

# chapter 1 What You Adopt When Adopting BIM

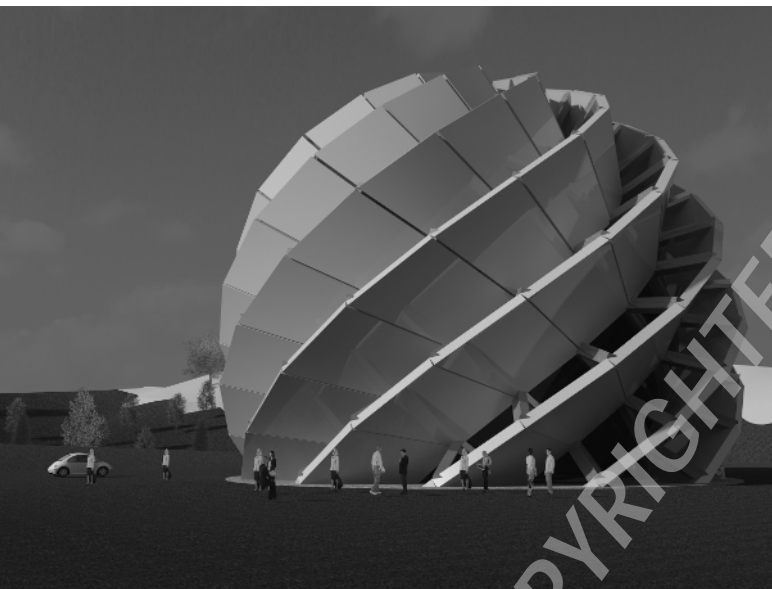


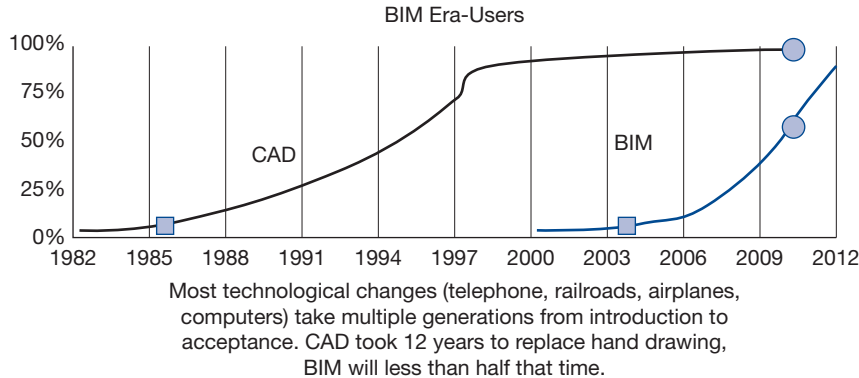
Figure 1.1 Whether the project is a wall sculpture or a city hall, the workflow that results from working in BIM is as fascinating as the imagery and as vital to its success. Zach Kron, [www.buildz.info](http://www.buildz.info)

Adopting BIM. Good or bad idea? Is there even a choice? Should you wait until they work out all the kinks and it becomes easier to learn and less cumbersome to use? Should you hold out until it becomes a more intuitive design tool?

Your firm is considering BIM or has already acquired the 3D software, perhaps is even using it to some degree and making strides. Why read a chapter on BIM adoption? Why refamiliarize yourself with BIM's many benefits? *We're sold*, you say. *Can't we finally move on?* Why read about the challenges, roadblocks, impediments, and hurdles that stand in the way of a full, successful BIM adoption for you and your organization? Anyone working in BIM must be well aware of these. *Right?*

It all depends on what is meant by BIM *adoption*. Too often it just means purchasing software, implementing, and moving on.

Read this chapter first—even if you are already working in BIM—because you need to understand the full implications and impacts on the people you work with and for, or who work for you, as well as those impacts on the profession and industry you are an important part of—not only in business and technology terms, but also in terms of how you and your organization have been impacted socially and culturally by the new



BIM Products: Revit, ArchiCAD, Digital project (Catia), Bentley, VectorWorks, Tekla

Figure 1.2 CAD versus BIM adoption chart. BIM has been adopted twice as quickly as CAD. *Dennis Neeley, AIA*

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*Design professionals are moving to BIM [at least two] times faster than the transition from hand drawing to CAD, which took about fifteen years. BIM will be the predominant tool of choice throughout the professions by 2011.*

—Dennis Neeley, AIA Convention, 2009

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work processes the industry is currently absorbing in response to the latest software (see Figure 1.2).

There is a larger impediment to the full, speedy, and widespread adoption of BIM by the design professions, and that has to do with the social impacts of the technology on individuals, organizations, and even the profession. You can be assured of a much smoother entry to this new technological process by understanding the social—communication, collaboration, and culture—impacts on your firm. As Autodesk's Phil Bernstein asks, "The productivity and economic benefits of building information modeling (BIM) to the global building industry are widely acknowledged and increasingly well understood.

Further, the technology to implement BIM is readily available and rapidly maturing. Yet despite the obvious benefits and readiness of BIM software, BIM adoption has been slower than anticipated. Why?"<sup>1</sup>

In this chapter we will take a look at a design firm that struggled with adopting BIM—only to find itself *growing* through the recent downturn, in large part due to its attitudes and approach to BIM adoption. We'll cover not only BIM's technical and business benefits but also its *social* benefits, as well as the challenges to individuals and organizations that this process creates. This chapter closes with proven strategies for managing this disruptive change. Whether you are new to the BIM world or have been working in BIM for some time, you may not be getting the best and highest use—and return on investment (ROI)—of this phenomenon unless you consider the concepts described and explained in this chapter.

## Bogged Down in Detail

BIM adoption and implementation are often used interchangeably, but they are not interchangeable—and

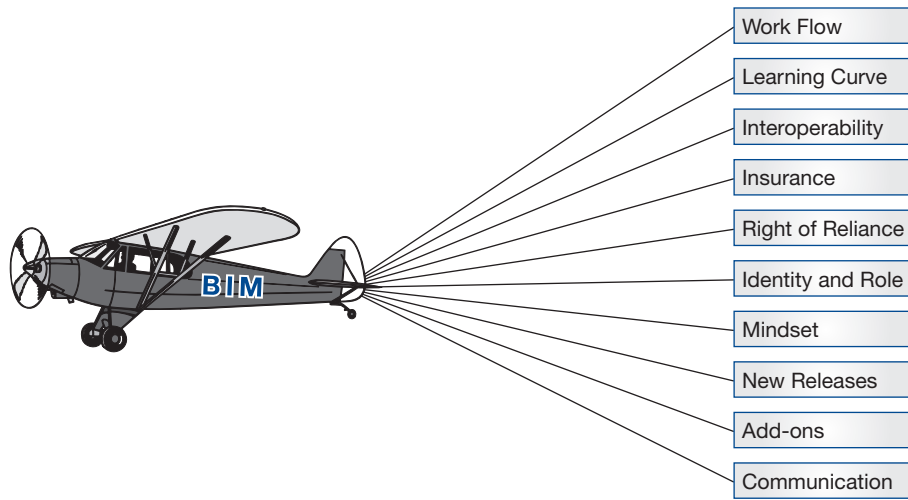


Figure 1.3 Adopting BIM without a plan can be like taking a trip unaware of all the baggage that can slow you down.

part of the reason for failure by firms to fully embrace BIM is because they mistakenly confuse the two concepts.

It is not enough to say BIM was adopted. How was it adopted? By what approach? Top-down or bottom-up? Enthusiastically or begrudgingly? All at once or slow and drawn-out? By a select team, then gradually spread out? Or on all projects from “go”?

Firms that have purchased the software have been getting frustrated with it, bogged down in detail, or have abandoned it altogether after initial pilot projects or efforts. Why is that? (See Figure 1.3.)

Although uptake has occurred quickly, BIM adoption is not widespread among all design professionals, and where adoption does occur it is not sticking in all cases. The big picture—beyond industry announcements to the contrary—indicates that BIM adoption is sporadic, incomplete, and prohibitively shallow. Technological and business adoption has occurred or is currently occurring at the majority of larger firms, but social

adoption, and a full understanding of BIM’s impacts on the firm and the individuals that make up the firm, is not. Impacts to the profession—thought to be game-changing—are understood by few and being watched closely by many. Deep, meaningful, and lasting BIM adoption has stalled not because of technological or business factors but because of *human* factors.

### Owning the Process

Where are you and your firm in the adoption process right now? Where do you find yourself along the continuum? You may

- Not have gotten some initial traction—you may have given the software a test run or even ventured into a pilot project.
- Be wondering how to get BIM to stick and become a competitive part of your firm’s future.
- Have installed it and are running with it—but have run into roadblocks, unexpected issues that you would like to resolve effectively.

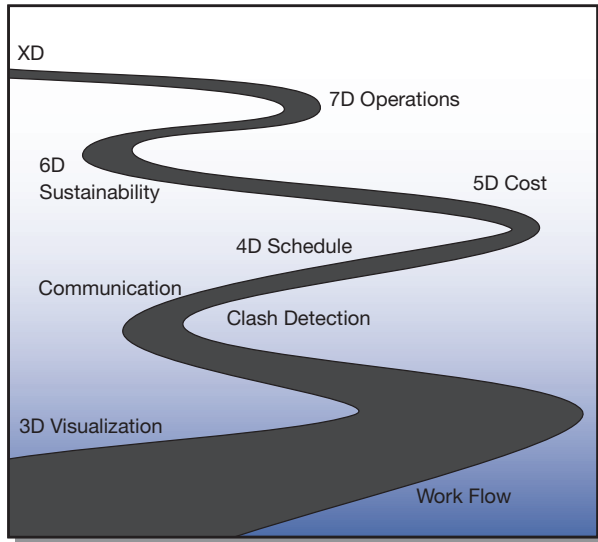


Figure 1.4 BIM as process: Where on the path are you? How far will you take it?

- Be looking for a clearheaded explanation of what is involved and what impact this technology will have on your practice.
- Be in search of an objective explanation that separates the facts from the marketing hype.
- Own the software but perhaps are not completely utilizing it or are utilizing it less satisfactorily than you had hoped—not for its highest and best use, or to its full advantage. (See Figure 1.4.)

Though BIM use reached the 50 percent mark among design professionals, business leader and author Rex Miller has taken announcements of BIM adoption rates to task. “It is an accurate number,” Miller notes, “if counting the number of architectural firms who have bought BIM software.” Miller continues,

However, this is where the mirage comes in. My take is by no means scientific but I have probably visited close to 100 firms in the last

two plus years and I always probe how firms are using BIM. Here is what I hear. Most use BIM for visualization and some for clash detection. The clash detection is again a derivative of the visualization. Both of these applications only require “dumb objects.” A dumb object is a door, a run of ductwork or any part of a building that includes the geometric information but none of the objects properties or rules for how it behaves in relation to other objects. In other words these have the “M” or modeling part of BIM but none of the “I” part that provides analytics. . . . Half of the architectural firms are now out telling their clients that they “do BIM” when less than 10 percent are fully using analytics.<sup>2</sup>

The message is clear. Firms may own the software but not yet own the process. What firms are looking for is some sense of control and assurance that they are utilizing the technology to the fullest advantage. For true adoption to take place—and be counted—other criteria must be considered. There are almost as many definitions as there are practitioners. What does BIM adoption involve? (See Figure 1.5.)

To some, BIM adoption means acquiring software. To others it implies embracing BIM, which is not just a matter of buying seats. To what extent in your organization is BIM adopted? What are the scope and scale of the adoption? Although there remain some significant and surprising BIM holdouts, it would be hard to find a leading AEC firm today that is not using BIM in some form or capacity; however, the breadth and depth of the implementation can vary widely. One thing is certain: acquiring and adopting BIM

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*Firms may own the software but not yet own the process.*

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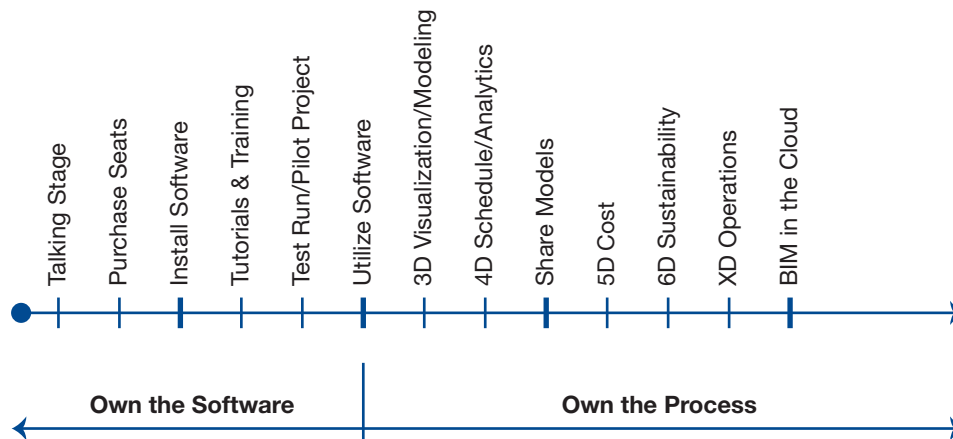


Figure 1.5 Where are you—and your organization—on the BIM adoption continuum?

tools are not the same thing. As trainer and blogger Gregory Arkin wrote, “Just because a firm has seats of Revit doesn’t necessarily mean they’re using Revit actively.”<sup>3</sup>

It is a contention of this book that buying seats does not constitute adoption because despite having the right tools, many BIM efforts have failed as a result of having the wrong people in place, the wrong attitudes (“We paid for the software—use it!”), and the wrong mindset (“Everybody else is doing it—we’d better get up to speed and fast!”). As Arkin predicts, “People investing heavily in a product *will* eventually demand that their employees use that product and deliver a return on that investment.”<sup>4</sup>

## Four Rules from the Start

Rule 1: Adopt first. *Then* implement.

Rule 2: What you adopt when you adopt BIM is *change*.

Rule 3: Change is inevitable. Transition is a choice.

Rule 4: BIM is both a tool *and* a process.

## Tradition and the New Technology

What role does tradition play in this process? Do we just adopt this technology and throw away all we’ve worked on and built up over the years to get to where we are today? In addition to being known for design, business practices, or delivery, your firm has a tradition of taking in and taking on technology as it has been introduced. You may not talk about it or even recognize it, but how you have reacted to new technologies over the years is also part of your firm tradition (see Figure 1.6).

You don’t want to just break with the past altogether. Legacy software and projects can be referenced and in many cases adapted or incorporated into BIM projects. The important thing is to see your work as part of a continuum. You are not throwing it all away. Your values, ethics, and focus continue. You recognize that in order to continue you need to remain relevant, and it is for *that* reason that you have agreed to enquire into this new technology and adopt—and adapt. Tradition isn’t a staid and static thing—it is a process. It changes, however slowly. Take it at your own pace—but do change. (See Figure 1.7.)

Then	Now
Hand Rendering	BIM
2D Drafting	
Hand Drafting	
Lettering	
Sketching	
Coordinating	
Red Lining	
Scaling	
CAD Skills	
Memorizing Macros	
Linear Thinking	

Figure 1.6 No longer drafting, today we model. BIM changes everything.

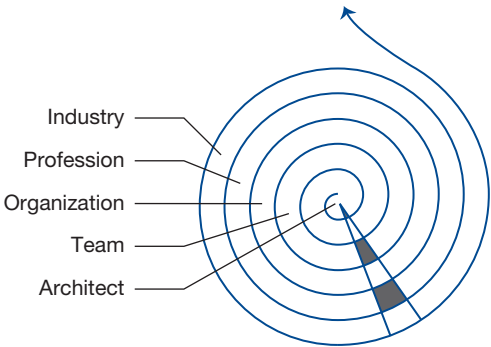


Figure 1.7 BIM impacts and changes all levels, from the individual to the industry.

Architects don't want to give up the traditional ways of doing things. In part, they are held back by their identification with drawing and being artists and ideators, combined with their fear—however mistaken—of becoming information inputters, slaves to technology.

Tradition is a powerful force—almost as powerful as the technologies and processes that seek to overcome it. A large, internationally recognized architecture firm in the Midwest refuses to adopt BIM

because, they say, it is *too convoluted*. In the midst of the technological maelstrom around them, they're waiting until BIM software and processes become simpler, easier, less complicated before embarking on a new path. That's tradition talking.

*Managing Change and Transition*

What if a well-informed, trusted authority figure said you had to make difficult and enduring changes in the way you think, feel, and act? If you didn't, your time would end soon. Could you change when change mattered most?

—Alan Deutschman, *Change or Die*

So, you want to change? What works and what does not work?

Give people a better story to believe, Alan Deutschman tells us, and their actions will be consistent with the new story. He encourages them to practice the story line even if they don't yet fully believe in it. One goal of this book is to help you create a better story to tell.

Tradition is in transition. Architects who are not convinced that their time—that is, the world as they've known it—will soon end are living in denial. We have heard this before, they say—with CAD, with design-build, even with green design. But this time is different.

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*BIM and IPD yield an eight-in-ten chance of completing a project on schedule and within budget, a notable improvement from design-bid-build project statistics.*

—Jacqueline Pezzillo, LEED-AP, communications manager at Davis Brody Bond Aedas, "AIA Navigates the Future of BIM and IPD," e-Oculus, April 28, 2009

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## BIM as Though People Mattered

None of this would be a concern if BIM were designed primarily with people in mind. Building information modeling is often explained as a business process supported by technology—or as a technological phenomenon resulting in business outcomes.

We are all by now familiar with the many technological and business benefits offered by the adoption of BIM, the specific practical benefits and computer program innovations that make BIM and integrated design appealing options. These opportunities and changes in thinking are often put forth to promote the benefits of the tools, but lack insights concerning workflow and communication that are essential to successful teams and projects. This book was written in part to rectify this situation and decrease this disparity.

What we are less familiar with—but need to recognize—are the benefits to human behavior that BIM and integrated design bring about, the sociological factors that can make or break an outcome and experience for you and your firm. What are the sociological and cultural benefits that integrated design and BIM bring to a firm utilizing these practices?

It is the human factor that makes a smooth adoption and implementation possible and makes the difference between an aborted or abandoned effort and a successful one that sticks. You and your firm are looking for a solution that has legs—that leverages skills and insights but also considers prevailing attitudes and mindsets already present in individuals in your firm (see Figure 1.8).

### The Missing Human Factor

The vast majority of BIM-related presentations, articles, and books are focused on the technology—not

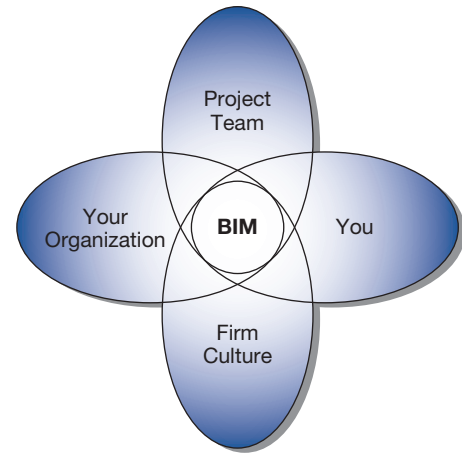


Figure 1.8 You, your team, and your organization continuously revolve around the BIM experience.

on the people who use it. This is a problem, given that people's thought processes and issues—people problems, human issues, issues of communication and collaboration, firm-culture issues—are the main impediments to widespread adoption and implementation of the technology. People-oriented factors are a greater challenge than solving the software, business, and technical problems of BIM implementation. What are these human factors?

### Human Factors in BIM and Integrated Design

- Communication
- Collaboration
- Trust
- Respect
- Firm culture
- Workflow and work processes
- Identity
- Roles



Working across generations

Mindset

Attitude

Control

Managing change

Transition

BIM etiquette

Leadership

Training

Learning and education

The number one problem of BIM implementation is not technology or business value propositions but rather behavioral, temperamental, emotional, and mental attributes: the sociocultural impact of BIM and integrated design on the design professions and construction industry. This means addressing a situation that many design professionals and their firms don't even think of when considering BIM—people, *you*—the social impacts, benefits, and challenges brought on and about by this still relatively new technology currently being introduced into the workforce. Understanding this concept will help you put BIM adoption and implementation back on track by making it manageable, understandable and approachable in people terms.

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*Yes, clash detection is a low-hanging fruit. Anyone with all trades modeled and a license to NavisWorks can do it. But here's the thing about it—it's really, really satisfying.*

—Laura Handler, Tocci Construction, (bim)x,  
October 2, 2008

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## Adopt First, *Then* Implement

BIM adoption and implementation are often used interchangeably—but they are not exchangeable, and part of the reason for failure by firms to fully embrace BIM is because they merge the two concepts, if they consider them at all. It is critical for the successful launch of the process that each is addressed separately. Neither step can be skipped.

BIM adoption has to do with familiarizing yourself—as you are doing right now by reading this book—and informing others. Gathering information *and* seeking out sources; making a decision *and* making a commitment; changing your mindset *and* attitudes about the technology for the long haul (see Figure 1.9).

BIM implementation of the technology is critical—we'll be covering it in the next chapter—but BIM adoption is its own first step. And unless it is addressed directly and experienced head-on, the likelihood for success of your BIM implementation will lessen. Why is this?

The challenges one faces in trying to learn a new technology while serving clients and turning a profit

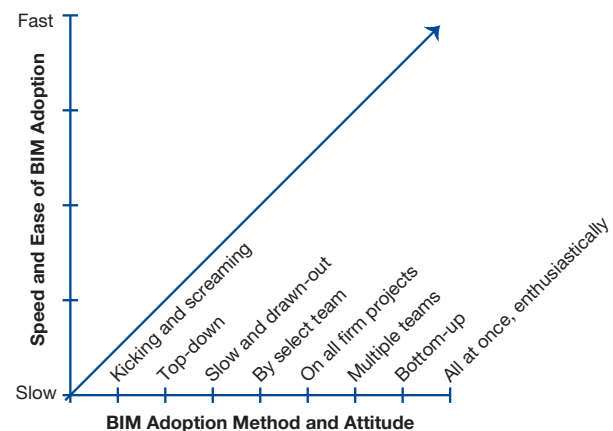


Figure 1.9 The speed and ease of BIM adoption is dependent on approach and attitudes.



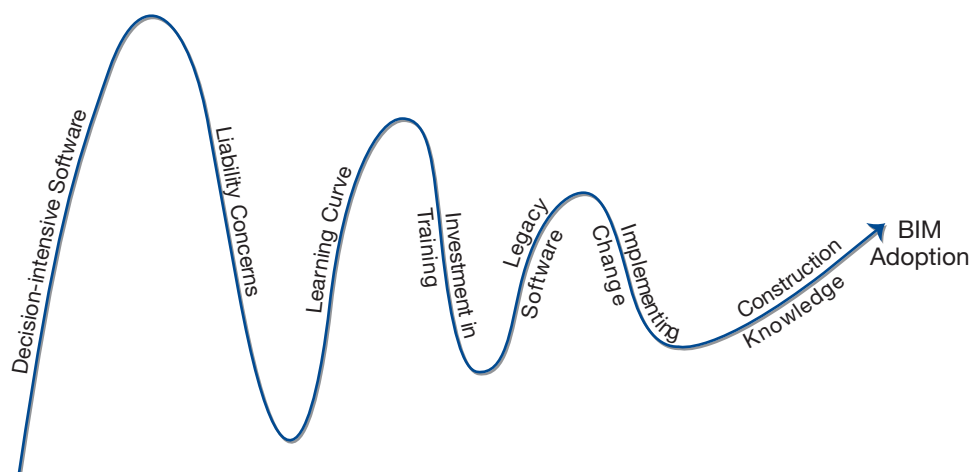


Figure 1.10 The most widely cited challenges to a smooth, firm-wide BIM adoption.

can be daunting. We'll cover some of the steepest challenges later in this chapter. First, it must be acknowledged that working in and with BIM can be difficult. Many new skills and habits are introduced and must be learned, understood, and mastered to make the most effective use of the work process and technology. Another important reason is because inevitably you will hit a snag, a technical difficulty, and you will feel like giving up; senior management will be dismissive of—or discouraged by—the meager ROI of the firm's initial attempt; or you will make it through your first project but will have no clear way to determine whether it was an improvement over previous pre-BIM processes (see Figure 1.10).

### BIM Adoption in Context

BIM adoption refers here to the stage in which a technology is selected for use by an individual or an organization. Why adopt a new technology? While we'll soon cover the benefits and co-benefits of BIM, here suffice it to say that past adoptions of a new

technology for architecture and other fields have “indicated confidence in its potential to alleviate a particular problem or to make a job easier or more efficient.”<sup>5</sup> Problem solving, ease of use, and efficiency: if it were only so easy. Why does BIM have to be so hard to adopt and implement?

## Mistaken Beliefs Surrounding BIM

Even with a working definition of BIM, it is easy to confuse the BIM process with others. In this section we will look at some of the most common BIM misconceptions—those that can serve to undermine your team's progress, efforts, and success.

If your firm has existing problems, adopting new technology will either exacerbate the problems or mask them. It won't solve the problems. Of course, architecture is not the only profession facing this situation. Health care, for example, has also found that throwing new technology at every problem won't solve it.<sup>6</sup>

## Five Misconceptions Regarding BIM

1. Productivity suffers during the transition to BIM.
2. BIM applications are difficult to learn.
3. BIM disrupts established workflows.
4. Owners and contractors benefit most from BIM—not the designer.
5. BIM increases risk.

BIMManager, “Five Fallacies Surrounding BIM—an Autodesk White Paper,” July 1, 2009, <http://www.bimmanager.com/2009/07/01/five-fallacies-surrounding-bim-from-autodesk/>.

Some say that you can’t design in BIM (you can.) Others will tell you that you can’t detail and complete CDs in BIM (you can.) Still others will contend that BIM will completely replace CAD right away (they’re wrong.) CAD will be around a long time, and firms using BIM ought to maintain at least one copy.

It’s a misconception to think BIM is a panacea that will solve everything. The model is only as good as the information or data put into it; the program is only as good as the competence, design, and construction experience of the modeler. “A key misconception that many make about BIM is that it is a product. Wrong. It is not a product it is a process, a process made up of sharing intelligent data and reducing repetitive user input.”<sup>7</sup> (See Figure 1.11.)

Misconceptions are rampant and all over the board—especially for those who are not intimately familiar with the software. As indicated in this discussion, “BIM will destroy our ability to produce good-looking drawings. The argument, or concern, here is that ‘extracting drawings’ or re-symbolizing a 3D model to represent 2D information produces substandard results.”<sup>8</sup>

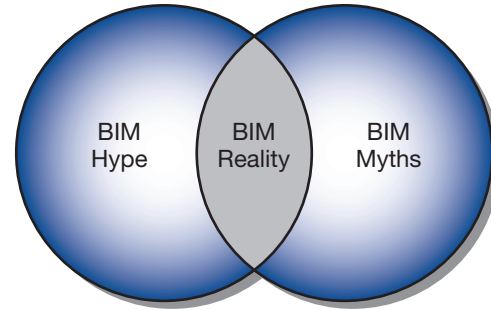


Figure 1.11 Make it your goal to separate BIM facts from BIM fiction by learning to recognize the hype and myths.

## BIM Myths

- BIM requires a different project delivery method.
- When using BIM, you cannot tell who is responsible for what or who owns the model.
- When using BIM, anyone can change anyone else’s model.
- BIM blurs the distinction between design and construction.
- The architect is not in “responsible charge” of the design.
- You cannot have some information in the model and some only in 2D details.
- The model cannot be a contract document.
- You cannot rely on the dimensions of the model.
- The architect is subject to more lawsuits from contractors and subs because now there are direct privities of contract.

Douglas C. Green, New York City Revit User Group.

BIM is often presented as the cure-all for whatever ails the construction industry. And although it has the potential to address and resolve many owner concerns, the tool itself is only as robust as the data fed into the model. When one considers using the BIM model for energy analysis, for example,

Contrary to the popular notion that BIM makes energy analysis a snap, it turns out that BIM, in

fact, does not actually help that much. This is because building geometry is only one of the inputs needed for analysis, and a relatively easy one at that, as it is completely objective. Much more effort is involved in defining the conditions and assumptions for the analysis, as those are very subjective. Also, analysis tools need the building geometry to be specified only at a certain level of detail, while BIM provides the complete detailed model, which is usually overkill for the tools. For BIM to become really useful for analysis, what is needed is for BIM tools to have filters so that the required information can be abstracted out for input to analysis tools.<sup>9</sup>

In presenting the positive attributes and capabilities of the BIM program, setting and managing client expectations from the start is one of the design professional's most important tasks.

There is another somewhat common belief that architects bring ego and visions of grandeur to a project and not true value to building design, leaving the client to pay for monuments to one's perceived greatness. Undoubtedly, this belief is based in fact and a few true instances, the exception rather than the norm. But is also a burgeoning belief that I've witnessed that B.I.M. applications will "solve" this perceived problem by distilling the design process down to a couple of "buttons" that when pressed in the correct sequence will produce a building meeting all the requirements of a client's program, compliant with all state and local building regulations, free from errors and omissions, and completely describing the construction process; and by pressing the desired "style" button, details will be applied to the building design to make it look like the desired style.

Providing all the value without the "cost" of ego (you just disable the "ego" button.)<sup>10</sup>

What is BIM, and why is the industry so confused? To answer that question it is probably easier to first define what BIM is not. As Nigel Davies posits, "BIM is not 3D. There is no added intelligence to give you any 'data' about the project. BIM is not Revit. The terms BIM and Revit are becoming interchangeable. BIM is not a single database or 'single building model.'"<sup>11</sup> It just may be that backing into a definition is the best approach.

## Social Benefits of Adopting BIM

So why restate the obvious? Why is it important to be familiar with—or to refamiliarize yourself with—BIM's many benefits? Here are a few reasons:

- To remain motivated
- For encouragement and refueling
- As a selling tool to owners

As Autodesk VP Phil Bernstein says, "The productivity and economic benefits of Building Information Modeling (BIM) to the global building industry are widely acknowledged and increasingly well understood." Benefits, whether described as competitive advantages, opportunities, strengths, or even reasons to adopt BIM, don't seem to bear repeating.

## Who Benefits?

Who benefits? Who are BIM's beneficiaries? Architect, contractor, and owner, facility operations, subcontractors, manufacturers, all benefit—in different ways. Often overlooked is the realization that when the owner benefits, the architect benefits—unintentionally—from a happy and engaged client. (See Figure 1.12.)

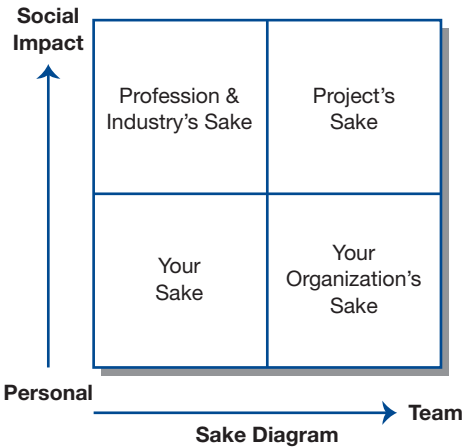


Figure 1.12 Sake diagram: reasons for working in BIM. After Martin Fischer, *For BIM's Sake*.

If the benefits are legion and well known (*“Enough with BIM’s benefits—aren’t these a given? Let’s move on!”*), why bother to reiterate them here? Whereas the technical and business benefits may be numerous and widely understood, BIM’s equally critical social benefits are perhaps less so. We reiterate BIM’s benefits because

- When frustrated—and you will get frustrated at times—it is good to remember why you are using it.
- You will need to repeat these benefits when marketing your services or explaining BIM to others.
- They serve as context for the main discussion of this book.

By “social benefits,” we mean the sociological, behavioral, collaborative, psychological, and motivational benefits of adopting BIM. The focus here is less on the benefits themselves than on the change that comes about due to BIM’s many benefits. Here we will explore two types of social benefits: co-benefits and qualitative benefits.

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*With BIM, as with bidirectional associativity, a change anywhere is a change everywhere.*

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In an *ArchDaily* interview, Phil Bernstein of Autodesk mentioned the *clarity of the design* as a benefit—and then went on to explain the benefit as “the ability to interact with the description of the building in numerous ways so people from various perspectives can understand it.”<sup>12</sup> That is a *co-benefit*, where a benefit for one entity positively impacts others, serving to dissolve silos while ostensibly paving the way toward collaboration and integrated design.

### Why Co-Benefits?

Too often, BIM’s many benefits are presented as a seemingly unending list. In order to organize the list, several sources have divided BIM’s benefits by category—or in other cases by entity: this one is a benefit to the owner, this to the contractor, and this to the architect, engineer, or consultant. There have been attempts to create a definitive list of BIM’s benefits,<sup>13</sup> but none exhaustive, thoroughly categorized, or ordered.

Despite the apparent orderliness of these lists, it is not helpful to organize benefits in terms of trades. Why? Because it reinforces the notion that each is separate, when the team ought to be emphasized. Instead of focusing on the constituent part, the whole must be kept in mind: what benefits the owner also benefits the architect and contractor, and so on. Some benefit directly—or the most—while others benefit indirectly. Take for example the case of clash detection: the contractor benefits directly, and the architect indirectly in that she is now working on a building where the risks are a bit better known.

Also, it is disingenuous—and shortsighted—to assume, for example, that modeling helps the contractor and

only the contractor with clash detection and, if done properly, provides accurate piece and quantity counts. In this instance, where there is little direct benefit to the architect, what helps one must necessarily help the other.

So, who benefits from BIM? Owners? Architects? Contractors? Benefits by trades only serve to reinforce silos—the opposite of what we’re trying to achieve with integrated design.

### The Co-Benefit Statement

A co-benefit statement looks something like this: technological and/or business attributes of BIM *that* benefit ROI or the bottom line *as well as* encourage team collaboration *can also* result in a more integrated design. These linkages (*that, as well as, can also*) are referred to as “co-effects” or “co-benefits.”

The following section explores some of the less apparent co-benefits that can help your team to collaborate more efficiently and effectively, ultimately resulting in an improved integrated design experience for all. It asks how these very benefits impact the employee, the designer, and the architect; what change comes about due to these benefits; and what, if any, are the negative social impacts of otherwise positive technical and/or business benefits.

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*Focused on advanced technology in the building industry, I don’t seek the typical benefits of BIM, such as increased coordination of drawing sets. I look for large-scale societal benefits of reduced errors, improved energy performance, and higher quality at lower costs.*

—Mike Bordenaro, co-founder,  
BIM Education Co-op

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### Sociological Benefits of BIM

Table 1.1 illustrates the typical relationship between software features and benefits to individual team members. *It does x, y, and z.* On the left are listed the benefits; in the middle are bonus benefits—that is, indirect benefit, practice culture benefit, social benefit, team-building benefit—based on the original benefit. On the far right are summaries of the various impacts of these social benefits. An example of this might serve to illustrate: clash detection (*benefit*), where the key issue is to determine major conflicts such as ducting/piping and ducting/structural—which makes collaboration easier (*co-benefit*), so that these conflicts are removed in the model when still relatively easy and cost-effective to contend with (social or sociocultural impact, regarding the sociological and cultural benefits that BIM and integrated design bring to any individual or organization utilizing these practices.) An offshoot—or indirect benefit—of clash detection: you avoid pointing fingers and laying blame later in the project—you are all in this together. “Clash detection makes collaboration easier so that these problems are identified and rectified digitally in the design, rather than during construction.”<sup>14</sup>

### BIM’s Qualitative Benefits

Of the many ways of organizing benefits, organizing in terms of qualitative and quantitative benefits can be of great use to teams:

- **Quantitative** benefits are—just as they sound—measurable using metrics, numerical comparisons, or tracking, resulting in a measurable quantity.
- **Qualitative** benefits cut across disciplines and subject matter, taking into consideration an in-depth understanding of firm culture, human behavior, and the reasons that govern such behavior.

**Table 1.1 The Benefits, Social Benefits, and Implications of Adopting BIM**

Benefit	Co-benefit	Sociocultural Impact
Interference checking and avoidance, clash detection, conflict resolution	Avoids headaches of rework, paybacks to subs; results in fewer callbacks, lower warranty costs	Results in smoother sailing for the schedule, creates fewer issues, helps in relationships
Team members start earlier in the process	Fosters a greater sense of involvement, input, being “at the table”	Provides greater opportunity to contribute
Clash detection	Makes collaboration easier	Eases tensions during construction
Takes less time overall	Allows more time to design	Allows architects to use their core competency vs. putting out fires
Requires one to be more involved as a contributing architect	Makes one more of a collaborator	Makes architects more balanced, well-rounded
Increases productivity; cuts man-hours and manpower by reducing team size	Reduces length of documentation phase	Increases design phase; emphasizes design
Increases coordination	Gives rise to professionals who think more globally; reduces need for field coordination by subcontractors	Leads to more successful projects and dramatically increased profits
Fewer RFIs and change orders	Smoother construction phase	Less conflict and stress
Improved cost control	Aligns budget and building	Designers perceived as fiscally responsible
Recent graduates work alongside experienced designers and train younger team members	Emerging architects just starting out learn how buildings come together earlier in career	Emerging architects avoid the drudgery of picking up redlines, are involved with the whole process
Robust modeling tool changes the playing field	Small firms can operate like large firms	Small firms can compete with larger firms
More integrated buildings	Less waste, eliminates redundant and wasted effort	Offers a sense of purpose and mission when first starting out
Start involvement earlier	Everyone is at the table	Creates opportunities to design, manage, and lead
More assured decisions	Focus on a single course of action; understand effects of design decisions	Entire team works toward the same goal
More sound buildings	Less investment in rework and post-construction	Improves image of the profession and industry
May raise fees if value proven	Increased value for owner if lower quantity take-offs are the result	Doing more with less improves environmental impact
Analyze and visualize project digitally before it is constructed	More cohesive integrated design	Model is utilized for entire lifecycle of a building
Design visualization; accurately visualize building appearance	More easily communicates design intent	Improves owner, user, and community satisfaction
Simulates real-world performance	Improves understanding of building characteristics	Reduces cost, schedule, and carbon footprint
Ensures well-coordinated documents	Results in higher-quality documentation and fewer claims	Reduces rework on site; increases client satisfaction

Benefit	Co-benefit	Sociocultural Impact
Streamlines delivery process	More economical use of resources	Less redundancy; more effective, purposeful staffing
Provides basis for more accurate fabrication	Fewer shop drawings; prefabrication of materials off-site; higher quality at a lower cost	Leaves less opportunity to make late game changes and therefore mistakes; shortens construction schedule
Designs are more closely tied to structural analysis and energy simulations	Produces better-performing, higher-quality buildings	Improves quality of life and experience for users and public at large
Design input occurs earlier in process	Opportunity to impact cost and functional capabilities; measurable ROI for users	Improves team relations; design intent expressed at increasingly detailed levels
Energy analysis	Determines building element location in terms of function	Determines in terms of impacts on building skin and user comfort
Model checking	Determine best routes: egress, traffic, security	Saves time and narrows down options
Information management	Manages the operations of the facility	Increases perceived value of delivery method
Improved data sharing; increased interoperability for all project team members	Reduces communication costs, errors, and omissions	Improves communication; faster client decisions
Capacity to analyze building performance	Expedites key design decisions	Reduces uncertainty, exposure, and risk
4D BIM modeling	Communicates relocation of tenants to tenants during renovation	Results in a smoother tenant experience and construction process
4D BIM	Saves time, decreases time overruns	Not always on deadline; more time to enjoy life
Compresses construction schedule	Earlier handover of risk	Attractive to owner and contractor
5D BIM	More accurate estimates; evaluate project in terms of impact on building	Results in savings in energy; reduces risk for each stakeholder
5D BIM tracks installation times	Helps trades avoid crossing paths	More logical process; less on-site disruption
Perform material quantity take-offs; fix project costs earlier	Alleviates concern about cost escalation; delivers owner a more cost-effective building	Designers reinforce role of budget stewardship; helping you attain a competitive advantage
More time in design phase (designing, not just uploading information)	Less time on construction documents, saves owners money, reduces schedule	Designers can focus on what they are good at; integrates workflow
Meets energy code requirements in just hours	Provides energy data to MEP consultant	Narrows options, frees time, meets objectives
Bidirectional associativity	A change anywhere is a change everywhere; Consequences for courses of action understood	Saves time; reduces drawing and site errors by instantly coordinating

(continued)



Table 1.1 (Continued)

Benefit	Co-benefit	Sociocultural Impact
DWF format mark-up capabilities	Nontechnical stakeholders are able to visualize and review end product	Input from all participants and stakeholders supports integrated design process; facilitates effective communication; and encourages collaboration
BIM model holds info accessed and utilized for project lifespan	All team players can access this information at any time	A model, tool, and process that keeps giving through project lifecycle
Ease of creating 3D views	Helps tell <i>the story</i> to communicate design intent and project goals	Helps all involved to understand design intent and goals
Earlier input in BIM model frontloads work	Creates opportunity for new billing structure	Changes can be reacted to more quickly
Less construction waste	Less overbuying; saves owner money	Less negative impact on the environment
Clash detection programs such as Navisworks or Solibri	Imports models from different trades into a single environment	Peace of mind knowing trades are coordinated and accounted for

As this book is about BIM's many unanticipated impacts and how best to navigate them, it is natural that we should pause here to elucidate what these impacts are. As Thom Mayne acknowledged about his own practice:

Now we model not to describe a building but to manage relationships between trades, which is a totally different reason than before. What we're finding is that the more facile we are with these tools, the more we use them for whatever challenges we're tackling—it frees us up to do other things. It frees us up to deal with more complexity during early design because we now have a way to handle it. We're constantly looking for new opportunities to employ these tools that we're comfortable with. But we're also tapping into whatever is coming next. In the very near future, robots will assemble buildings. What does that allow you to do? Just the fact that it's happening, what does that allow you to do? What opportunities does that open up? And so that's what we're looking for.<sup>15</sup>



Figure 1.13 Irrespective of whether the benefits are quantitative or qualitative, we need to manage our working relationships to accomplish our BIM goals.

As the design professions and construction industry evolve from a 2D-based process to use of an intelligence-rich model, as we have shown, the benefits that once provided opportunity for the few are now shared by the entire project team. “High-performing

teams are moving to BIM benefits for the whole team and a framework for pursuing peak performance from their BIM solution,” says Ken Stowe of Autodesk. “Advanced builders combine excellence in BIM with *Lean Construction* principles of reduced waste and rework, better process, ‘making things happen,’ and a focus on value. Calculations of the return on investment will convince you that your projects can enjoy a lot of savings resulting from the transformation to model-based communications and a focus on digital cooperation.”<sup>16</sup> (See Figure 1.13.)

## Challenges and Obstacles to a Comprehensive and Effective BIM Adoption

It would seem for the practitioner new to BIM that for every benefit there is a corresponding liability—that is, one man’s benefit is another’s liability (see Table 1.2). Most design professionals using BIM on a regular basis don’t need reminding of the challenges. There are many. In fact, there may indeed be as many technology, business, and social (mindset/attitude/firm culture) challenges as there are benefits. And yet, in terms of degree the greatest challenges to adoption aren’t technological or business ones but rather sociocultural challenges.

### BIM and Its Discontents

When adopted along with lean concepts, BIM helps reduce lifecycle costs. According to Ghafari Associates Inc., “the wastages in construction include:

- **Correction**—Rechecking and redoing errors occurring in design but discovered only at the construction stage
- **Overproduction**—Executing tasks ahead of schedule, thus interfering with other practical, scheduled work

- **Motion**—Time and effort lost in transit due to team moving from and to the office picking up plans, tools, or materials
- **Material movement**—Moving material from one stage to another or from one crew to another
- **Waiting**—Teams waiting for equipment, plans, instruction, materials, etc.
- **Processing**—Unnecessary reporting, expediting material orders, or excessive coordination
- **Inventory**—Material staged too far in advance on site”<sup>17</sup>

Ultimately, the ability to move beyond the difficulties and challenges of using BIM productively comes down to a *me* versus *we* mentality: the argument that *there is no “I” in BIM*. Successful navigation of the many hardships of BIM and integrated design—especially when firms first adopt the processes—comes down to an open-minded attitude and team-oriented mindset. In reference to an article by Stewart Carroll, BIM author Paul Teicholz writes,

Personally, I agree . . . that the primary constraint to obtaining the benefits of integrated project delivery (IPD) is the reluctance of the project team to move from a sequential to a concurrent work process. As long as each team member uses BIM mainly or solely for their own benefits and continues to work under traditional contracts, it will be very difficult to gain the more significant benefits that BIM 2.0 and 3.0 can deliver (earlier and less costly delivery of better buildings, use of model for facility management). This is true even if all team members use compatible software that minimizes the integration difficulties. I have observed at first-hand projects where various software products were used

by team members in truly integrated teams. The positive results showed that technical difficulties could be overcome if there is a desire and/or a requirement to do so.<sup>18</sup>

One challenge, for example, can be avoided by following a simple tip: add detail as you go. There's a tendency in BIM to add too much too soon, to get carried away by the BIM model—to get bogged down in detail, especially for emerging architects. An example of this might be learning to model just enough of your project so that it communicates and displays properly, with neither too much nor too little detail. Too much information increases file size, slowing down your computer system's performance, while too little detail may undermine BIM's ability to utilize the embedded information for multiple tasks. With practice, the modeler learns to strike a balance between too much and too little information.

Building virtually prior to construction has its own challenges. There is the hope that a BIM model can predict the future, even while we were recently humbled to learn an economic model cannot always accurately predict the future. Just as economists were blindsided by overconfidence in computer models in the recent economic downturn, so too there can be overconfidence in virtual computer models to do the work for you. The model is only as good as the information that is put into it, and the knowledge, experience, and proficiency of the modeler.

### First Comes the Mindset, Next the Collaboration

Some say, on one extreme, that BIM is intuitive, easy to learn and use, and “thinks the way architects think.”

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## Barriers to BIM Adoption

Interoperability is neither the singular nor most important factor impeding BIM adoption and the general use of digital tools in design and construction. Here we posit three interrelated barriers to BIM adoption:

1. the need for well-defined transactional business process models;
2. the requirement that digital design data be computable; and, finally,
3. the need for well-developed practical strategies for the purposeful exchange of meaningful information between the many tools applied to industry processes today.

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Phillip G. Bernstein with Jon H. Pittman, “Barriers to the Adoption of Building Information Modeling in the Building Industry,” Autodesk White Paper, November 2004, 1.

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On the other extreme are those users who admit that there are steep barriers to entry to work in a BIM environment.

Never has a representation tool been so demanding of its user. The competent BIM operator must have an understanding of the tool, knowledge of materials and construction methods, and appreciation for professional practice. However, to move from “competence” to “excellence,” I would add to this list perhaps the most important aptitude—*critical thinking*: the ability to simultaneously envision multiple aspects of a problem and their relationships before proceeding toward a solution. In contrast to the other qualifications listed above, this particular ability must be developed *before* entering practice as is best honed during an academic architectural education.<sup>19</sup>

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*Firms having to reposture and retool under times of retraction greatly diminishes the level of confidence and risk-taking.*

—Michael Coston, LinkedIn group discussion,  
www.linkedin.com, 2009

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For many who have been using the tool for some time, the BIM approach may in fact take less time and effort than a CAD approach. But to be considered truly collaborative, the team utilizing BIM must first overcome the collection of fiefdoms that limit what information can be accessed, and by what team member.

### Reasons to Delay Adopting BIM

Issues such as migration from CAD to BIM, interoperability, risk, and ROI are serious—and may express concerns some have for transitioning to BIM—but do not constitute legitimate reasons for *not* adopting BIM. As Pete Zyskowski has explained, “Since Revit is not CAD, there are some migration issues to consider. Things like detail libraries can be taken to Revit, but it is a time-consuming process to make them true Revit details and may be better served on a project-by-project basis. There may be other, more immediate issues such as standard annotations, line weights, and general information sheets that can be migrated up front.”<sup>20</sup> There are many details to work out, as there are with any significant change. But the message is clear: all of these can be overcome, have been overcome, and shouldn’t discourage you from moving forward into a BIM environment. “BIM is bringing new changes to the workplace in terms of whom we hire, how we mentor, and how we share data among the parties involved.”<sup>21</sup>

Incorporating BIM into your office raises issues as widespread and diverse as human identity—roles, how architects see and view themselves. “Human identity,

the idea that defines each and every one of us, could be facing an unprecedented crisis. It is a crisis that would threaten long-held notions of who we are, what we do, and how we behave.”<sup>22</sup> Other issues include

- The way people behave in response to new technology.
- How people manage technological change.
- How much more communication needs to occur when working in a BIM environment.

### Recognizing Challenges to BIM Adoption

The most widely cited challenges to a widespread—and deep—BIM adoption are described in the following paragraphs.

#### Decision-Intensive Software

The modeler must consider construction methodologies when creating a model—making consequential decisions that impact the project every step of the way. No more loose (i.e., expressive yet inaccurate) sketches on trace—the expected level of detail is significant. Feeding the beast—answer-driven software, hungry for information—requires data. The model is only as good and useful as the quality of the information you put into it. For the designer, working in BIM can be constraining sometimes—information hungry, feed the beast.

#### Speed of Adoption

BIM has been adopted much more quickly in comparison with CAD adoption twenty years earlier. Even after the initial shock to the system, design professionals have had less time to make adjustments to practice methods, workflow, communications, and firm culture due to this virtually instantaneous upheaval brought about by the transition to BIM.

## What Is BIM?

There are almost as many definitions of BIM as there are BIM users. “Over the last couple of years,” says Jim Bedrick, AIA, director of systems integration for Webcor Builders, “the term ‘Building Information Model,’ or ‘BIM,’ has gained widespread popularity. It has not, however, gained a widespread consistent definition—it’s like the blind men describing the elephant. But there’s a lot of fuss being generated over this particular elephant.”\*

The six blind men in this tale go on to describe the elephant as a wall, a spear, a snake, or a tree depending on which part of the elephant—or, in our instance, 3D model—they happened to grab hold of. The message for those of us wrestling with BIM is clear: like the blind men, it is all in how you approach it. BIM is something different to everyone who uses the term.

Another analogy may serve to clarify. In Italo Calvino’s resplendent fiction *Invisible Cities*, as Marco Polo describes the cities

visited on his expeditions to Kublai Kahn—the city of Armilla, which “has nothing that makes it seem a city, except the water pipes that rise vertically where the houses should be and spread out horizontally where the floors should be,” or the spider-web city of Octavia, and many other marvelous cities—he is actually describing details (and different takes) of his native Venice. Kahn believes he is learning about many cities when in actuality there is only one.

One city. Many descriptions. Many definitions, but only one BIM.

Some uses are grammatically challenging (*Your BIM? The BIM?*) The thing is that all definitions of BIM at this stage of its development are *working* definitions. One concept the best of the definitions have in common is that BIM is a process *and* a tool. Those who liken BIM to an expensive drafting tool are either skeptics or don’t understand the full benefits of BIM.

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\*Jim Bedrick, “BIM and Process Improvement,” [www.AECbytes.com](http://www.AECbytes.com), December 13, 2005.

## Time Invested in Legacy Software

For both individuals and firms, a great deal has been invested in creating and learning office standards and in mastering the use of these tools since the transition from hand drafting. Each has to grapple with the fact that years spent working in and promoting use of, say, ADT are now for the most part perceived as lost years.

## Concerns about Liability

“Some project team members are concerned that increased collaboration over a shared model might make ‘the chains of responsibility for work fuzzier than they are traditionally,’” explains Markku Allison,

resource architect at the American Institute of Architects in Washington, DC. For instance, an architect may worry that sharing a building information model with a contractor will expose him/her to liability for means and methods. “In actuality, what we’re finding is that, when it’s used in practice in a collaborative fashion, claims are actually going down because we’re having far fewer conflicts or problems in the field,” he says.”<sup>23</sup> (See Figure 1.14.)

## Learning Curve

In other words, equipping teams with the skills necessary to leverage the promised benefits of BIM, with limited time for out-of-office or even in-office training,

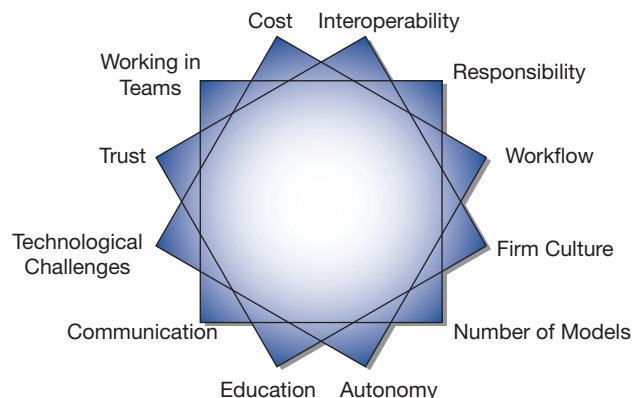


Figure 1.14 Twelve obstacles to successful adoption of and collaboration in BIM and integrated design.

requires a realistic understanding and acceptance of initial lost productivity.

### *Investment in Training*

Return on initial investment may be neither immediate nor astounding. Even with training, productivity will most likely take a hit in the early stages—the first one to three months.<sup>24</sup> Mistakes will happen. Patience will be required of all but the most optimistic.

### *Implementing Change in an Existing System*

Irrespective of how advanced and innovative their work products, design professionals are by nature and design conservative businesspeople. They change slowly and sometimes painfully, kicking and screaming the whole way.

### *Knowledge of Construction*

No matter how good and capable and even award-winning a designer you may be, if you don't understand how buildings go together from smallest detail to largest system, you may not like where you find yourself working—if fortunate to be doing so—in the

BIM environment. No matter where you are in your career, right-brain thinking is of little consequence for the left-brain demands made by BIM.

### *A Work in Progress*

The software itself and the processes enabled by it are still evolving. Some firms are holding out from adopting and implementing BIM until the user interface becomes friendlier; universal collaboration tools fully mature; the software becomes more interoperable; the workflow less cumbersome; and the use as a design tool less convoluted, more intuitive, and fluid.

### *Whom to Trust?*

Software trainers say that we need BIM training; software resellers say we need BIM software. It is hard to know whom you can believe and trust. People who say things like this, using exegesis, urgency, fear, bullying, prodding, or threatening, may have a vested interest in training others or selling outsourcing services. However, vested interest or not, they have a point that deserves to be heard out. Design professionals and AEC firms that wait to build their in-house BIM team risk playing catch-up, remaining behind the curve, cultivating a competitive disadvantage, and competing with others for the profession and industry's best talent. How long will you need to catch up: weeks, months? Meanwhile others, including contractors, have already put together their BIM teams. Don't be left out.

### *Managing: Information, Technology, and Staff*

So far we have reviewed challenges to BIM adoption that come from outside ourselves and our organizations. Perhaps the most important challenge is managing yourself and the ever-present need to counter those who wonder why the software hasn't solved every problem, even those unrelated to design—while at the same time encouraging those who are



growing weary and even leery of BIM’s overpromise as a design tool. The goal remains long-term commitment by management and staff.

Managing Expectations

Another challenge to a successful adoption of BIM involves managing expectations—our own as well as others’. To address this challenge, set realistic expectations for BIM. The successful implementation of Building Information Modeling requires managing expectations and careful planning, writes Robert Green, a CAD programmer and consultant. He notes that it is important for management to support a BIM plan before putting it in place. “You can achieve management buy-in by explaining the costs, benefits, and difficulties you anticipate during implementation, so be honest and open when speaking to your managers about BIM,” he writes.<sup>25</sup>

*Using Revit, or any other BIM platform, as simply a 3D visualization or documentation production tool is like using a laptop as a hammer.*

—Kell Pollard, “The BIM Fad?,” [www.revolutionbim.blogspot.com](http://www.revolutionbim.blogspot.com), January 22, 2009

Table 1.2 BIM Adoption: Challenges and Outcomes

Challenge	Desired Social Outcome
Increased communication required	Teams communicate more.
Clash detection	All team members are on the same page.
Concerns about increased liability	Collaboration and sharing decrease claims.
Limited time to train	Younger staff step up and lead training sessions.
Construction wherewithal required	Interacting with team takes people out of their silos.

*Collaboration, with its attendant file sharing, actually decreases claims.*

Communication: Challenges and Opportunities

The BIM workflow requires that team members communicate with each other, perhaps more frequently than they are used to or even comfortable with. Many design professionals have been assessed on the inhibited or introverted side of the personality scale and may find the requirement to communicate verbally, face-to-face, in video conferences, and via file sharing a significant challenge. The outcome—and opportunity—driven by meeting this challenge is that your team will communicate with each other more frequently, answering questions of each other, clarifying discrepancies, and resolving problems before they occur out in the field. In time, team members will feel more comfortable speaking before others, verbalizing hunches and observations, and trying together to figure out how to accomplish tasks at hand. Some may show leadership tendencies that otherwise may have lay dormant.

*“BIM doesn’t work,” that’s very humorous and in many cases true. It doesn’t work for someone whose expectations are too high, it doesn’t work for someone who doesn’t know how to use it, it doesn’t work for someone unwilling to change the way they think, and it doesn’t work for someone unwilling to change the way they work.*

—“Senior Project Architect,” LinkedIn group discussion, “BIM Doesn’t Work,” [www.linkedin.com](http://www.linkedin.com), 2009



## What's Holding You Back?

1. It seems like or actually will be punishment to do it.
2. It seems like or actually will be more beneficial to do something else.
3. The relevance of doing it is not understood.
4. There are other problems that come before or stand in the way.

Don Koberg and Jim Bagnall, inspired by  
*The Universal Traveler*, 1976, 44.

## In Conclusion

Is it possible to have too much information, to gather too much advice? Possibly, raising the necessity of separating the sage advice from increasingly disparaging and discouraging comments found on websites, blogs, and online forums. For as one Australian BIM consultancy advised, "Faced with all this 'BIM chatter,' AEC stakeholders will understandably find it difficult to pinpoint what they actually need to do to reap the promised benefits of BIM. The chatter causes the change process to sound more difficult, extended, and complex than it should be. . . . This need not be the case at all."<sup>26</sup> (See Figure 1.15.)

## Strategies for BIM Adoption

Suggestions for adopting BIM in your own office and for acquiring the mindset necessary to master the process:

**Strategy 1:** Think of ways in which BIM could benefit you, your team, or firm that could also be considered co-benefits for using BIM.

**Strategy 2:** Seek help from an expert, a trainer, or even a BIM guru that specializes in BIM adoption as

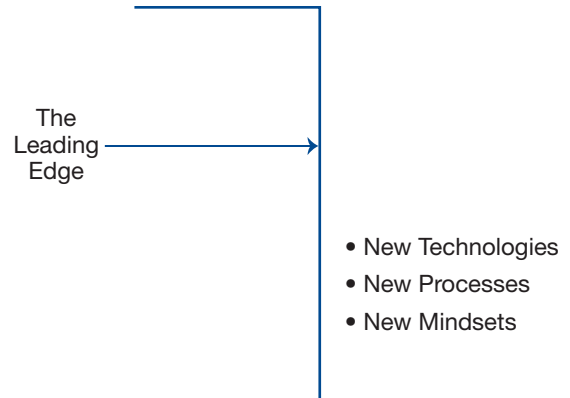


Figure 1.15 The leading edge: "There has to be a willingness to jump off and try something new."—Phil Bernstein, FAIA.

well as implementation. A recent online help wanted ad, "BIM Guru to Shepherd Office Transformation to BIM," read "Wilkinson Architects seeks a highly motivated, technology-focused Revit manager/guru with 7+ years of experience to shepherd the office's transformation to BIM . . ."<sup>27</sup> CAD adoption was never treated in these almost spiritual terms.

**Strategy 3:** If even after considering the benefits the challenges of adopting BIM still seem too daunting to overcome, consider breaking the stages of BIM adoption discussed in this chapter into smaller chunks to make them more manageable. Some firms pick a date to throw the switch from CAD to BIM and never look back. But the majority of firms approach BIM adoption more gradually and rationally on a project-by-project basis. They succeed because instead of being overwhelmed by all that is involved in the changeover to BIM, they manage to break down the psychologically and socially complex process into chunks that they and others can handle, manage, and use.

**Strategy 4:** Take the Kaizen approach. Similar to breaking down the vast information involved into

chunks, Kaizen suggests instead taking small, incremental steps.<sup>28</sup> Before you know it, you'll be using—and have mastered—BIM.

**Strategy 5:** Adoption as problem solving. Architects are problem solvers—approach BIM adoption and implementation as an architect would. Using design thinking, tackle the task of adopting BIM as you would any design assignment. In other words, how you go about adopting BIM is the same way you would go about anything else.

**Strategy 6:** Steps, stages, or phases. Approach BIM adoption as a sequential series of steps. Pete Zyskowski, in “The World According to BIM: Part 1,” suggests the following stripped-down, highly condensed, four-step BIM adoption process:

Step 1: Define goals. Measuring success. Other goals.

Step 2: Assess your current situation. Evaluate user skills. Identify concerns. Understand current workflow and processes. Anticipate changes to CAD standards. Assess (and upgrade) your hardware. Determine network needs. Don't forget about other software—I recommend that even the most hard-core Revit adopters keep at least one copy of AutoCAD lying around somewhere.

Step 3: Choose a pilot project. Migration.

Step 4: Make a plan. The delivery model. Training. Consultation and mentoring. Timeline and budget. Continuing education.<sup>29</sup>

Another example follows slightly more expansive, sequential steps—like dance steps—that can be followed one at a time:

- Agree on a common **vision** (any *defined* vision can be agreed upon; undefined visions cannot).

- Generate a simplified implementation **roadmap** for organizations to follow.
- Simplify BIM **terminology** around fewer headings.
- Identify **incremental and achievable steps** between major stages.
- Provide **benchmarks** for business improvement.
- Allow organizations to **assess** themselves and others.<sup>30</sup>

**Strategy 7:** Adoption as finding motivation to proceed. There are two types of BIM adoption: you do it freely—by choice—or you pursue BIM begrudgingly, kicking and screaming, where outside forces—the market, a client, the boss returning suddenly enlightened from a seminar or conference—pressure you to adopt and implement the new technology (BIM adoption from without).

**Strategy 8:** Come up with your own recipe for BIM adoption. When *Acronym* magazine editor Caron Beesley asked architect-trained technology implementer Neil Rosado, “How do you recommend organizations approach the adoption of a building information modeling (BIM) technology?” Rosado responded,

First, I am a big fan of using a pilot project. Pilot project selection is the key to success and should take into consideration three things: One, pick a project that your team is used to working on. For example, if your team works mostly on office space projects, then selecting a project like a fire hall to implement BIM would not make a lot of sense. Two, organizations should consider a project with liberal timelines—not one with looming deadlines. Three, the project should be midsize. If the project is too small, not enough people participate, and

in a large department, word spreads from the project team and others become interested. If the project is too large or complex, the learning curve may be too steep. The idea behind pilot project selection is that you are trying to minimize the number of curveballs thrown at your team all at once.<sup>31</sup>

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