of BIM 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."

– Principal at a design firm

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 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.'"

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."

– Electrical construction contractor

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."

– Sr Principal, Architecture and Engineering firm

Business dimensions of BIM 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. As one builder stated, “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.”

Other benefits include staffing competency and retention. One architect asserted, “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 smoothly integrated into facility operations and maintenance.

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

Business dimensions of BIM ROI



Returns at the firm level can be challenging to attribute solely to BIM adoption. If companies continue to track business health in terms of traditional metrics such as profitability, risk factors, amount 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.

One contractor said, "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, at the end they want to have you back."

Business dimensions of BIM ROI

Stakeholder dimension of BIM ROI

A second BIM ROI factor is the stakeholder dimension. 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. For example, owners tend to recognize multiparty communication and improved project process and outcomes as top benefits.

Alternatively, architects and engineers prioritize productivity and communication. Contractors list productivity and lower project cost as their top BIM benefits.⁸ “The elimination of rework is low-hanging fruit for our industry,” said one contractor. “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.”

The chart (see next page) consolidates individual responses from the 2013 Autodesk ROI research project.

Owners tend to recognize multiparty communication and improved project process and outcomes as top benefits.

Contractors list productivity and lower project cost as their top BIM benefits.

⁸ McGraw Hill Construction (2012)

Business dimensions of BIM ROI

How stakeholder roles impact assessment of BIM

	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

Business dimensions of BIM ROI

Owners appear to be much more interested in ROI calculations. As an architecture firm principal stated, “Definitely the benefit is going to the owners of the projects in terms of change orders avoided during construction. 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.”

Designers, like owners, 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.



Business dimensions of BIM ROI

Maturity dimension of BIM ROI

A third dimension in the application of ROI is the BIM experience level. 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 percent of the low maturity BIM users.⁹

“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,” a design firm principal commented.



⁹ McGraw Hill Construction (2012)

Business dimensions of BIM ROI

Many customers with significant BIM experience report having internal practices to measure experience, assess company competency, and incent 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.¹⁰ As companies move from one maturity level to another, different measures provide quantitative feedback on return.

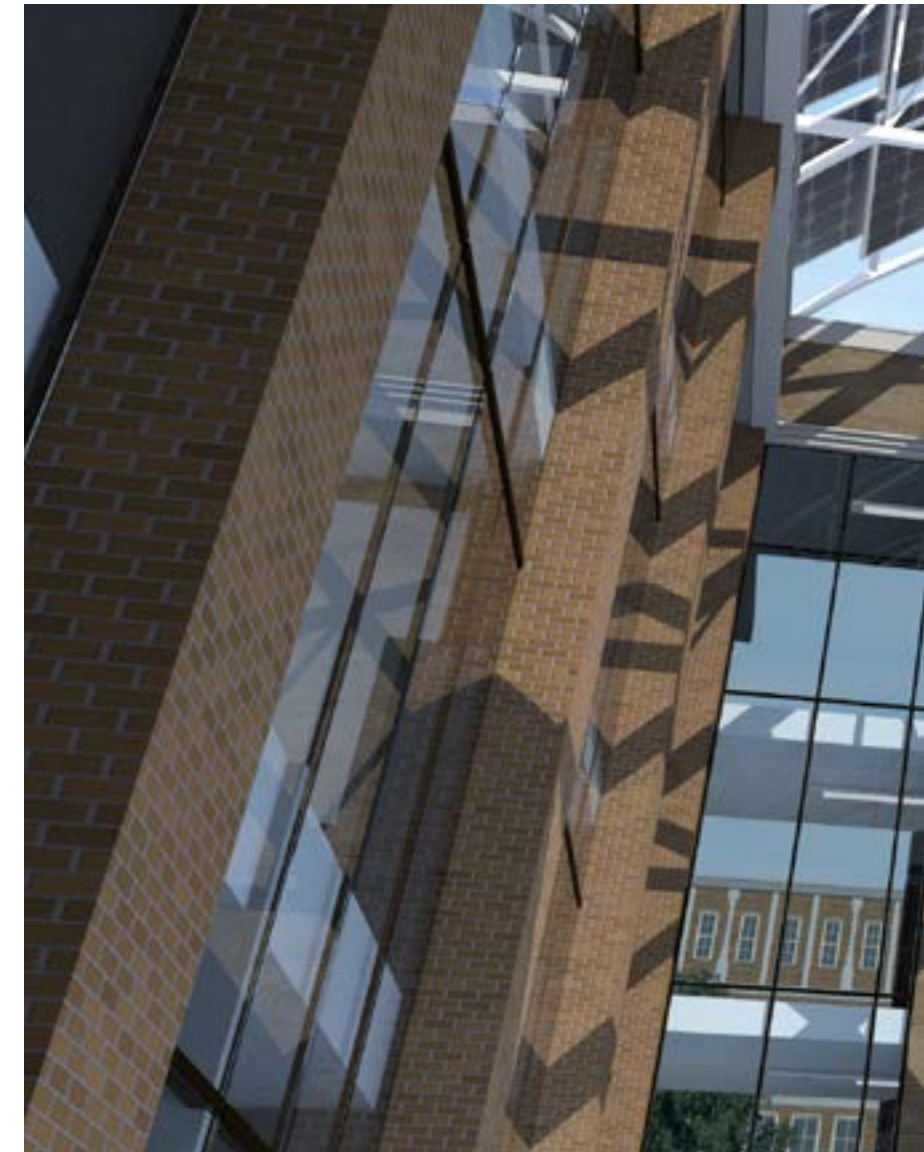


¹⁰ BIM Industry Working Group (2011)

Business dimensions of BIM ROI

Respondents at a more mature level of BIM actually tended to find ROI more difficult to measure. And seven percent of the most experienced firms that had applied rigorous approaches to ROI evolved to a point where the company had transformed so completely to model-based processes that they no longer found the measurement of BIM to be critical to decision making.

A construction BIM manager commented on the mature phase use of BIM: “For years, we painstakingly calculated ROI on every single project because we were still in that phase of trying to justify BIM. 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 an ROI. Now, we have an inherent knowledge that there is value to BIM.”





Quantifying the impact of process change



Quantifying the impact of process change

What BIM benefits are firms and ecosystems achieving?

In conversations with design, construction, and client teams around the world as they strive for collaborative process change, 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

- Well-understood scope of project design
- Higher-quality facility, fewer warranty problems
- Design productivity, parametrically coordinated documents
- Model-based energy and sustainability analysis

Scope control

- Optimize overall design duration
- Fewer and leaner RFIs, addenda ASIs
- Fewer design change orders
- Fewer owner changes

Preconstruction

- Easier, quicker visualization for GCs, subs, inspectors
- 3D and 4D visualization logistics/sequencing efficiencies
- Organized, efficient document management
- Faster, accurate prices

Construction workflow

- Team size, focus
- Reduced costs of printing, packing, copying, shipping/receiving, distribution
- Lower general conditions for GC and subcontractors
- Reduction in project schedule
- Reduced prices, less anticipated risk by subcontractors
- Prefabrication and just-in-time delivery
- Improved field safety, control, survey, crew tracking

Operations/maintenance

- Earlier C of O
- Improved handover process
- Digital facility information to support maintenance efficiency

Quantifying the impact of process change

The tables below suggest a sample of measures associated with potential benefit targets that companies can apply to assess progress and ROI. 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. In order to provide feedback on the effectiveness of the strategy, the firm could track the time invested in specific tasks by phase and compare the metrics to benchmarks for comparable projects.

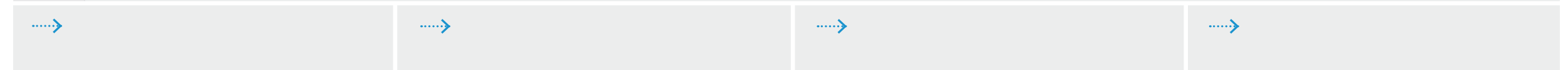
Alternatively, a team might target the BIM benefit of “fewer, earlier, and leaner RFIs” under the Scope Control category. A process change to define responsibility and level of development for models could be combined with a measurement strategy of tracking RFIs and hours invested in responding to them.

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.”

– Technology director
for a trade contractor

Quantifying the impact of process change



Design and Communications	Process Change Options	Desired Outcomes	Potential Measures for Return
Well-understood scope of project design	Share 3D model and data among stakeholders	Design and construction bids reflect accurate scope, and the scope and geometry are more stable	SAVING: 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	SAVINGS: Shorter punchlist and fewer callbacks. Cost of warranty claims and other facility management issues. HOURS SAVED, AVOIDED COSTS: 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	HOURS SAVED: 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	HOURS SAVED: Time invested in design; comparative energy costs. Energy savings.
Scope Control			
Overall design duration	Opportunities to develop additional design alternatives	Improved quality, client and occupant satisfaction	VALUE OF QUALITY: 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.	HOURS SAVED: 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	HOURS SAVED: 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	VALUE OF QUALITY: Owner/client feedback

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

Quantifying the impact of process change

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	VALUE OF DELIVERABLES: 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 & systems; construction field efficiencies	VALUE OF SCORE: Design and systems understanding feedback Savings: reduced rework
Organized, efficient document management	Conduct meetings electronically with digital markup, comments, review	Efficient use of professional labor	HOURS SAVED: 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	SAVINGS: Reduced price fluctuations & wasted resources
Construction Workflow			
Team size, focus	Increase specialization of BIM team	Efficient use of resources, expertise	HOURS SAVED: 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	SAVINGS: Cost of duplication and shipping/receiving
Lower general conditions for GC and subcontractors	Reduce contingency by accurately anticipating scope	Efficient use of resources, expertise	SAVINGS: Variations in scope, cost avoidance
Reduction in project schedule	Reduced dependence on fluctuating scope documentation	Reduced risk, reduce rework.	SAVINGS: 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	SAVINGS: 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	DAYS SAVINGS: Milestone achievement (+/- days)
Improved field safety, control, survey, crew tracking	Improved planning, increased monitoring	Predictability, Reduced risk	SAVINGS: 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	SAVINGS: 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	HOURS: labor to build up facility data store Savings: lower maintenance costs

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



Strategic ROI—conclusion and key takeaways

Strategic ROI—conclusion and key takeaways

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 percent responded that their firms were quantitatively assessing the impact of BIM. However, only 21 percent were literally measuring ROI. The rest were measuring other factors, such as the ability to complete projects with smaller teams or shorter schedules.

There remains a strong interest in applying ROI to assess specific BIM advances once firms have achieved the first level of maturity. Interestingly, seven percent 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.

Strategic ROI—conclusion and key takeaways

Firms with deep 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. 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.

Firm leaders can shape the road map 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. 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.



Strategic ROI—conclusion and key takeaways

Academic research provides recommendations and frameworks for business leaders to devise optimization strategies stretching from initial BIM adoption to more sophisticated maturity levels.¹¹ Important strategic factors for firms include the competency of employees, collaborative culture, and capability of teams. By employing ROI to assess BIM initiatives aimed at improving the performance of individuals and teams, firms can prioritize investments for organizational effectiveness¹² to support sustained business improvement or implement models to assess BIM maturity¹³ and increase competency levels.¹⁴

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.



¹¹ Qian (2012)

¹² Lawler III and Worley (2006)

¹³ National BIM Standard (2012)

¹⁴ Succar (2009)

Strategic ROI—conclusion and key takeaways

Key takeaways

- ➔ **Recognize** that practices for measuring and assessing ROI vary widely. While 21 percent of firms surveyed are committed to ROI-based BIM decision making, 53 percent of firms interviewed seek to apply ROI to BIM, yet find it challenging, and the highly experienced seven percent 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.



Appendix A: Measuring value of BIM reference articles

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