Research Insights

–

Cloud's next leap

How to create transformational business value

IBM **Institute for Business Value**

IBM

How IBM can help

Accelerate business agility and growth by continuously modernizing your applications on any platform using a hybrid cloud approach. See Cloud Consulting Services at ibm.com/cloud/services.

By Howard Boville, Hillery Hunter, and Richard Warrick

Key takeaways

Untapped potential remains

79% of stakeholders in enterprise cloud adoption require comprehensive, advanced cloud capabilities to power their highest-priority digital plays. But they have yet to fully realize cloud's full transformational power.

And the winner is...

Hybrid cloud/multicloud has won the race to become the dominant architecture for cloud service delivery. The percentage of respondents claiming a single public cloud as their primary archetype dropped from 16% in 2019 to 2% in 2021, setting the stage for the next wave of innovation in cloud-driven business transformation.

The soft stuff matters

Better operating model design and development practices are strongly associated with better business performance. For example, 69% of respondents attribute "sustained improvements at enterprise scale" and "material and accelerating improvements at enterprise scale" to their digital/business/IT operating environment.

—

Cloud adoption—testing a common narrative

A common business story has emerged over the course of the pandemic: COVID-19 has provided a burning platform to accelerate digital transformation. Our own research indicates the pandemic has accelerated digital transformation at 59% of surveyed organizations.[1] Some sources even cite a 6-year acceleration—with huge budget increases to support it and to build the infrastructure it requires: cloud computing.[2]

But is this narrative the complete picture? Are enterprises accelerating their digital transformation agendas along with their adoption of cloud computing? And are those investments returning the business value enterprises expected? What is the current state of cloud-powered digital transformation?

To answer these questions, the IBM Institute for Business Value, in collaboration with Oxford Economics, surveyed almost 7,164 C-suite executives across 29 industries and 44 countries (see "About this research," page 19). What we found confirmed many things that our direct experience with organizations making the cloud journey had suggested.

But there were also a few surprises. In fact, the data did not support some of our hypotheses (see "Evidence of cloud adoption," page 5).

Our findings can help your organization take stock of its cloud adoption strategies and investments. If you are achieving the business benefits you expected, should you consider your cloud adoption efforts complete? On the other hand, if you're struggling to realize your cloud vision, are you on the wrong path, or just on a more ambitious journey?

While the enterprises we surveyed report achieving better business outcomes from cloud-powered digital initiatives, many have yet to drive a broad and deep business transformation. Companies have yet to invoke the full scope of what a cloud-enabled, software-driven (virtual) enterprise can do: design and execute new business models, create and/or participate in industry ecosystems, reinvent core business processes, and dramatically reduce coordination costs.

This report's findings are particularly useful if you consider that not all cloud adoption journeys are created equal.

Our experience with organizations adopting cloud reveals that, while they are all moving to the cloud, they are often moving to different versions of it. From work with clients around the world and across industries, we are discerning 4 versions of cloud, each of which presents distinct value propositions and involves distinct types of stakeholders.

For simplicity's sake, we'll refer to them as cloud versions 1-4.

- Cloud v1: Buying infrastructure as a service, paying only for services actually consumed.
- Cloud v2: Purchasing cloud services with a credit card swipe from hyperscale cloud providers.
- Cloud v3: The current enterprise movement to cloud as the default model for application, compute, and networking infrastructure.
- Cloud v4: An emerging version that becomes the default operational infrastructure for business transformation.

The next section of this report discusses the implications of these versions in more detail.

An action guide at the end of this report provides 2 calls to action. The first can help organizations that realize they haven't adopted a version of cloud that is delivering the improved business outcomes other enterprises are getting.

The second can help organizations that have embraced a more advanced version of cloud. While they are enjoying its impact on their business performance, they can go much further.

Implications of evolving versions of cloud

Cloud computing has become a huge global industry, with 2020 revenues of $219 billion, and industry analysts expect those revenues to grow to $791 billion by 2028.[3] One report even estimated it to be a $1 trillion dollar market by 2030.[4]

Our research shows it is by far the biggest investment in "emerging technologies" underway in large enterprises. With all this energy and investment by mainstream users, does the current state of cloud foreshadow the rapid expansion of adoption and the transformational potential predicted for it?

Things may not be quite that simple.

37% of stakeholders say they are "almost done" with their planned cloud adoption. Another 31% say that their cloud adoption efforts are "stalled" midway through implementation. How can both reports be true at the same time? And if 68% of stakeholders are stalled or almost done, where is the dramatic growth predicted for cloud going to come from?

To better understand how enterprise cloud adoption has evolved during the pandemic, it may help to view it through the lens of organizations "crossing the chasm" as they adopt a new technology.

In Geoffrey Moore's classic treatise on the technology adoption lifecycle, early adopters of a technology will experiment with it in return for being the first to capture its potential benefits.[5] But the early majority—a much larger market—prefers to wait until the new technology has proven itself before making substantial investments. When this happens, the technology can cross the chasm to broad adoption.

Cloud v3 combines two value propositions: the default model for compute and networking, and a better way to develop software.

But in applying this model, we can't think of cloud as a single technology, as we might with a cell phone. In fact, cloud may more closely resemble technologies that arrive in successive waves of integrated "whole product" technologies and capabilities—think 3G versus 5G—each with specific attributes, value propositions, and champions within the enterprise.

Cloud v1 introduced the disruptive idea that what happens in an enterprise data center could be purchased as a service, with the cost based on actual consumption of the service. This version of cloud crossed the chasm from early to mainstream adopters in the enterprise data center as a solution to the high cost and cumbersome processes associated with conventional on-premises data centers (see Figure 1).

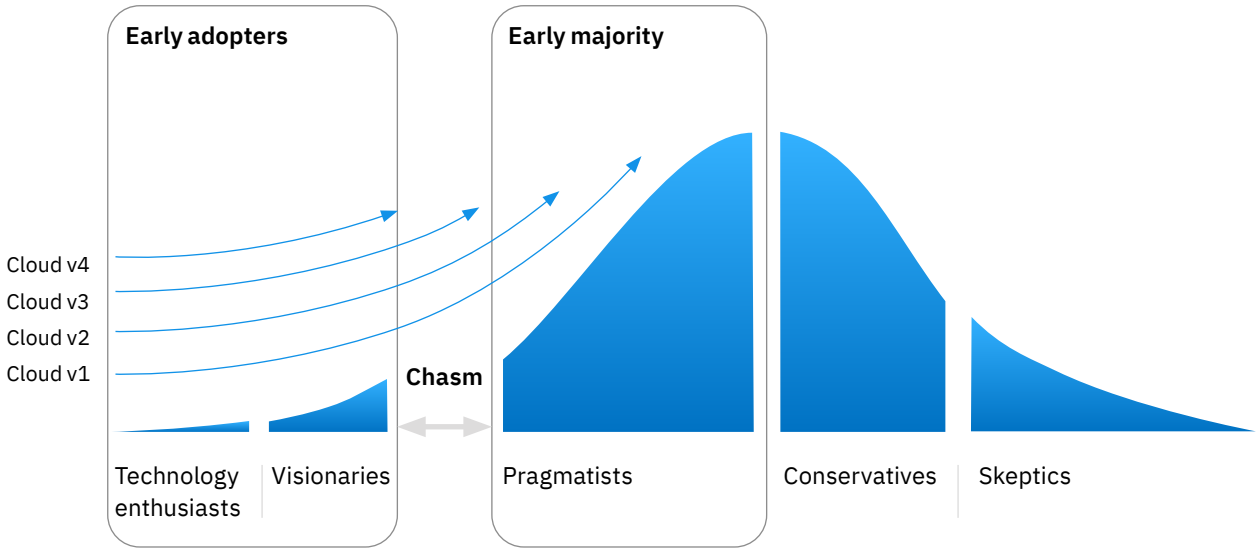
Cloud v2 crossed the chasm when the non-IT customers of the data center realized that they could bypass the IT organization almost entirely by getting out a credit card and opening a cloud services account with one of the burgeoning hyperscale cloud service providers. Cloud v2 made business-unit experimentation with software development faster, easier, and less expensive—though perhaps not safer, since "shadow IT" delivered high rates of outages and security breaches.

Cloud v3 combines 2 very different value propositions. First, it presents an enterprise-scale shift to cloud as the default model for application, compute, and networking infrastructure. In this version, the conventional data center may or may not go away entirely, but cloud is clearly the way forward.

Figure 1

Cloud versions cross the chasm

Cloud v1 and v2 have already crossed from early adopters to early majority. Cloud v3 is crossing the chasm, while cloud v4 is emerging



Source: Adapted from Moore, Geoffrey A. Crossing the Chasm: Marketing and Selling High-Tech Products to Mainstream Customers. Collins Business Essentials. August 2006.

Cloud v3 is improving the performance of the current business model, but not yet transforming that model.

Cloud v3 has emphasized migrating existing workloads to the cloud, modernizing applications, and assembling cloud "estates" composed of cloud service providers and styles of cloud computing (infrastructure-, platform-, or software-as-a-service, for example).

Its second value proposition presents cloud as a much better, faster, more powerful way to develop software and manage applications. It is a complex recipe of technologies and technical practices where application modernization, containers, and microservices mix with design thinking, agile, and SecDevOps (security, development, and operations). In v3, cloud is the "platform" on which new and modernized applications get developed and deployed.

As with most things at an enterprise level, cloud v3 gets complex. The attractive economics of cloud—once straightforward—can get diluted by the cost of migration, modernization, and platform construction.

Potential savings can get lost when cloud sparks demand for more services, which are now being charged by the drink. Workload migration plans can get confused with cloud strategies, digital transformation initiatives often proceed with no clear integration with cloud, and cloud tech can get implemented without the changes to cloud operations required to take advantage of what they offer.

Even though cloud v3 investments have a much higher upside than previous versions of cloud, many enterprises struggle to define and fund a clear business case for a cloud adoption journey. This results in a great deal of organizational pressure to realize business benefits from implementation and to show that those benefits are outcomes of cloud adoption.

While cloud v3 expands the idea of cloud computing from a discrete technology to a broader and deeper way of operating, the operating context for this third version is still conventional. The relationship between the "the business" and the IT organization is still one of customer and contractor, with clear organizational and cultural boundaries. The business cases behind cloud v3-built applications are likely to be based on improvements to current business models, rather than innovations on new business models.

Enterprises may claim to be cloud-enabled software companies on the inside (while remaining banks or retailers on the outside), but they still constrain tech spending to about 4% of enterprise revenues. Cloud v3 is improving the performance of the current business model, but not yet transforming that model.

Cloud v4 is the active operational infrastructure for business transformation. It builds on the previous versions but also represents a clear change in direction from the conventional ways of operating noted above. It recasts the entire enterprise as the object of cloud-enabled software development.

It's not only concerned with new customer-facing applications, but also with the entire enterprise business model (or models) and the core business processes and workflows that deliver value to customers. It plays a central role in fulfilling the promise of fully applying the power of software and data. And it blurs conventional boundaries between "the business" and IT.

Cloud v4 is concerned with a huge pool of potential value: not just reducing the cost of data center operations, not just reaping the benefits of better, faster software delivery, but changing the top and bottom lines of the enterprise by innovating at the core of how the business works. However, tapping into greater potential value comes with an increase in the difficulty of execution.

Many, if not most, mainstream enterprises confronted with the investments and changes required to implement cloud v4 may balk. The barrier to entry is very high and, for early adopters, promises a sustained first-mover advantage.

What do these findings mean for enterprises pursuing digital transformation and cloud adoption during the ongoing uncertainty of a global pandemic? What do "good outcomes" look like today? How does framing cloud adoption as adopting progressively more powerful versions of cloud help to clarify the way forward?

Let's explore some of the findings in more depth.

Evidence of advanced cloud adoption

Some hypotheses confirmed by survey data, others challenged

Our hypothesis	Did the data support this?
Enterprises are using cloud to drive their highest-priority digital investments, moving past cloud value propositions focused on reducing the cost of IT infrastructure.	✓
Hybrid cloud/multicloud won and has become the dominant architecture for enterprise cloud estates.	✓
Enterprises are breaking through the 20% barrier of low-hanging fruit workload migration.	✓
Enterprises are increasing levels of IT spending, especially based on the many reports that enterprises have been doubling down on digital investments during the pandemic.	✗
Most enterprises are about midway—but not further—on their cloud adoption journeys.	✗
Work on cloud operating model design—approaching cloud not just as a technology but as a way of operating more like a software-driven enterprise—is generating positive returns, and is a marker of higher performance.	✓
Cultural openness to both new ways of working and growth mindsets is yielding positive outcomes, and is a marker of higher performance.	✓

The high barrier to entry for cloud v4 offers early adopters a sustained first-mover advantage.

The shift from IT cost reduction to top-line revenue growth and business performance improvement

To better understand which plays are enterprises' highest priorities, we specified 13 types of digital initiatives designed to employ software to improve business performance (see Figure 2).

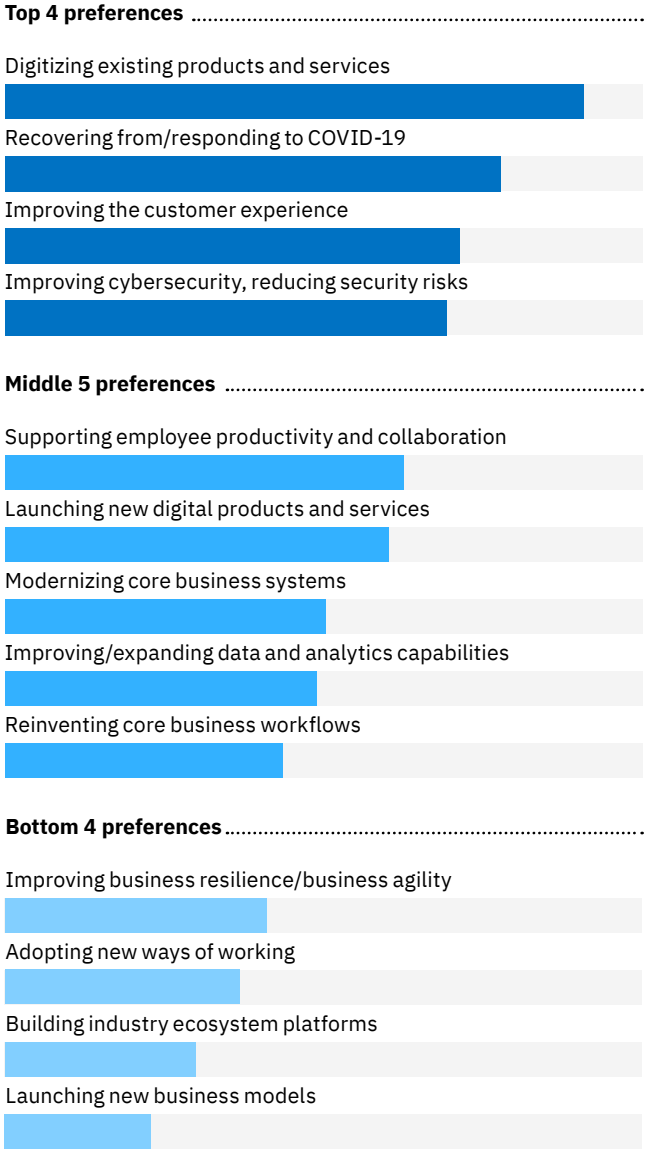
The initiatives ranged from more tactical, here-and-now, easily measurable plays, such as digitizing existing products and services, to more abstract, strategic, harder-to-measure plays, such as improving business agility. They were designed to be industry-agnostic in the sense that they could be applied in any industry to good effect.

In early versions of cloud, there was only a weak connection between cloud adoption and the enterprise's highest-investment, highest-priority digital plays. Did that change during the pandemic? If so, that would be evidence that cloud v3 is crossing over to the mainstream.

Figure 2

Highest-priority digital plays

Enterprise preferences among 13 digital business performance improvement investments



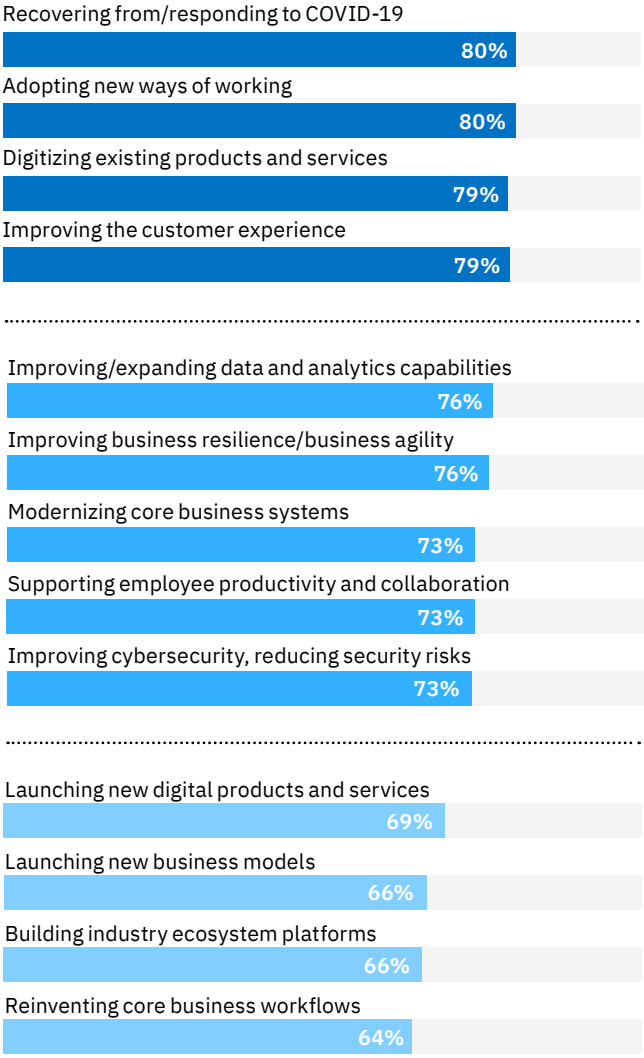
Significantly, respondents reported that across their highest-priority digital investments, successful execution requires either more comprehensive cloud capabilities or the most advanced available cloud capabilities (see Figure 3).

In other words, they require greater capabilities than those available in the first 2 versions of cloud, and greater capabilities than those delivered by infrastructure as a service (IaaS) and software as a service (SaaS) offerings. Across 13 surveyed high-priority digital plays, only about 25% of respondents claimed that they could execute those plays successfully with only basic cloud infrastructure hosting (cloud v1 and v2).

Figure 3

Advanced cloud capabilities needed

Successful execution of digital plays requires comprehensive, advanced cloud capabilities



Percentage of respondents saying digital plays require more comprehensive or the most advanced cloud capabilities

73% of respondents say cloud-driven digitization of products and services is delivering positive, transformational performance improvements—at scale.

Using cloud to execute digital plays can yield excellent results

Is this cloud v3 connection—combining digital plays with cloud as the development and delivery infrastructure—paying off? Yes. Respondents' highest-priority digital plays require advanced cloud v3 capabilities and are returning a mix of "positive improvements at enterprise scale" and "transformational improvements at enterprise scale" (see Figure 4).

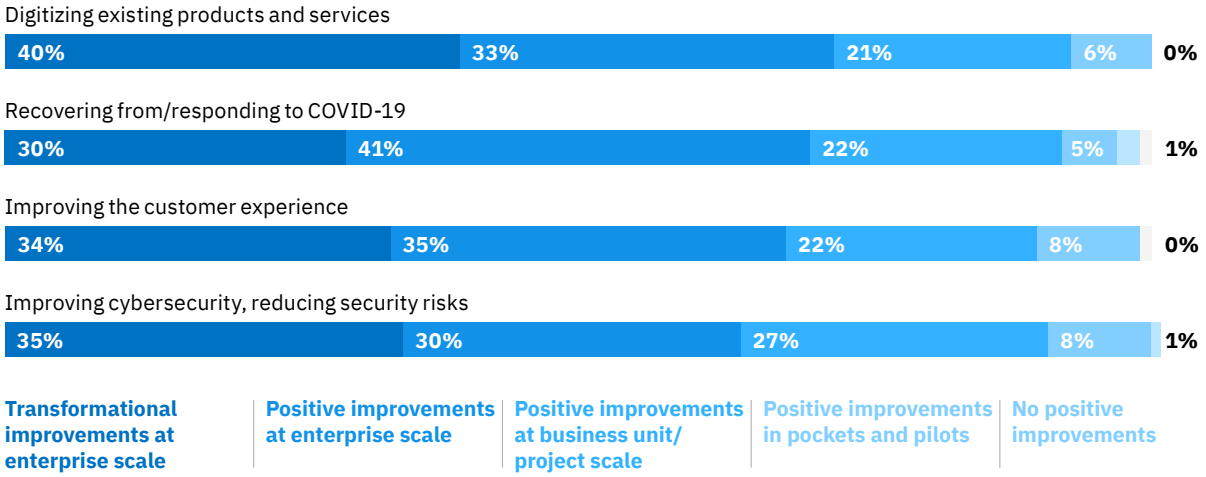
Clearly, they feel very bullish about the returns they are getting, and that confirmation of productivity is what's required to pull cloud v3 over the chasm.

—

Figure 4

Cloud-driven digital plays get results

Top plays are delivering positive, transformational performance improvements



Hybrid cloud/multicloud—a dominant architecture for cloud estates

Operations and innovation expert Steven Spear, author of *The High Velocity Edge*, describes how any new technology needs to arrive at a "dominant architecture" before it can be broadly adopted in the marketplace.[6] He uses the example of the automobile industry in the United States, which was at one point a small, fragmented industry with over 300 start-ups in Detroit, Michigan, alone.

We often think that Henry Ford and the assembly line—a truly transformational technology—changed all that, but Spears makes the case that the most important pivot was the industry's tacit agreement that automobiles would adhere to some common design patterns: an internal combustion engine, a chassis with 4 wheels, a steering wheel, seats for passengers, and the like.

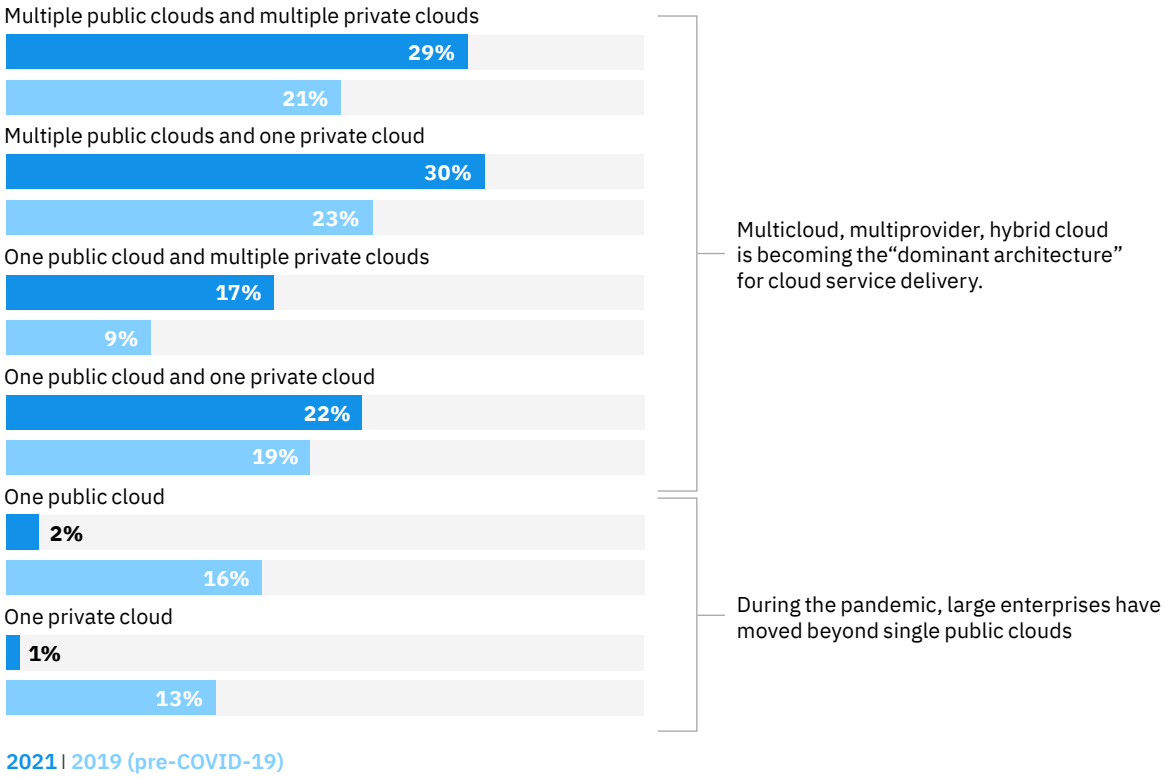
This configuration—the dominant architecture for the automobile that is still with us today—was not an end to the many design experiments in the industry. Rather, it was what permitted the customer-focused innovation that made the automobile a big part of modern life. We can see similar dominant architectures all around us: container ships, single-family homes, and smart phones, for example.

Cloud v3 requires a dominant architecture to cross the chasm because mainstream enterprises need to be confident that their investments in cloud won't become obsolete or overtaken by a fundamentally different technology before they can recoup those investments. Entering the pandemic there were 2 competing architectures for cloud: a single-cloud architecture and a multicloud/hybrid cloud architecture. Now, a clear winner has emerged (see Figure 5).

Figure 5

Hybrid/multicloud won

Enterprises have weaned themselves off single public clouds



Respondents claiming a mix of multiple private and public clouds rose from 44% to 59%.

Enterprises that had adopted cloud v1 or cloud v2 using a single public cloud and a single cloud service provider could have tried to stick with that approach. But some found themselves forced to experiment with multiple-cloud architectures because use cases required more than one cloud or because the enterprise had acquired multiple clouds in a decentralized—and perhaps strategy-free—manner.

During the pandemic, however, the percentage of respondents claiming a single public cloud as their primary archetype for cloud service delivery dropped from 16% to 2%. The percentage of respondents claiming a mix of multiple private and public clouds rose from 44% to 59%.

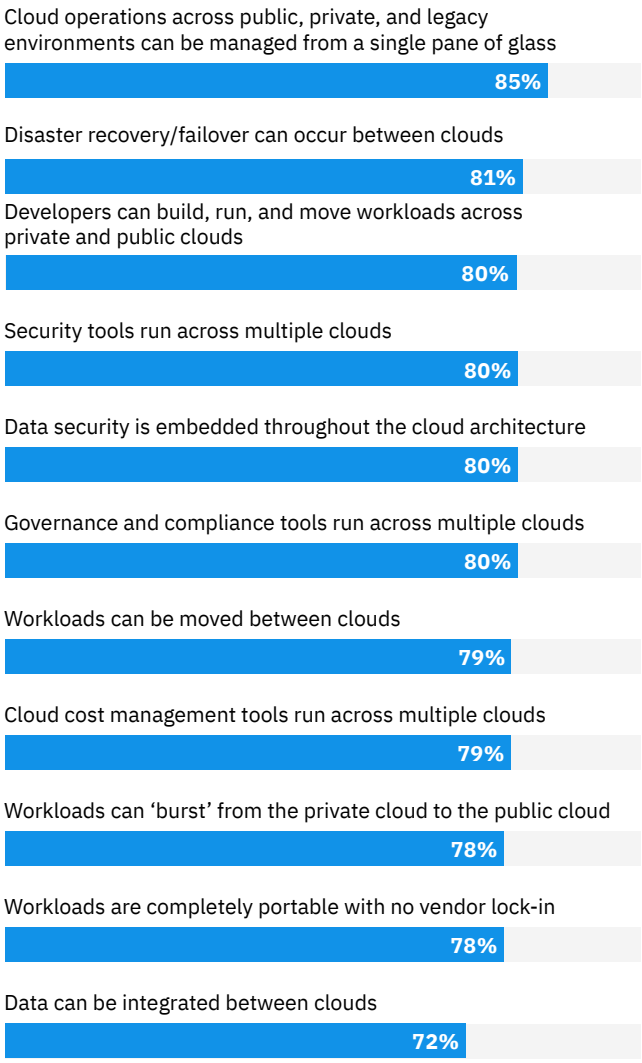
While the definition of "hybrid" cloud varied across respondents, they did claim hybrid cloud capabilities (such as moving data from cloud to cloud and running consistent governance and compliance tools across multiple clouds) as important or extremely important to the success of their digital initiatives (see Figure 6).

Again, the evidence supporting hybrid cloud/multicloud as a dominant architecture is important because enterprises in the early majority phase of cloud v3 have much less tolerance for the "lots of assembly required" experimentation that early adopters accept. And a dominant architecture provides the guardrails within which a great deal of innovation and cost reduction can occur, driving demand throughout the large early majority market segment.

Figure 6

Essential hybrid/multicloud capabilities

Cloud capabilities ranked "important" or "extremely important" to most use cases



Success isn't all about the technology—operating model design and the "soft stuff" are critical factors

Cloud v3 is distinct because it incorporates other technologies and practices. No longer a stand-alone technology, it's part of a larger system or "whole product," especially as platform as a service (PaaS) and hybrid cloud platforms have matured. In cloud v3, cloud, software development, data engineering, and a host of modern practices such as design thinking, agile, SecDevOps, and site reliability engineering (SRE) are meshed together.

Cloud v3 also incorporates SaaS offerings that replace existing applications entirely so that they don't need to be migrated to the cloud.

Ideally, all these moving parts become greater than their sum by playing roles in an operating model—specifically, in an operating model for converting digital opportunities into digital products, and then converting digital products into business value (see Figure 7).

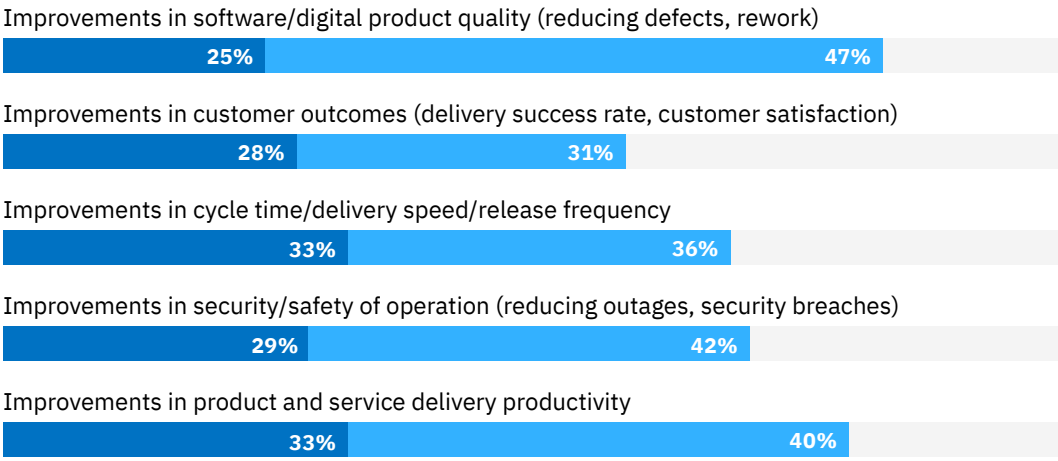
Therefore, we expected to see enterprises paying more attention to operating model design—the bigger-picture context for cloud—as evidence that they are crossing over to cloud v3. We also expected to see some markers of high-performance culture beginning to take root in higher-performing enterprises.

Our findings confirmed those expectations. The non-technical "soft stuff" matters a great deal to the cloud-powered execution of digital plays.

Figure 7

Better operating model, better performance

Better operating model design strongly associated with better business performance outcomes



Material/accelerating improvements at enterprise scale | **Sustained improvements at enterprise scale**

We expected a modest level of openness to change—but between 31% and 41% of respondents report they're already implementing changes.

Respondents reported that their current operating environment is delivering significant improvements to many dimensions of software development: customer outcomes, velocity, quality, safety, value from data, and the like. We saw strong, positive outcomes across each of the dimensions we tested (see Figure 8).

When we looked deeper into software development practices and things enterprises are doing to improve development outcomes, we found that a strong majority of respondents reported excellent ("material and accelerating improvements at enterprise scale") results from improvements in software development practices such as "working with a high degree of psychological safety" and "reducing dependencies between teams and among components of software."

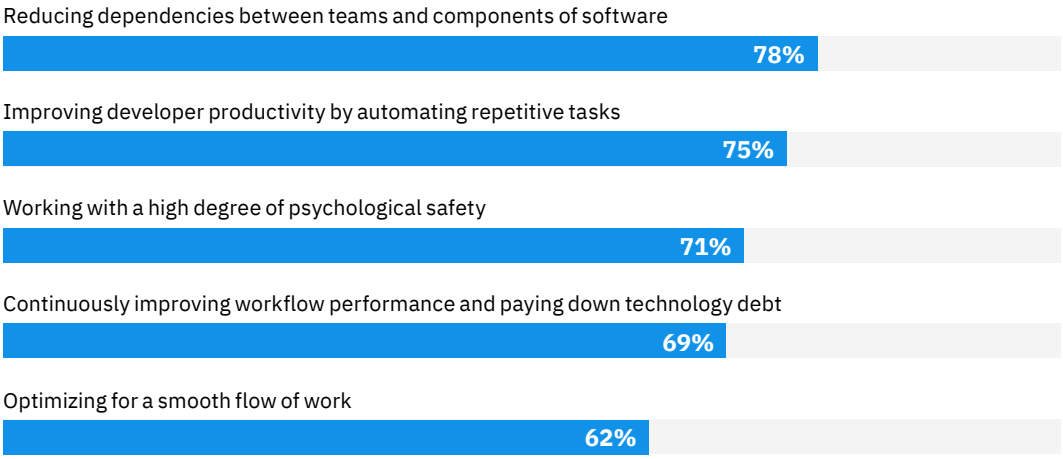
We also tested how respondents perceived senior leadership openness to management innovations in the operating model for delivering digital products and services. We asked the respondents to report the status of progressive, pushing-the-envelope changes in the enterprise's mindset and ways of working, such as:

- Eliminating leadership incentives to build, enlarge, and defend organizational silos
- Breaking down barriers separating the business from the IT organization and from customers
- Reinventing how digital initiatives are selected, designed, and funded
- Practicing servant leadership
- Preferring direct experimentation over transplanted "best practices."

Figure 8

Better development practices, better performance

Better software development practices strongly associated with better business performance outcomes



Data shows percentage of respondents reporting that improvements to software development practices were delivering improvements in the success of digital initiatives.

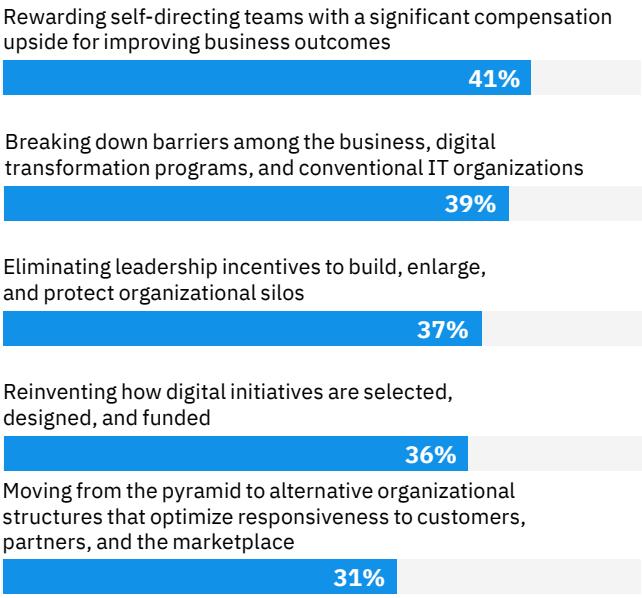
Our direct experience with digital transformation implementation made us expect a modest level of openness to these sorts of changes, but what we found surprised us.

Each type of management innovation in the survey got a positive result, with between 31% and 41% of respondents reporting that they are "already implementing changes" related to the innovation (see Figure 9). The highest-rated innovation is "rewarding self-directing teams with significant compensation upsides for improving business outcomes."

Figure 9

Ready for transformation

Digital-enterprise management innovations are beginning to take root



Enterprise spending on IT —still stuck at pre-pandemic levels

If enterprises are indeed accelerating digital transformation during the pandemic, it would be reasonable to expect to see increases in IT spending. Considering the successes reported by respondents—including very strong returns on their biggest digital investments, some of which were specified as "among the largest investments anywhere in the enterprise"—wouldn't enterprises take full advantage of the value available by expanding their IT investments?

That's not what we saw happening: respondents reported IT spending equal to only 3.4% of enterprise revenues, a level consistent with pre-pandemic spending history.

Levels of IT spending vary by industry, but over the past several years of digital transformation, they've held steady at about 3% - 5% of enterprise revenues.[7] And that figure is misleadingly high, since 60% to 80% of IT spending goes directly to business-as-usual, keep-the-lights-on costs.

So, even if we assume some "shadow IT" spending outside the formal IT budget, only about 25% of the IT budget is available to fund the digital plays we've been discussing in this study.

That's about 1% of enterprise revenues, assuming every penny of the discretionary end of the IT budget goes to the very best enterprise digital plays—and it doesn't.

When you've found an excellent source of high-return investment opportunities, shouldn't you invest more, especially in a business environment where capital is cheap? There's a disconnect here.

One possibility is that spending within the IT budget shifted away from the business-as-usual, keep-the-lights-on portion of the budget to the digital/cloud/business performance improvement portion of the budget. But that would be unsustainable over time.

Another is that enterprises may be willing to expand IT spending beyond a conventional and arbitrary limit, but the budget cycle has just not caught up with the business environment. A third hypothesis is that cloud-driven cost savings are being reinvested in business improvement plays without raising the total level of IT spending.

Despite reports of talent scarcity and the urgent need for reskilling, we found that talent gaps are not as formidable an obstacle as expected.

Stakeholders don't report skills gaps as a major obstacle

The research survey explored the extent to which a variety of obstacles are making it difficult to deliver on digital plays and cloud adoption. These include friction generators such as:

- Cloud cost management
- Technology debt and legacy-tech brownfields
- Industry-specific regulatory compliance requirements
- Data privacy/data sovereignty requirements
- Lack of interoperability among clouds
- A scarcity of funding for the cloud estate.

Respondents reported that these constraints are having a moderate but—considering the generally bullish response to questions about performance—not insurmountable effect on improving business performance. Very few respondents viewed them as "significant obstacles everywhere in our cloud estate."

About 40% viewed them as "significant obstacles in some parts of our cloud estate," but not everywhere. And across all obstacles, between 30% and 40% of respondents viewed them as "not a significant obstacle" in any part of their cloud estate.

If we view these positive "obstacle" findings as evidence that cloud v3 is crossing the chasm, albeit with some difficulties in some parts of the enterprise, the most interesting finding concerns talent: the availability of the right levels of leadership and implementation talent.

We have grown accustomed to reports of talent scarcity and the urgent need for reskilling and upskilling the existing workforce to meet the demands of more fully digital enterprises.

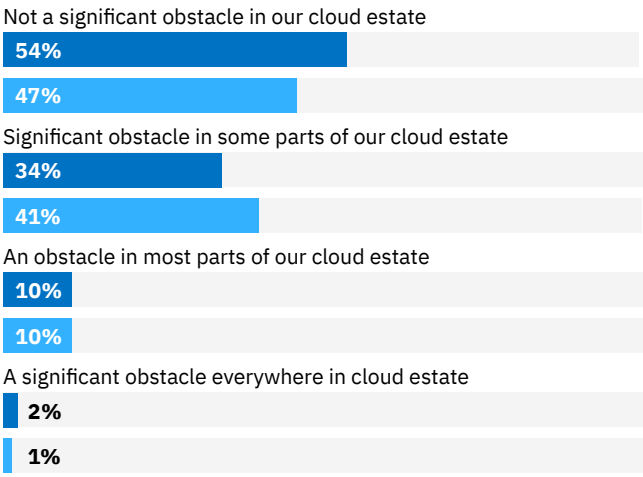
Cloud v3 dramatically expands and deepens the need for "T-shaped" and "comb-shaped" people who can work in small, cross-disciplinary teams to develop and deliver digital products on cloud platforms. Shouldn't we expect to see lots of difficulty related to talent shortages?

We found that talent gaps are not as formidable an obstacle as expected (see Figure 10). In fact, among all the obstacles listed in the survey, talent gaps were among the weakest: 54% of respondents reported that leadership talent is "not a significant obstacle" anywhere in the cloud estate, and 47% reported that the availability of "people with the right skills and experience" is "not a significant obstacle" anywhere in the cloud estate. High levels of SaaS adoption may be making talent shortages less acute.

Figure 10

Cloud adoption skills and leadership

Significant skills or leadership gaps not reported as obstacles to cloud adoption



Scarcity of the right leadership to drive cloud adoption
Scarcity of people with the right skills and experience

The most transformational digital plays cloud could be delivering are the least preferred

In our first finding, we showed the top 4 highest-priority digital initiatives (see Figure 2 on page 6). The bottom or least-preferred 4 of the 13 were:

- Improving business resilience and business agility
- Adopting new ways of working
- Building industry ecosystem platforms
- Launching new business models.

In comparison to the top 4, such as the number-one most-preferred play, digitizing existing products and services, the bottom 4 are more strategic. They are also more transformational, but considerably more difficult to design, fund, and execute. Most importantly, they require the most change to the non-IT parts of the organization.

Each of them requires changes to fundamental business processes and business process ownership. Each requires changes to organizational structure and a deconstruction of organizational silos. Each requires a blurring—if not the complete erasure—of the line between the business and the IT organization. Each requires, to at least some degree, the redistribution of power in the enterprise.

The digital initiatives that are today the least preferred are those that best describe cloud v4. Cloud v4 emerges as enterprises come to terms with the essential paradox of digital transformation: while it has never been more critical to employ digital technology across the enterprise, it has never been more difficult to create a sustainable competitive advantage based on technology alone. That difficulty has less to do with the limits of technology than with the limits of enterprise management innovation and a willingness to adopt new behaviors.

We expect cloud v4 to focus on what Scott Galloway calls "gangster moves" in his book *Post Corona: From Crisis to Opportunity*.[8] These might include driving toward a highly variable cost structure, turning the enterprise's biggest expense into a stand-alone source of revenue. Or dramatically reducing the cost and lead time for co-developing customer products by fully integrating internal as well as external (supplier and customer) value streams.

Galloway writes that "every executive team needs to explore the limits of their comfort zone and imagine a business with 20% less revenue that commands twice the value."

As a strategy for early adopters, cloud v4-powered business transformation offers a built-in, durable barrier to would-be copycats: the need to abandon decades of conventional thinking about how the business, IT, customers, suppliers, and partners collaborate in a purposeful way.

Action guide

For the late majority: Get on board the cloud v3 bus

We've considered evidence that cloud v1 and v2 have been widely adopted, while cloud v3 is crossing—or has crossed—the chasm between early adopters and an early majority of enterprises. These enterprises are realizing business performance improvements well beyond reductions in the cost of IT operations. Enterprises that have not yet adopted cloud v3 have two options:

Resolve quickly to be part of the late majority.
The late majority is much less comfortable with new technology in general and waits until a solution becomes available that effectively shields the user from hands-on tech work and the need to employ and manage tech workers. That solution is becoming available today: a modernized form of IT outsourcing that employs cloud v3, but from "behind the curtain" of an outsourcing agreement and a contractor's workforce.

For enterprises that do not count IT and/or digital as core competencies, this would be a high-risk, contrarian strategy, but it may be the only viable strategy available. These enterprises are likely to be outsourcing IT already, so the goal would be to upgrade their contracts' KPIs to reflect more cloud v3-like levels of delivery performance.

Catch up to the early majority.
One possibility for the 37% of respondents that reported being "almost done" with cloud adoption is that their adoption plans had cloud v2 as their target state: lots of workload migration, but few business performance improvements.

For them, the bad news is that they are probably further behind than they may think, given the organic work that needs to accompany tech adoption in a cloud v3 model. The good news is that, if they are willing, a leapfrog strategy can get them back in the game.

A leapfrog strategy means doubling down on removing the blind spots that got them there in the first place. If you find your organization in need of such a strategy, consider the following 5 actions:

1. Check to see if your cloud strategy is really a workload migration plan.
If it is, start over.

2. Don't be tempted to settle.
With a new cloud v3 strategy, don't be tempted to settle for "alignment" with the enterprise strategy or with business unit strategies. Insist that cloud v3 directly supports specific business cases for specific digital plays and that the funding for both the digital play and the cloud services required are bound together in the funding package.

If the digital plays are too vague to permit direct support, find at least a few bright spots or willing business-unit collaborators and focus there. It's better to be exclusive than inclusive at this point: join forces with ideal potential partners only. Get help from design thinking practitioners who can bridge the gap between business intent and digital delivery.[9]

3. Build a "fishbowl" environment.
Armed with a real cloud v3 strategy and real digital plays for it to deliver, build a fishbowl environment containing everyone involved in using cloud v3 to execute the digital plays. Within the fishbowl, previous organization silos and affiliations drop away and the only objective is strategy execution.

You'll need senior executive sponsorship to do this, which is why it makes sense to limit the number of participating business units. Remember that with a leapfrog strategy, you are trading away breadth of adoption in favor of demonstrating compelling value with more targeted digital plays.[10]

4. Start small, learn fast, but make a dent.
If you have had to spend time renewing an integrated business/digital/cloud v3 strategy, there will be pressure to show results quickly. That pressure will morph into showing results reliably: predicting when results will be realized based on a fixed schedule. Be careful not to fall into a waterfall planning trap.

Instead, pursue a more agile, iterative approach, but make sure that as results improve, they're results that matter. In other words, don't incur all the effort and risks of a leapfrog strategy only to succeed in improving results on a low-priority digital play.

5. Save time with "industry cloud."
In some industries—such as banking and financial services—you may be able to save time by leveraging an "industry cloud," one that has been pre-configured to comply with industry regulations and to support common industry-specific workflows or software development requirements.[11]

For early adopters: Get on the path to cloud v4

Imagine you are a respondent to this survey and you're successfully adopting cloud v3 and reaping success with current digital plays. You've achieved competitive parity with others of the early majority and are on a path to sustain that position. You're working on the soft stuff and leadership is open to innovations in organizational structure, funding, and decision governance. You might have reported that you are "stalled" in your cloud adoption because your vision for cloud adoption goes well beyond cloud v3.

As with the call to action for enterprises needing to leapfrog to cloud v3, there is good news and bad news for enterprises seeking to be early adopters of cloud v4. The bad news is that the changes required to implement cloud v4 include changes to aspects of management practices and culture to which senior leadership may be strongly attached.

More bad news: cloud v4 requires operating like a faster, nimbler digital native, but it won't make those digital natives go away. They'll still be there.

The good news is that since many enterprises may balk at these changes, successful early adopters should enjoy a long period of first-mover advantage. The technical, behavioral, and cultural difficulty of cloud v4 creates a natural barrier to imitation.

Enterprise leaders considering cloud v4 should take the following actions:

1. Use end-to-end workflow redesign as an entry point to cloud v4.[12]
There are many types of digital plays that require cloud v4 innovation, unshackled by legacy management practices and business models, but workflows are a good place to start. Put a cross-disciplinary team of people to work rethinking how your enterprise creates value for its customers. Use a modular approach, where the value streams that create customer value act as modules of work that can be assembled in different ways and by different "players" (customers, suppliers, partners).

Use a similar approach to the applications and data that support the value stream. Where are the most powerful, transformational opportunities for reinvention? How much business value could be unlocked via cloud v4 technologies, including APIs, data fabric, and AI? How much business value could be unlocked by improving full product lifecycle delivery velocity?

2. Take advantage of your existing assets.
Cloud v4 emphasizes embracing the new and letting go of the conventional, but be smart in your planning assumptions. If you're competing with digital natives that are unencumbered by a legacy environment, you must find a way to repurpose some existing assets.

Mainframe computers are one example: the combination of mainframe-driven applications and a hybrid cloud platform can be powerful. Monolithic systems, which can be converted to microservices modules of software, are another.[13] And cloud v4 can use data fabric to unlock and "democratize" hugely valuable stores of customer and operational data.

3. Fund cloud v4 as products, not as projects.
Agile software experts such as Dr. Mik Kersten have argued that the structure of conventional IT projects—with pre-defined starts and stops and budgets developed when the parties involved knew the least about how to build the right thing (before the actual design and development begins)—doesn't work.[14]

It's better to develop digital products as living assets that begin with a prototype and advance with many cycles of learning and development. Products need to be funded based on the requirements of the product life cycle and on frequent customer feedback loops.

Recognize that cloud v4 has never been done before in your enterprise, with your enterprise's people, culture, and assets, in this business environment. It will succeed or fail based on how fast the product teams can learn—and needs to be funded that way.

4. Resist employing the usual suspects as transformation catalysts.
Cloud v4 is a very large investment and will require the highest level of executive sponsorship and business unit skin-in-the-game engagement. But just as importantly, it will require a heavyweight product manager/change agent to drive the program forward.

Be very careful in selecting the right candidate: the candidate should probably not be a conventional choice for running a large enterprise IT program, and probably should not be someone who already "owns" other important programs.

Rather, the right candidate should be an up-and-comer about whom stakeholders will say: "If that's who they picked to drop everything and focus on this program, they must be serious."[15]

About the authors

Howard Boville
Senior Vice President and
Head of IBM Cloud Platform, IBM
howardboville@ibm.com
linkedin.com/in/howardboville

Howard leads IBM's global cloud business and helps develop market-leading capabilities to drive digital transformation for enterprises. He has more than 25 years of experience working as a business technologist across sales, marketing, product development, engineering, operations, and contracts. Prior to joining IBM, Howard was Chief Technology Officer for Bank of America, responsible for the company's infrastructure strategy across its 8 lines of business. Howard holds a Bachelor of Arts in business from Teesside University in Middlesbrough, U.K., and a Diploma of Business Studies from Leeds University, Leeds, U.K.

Hillery Hunter
IBM Fellow, Vice President,
and CTO, IBM Cloud
hhunter@us.ibm.com
linkedin.com/in/hillery-hunter-97962a14

Hillery is responsible for technical strategy for IBM's cloud-native and infrastructure offerings. She has served as Director of Accelerated Cognitive Infrastructure in IBM Research, leading a team doing cross-stack—hardware through software—optimization of AI workloads, producing productivity breakthroughs of 40 times and greater. She is a member of the IBM Academy of Technology and was appointed as an IBM Fellow in 2017. Hillery holds a BS, MS, and PhD from the University of Illinois at Urbana-Champaign.

Richard Warrick
Global Research Lead, Cloud Computing
IBM Institute for Business Value
rwarric@us.ibm.com
linkedin.com/in/richardwarrick

Richard leads the IBM Institute for Business Value's cloud research agenda that explores cloud as part of a new way of working as enterprises evolve to become more fully digital businesses. Richard's consulting career spans over 20 years of helping Global 1000 clients navigate the intersection of business and technology. His work has focused on business + IT strategy, operating model design and implementation, and large-scale transformation programs. He has a Master of Science degree in Organizational Learning from George Mason University.

About this research

In partnership with Oxford Economics, we surveyed 7,164 executives in enterprise cloud adoption. The scope of the survey was global, including 44 countries across the Americas, Europe, India, China, Asia/Pacific, the Middle East and Africa. The surveyed enterprises represented 29 industries, from agriculture to travel. The survey targeted enterprises with revenue greater than $500M USD; the mean level of revenues across all enterprises surveyed was $805M.

The survey respondents included a wide variety of job roles related to cloud enterprise adoption: CEOs, CIOs, CTOs, COOs, CFOs, and IT professionals in infrastructure, software development, operations, digital transformation, design/UX, and the like. The survey respondents included a variety of organizational levels, from team members to C-suite executives. All respondents were screened based on their ability to answer questions about enterprise IT investments and cloud adoption.

Our research made use of a probit model. Probit and logistic regression are statistical tools developed to allow for the creation of associative models where the desired outcome variable is binary. Binary outcome variables are dependent variables where only 2 possibilities, as in yes/no, positive/negative, are possible.

"Probit" is a combination of the words probability and unit. The goal of the analysis is to determine what considered elements, known as criterion or independent variables, most influence inclusion into one or the other of the 2 possible outcomes.

For this study we constructed 2 groups: organizations just beginning the journey toward cloud maturity and those who considered themselves relatively at journey's end. Using our probit model, we then ascertained from a group of 13 possible constraints the most significant impediments to successfully completing the journey to full cloud adoption.

IBM Institute for Business Value

The IBM Institute for Business Value develops fact-based, strategic insights for senior business executives on critical public and private sector issues.

For more information

To learn more about this study or the IBM Institute for Business Value, please contact us at iibv@us.ibm.com. Follow @IBMIBV on Twitter, and, for a full catalog of our research or to subscribe to our monthly newsletter, visit: ibm.com/ibv.

About Research Insights

Research Insights are fact-based strategic insights for business executives on critical public and private sector issues. They are based on findings from analysis of our own primary research studies. For more information, contact the IBM Institute for Business Value at iibv@us.ibm.com.

Notes and sources

1 "COVID-19 and the future of business." IBM Institute for Business Value. September 2020. https://www.ibm.com/thought-leadership/institute-business-value/report/covid-19-future-business

2 Koetsier, John. "97% Of Executives Say Covid-19 Sped Up Digital Transformation." Forbes. September 10, 2020. https://www.forbes.com/sites/johnkoetsier/2020/09/10/97-of-executives-say-covid-19-sped-up-digital-transformation/?sh=7c0b05204799

3 "Cloud Computing Market to Hit USD 791.48 Billion by 2028." Fortune Business Insights, GlobalNewswire. August 11, 2021. https://www.globenewswire.com/news-release/2021/08/11/2278451/0/en/Cloud-Computing-Market-to-Hit-USD-791-48-Billion-by-2028-Rising-Demand-for-Improved-Virtual-Access-to-Information-among-Industries-to-Foster-Stea-dy-Growth-Fortune-Business-Insights.html; "Cloud Computing Market Size Worth $1251.09 Billion By 2028." Grand View Research, PRNewswire. September 1, 2021. https://www.prnewswire.com/news-releases/cloud-computing-market-size-worth-1251-09-billion-by-2028--cagr-19-1-grand-view-research-inc-301366888.html

4 Forrest, Will, Raghav Sharma, Mark Gu, James Kaplan, Michael Liebow, Kate Smaje, and Steve Van Kuiken. "Cloud's trillion-dollar prize is up for grabs." McKinsey Quarterly. February 26, 2021. https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/clouds-trillion-dollar-prize-is-up-for-grabs

5 Moore, Geoffrey A. *Crossing the Chasm: Marketing and Selling High-Tech Products to Mainstream Customers*. Collins Business Essentials. August 2006.

6 Spear, Stephen J., The High-Velocity Edge: How Market Leaders Leverage Operational Excellence to Beat the Competition. McGraw-Hill Education. 2nd edition. May 2010.

7 "Flexera 2021 State of Tech Spend Report." 2021. https://info.flexera.com/SLO-REPORT-State-of-Tech-Spend

8 Galloway, Scott. Post Corona: From Crisis to Opportunity. Portfolio, November 24, 2020.

9 McElroy, Nicole Gull. "The innovative engine of IBM's design philosophy." Fortune. September 7, 2021. https://fortune. com/2021/09/07/new-ibm-design-director-katrina-alcorn-phil-gilbert

10 "How IBM Garage is Meeting the Accelerated Demand for Digital Transformation." IBM. October 22, 2020. https://newsroom.ibm.com/How-IBM-Garage-is-Meeting-the-Accelerated-Demand-for-Digital-Transformation

11 Evans, Bob. "IBM Cloud Renaissance: General-Purpose Clouds Out, Industry Clouds In." Cloud Wars. May 10, 2021. https://cloudwars.co/ibm/ibm-cloud-renaissance-general-purpose-out-industry-clouds-in

12 Butner, Karen, Tom Ivory, Marco Albertoni, and Katie Sotheran. "Automation and the future of work." IBM Institute for Business Value. July 2020. https://www.ibm.com/thought-leadership/institute-business-value/report/automation-workflows

13 Granger, John, Aparna Sharma, Anthony Marshall, and Smitha Soman. "Application modernization on the mainframe." IBM Institute for Business Value. July 2021. https://www.ibm.com/thought-leadership/institute-business-value/report/application-modernization-mainframe

14 Kersten, Mik. Project to Product: How to Survive and Thrive in the Age of Digital Disruption with the Flow Framework. IT Revolution Press. November 20, 2018.

15 Furr, Nathan, Jur Gaarlandt, and Andrew Shipilov. "Don't Put a Digital Expert in Charge of Your Digital Transformation." Harvard Business Review. August 5, 2019. https://hbr.org/2019/08/dont-put-a-digital-expert-in-charge-of-your-digital-transformation

© Copyright IBM Corporation 2021

IBM Corporation
New Orchard Road
Armonk, NY 10504
Produced in the United States of America
October 2021

IBM, the IBM logo, and ibm.com are trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at "Copyright and trademark information" at: ibm.com/legal/copytrade.shtml.

This document is current as of the initial date of publication and may be changed by IBM at any time. Not all offerings are available in every country in which IBM operates.

THE INFORMATION IN THIS DOCUMENT IS PROVIDED "AS IS" WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, INCLUDING WITHOUT ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY OR CONDITION OF NON-INFRINGEMENT. IBM products are warranted according to the terms and conditions of the agreements under which they are provided.

This report is intended for general guidance only. It is not intended to be a substitute for detailed research or the exercise of professional judgment. IBM shall not be responsible for any loss whatsoever sustained by any organization or person who relies on this publication.

The data used in this report may be derived from third-party sources and IBM does not independently verify, validate or audit such data. The results from the use of such data are provided on an "as is" basis and IBM makes no representations or warranties, express or implied.

IBM®