Immersive Internet Analyst Report Series, Issue #2

ThinkBalm Immersive Internet Business Value Study, Q2 2009

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May 26, 2009

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Executive Summary

The Immersive Internet is a collection of emerging technologies combined with a social culture that has roots in video games and virtual worlds. Success in the consumer virtual world and video game markets has driven experimentation with immersive technology in the workplace. During the past year, the idea of using immersive technology at work has gained some traction and anecdotal success has led to questions about business value. To try to answer these questions about the business value of using immersive technologies in the workplace, ThinkBalm surveyed 66 Immersive Internet practitioners and conducted 15 in-depth interviews. This report contains our research findings and analysis.

Early investments in immersive technology for work are yielding business value. More than 40% of those surveyed (26 of 66) saw a positive total economic benefit from investments in immersive technologies in 2008 and 1Q 2009, and more than 50% of respondents (34 of 65) expect to obtain a positive total economic benefit in 2009. Quantification of this value was all over the map, ranging from less than $10,000 USD to more than $1 million. The number of respondents who expect to obtain economic benefit of $25,000 USD or more in 2009 is more than double the number who indicated they achieved this level for 2008 / 1Q 2009. We found that many who have been implementing immersive technology in the workplace did not even expect to achieve a return on their investment.

Ninety five percent of survey respondents (62 of 66) reported some level of success with their 2008 / 1Q 2009 immersive technology deployments. People who worked for government, non-profits and even some corporations focused on non-financial benefits, which sometimes makes quantification of that success difficult. Regardless, over a third of those surveyed (36%, or 23 of 64) said their organization will definitely expand investment in immersive technology in 2009 and 2010, and another 38% (24 of 64) indicated that they might expand their investment.

The top motivations for investment in this area in 2008 /1Q 2009 were enabling people in disparate locations to spend time together, increased innovation, and cost savings or avoidance — with each reported as at least somewhat important by the vast majority of respondents. Unsurprisingly, early implementers are choosing the simplest use cases first. Learning and training (80%, or 53 of 66 respondents) and meetings (76%, or 50 of 66) were the most common. Using immersive technology for internal meetings was more prevalent than using it for external meetings.

Immersive technology won out over a variety of alternatives primarily due to low cost and the increased engagement it delivers. The leading alternatives were Web conferencing and in-person meetings, followed by phone calls. Nearly 60% of respondents (38 of 66) indicated that immersive technology was less expensive than alternatives, and 11% (7 of 66) reported that it was more expensive.

Work-related use of the Immersive Internet is in the early adopter phase. Before it can pass into the early majority phase, practitioners and the technology vendors who serve them must “cross the chasm.” They face a number of issues — some technological, such as inadequate end user hardware and corporate security concerns, and others social, such as raising awareness and providing training. All in all, significant opportunity exists to extract business value from immersive technology, and experimentation now can lay the groundwork for transformational initiatives down the road.

THE BIG QUESTION: WHAT'S THE ROI?

As industry analysts, we hear it all the time: "I can see how immersive technologies might increase engagement, but how do you measure the business value of that?" The question of business value came up repeatedly at the 3D Training, Learning and Collaboration (3DTLC) conference in Washington DC in April 2009. It comes up in conversation at nearly every ThinkBalm Innovation Community event and has peppered many community discussions. The blog articles we write that contain business value numbers are the most widely-read ones we publish.[1] It is the following question we set out to answer in this research study: "What is the business value of using immersive technologies in the workplace?"

Definition: Immersive Internet

A collection of emerging technologies combined with a social culture that has roots in video games and virtual worlds.

EARLY INVESTMENTS ARE YIELDING BUSINESS VALUE

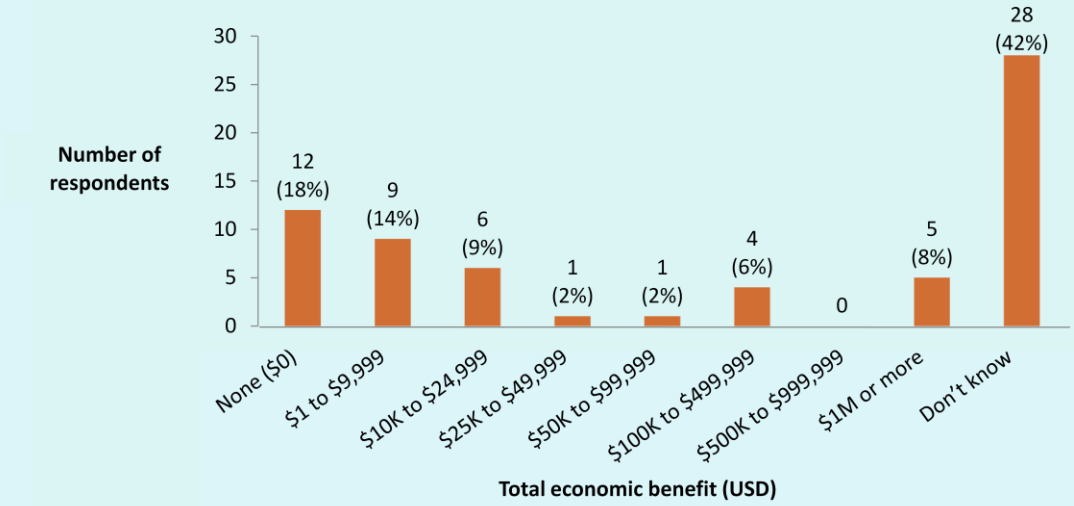
Not everyone who's been implementing immersive technology in the workplace can — or even expects to — quantify the business value of the investments they've made so far. Few 2008 or 1Q 2009 Immersive Internet projects had rigorous ROI numbers attached. But various data points collected via survey and interviews indicate that investments in immersive technologies in the workplace are in fact yielding value. As just one example, BP expects to deliver tens of millions USD in business value from its investments in immersive technology. The company has already recouped the cost of many of the Immersive Internet investments it made in 2008 and 1Q 2009, according to Brian Ralphs, a director in the IT chief technology office.

More Than 40% of Those Surveyed Saw Positive Total Economic Benefit

More than 40% of the practitioners we surveyed (26 of 66) said their organizations saw a positive total economic benefit from investments made in immersive technologies in 2008 and 1Q 2009, and more than 50% of respondents (34 of 65) expect to obtain a positive total economic benefit in 2009 (see Figure 1 and Figure 2). Quantification of this value ranged from less than $10,000 USD to more than $1 million. Our assessment reveals three main reasons for this extensive diversity: 1) business value depends heavily on use case, and use cases varied widely, 2) business value depends on the maturity and breadth of the rollout, and 3) our survey sample size was fairly small due to the early-stage nature of this emerging market. Still, the number of respondents who expect to obtain economic benefit of $25,000 or more in 2009 is more than double the number who said they achieved this level for 2008 / 1Q 2009.

Figure 1: >40% of respondents saw positive economic benefit; 42% don't know

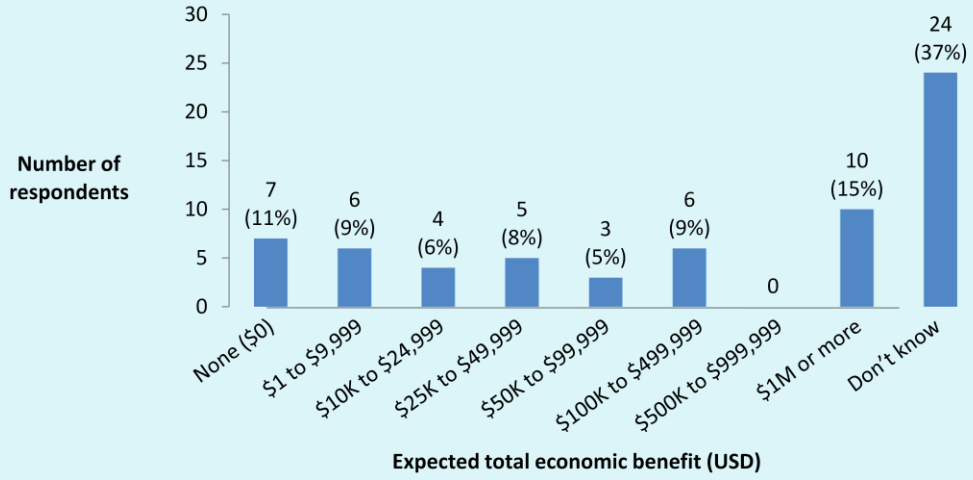
"MQ18. What is the total economic benefit your organization obtained by using immersive technologies in 2008 or 1Q 2009, in US dollars?"



Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = 66 respondents. Percentage may not total 100 due to rounding.

Figure 2: >50% of respondents expect positive economic benefit in 2009

"MQ20. What is the total business value your organization anticipates getting out of its investment in immersive technologies in 2009, in US dollars?"

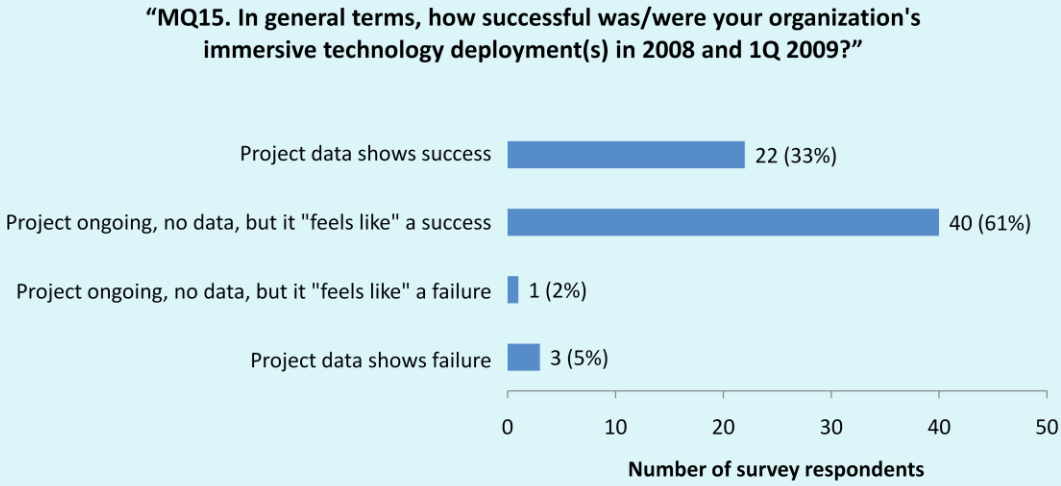


Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = 65 respondents. Percentage may not total 100 due to rounding.

Almost All Survey Respondents Indicated Some Level of Project Success

In answer to the question, “In general terms, how successful was/were your organization's immersive technology deployment(s) in 2008 and 1Q 2009?” one third of respondents (22 of 66) said their project data shows success (see Figure 3). Another 61% of respondents (40 of 66) said the project “feels like” a success, for a total of 94% of respondents.

Figure 3: One third of respondents said project data shows success and another 61% reported that projects “feel like” a success



Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = 66 respondents. Percentage may not total 100 due to rounding.

While we did not ask survey participants to define how they measured success, we gained insight into the many ways they are doing so through the interview process and answers to open-ended survey questions. One interviewee, Eric Hackathorn, 3D Web designer with NOAA, simply said, “If we weren’t successful I wouldn’t have a job.” David Fenech, VP of interactive marketing at Kelly Services, said, “Qualitatively, we have been successful. But we have not yet put the back-end measurement tools in place to prove it quantitatively.” These comments echo words we have heard from many people working in this area and illustrates that strict financial ROI is not the only measure of success. Practitioners are using a variety of metrics to determine the success of their projects:

- **Improved employee productivity**. Seventy two percent of survey respondents (46 of 64) rated improvement in employee productivity through their organization's immersive technology deployments in 2008/1Q 2009 as at least “somewhat important” (see Figure 4). When IBM held its Academy of Advanced Technology, an internal conference, in an immersive environment last October, the organization measured employee productivity gains as part of its ROI analysis. Karen Keeter, marketing executive in IBM's Digital Convergence business unit, and Neil Katz, distinguished engineer, said they estimated that on average each attendee saved six hours that

would otherwise have been spent travelling had the event been held at a physical meeting location, as was typically done. Using an average cost of $150 an hour per person multiplied by 150 people, the IBM team calculated a savings of $135,000 USD in productivity value.

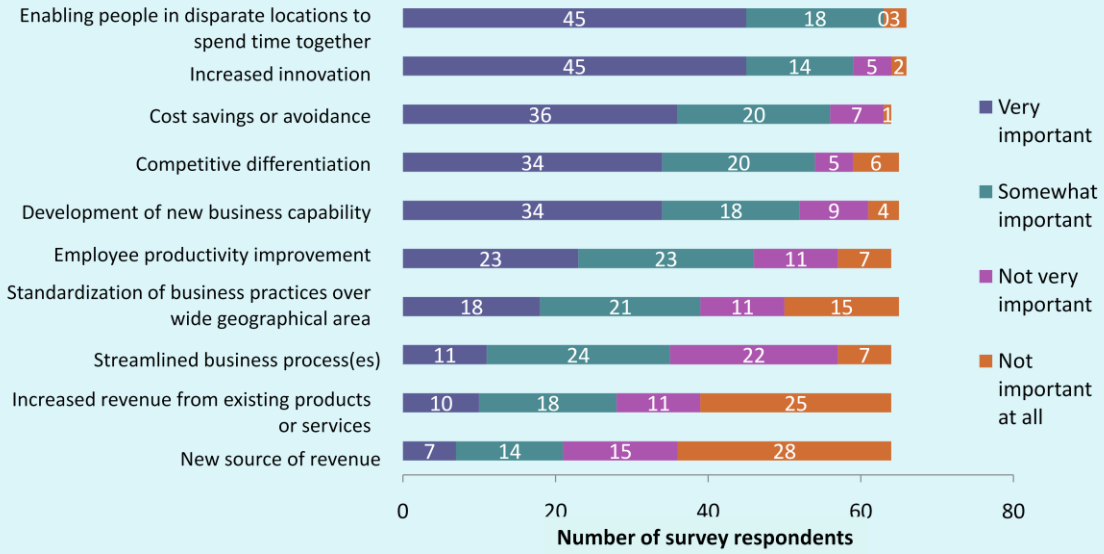
- **Increased revenue**. One third of survey respondents (21 of 64) reported that increased revenue from new sources, and 44% (28 out of 64) said increased revenue from existing products and services, were benefits at least "somewhat important" for their 2008 / 1Q 2009 immersive technology deployments. An example of this is BAE Systems, which built and maintains a custom immersive learning simulation for armed services personnel training. Kurt Steuck, director of training technology at BAE Systems, San Antonio Operations, said the value his organization got out of its investment in immersive technologies was measured by direct financial gain from customer engagements, in particular by volume of repeat and increased business.

- **Increased employee retention rates.** David Fenech, VP of interactive marketing at Kelly Services, said it well: "People who are more engaged in the company culture are more engaged in work. People who aren't immersed in corporate culture are more likely to leave." Kelly Services is turning to immersive technology to increase employee retention rates by creating virtual places where distributed workers can meet and build connections. Likewise, a project manager we interviewed said her team is measuring success of its deployment by retention rates of recent master of business administration (MBA) graduates.

- **Improved counseling outcomes.** Preferred Family Healthcare delivers psychological counseling to troubled adolescents. Dick Dillon, senior VP of planning and development at Preferred Family Healthcare, said his organization is measuring success of its deployment of immersive technology by comparing a control group of clients (troubled adolescents) with a group that receives counseling services delivered in an immersive environment. The client groups will be compared on completion rates of counseling services, attendance rate at scheduled events, and the length of time clients remain connected to a clinician.

Figure 4: Important benefits: face time, innovation, and cost savings

"MQ13. How important were each of the following business benefits for immersive technology pilot(s) or deployment(s) your organization did in 2008 or 1Q 2009?"



Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = from 64 to 66 depending on the business benefit in question

A Primary Benefit Is Cost Savings or Avoidance

When asked "How important [was cost savings or avoidance] for immersive technology pilot(s) or deployment(s) your organization did in 2008 or 1Q 2009?" nearly 90% of those surveyed (56 of 64) said it was at least "somewhat important." This breaks down into 56% of respondents (36 of 64) saying it was "very important" and almost a third (20 of 64) saying it was "somewhat important." Based on our work with our clients and our experiences with members of the ThinkBalm Innovation Community, as well as on conversations we've had with hundreds of Immersive Internet practitioners during the past year, this comes as no surprise. Here are just a few examples:

- **Virtual events cost much less than physical events.** Zain Naboulsi, developer evangelist at Microsoft, demonstrated that his company was able to reduce the per-attendee cost of a developer conference by more than a factor of 100: from between $40 and $45 per person to about $.35 per person USD. His organization's costs are lower than might be expected because community members volunteered their time to revamp the needed digital assets (e.g., 3D meeting space, presentation tools, etc.) In another example, referenced above, Karen Keeter of IBM said a conservative estimate of travel costs for the 150 people attending the Academy of Technology event would have been roughly $1,500 per person. Holding the event in an immersive environment resulted in an estimated $225,000 in travel savings and $25,000 in venue savings, for a total of $250,000.

- **Machinima costs much less to produce than traditional videos**. Several survey respondents and interview participants listed machinima creation as one of their organization's uses of immersive technology in 2008 and 1Q 2009. Rita J. King of Dancing Ink Productions said, "At this stage in the development of virtual platforms, machinima is the record of a shared experience. What you see when you watch a piece of machinima is a collaborative effort to create a space in which people from around the world can inhabit and enhance one another's ideas." In one example, United Space Alliance needed to produce a training video that required a complex stage set. The project team found it could create a digital set inexpensively in an immersive environment by acquiring off-the-shelf assets; this cost a fraction of what it would have cost to build a physical set.

The Immersive Internet Presents an Innovation Opportunity

When asked, "How important [was increased innovation] for immersive technology pilot(s) or deployment(s) your organization did in 2008 or 1Q 2009?" nearly 90% (59 of 66) said it was "somewhat important" or "very important." This breaks down into more than two thirds of respondents (45 of 66) saying it was "very important" and 21% (14 of 66) saying it was "somewhat important." This came as a surprise to us: we thought few would select these answers, and that those who did would be part of a formal innovation program in their organizations. We also thought that at this early stage in the adoption of immersive technology in the workplace, and in this economy, respondents would be more focused on cost savings than on innovation.

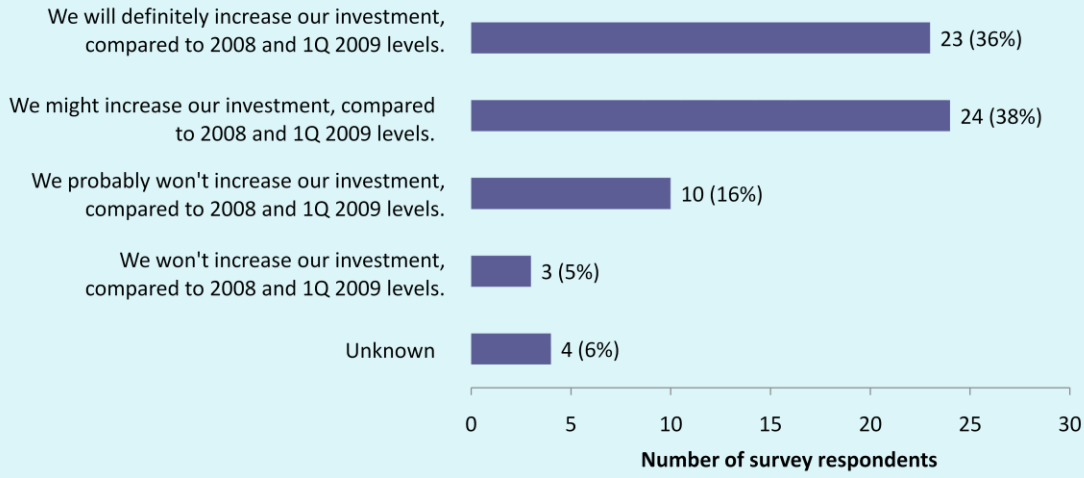
Some practitioners are getting in the game early to gain valuable experience with an emerging technology they believe will result in a competitive advantage. Mark Dowman, designer at the United Space Alliance said, "We actually see the current technology as inadequate in many ways but we still use it because there is so much value in experimenting early. We see unlimited potential." In another example, Mark Jankowski, president and co-founder of Shapiro Negotiations Institute, said, "Our business is delivering negotiation seminars. Migrating delivery of this intellectual property (IP) to an immersive environment will greatly expand our access to new sources of revenue and provide a significant competitive advantage. Teaching negotiation skills is a face-to-face job. By removing the need for people to be in the same place at the same time, we are fundamentally changing our business model." And David Fenech, VP of interactive marketing at Kelly Services, put it this way: "The common perception is that Kelly Services is traditional. We have had more doors opened to us saying, 'Wow! You guys are doing that?' in reference to our work with immersive technologies."

Nearly ¾ of Respondents Said They Might or Will Increase Investment

Thirty eight percent of respondents (24 of 64) said their organizations *might* increase their investment in immersive technologies in 2009 and 2010 (see Figure 5). More than another one third (23 of 64) said that, based on their experiences with immersive technologies in 2008 and 1Q 2009, they *will definitely* increase their investment. In all, nearly ¾ of survey participants indicated that they are leaning toward increased investment in this area during the next couple of years. Only 5% of respondents (3 of 64) said they won't increase their investment.

Figure 5: Nearly ¾ say org's investment might or will increase in '09/'10

"MQ23. How do the experiences your organization had with immersive technologies in 2008 or 1Q 2009 affect plans for *increased* investment in immersive technologies in 2009 and 2010?"



Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = 64 respondents

Through the interview process and answers to open-ended survey questions, it became apparent that the main criterion influencing whether or not an organization plans to increase investment in immersive technologies in 2009 and 2010 is the ability to demonstrate business value. Here is a great example. Mark Jankowski of Shapiro Negotiations Institute proposed immersive technology as one of what the company calls the "final four" technology opportunities for growing its business in the coming year. He proposed immersive technology as a method of delivering the company's IP to clients. His proposal didn't make the cut. So he worked on an immersive solution in his spare time, delivered it to a few select clients, and was able to demonstrate that immersive technology was actually more valuable than the technology the company's leadership team had originally selected. The management team dropped the technology it had originally selected, replacing it with immersive technology.

Use Cases: People Are Picking the Low-Hanging Fruit First

In an era of ravaging travel cuts, people are looking for easy, inexpensive ways to meet with others with whom they need to work. As social creatures, people crave "face time" — time spent together with other people, communicating and collaborating. Face time gives people a chance to catch up on shared projects, bounce ideas off each other, and make decisions. Almost all survey respondents (95%, or 63 of 66) said enabling people in disparate locations to spend time together was a "somewhat important" or "very important" benefit of their 2008 / 1Q 2009 projects.

The Most Common Use Cases Today: Learning and Training, Meetings

To gain a deeper understanding of how people are using immersive technologies in the workplace, we asked survey participants: "For which of the following use cases did your organization pilot or deploy immersive technology in 2008 or 1Q 2009?" The answers show that early adopters are plucking the low-hanging fruit first, with (see Figure 6):

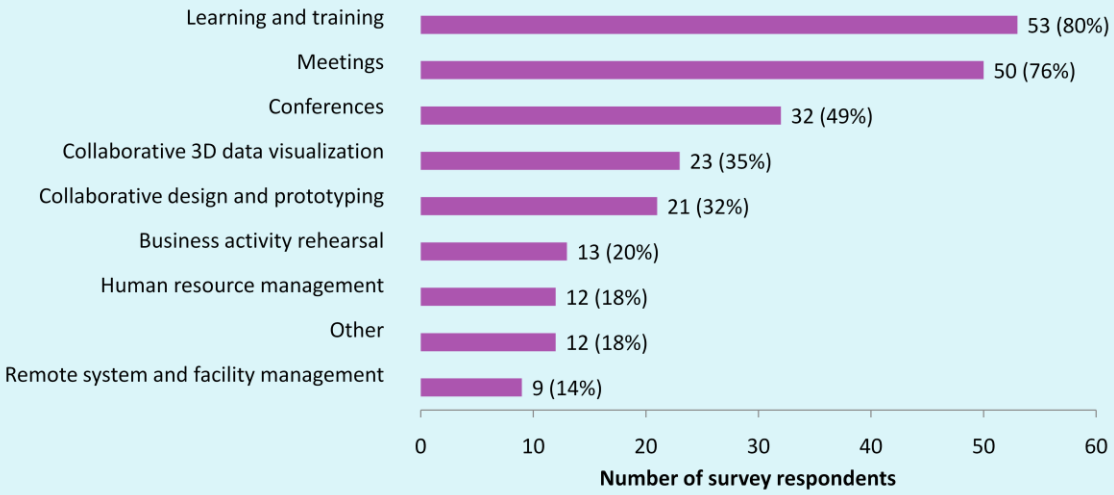
- **Learning and training.** In answer to the question, "For which of the following use cases did your organization pilot or deploy immersive technology in 2008 or 1Q 2009?" 80% of respondents (53 of 66) selected learning and training. Immersive learning environments allow trainers to conduct sessions in the style of a lecture, hands-on session (for familiarization with specific equipment or tasks), or tour (for example, to explore systems, places, buildings, body parts or even chemical structures).

- **Meetings.** Seventy six percent of survey respondents (50 of 66) said their organizations used immersive technology for meetings. When we asked respondents to describe their organization's deployment(s) of immersive technologies in 2008 and 1Q 2009, more than twice as many of them (36%, or 24 of 66) indicated they used the technology for internal meetings as for external meetings (15%, or 10 of 66) (see Figure 7). In all likelihood, it is easier to deploy the technology to a group of people under one organization's umbrella than to open firewall ports and deal with a wide range of end user hardware — never mind provide support for external users.

- **Conferences**. At the last minute prior to launching the survey for this study, we separated meetings from conferences — and we're glad we did because the survey shows many people treat the two separately. We think of meetings on the scale of a few tens of people and conferences extending well into the hundreds or thousands. Nearly half of respondents (49%, or 32 of 66) said their organizations used immersive technology for conferences in 2008/1Q 2009. As an example, the Risk and Insurance management Society, Inc. (RIMS), held a virtual conference with over 700 registrants, of which more than 500 attended for an average of an hour and a half each. A critical technology requirement was the ability to scale to support this large number of simultaneous users.

Figure 6: Common use cases in 2008 / 1Q '09: learning & training, meetings

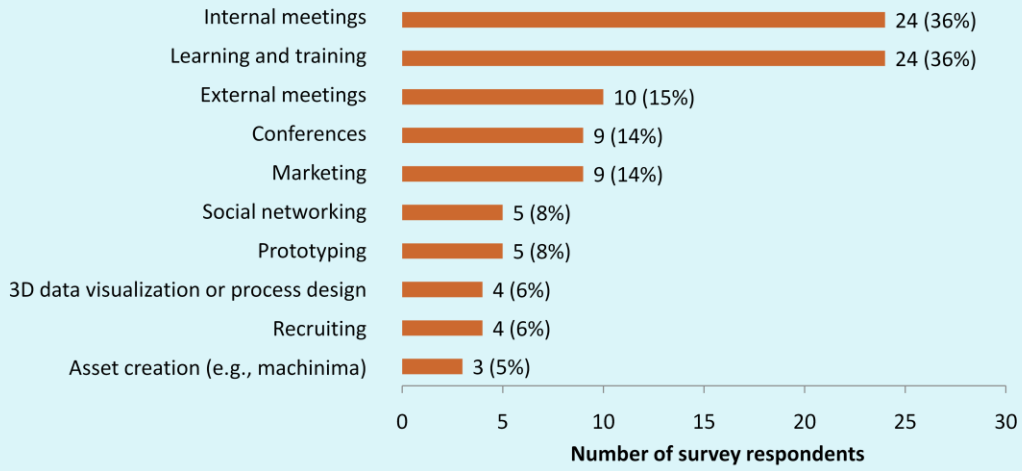
"MQ7. For which of the following use cases did your organization pilot or deploy immersive technology in 2008 or 1Q, 2009?"



Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = 66 respondents. Multiple answers accepted.

Figure 7: Internal meetings were more common than external meetings

"MQ8. Please briefly describe your organization's deployment(s) of immersive technologies in 2008 and 1Q 2009."

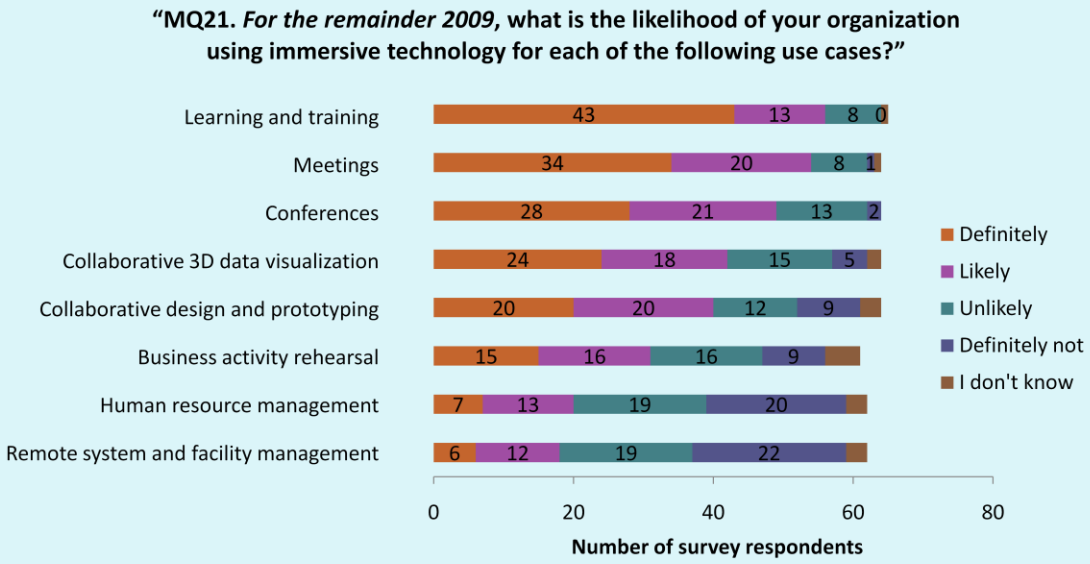


Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = 66 respondents. Open-ended question. Multiple answers accepted.

Some Have Their Eye on More Complex Use Cases for 2010 and 2011

We expect the common use cases to remain pretty much the same for the remainder of 2009 as they were for 2008 / 1Q 2009 (see Figure 8 compared to Figure 7). Survey respondents on average expect to be more likely to use immersive technology in 2010 or 2011 than in 2009 for potentially complex use cases like business activity rehearsal and remote system and facility management (see Figure 9). In Figure 9, each upward-pointing arrow represents a tenth of a point change in the rating average for each use case. A rating score of 4 means "definitely" and a score of 3 means "likely." An average score of 2.5 means respondents think they are just as likely as not to use immersive technology for a particular purpose. For the most common use case — learning and training — survey respondents don't foresee being any more likely to focus on this use case a year or two down the road than they are to focus on it in 2009.

Figure 8: Common use cases for the remainder of 2009 will be learning and training and meetings



Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = from 61 to 65 depending on the use case in question

Figure 9: Advocates eye more complex use cases for 2010-2011

"MQ21 and MQ22. For the remainder 2009, and for 2010 and 2011, what is the likelihood of your organization using immersive technology for each of the following use cases?"

	Rating Average (max = 4) 2009	2010-2011	
Business activity rehearsal	2.7	3.1	
Remote system and facility management	2.0	2.4	
Collaborative 3D data visualization	3.0	3.3	
Collaborative design and prototyping	2.8	3.1	
Human resource management	2.1	2.4	
Conferences	3.2	3.4	
Meetings	3.4	3.6	
Learning and training	3.6	3.6	

1 = Definitely not; 2 = Unlikely; 3 = Likely; 4 = Definitely;  = .10 point increase in avg. rating

Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = from 58 to 64 depending on the use case in question

A typical adoption path is to start with relatively inexpensive solutions to straightforward business problems, create a cache of digital assets and develop a wealth of experience, and then leverage these assets and experience to solve more complex business problems. For example, the team at United Space Appliance started with one inexpensive yet high-impact project: creating a training video. Based on the success of that project, the team now has its eye on business activity rehearsal, digital prototyping of new products, conceptual prototyping, and ergonomics modeling. At BP, the company started with virtual internal meetings and conferences and some fairly basic training applications and has since moved into sophisticated use cases in parts of the business like manufacturing, refining, and exploration. According to Brian Ralphs in the CTO's office, "This is where we determined the value lay."

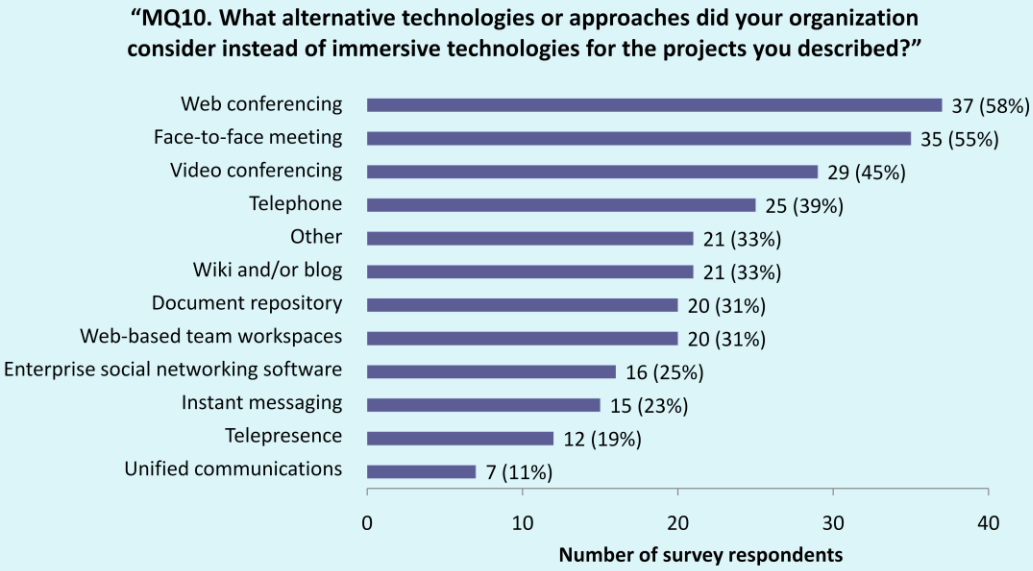
Why Immersive Technology Versus the Alternatives?

Whenever the question of the business value of technology investment arises, one of the first challenges is to compare it to existing options. A common question is, "Do we need to invest in this technology now, or can we get by with technology we already own?" To get at the heart of this, we asked our survey participants what alternative technologies or approaches their organization considered instead of immersive technologies, for their 2008 / 1Q 2009 projects, and why. For both of these questions, respondents could choose or provide multiple answers.

Leading Alternatives Offer Communication Capabilities and Presence Info

Survey results show that the leading alternatives to immersive technology were Web conferencing (58%, or 37 of 64 respondents selected this answer); face-to-face meetings (55%, or 35 of 64); and video conferencing (45%, or 29 of 64) (see Figure 10). These numbers make perfect sense to us because these alternative approaches are more similar to immersive meetings than, for example, asynchronous collaboration technologies like document repositories and wikis. The three top-ranked alternatives provide a higher level of engagement than a simple telephone or conference call or an instant message conversation (see Figure 11).

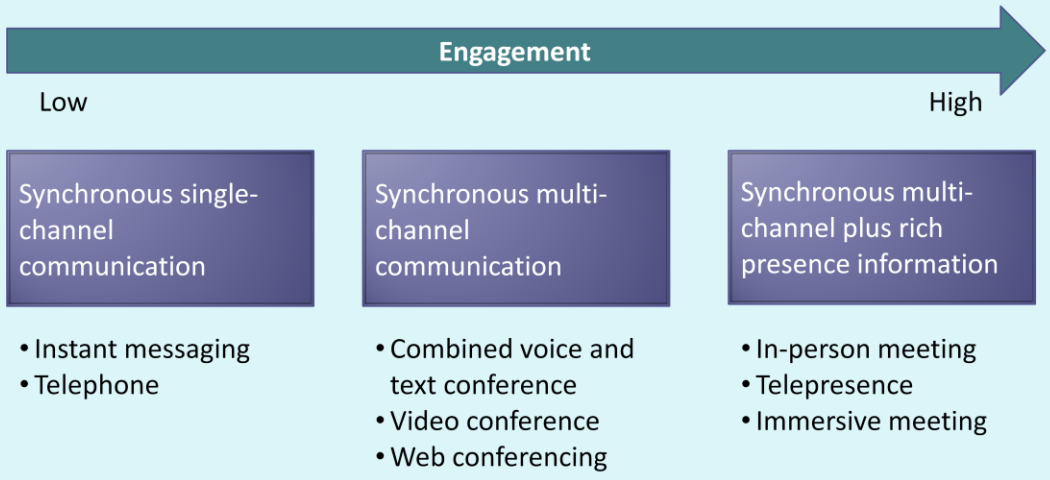
Figure 10: Leading alternatives: Web conf., in person, videoconferencing



Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = 64 respondents. Multiple answers accepted.

We were surprised to see unified communications and telepresence at the bottom of the list, as immersive technology solutions have a lot of overlap with these alternatives (e.g., both feature, at minimum, integrated voice communication, text chat, and presence awareness). Our explanation for this is that relatively few of the survey respondents probably had unified communications or telepresence in their enterprises — based in part on the fact that nearly 1/3 of the survey respondents (21 of 65) worked for organizations that had fewer than 100 employees.

Figure 11: Immersive meetings are more like in-person meetings than like they are like Web conferences



Source: ThinkBalm

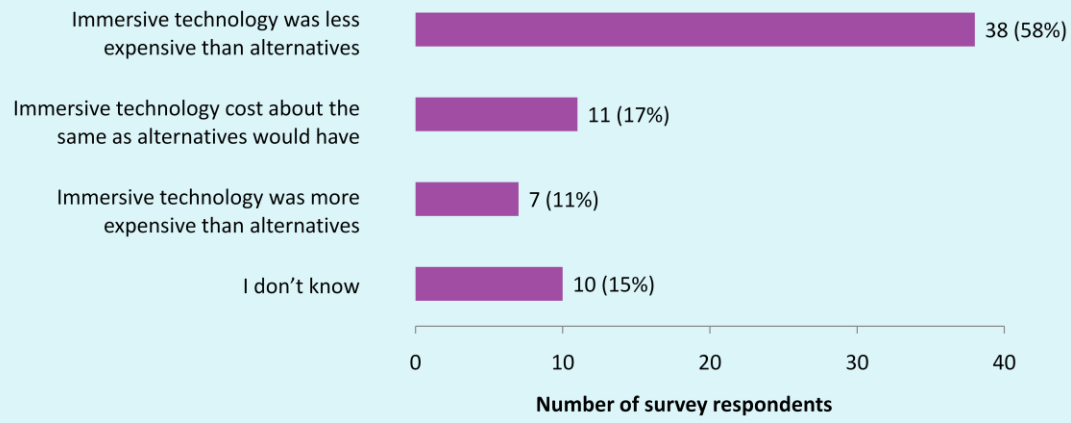
Implementers Chose Immersive Tech for Low Cost, Increased Engagement

We asked the question, "How did the cost of implementing immersive technology compare with what it would have cost to take an alternative approach?" Almost 60% of respondents (38 of 66) said that immersive technology was less expensive than alternatives (see Figure 12). Eleven percent (7 of 66) said it was more expensive. We also asked the open-ended question, "Why did your organization choose to use immersive technologies over the alternatives for the project(s) you described?" Twenty seven percent of respondents (18 of 66) provided an answer we categorized as "to reduce costs."

We bucketed 26% of the respondents' answers (17 of 66) into a category we called "to increase engagement" (see Figure 13). As an example, at United Space Alliance, training videos were inexpensively built by teams formed of people who had never met in person. The team leader was able to sell the immersive technology to budget-holders on the argument that he could allow geographically dispersed people to feel like they were all together in the same place. The team had tried telepresence but it didn't meet their needs. In another case, Zain Naboulsi, developer evangelist at Microsoft, said, "We tried phone and Web conference for Microsoft developer events. Just as Web conferencing adds a layer of experience to a phone conversation, the next logical step is to move from a Web conference to an immersive event. It adds many more layers of function."

Figure 12: >50% of respondents: immersive costs less than alternatives

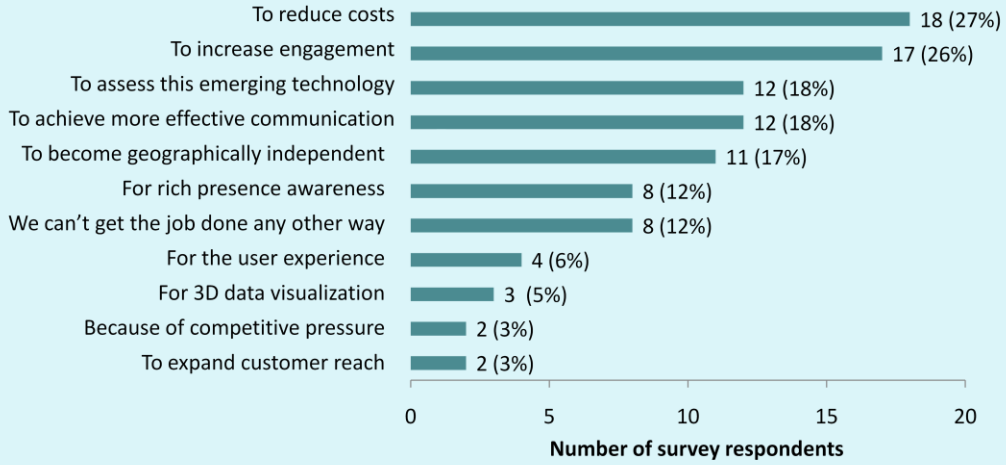
"MQ12. How did the cost of implementing immersive technology compare with what it would have cost to take an alternative approach?"



Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = 66 respondents. Percentage may not total 100 due to rounding.

Figure 13: Why immersive vs. others? Reduce costs, increase engagement

"MQ11. Why did your organization choose to use immersive technologies over the alternatives for the project(s) you described?"

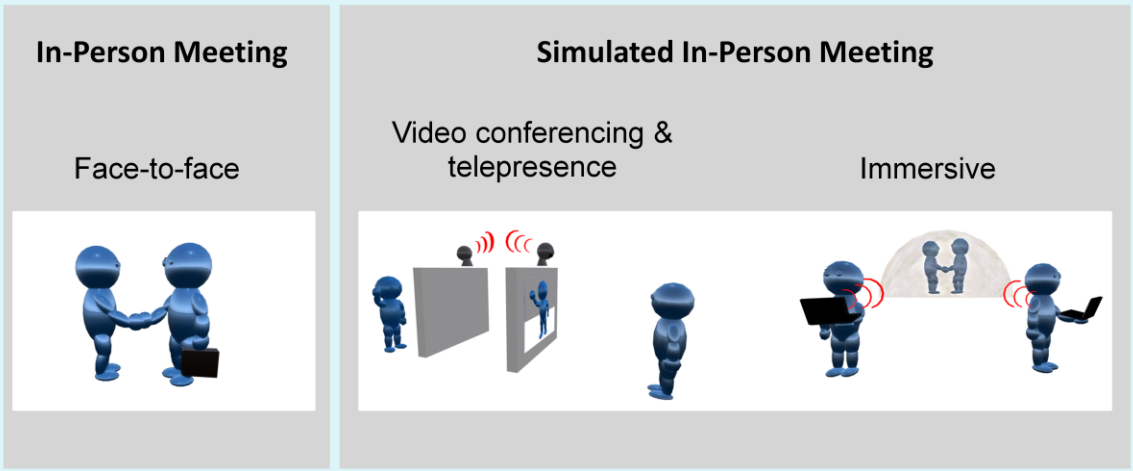


Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = 66 respondents. Open-ended question. Multiple answers accepted.

Immersive Meetings Just May Be the New "Face Time"

Much gets lost in translation when the richness of an in-person meeting is flattened into a telephone conversation or instant message exchange. Immersive technology can be used to simulate in-person meetings (see Figure 14). We often hear immersive technology compared to web conferencing or desktop video conferencing, but our take is immersive meetings actually share more in common with in-person meetings than with these other technologies — certainly when immersion is the key comparison point. In-person meetings, telepresence sessions, and immersive meetings offer synchronous collaboration and communication with shared context and experience, presence awareness, and a voice channel.

Figure 14: Face-to-face doesn't necessarily mean in-person



Source: ThinkBalm

"We Couldn't Do It Any Other Way"

The Immersive Internet allows us to do things we can't do as well, or within budget, using alternative methods, and much value can be derived from this. The Immersive Internet also allows us to do things we simply can't do at all in the physical world, and organizations willing to use the technology to this end can unlock even greater value. Examples include:

- **Creating complex stage sets for videos.** United Space Alliance had to create a training video on a very limited budget. In a sense the project team was practically forced into using immersive technology to assemble a virtual stage set, rather than trying to build a physical one. It would have been impossible for the team to deliver the training video using traditional methods on its small budget.

- **Bringing together people who had no other means of meeting.** In the view of civil engineer Pam Broviak, formerly of the City of Lasalle (Illinois USA), investment in immersive technologies can help close a gap in information sharing and knowledge transfer among construction companies,

government public works program staffers, and civil engineers. She set up an immersive environment in which people could meet and share stories. “We couldn’t do this any other way,” Broviak said. The people who need to talk to each other typically don’t know or have access to each other and don’t have travel budgets to allow them to get together. Broviak’s aims are to expand the range of government people who can participate in public works projects and ultimately to achieve better, higher quality public works contracts.

- **Delivering counseling services to clients unreachable through traditional outpatient services.** Dick Dillon, senior VP of planning and development at Preferred Family Healthcare, said, “We provide counseling services for adolescents. Often, after clients leave our facility they are unable to access our services because of a lack of transportation or due to disabilities. Circuit clinicians could go visit clients in their homes but they are expensive, especially when you have to pay for driving time. Plus, sending a counselor to a home isn’t as effective as group counseling sessions. We think immersive technology will allow us to deliver a service level we couldn’t otherwise.”

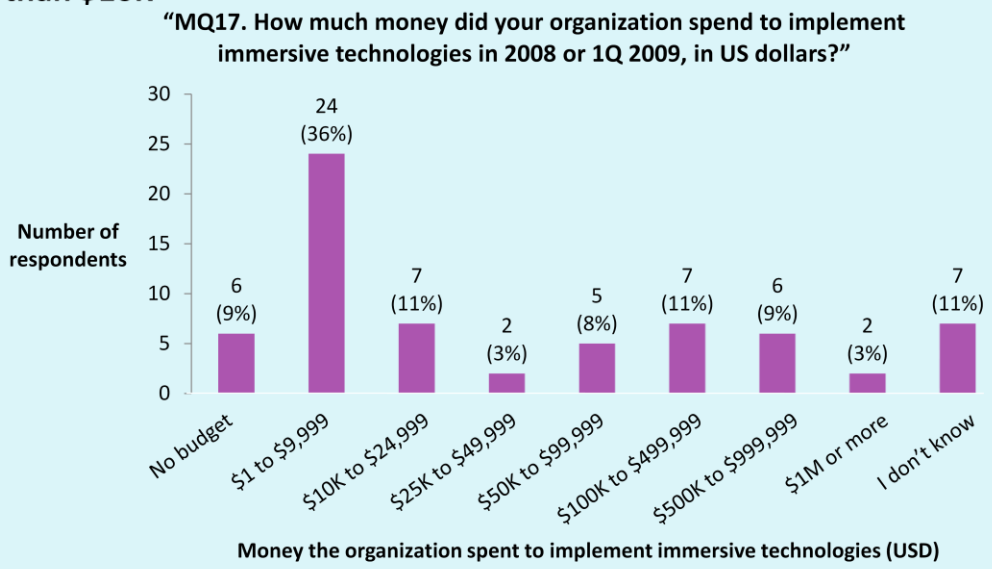
- **Effective training for high-risk, low-frequency activities.** Brian Ralphs in the CTO’s office at BP said, “Think about a crisis management exercise for an oil refinery. We could save $1 million or $2 million USD per training event. Also, not having to shut down the refinery to hold the exercise reduces our risk and costs. But it’s not all about profitability, per se. It’s also about risk mitigation. Cost savings aside, with immersive technology we could run exercises like simulating an explosion at a refinery — which we simply couldn’t in the physical world.”

YOU CAN GET YOUR FEET WET AT VERY LITTLE COST

We asked, “How much money did your organization spend to implement immersive technologies in 2008 or 1Q 2009, in US dollars?” Fifty six percent of respondents (37 of 66) said their organization spent less than $25,000 — with 30 of these respondents (or 45% of those who answered the question) indicating their organization spent less than $10,000 (see Figure 15). Nine percent (6 of 66) reported they actually had zero budget; this means they got by on efforts by volunteers who used either free software or software they paid for on their own. According to David Fenech of Kelly Services, “One of the reasons we selected the technology we did is because it is extremely inexpensive, making it affordable to do pilots or testing without having to initially prove a hard ROI.”

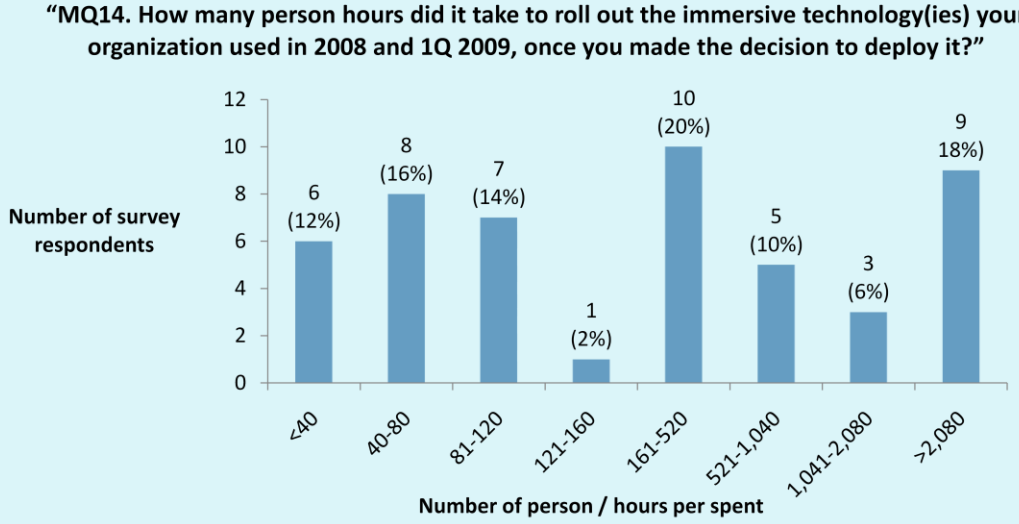
Another way to look at cost is in terms of the hours team members spent on projects. We asked the open-ended question, “How many person hours did it take to roll out the immersive technology(ies) your organization used in 2008 and 1Q 2009, once you made the decision to deploy it?” About 45% of respondents (22 of 49) indicated their organization spent less 160 person hours or less (see Figure 16). When you do the math, this works out to about $16,000 for one professional employee that carries a fully-burdened cost of $100 USD/hour.

Figure 15: >1/2 of respondents cite costs at <$25K, with >1/3 citing less than $10K



Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = 66 respondents. Percentage may not total 100 due to rounding.

Figure 16: About 45% of orgs spent <160 person-hours rolling out immersive tech

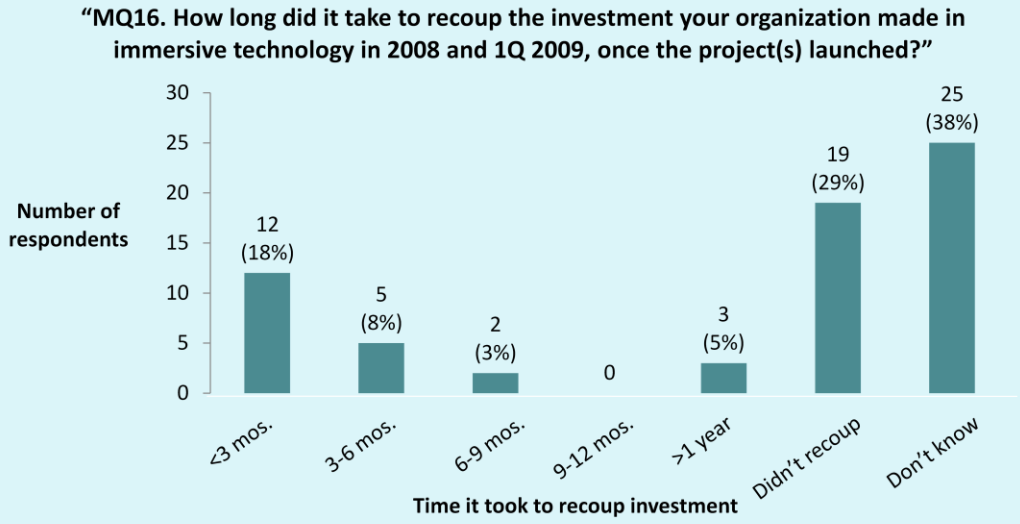


Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = 49 respondents. Percentage may not total 100 due to rounding.

Nearly 30% of Orgs Recouped Their Investment in Less Than Nine Months

Nearly 30% of survey respondents (19 of 66) said their organization recouped their investment in immersive technologies in less than nine months, once their project(s) launched (see Figure 17). An example is United Space Alliance. Project team members Leslie Roche, Loren Shriver, Mark Dowman, and Mike Lippold said it took about four months to achieve a return on their investment in immersive technology for creating training videos. Furthermore, because the team now owns a collection of digital assets, the time to ROI for each project is getting shorter and shorter. Meanwhile at BP, a project team focused on an annual event that took place in London, called Global Graduate Forum — which used to cost $5 million USD. A virtual version of the event held in March of 2009 cost about 10% of that, resulting in a savings of $4 million USD. This savings alone paid for much of the investment BP made in immersive technology in 2008 / 1Q 2009.

Figure 17: About 2/3 of respondents didn't recoup investment or don't know if they have, and 29% recouped investment in <9 months



Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = 66 respondents. Percentage may not total 100 due to rounding.

Almost 30% of respondents (19 of 66) said their organization did not recoup their investment. Another 38% (25 of 66) said they didn't know if their organizations had recouped their investment. This is not an unexpected finding because so many Immersive Internet initiatives in 2008 and 1Q 2009 were experiments or pilots. In fact, most of the projects described by survey respondents are still underway. Anthony Adams, owner of groupVision AG, which delivers executive meeting facilitation services in both physical meetings and virtual environments, said, "This is a long-term investment. Anyone who thinks they can jump right in and turn a profit right away are dreaming." He added, "I fully expect to turn a profit, eventually."

In retrospect, we should have asked survey participants if their organizations were even expecting to get a return on their investment in immersive technologies. We gained insight into this from interviews and answers to open-ended survey questions. For example, civil engineer Pam Broviak did not expect to receive a return on investment from her organization's initial project; rather, she views it as an investment in the future. Jeffrey Abbott, a software engineer formerly with IBM, said, "IBM's early metaverse efforts are not justified so much by direct benefits from those projects, but by the progeny of those projects — such as what you see happening in IBM's Digital Convergence business unit. The whole point of the early work was to lay the groundwork for future revenue-generating projects." And Andy Steggles, chief information officer at RIMS, said about his organization's 3D virtual trade show, "This was an effort to provide value to our customers beyond that which they get at our in-person event. We didn't expect to get a return on our investment this year because this was a R&D effort. But we believe immersive events will be an important part of our business next year."

Don't Be Misled By Low Cost of Entry

The survey findings suggest that a lot of active projects are still in either experimental or pilot stage. Teams working on many early-stage immersive technology projects can get away with spending next to nothing on software and hardware. For many, the technology infrastructure is easily accessible in the form of free or inexpensive software. But beware of hidden costs. The cost of immersive technology projects:

- **Is heavily dependent on use case.** Some projects (e.g., meetings and some learning and training applications) can leverage inexpensive technology and have fairly simple requirements. Other use cases, like collaborative design and prototyping or remote system and facility management, bear additional required costs. These may include system integration, 3D model translation and import, and sensors and tracking devices.

- **Depends on the maturity of the project.** Pilots that utilize a public virtual world are often relatively inexpensive. But this technology may not be the best fit for a production implementation. According to David Fenech of Kelly Services, "We will be looking at expanding our efforts possibly using another technology, as we move out of our pilot. Ease of use is a top priority, as is cost. We need to ease the learning curve, especially for at-home workers."

- **Is deceptively low due to prevalence of a volunteer culture.** A typical scenario is that a population of true believers within an organization leads development and learning that is "off the clock." Early project cost reports often don't count development time or time spent learning how to use or customize immersive technology. As projects mature, costs rise because previously unbooked costs are now accounted for.

THIS IS AN EMERGING MARKET IN THE EARLY ADOPTER STAGE

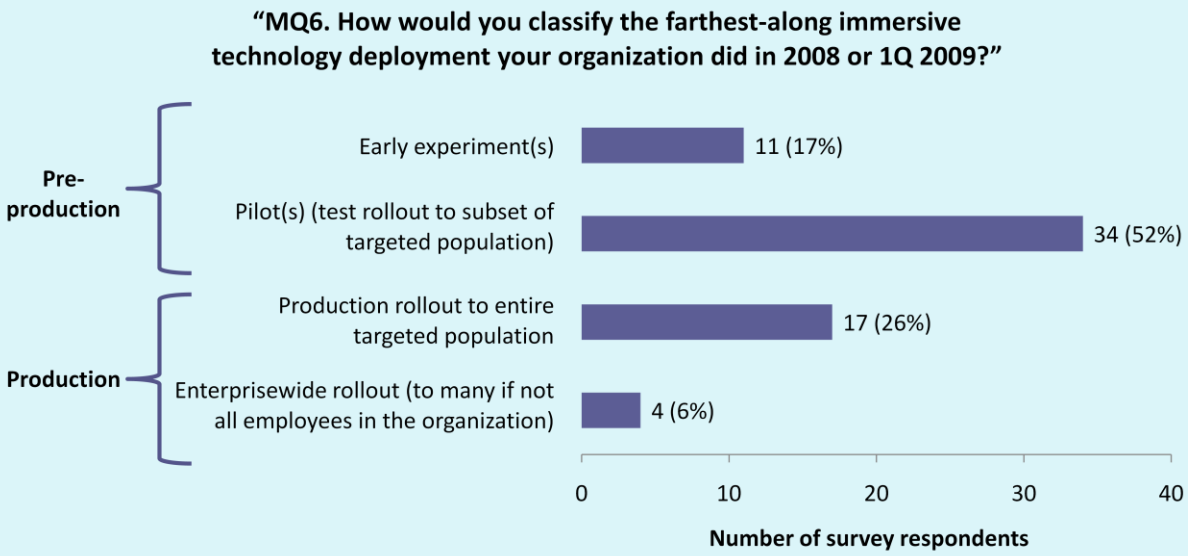
By anyone's measure, the Immersive Internet is an early stage market. In November of 2008 we characterized the market as being in the "seedling" stage of adoption (the innovator phase).[2] In our view, as of May 2009, adoption of immersive technologies in the workplace is crossing over from the "innovator" phase to the "early adopter phase." People who are not technologists, not "virtual world geeks," are turning to immersive technology to solve business problems. Business people in marketing, human resources, and other roles have become evangelists (albeit sometimes cautious ones) because the technology has helped them solve a business problem. Work-related use of the Immersive Internet is in the early adopter phase, rather than an earlier or later, as evidenced by:

- **Two thirds of projects in 2008 and 1Q 2009 were pre-production.** We asked the survey participants, "How would you classify the farthest-along immersive technology deployment your organization did in 2008 or 1Q 2009?" (see Figure 18). Two thirds of respondents (45 of 66) selected "early experiment" or "pilot (test rollout to subset of targeted population)." About a quarter of respondents (17 of 66) said their projects were production rollouts to the entire targeted population and 6% (4 of 66) said theirs were enterprisewide rollouts to many, if not all employees in the organization.

- **The technology market is immature, comprising mostly small, young vendors.** On top of this, new entrants are coming on the scene all the time. Unlike mature software sectors like enterprise apps (with huge, longstanding players like IBM, Microsoft, Oracle, and SAP), the enterprise immersive platforms market is populated with small, relatively young software companies (six of which sponsored this research study). The biggest vendor in this emerging market in terms of company size is IBM, and IBM's product (currently called Sametime 3D) is still in beta, with plans for general availability in the first half of 2009.

- **The early success of the ThinkBalm Innovation Community**. The ThinkBalm Innovation Community currently has more than 280 members — all Immersive Internet advocates, implementers, or explorers. The mission of the community is to advance work-related adoption of the Immersive Internet. Since its inception in August of 2008 the community has evolved from an experiment in collaborative idea sharing to a mix between a social network, collaborative laboratory, and guild. We posit that in a more mature market, people who use or market and sell technology would be less willing to share learnings and experiences and to participate in experiments with others outside their organization than they are in this early adopter market.

Figure 18: Two thirds of work-related immersive technology initiatives in 2008 and 1Q 2009 were pre-production



Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = 66 respondents. Percentage may not total 100 due to rounding.

To Cross the Chasm, Early Pioneers Have Lots of Issues to Address

Some barriers to adoption are technology-related and others have more to do with people (see Figure 19). Civil engineer Pam Broviak said, "We faced two major barriers. The first had to do with technical issues — specifically, the inability to import computer-aided design models into the immersive environment. The second was a general lack of knowledge about immersive technology within our target user base." To successfully cross from the early adopter phase to early majority, pioneers will have to address a number of issues — to "cross the chasm," in Geoffrey Moore's parlance (see Figure 20).[3] The most common barriers are:

- **Overcoming technology hurdles.** The lack of adequate hardware for end users is a big issue, with 60% of survey respondents (39 of 65) reporting this as a barrier. Nearly half of survey respondents (32 of 65) also reported problems with corporate security restrictions. Andy Steggles of RIMS said, "We faced lots of technology hurdles, like lack of single sign on. And because our target audience is risk managers who work for a diverse group of organizations, we found that hardware and security issues were huge. In our trial run we found that 20% of our users couldn't access the immersive space due to security issues. However, three weeks prior to our live event our technology provider enhanced the software to incorporate firewall tunneling techniques, which reduced the percentage of users who had problems from 20% down to approximately 1%." Eric Hackathorn of NOAA said, "Right now, 95% of government employees

have no ability to access Second Life, never mind YouTube." And Tony Adams of groupVision said that one of his clients told all attendees who would be attending a virtual event to take the day off from work and attend the session from home, rather than fight with the IT people.

- **A problematic learning curve.** Forty five percent of respondents (29 of 65) said it took more effort than they expected to train their target user population. United Space Alliance had to train five people to develop content and make machinima, for a combined total of 50-60 hours. Zain Naboulsi of Microsoft said, "I have discovered what I call the 'magic hour.' If I can guide someone through their first hour in the immersive environment, the likelihood they will continue to use immersive technology goes way up." Andy Steggles of RIMS knew his target user population was not well-versed in using immersive 3D technology. "Recognizing people are busy, we told them they would not be allowed to attend our virtual conference unless they first attended a "First-Timer Orientation Session." Sixty percent of them did attend and the rest we just let in anyway."

- **Getting buy-in from management and the IT organization.** Software engineer Jeffrey Abbott, formerly of IBM, said, "We were lucky in that IBM management favored investment in immersive technology. We didn't have to deal with some of the setbacks that project teams in other companies face." Brian Ralphs, director in the CTO's office at BP, said, "We had to overcome a perception that immersive technology was frivolous because it evolved, in part, from video games. So we don't use the word game for what we are doing." A project manager we interviewed said, "A major issue for us was getting IT alignment. We needed their help for scripting and supporting users. They were concerned about opening firewall ports and letting voice over IP through. This was something completely new for them, and they were dealing with a lot of competing priorities." According to David Fenech of Kelly Services, "Building the environment was the easy part. IT, human resources, and legal issues were more difficult. But when we could say, 'The CEO wants this innovation,' it got done."

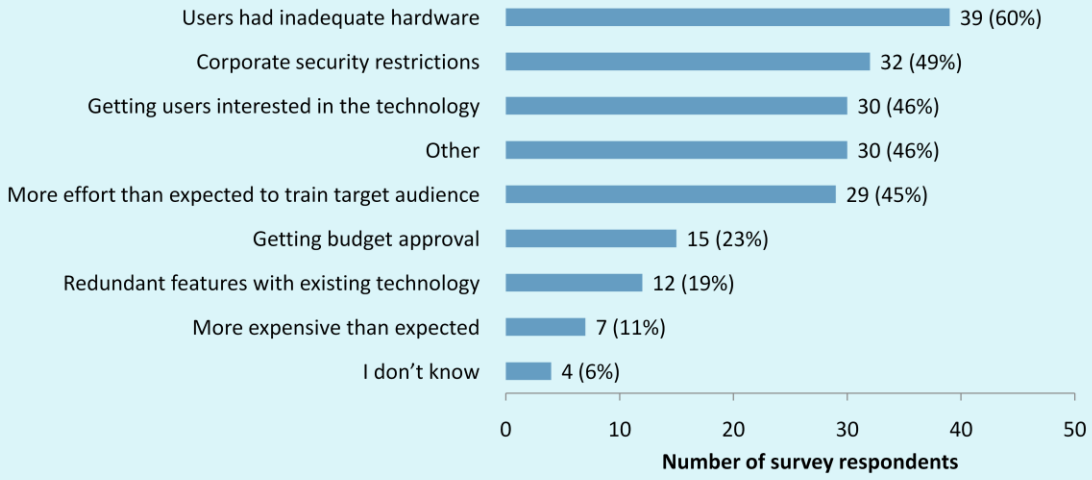
- **Getting buy-in from target end users.** Forty six percent of respondents (30 of 65) reported that a barrier was getting users interested in the technology. Zain Naboulsi at Microsoft said, "In the beginning, people thought I was crazy. The biggest problem I had was getting people to try it. Initially I had no budget and had to be creative with acquiring dollars." Mark Dowman of the United Space Alliance said, "One of the challenges we faced was convincing people that immersive technology is valuable and not just a game; we accomplished this by promoting rich presence awareness. We faced a lot of resistance to change driven by what you'd expect: government bureaucracy and security concerns." Kurt Steuck of BAE Systems worked on a training program for bank customer service reps — a project he described as unsuccessful. The program initially captured interest, but the project flailed and then died not only because of lack of management buy-in, but because the target user population was resistant to change. "We only have 40 hours to do our jobs," they said. "How are we going to fit in this kind of training?"

- **Driving organizational and end user awareness.** Karen Keeter, marketing executive at IBM said, "It's a viral effect. After people experience an immersive event, they want to do it again. Now we are scrambling to support all the internal groups who want to hold meetings this way. The scariest thing for me now is to hear, 'I have a meeting every year of the top 5,000 managers in my country . . .' We now have to move beyond a volunteer support team." Now that the virtual meeting and conference space is set up, Keeter said there are requests from more than 50

groups across IBM to schedule meetings in this environment, with dozens already held. Zain Naboulsi at Microsoft said, "You can't just set up an immersive environment and expect that people will find it and use it. You have to drive traffic to it and have a compelling reason for people to use the space."

Figure 19: Early adopters face many barriers to adoption

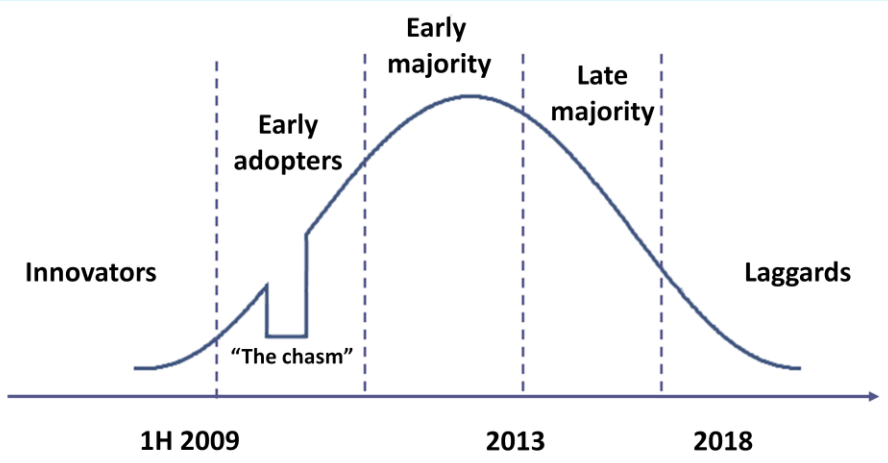
"MQ19. What barriers did your organization face, if any, during its 2008/1Q 2009 deployment of immersive technologies?"



Source: ThinkBalm Enterprise Immersive Internet Business Value Study, April 2009
n = 65 respondents. Multiple responses accepted.

Figure 20: Early Immersive Internet adopters are facing "the chasm"

The chasm
- Ease of use
- Hardware requirements
- Problematic learning curve
- Perception problems



Source: ThinkBalm, based on Geoffrey Moore's technology adoption lifecycle

RECOMMENDATIONS

The best characterization of the result of this survey is probably: "Immersive technology is delivering solid business benefit, both financial and non-financial, to a wide range of organizations, for a wide range of use cases. Well, at least to those organizations that are aware of immersive technology, anyway." Humor aside, this data about the business value of work-related use of immersive technologies leads to the following recommendations:

- **Start early, learn immersive skills, and grow with the sector.** Hurdles are bountiful, but early experimentation will lead to invaluable experience and fewer mistakes in the future. As evidenced by the findings in this study, business value is to be had if you focus on the right business problem; look first to the low-hanging fruit of meetings, learning, and training.
- **Be prepared to jump a whole host of technology hurdles.** Work with people in your IT organization as early in the process as you can in case they need to open security ports or start ordering new PCs and laptops that have adequate graphics cards. Seek funding to order a collection of USB headsets if your target user population doesn't already have them.
- **Be clear about and declare your mission.** In the words of Tony Adams of groupVision AG, "Be clear in your mission. If you are using an immersive technology but are not sure why, you will not be successful. Don't adopt the technology for technology's sake; use it to solve a business problem."
- **Know your target user population.** Make sure you understand their motivation for using the technology. Andy Steggles of RIMS found the risk managers attending RIMS conference events

wanted to get into the environment, learn what they needed to learn, and get out. They didn't want to spend time riding around on virtual jet skis.

- **Secure management buy-in.** As with any emerging technology initiative, executive support goes a long way to clearing technical hurdles and changing corporate attitudes. Kurt Steuck of BAE Systems indicated that the failure of one immersive training program in which he was involved was due in large part to lack of management buy-in. This is a common refrain.

Overall our analysis of this emerging market is encouraging. People are innovating and adoption is driven more by business decisions than a technologist's love of all things new. Real value is available today — if you know where to look for it — and there is plenty of room to grow as this fledgling technology sector evolves. As immersive technology evolves toward mainstream adoption and is integrated with enterprise systems like office productivity and unified communications, it will provide a powerful immersion layer that will tie together much more of an information worker's day. We see the promise of a new way to work arising from the convergence of technologies that is the Immersive Internet.

RESEARCH METHODOLOGY

ThinkBalm conducted all of the research and analysis for this study in-house. The data collection phase of this study had two components: an anonymous web-based survey of 66 individuals and 15 in-depth interviews. All survey and interview participants were individuals closely involved in work-related Immersive Internet projects in 2008 or 1Q 2009. The survey and interviews were conducted during the month of April, 2009. We used the Web-based Survey Monkey tool (www.surveymonkey.com) to conduct the anonymous online survey. We conducted the in-depth interviews via telephone, Skype, or in an immersive environment.

The Survey

To obtain the highest quality data possible from the most knowledgeable respondents, potential survey participants were only able to take the survey once and we presented a series of screening questions. We collected data from 149 respondents, of which only 66 passed the screening process. Some failed the screening process because of their answers to multiple reasons. The screening effort selected for individuals who:

- **Worked at an organization that had deployed immersive technology.** One-third of the potential respondents (48 of 149) were excluded because they said their organization did not deploy immersive technology, in pilot or production, in 2008 or 1Q 2009, or they were unaware of such a deployment if it existed.

- **Did not work in key roles for vendors in this market.** Eighteen percent of potential respondents (27 of 149) were excluded because they answered "Yes" or "I don't know" to the question, "Do you work in sales, marketing, product development, or customer support for a technology vendor that sells an immersive technology solution?"

- **Used immersive technology at work.** Eighteen percent of potential survey respondents (26 of 149) were disqualified because they said they had never heard of immersive technologies, had heard of immersive technology but had no personal experience with it, or had used immersive technology for personal reasons but not for work.

- **Knew whether or not they were responsible for a deployment.** We disqualified a handful of potential participants (3%, or 4 of 149) because they answered "I don't know" to the question, "Were you responsible for a pilot or production deployment of immersive technologies in the workplace in 2008 or 1Q 2009, in whole or in part?" We did not exclude people who said they were or were not responsible, only those who said they didn't know.

While we sought survey respondents who could answer questions on business value and ROI, we didn't exclude respondents who said they didn't have budget authority. About half of the 149 potential respondents (76 of 149) said they did have budget authority and half (73 of 149) said they didn't.

This rigorous selection process left us with 66 survey respondents who were well-qualified to answer questions about the business value of immersive technology at work. This qualified group represented a variety of job functions including information technology, educators, researchers, product development,

human resources, operations, and sales and marketing. They worked in organizations of all sizes, with almost a third (21 of 65) working in small organizations of fewer than 100 employees and more than a third (24 of 65) working for organizations that had 50,000 or more employees. The rest fell somewhere in between. No single industry dominated the population, with respondents representing more than 14 major industry sectors.

The Interviews

ThinkBalm selected interview candidates from our professional network, the ThinkBalm Innovation Community, recommendations from our project sponsors, and a question in the online survey asking participants if they wanted to be contacted for an interview. We conducted in-depth interviews with people who worked for the following companies and organizations: BAE Systems, BP, City of Lasalle (Illinois, U.S.), Dancing Ink Productions, groupVision AG, IBM, Kelly Services, Microsoft, National Oceanic and Atmospheric Administration (NOAA), Preferred Family Healthcare, Risk and Insurance Management Society, Shapiro Negotiations Institute, United Space Alliance, and others. The interviews, which lasted up to an hour, were conducted by a ThinkBalm analyst following a structured interview guide about the business value of using immersive technology for work.

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- *At Microsoft, cost of virtual events about 1/3 the cost of traditional events*, July 18, 2008
- *Heavy equipment manufacturer explores Immersive Internet for product prototyping*, July 1, 2008

About the Authors

Erica Driver

Erica Driver is a co-founder and principal at ThinkBalm. She is a leading industry analyst and consultant with 15 years of experience in the IT sector. She is quoted in mainstream and industry trade press including the *Boston Globe*, *The Wall Street Journal*, *The New York Times*, *CIO*, and *Computerworld*. Prior to co-founding ThinkBalm, Erica was a Principal Analyst at Forrester Research, where she launched the company's Web3D coverage as part of her enterprise collaboration research. She was also the co-conspirator behind Forrester's Information Workplace concepts and research.

While at Forrester, Erica served as a strategic advisor to a wide range of clients including Alcoa, Bell Canada, Dominion Resources, GlaxoSmithKline, IBM, Marriott, Microsoft, Raytheon, Roche, the United Nations, and the U.S. General Services Administration. Prior to her tenure at Forrester, she was a Director at Giga Information Group (now part of Forrester) and an analyst at Hurwitz Group (now Hurwitz & Associates). She began her career in IT as a system administrator and Lotus Notes developer. Erica is a graduate of Harvard University.

Sam Driver

Sam Driver is a co-founder and principal at ThinkBalm. He is an inventor and entrepreneur whose take on the Immersive Internet is heavily influenced by science, game theory, and science fiction. At the University of Massachusetts Medical School, Sam was part of a team that discovered RNA interference (RNAi) which was awarded the 2006 Nobel Prize in Physiology and Medicine. He founded Qik Technology to develop intellectual property (IP) holdings in functional genomics and co-founded a small Rhode Island-based residential real estate investment partnership. He also founded and operates Evil Minions Games, an IP and product development company, and established and runs a regional gaming organization. He's also an instrument-rated private pilot. Sam earned his BS at Ohio Wesleyan University and a masters in genetics from the University of Massachusetts Medical School.

Special Thanks

Special thanks to the following Immersive Internet advocates and implementers who participated in interviews with ThinkBalm analysts in support of this research: Andy Steggles, Anthony Adams, Brian Ralphs, David Fenech, Dick Dillon, Eric Hackathorn, Jeffrey Abbott, Jennifer Swayze, Joshua Fouts, Karen Keeter, Kurt Steuck, Leslie Roche, Loren Shriver, Mark Dowman, Mark Jankowski, Mike Lippold, Neil Katz, Pam Broviak, Zain Naboulsi, and others who requested not to be named. A huge shoutout to Christopher Simpson for the editing.

About the Project Sponsors

This research study was funded by the following companies:

- **Altadyn.** Altadyn (www.3dxplorer.com) develops and markets 3DXplorer, a disruptive 3D web technology that enables browser-based, immersive and interactive 3D web spaces, without any prior installation, from any platform and browser. 3DXplorer/Online-Meeting increases efficiency in enterprise collaboration by bringing 3D capabilities into everyone's daily web meetings. 3DXplorer/Meet-in-3D enables first-of-its-kind accessible 3D lobbies, right on a website home page, for greeting visitors and transforming anonymous web visitors into leads. Altadyn customers include National Defense University's FCVW, Cubic, Saint-Gobain, France Television, TMP Worldwide and AVW. The company has offices in Irvine, California, and Paris, France.

- **Forterra Systems, Inc.** Forterra Systems (www.forterrainc.com) provides enterprise grade virtual world software that enables its customers and partners to create their own secure, scalable 3D Internet solutions for the corporate, healthcare, government, and education industries. Using Forterra's OLIVE™ (On-Line Interactive Virtual Environment) platform and industry standard PC hardware, customers can rapidly deploy realistic, collaborative, 3D Internet solutions that scale from small group applications to large scale simulated environments supporting many thousands of concurrent users. OLIVE applications include virtual meetings, events, training, project management, and operations rooms. Forterra customers indicate OLIVE provides a better user experience and is less expensive than audio, web and video conferencing.

- **Linden Lab.** Linden Lab, founded in 1999 by Chairman of the Board Philip Rosedale and headquartered in San Francisco, develops revolutionary, immersive technologies that change the way people communicate, interact, learn and create. Privately held and profitable, Linden Lab is led by CEO Mark Kingdon, and has more than 300 employees spread across the U.S., Europe, and Asia. Developed and launched by Linden Lab (www.lindenlab.com) in 2003, Second Life (www.secondlife.com) is the world's leading 3D virtual world environment. It enables its users — known as Residents — to create content, interact with others, launch businesses, collaborate, and educate. With a thriving inworld economy that saw over $360 million USD transacted in 2008, and a broad user base that includes everyone from consumers and educators to medical researchers and large enterprises, Second Life has become one of the largest hubs of user-generated content in the world.

- **ProtonMedia, LLC**. ProtonMedia (www.protonmedia.com) is the leading provider of virtual world technology for the enterprise. The company's flagship product ProtoSphere® is a secure, private virtual world environment for collaboration and learning. As the premier virtual world platform for the enterprise, ProtoSphere features a suite of communications and social networking tools designed to overcome linear communications and create a networked learning organization.

- **Qwaq, Inc.** Qwaq, Inc. (www.qwaq.com) creates application collaboration solutions to help enterprises manage data-intensive projects and operations across multiple locations. Qwaq Forums is a secure virtual workspace that runs in the cloud or behind a firewall and combines voice, video and chat communications with multi-application and document sharing, enabling

more efficient workflows among distributed teams, suppliers and customers. Qwaq provides application collaboration solutions to more than 100 Global 500 and mid-size customers, including leading firms in the semiconductor, financial, energy, consulting, IT, and manufacturing sectors.

- **Tandem Learning.** Tandem Learning (www.tandem-learning.com) is not your ordinary learning partner. Tandem Learning has the expertise to design creative, practical and effective learning solutions to not only build the knowledge base within companies, but also change behavior to improve organizational performance. How does Tandem Learning do this? The company has experience with organizations large and small and delivers solutions ranging from traditional e-learning tutorials, workshops, and print modules to serious games, simulations and immersive learning worlds. Tandem Learning's knowledge and experience are backed up by hard data that show the company's solutions work. Tandem Learning accomplishes this while keeping their client partners happy with exemplary customer service. There's nothing more effective than working in Tandem.

ENDNOTES

[1] For stories about organizations using immersive technologies to reduce costs, see the following ThinkBalm blog articles: *Digital prototypes help university team get $550k+ in technology funding*, September 24, 2008, *Accenture recruiting in Second Life cost-effectively targets the "Facebook audience,"* August 14, 2008, and *At Microsoft, cost of virtual events about 1/3 the cost of traditional events*, July 18, 2008. Also see this ThinkBalm article: *Economic slowdown will spur enterprise Immersive Internet adoption*, October 29, 2008.

[2] As of November 2008, adoption was in the innovator phase and we predicted it would evolve to become mainstream within five years due to factors like a slow economy and the green movement; early case studies demonstrating positive ROI; large technology vendors jumping into the fray; advancements in hardware and networking technology; and social factors like the prevalence of social networking and a video game culture. For more information see the November 17, 2008 ThinkBalm report, *The Immersive Internet: Make Tactical Moves Today for Strategic Advantage Tomorrow*.

[3] Geoffrey Moore's work on the technology adoption life cycle is highly relevant to the evolution of the Immersive Internet. See *Crossing the Chasm: Marketing and Selling High-Tech Products to Mainstream Customers*, Geoffrey Moore, HarperBusiness 1999.

About ThinkBalm

ThinkBalm offers independent IT industry analysis and strategy consulting services. ThinkBalm was established in June, 2008 and is headquartered in Rhode Island, USA.

- **Research area.** We cover work-related use of the Immersive Internet. This includes virtual worlds and campuses, immersive learning environments, and 3D business applications. ThinkBalm offers research and analysis and custom strategy consulting on these topics to technology marketers and Immersive Internet advocates, implementers, and explorers.

- **ThinkBalm Innovation Community.** The ThinkBalm Innovation Community is a collaborative community with the mission of propelling forward work-related adoption of the Immersive Internet. The ThinkBalm Innovation Community runs on the InnovationSpigit™ enterprise innovation management platform.

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