







As companies strive to accelerate out of pandemic disruption, how can IT meet increasing demands—and reap unprecedented benefits? In a series of virtual roundtables, dozens of IT leaders identify obstacles, highlight innovative approaches, and challenge the tech industry to help navigate the road ahead.

In March and April 2021, CIO held a series of CIO Think Tank discussions—virtual roundtables that brought together 36 IT leaders to unpack one of the most important issues in the enterprise today: IT reinvention.

These discussions aimed to identify key issues in reinventing IT to meet today's rapidly evolving business requirements, and offer a roadmap for IT leadership to overcome practical obstacles. The roundtables were facilitated by John Gallant, Enterprise Consulting Director for IDG, and also included IDC Research Director Joe Pucciarelli, Group VP & IT Executive Advisor, IDC; IDG B2B Editor-in-Chief Eric Knorr; and BMC Software Chief Technical Officer Ram Chakravarti.

The participants—IT leaders from a broad swath of commercial industries, universities, and government agencies of all sizes—drew on their own experience and knowledge to describe strategic and tactical approaches to critical challenges. How can IT overcome old habits and technical debt, reskill the workforce, and even reshape its own mandate?



WHAT IS CIO THINK TANK?

CIO Think Tank is a unique collaboration showcasing the ideas and expertise of top IT executives, IDC analysts, IDG editors, and our exclusive vendor partner. Our goal is to explore and shape the future of the IT function and emerging technologies. BMC Software is IDG's partner on this IT Reinvention CIO Think Tank. For more on this program go to www.idg.com/product/cio-virtual-think-tank.



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The Urgency of IT Reinvention

CIOs are under pressure—so what's new? Well, a global pandemic was new, and that knocked lots of IT projects and priorities off track.

Now IT not only has to resume business as usual, but it also needs to help business accelerate in a new environment.

For a prime example, look at healthcare providers. For these organizations, the top priority obviously has been delivering care in a locked-down world—but the economic restart doesn't mean virtual care is no longer vital. "That continues to be a strong theme for us, including all other aspects—patient engagement, remote patient monitoring, you name it," said Lisa Dykstra, Lurie Children's Hospital.

Academic institutions are also rethinking their entire business models in this new "hybrid" remote-and-in-person world, several CIOs said. And consider commercial real estate companies: "When all of you guys left the office, you stopped using my product overnight," said JLL CIO Edward Wagoner about the sudden exit to remote work.

While these business challenges take different forms in different industries, a majority of organizations around the world faced significant headwinds over the past year-plus. A global IDC Wave Survey, conducted in September 2020 with 679 respondents, found that 60% experienced supply chain planning and forecasting failures after the initial pandemic shock. Most forecasting models weren't created with such long and profound interruptions in view.

Interruptions were not just in the supply chain, but internal as well. At that time—late 2020—56% of respondents said that they were still focused on maintaining existing IT operations rather than on new projects or initiatives.

Making up for lost time

The pressure for IT to deliver results has always been high. Now, as companies work to emerge from these pandemic shocks, CIO Think Tank participants said they are increasingly tasked with driving growth and profit. It's "all hands on deck" for organizations to recover and get back into growth mode.

Technical evolution continues as it always has. Panelists described numerous technology projects and pilots across cloud, robotic process automation (RPA), early artificial intelligence, and more—even quantum computing. But CIOs are keenly aware that technical updates, in isolation, don't drive the necessary business growth.

"We are seeing what I like to term as 'digital sameness,'" said <u>Ajit Naidu</u>, SVP at Nuveen and its parent company TIAA. "The digital side has almost become table stakes. It's more a defensive move than an offensive move now."

How does IT respond and deliver? That's what reinvention is about. Panelists offered a variety of descriptions of their target state or goal, but clearly it all has to start with a vision of what's possible.

"To me, IT reinvention at its core means that IT organizations shift their responsibilities from traditional cost to complexity management," said BMC's Ram Chakravarti. IDG's Eric Knorr noted that past IT transitions were typically about moving from one fixed state to another—think mainframe to client/server—whereas today's imperative is about "creating a platform for continuous change."



NEW DIGITAL PRIORITIES

When IDC asked 790 world-wide companies about their top business priorities for 2021—opportunity, volatility, uncertainty, and all—the top four business priorities included:



29%

Profit growth



29%

Improve operational efficiency



28%

Revenue growth



28%

Increase innovation

Source: IDC

The Urgency of IT Reinvention continued

Reinvention takes many forms. "Industry 4.0" is the term at Kimball Electronics, said Sandy Smith, VP of IT, focusing on "the smart factory and digitizing and automating as much as we can." At UPS, Ken Finnerty, President of Information Technology, uses the name "digital factory" not in reference to manufacturing, but to the IT operation itself. For UPS, the overarching vision is "all about being able to make our software into building blocks" that can be reused quickly for new purposes, Finnerty said.

"We frame it in terms of 'maximizing potential.' That sounds like a cliche, but what we mean is, how do we maximize the potential of our assets in manufacturing that leads to our digital manufacturing practice? How do we maximize the potential through data?" said Anu Khare, SVP/CIO, Oshkosh Corp.

However that vision takes shape for a given organization, reinvention clearly demands a rethinking of IT's goals, relationships, processes, structures, and much more.

Across all industries, there's no shortage of common challenges that impede wholesale change. We've grouped them under five headings: institutional inertia, skills gaps, unruly data, lack of agility, and lack of customer focus.

How will organizations attack these challenges? In this report, IT leaders offer a wealth of ideas. Every roadmap will look different, but all roads lead to reinvention—according to our panelists, they must. And you may never find a better fuel to accelerate your journey than the disruptions of 2020, still lingering today and demanding an urgent response.



The productivity of technology investment is dropping.



REINVENTION MEANS BUILDING NEW DIGITAL CAPABILITIES



of companies are actively investing in new digital capabilities.

Source: December 2020 global IDC survey of 648 companies



70%

of respondents will also be modernizing their server, storage, and/or data protection infrastructure over the next two years to better accommodate new workloads.

Source: IDC





Change is hard—and reinvention-level change raises the natural human resistance to change by an order of magnitude. "I call it mental inertia. The entire supply chain and all of IT have horrible mental inertia, and it takes ridiculous amounts of energy to defeat that mental inertia," said Vince Kellen, CIO at the University of California San Diego.

But the pain and disruption of the pandemic have already shaken things up, in many cases causing organizations to take a fresh look at what needs to be done. "This situation that we're engaged in right now has really caused us to deprioritize things that really weren't important to the organization, and reprioritize things that were truly important," said John McGuthry, CIO and Vice President of IT for California State Polytechnic University, Pomona.

Crises don't last forever, though. "What we're going to kind of need to think about going forward—how do we constantly reinvent ourselves without having the external force making us do it?" McGuthry said.

Matt Hoag, Chief Technology Officer of Koch Business Solutions, agreed: "That's an important concept. When we talk about creative destruction, it's much more comfortable to do it to yourself, rather than have the market do it to you."

But even with so many urgent incentives to do things differently, reinvention isn't a foregone conclusion.

"I remember after 9/11, we had the same conversation. The stock market crashed in 2008, we had the same conversation. And nothing came of it," said Nathan McBride, Ohana Biosciences. "Companies are still using the same software they were using 20 years ago—same processes, same governance, same archetype model for IT."



A revenue mindset completely changes the way people think.



— EDWARD WAGONER



RECOMMENDATIONS:

For starters, lead by example. "As IT leaders, if we really want to be the change agents, we need to let go of our own bad ideas—and learn how to do it quicker. And then this way we can have the capacity to move on to other projects," said McGuthry.

Talking to more and different people can help break conceptual block, panelists agreed, and the most valuable of these discussions are with customers. CIO-customer conversations aren't new, but for many companies the stakes changed in 2020, and the conversations became much more pointed.

"It's causing us to look at it differently," agreed JLL's Wagoner. "It's causing us to talk to [clients] more closely: 'What do you need? How do we need to change?'

"And because of the demand for flexibility, a better experience, and health and safety, we are completely rethinking the way we deliver technology, both inside the company, but also outside. So I'm now buying technology companies and technologies because of the boom in [property technology]."

Deadlines help overcome inertia, even if they're somewhat arbitrary. "What we do as leaders is we have to provide the timeframe and the commitment and push," said Kellen. "If people wait for change to occur where it feels comfortable and normal and natural, you'll never do it. So we just set an end date and we work like mad across the enterprise to make the change happen. Give it a sense of urgency."

Panelists widely agreed that there may never be a better time for change, with several repeating the phrase "never waste a good crisis."



Reinvention challenge 2: **Skills deficits**

Digital skills of all kinds are in high demand.

For example, multicloud complexity presents one challenge with a direct bearing on the ability to remake IT. "Coming up with reference architectures, whether it's AWS or Google or Azure, making sure that you know what the cloud portability strategy is, I think cloud architecture skillsets are really important for us today," said Finnerty of UPS.

Specialized industry skills can be even more difficult to find. "There are some great solutions in the fintech world. The challenge is, these product companies sometimes don't have the professional services, or for that matter the expertise, to work with your teams to transfer that knowledge to use that solution effectively," according to Ajit Naidu.

But digital skills deficits exist not just within IT departments, where some organizations struggle to fill key technical positions, but also across entire organizations.

"How do we make our business users and business leaders more digitally savvy? Because if they are not digitally savvy, we can bring all kinds of technology, but accelerated adoption doesn't help," commented Anu Khare of Oshkosh Corporation.

In fact, there may be skills needed for true reinvention that haven't been fully identified yet. "Although we're leveraging some of the collaboration tools that are out there, we really haven't changed the way we think about how we do work," said Alberto Ruocco, CIO, West Monroe Partners.

Trying to find a
Kubernetes expert
is like trying to find
a purple squirrel.



— GEORGE DUCHAK, CIO & Innovation Officer, Defense Logistics Agency

RECOMMENDATIONS:

No magic wands or silver bullets here. IT leaders cite timeworn tactics to build new skills—training, hiring, partnering with universities—although perhaps with a new focus and energy.

"I'm a big fan of reskilling or education, so gosh golly, do it yourself. Educate your own staff," said Kellen. "I think most IT staff are reskillable. Some are not. Some don't wish to be, and so we part ways. But we set the direction, we set where we're going to go with skill sets, provide the training opportunities for the staff to make the leap. Some don't make it, they find another path, but 75 percent-plus do," he noted.

Expanding the candidate pool can help fill gaps and also benefit reinvention by bringing in more viewpoints. "To reinvent, we need to consider how we can leverage digital technology to address diversity, equality, and inclusion. How can we bring more female employees into the IT organization?" said Feng Hou, Maryville University. "This particular topic is very close to me; I've been working with the university president on that roadmap."

Kristie Grinnell, Global CIO of General Dynamics Information Technology, works with multiple organizations to deepen the technology talent pool, including Women in Technology (WIT), Girls Who Code, and STEMforHer.

Likewise, Erickson Living CIO Hans Keller said, "We're partnering with Baltimore Tracks, a local group of technology companies focused on diversity, inclusion, and equity. So we use that as an avenue to attract talent as well."

Keller also takes proactive steps toward recruiting entry-level employees. "I sit on the advisory board at Towson University, and we have a very, very robust internship program—probably almost a dozen interns at any given time," he said.

Reinvention challenge 3: **Ugly data**

Data might provide the biggest set of opportunities for IT reinvention. Cleaning and reorganizing data to allow Al-driven insights is a big task, and many IT leaders have their sights set on monetizing data by selling it directly, or by creating new data-driven services.

"I have this dream: I want to serve the right information to the right person at the right time. And that means unlocking the treasure trove we are sitting on—an enormous amount of structured and unstructured data," said Gundeep Ahluwalia, CIO of the U.S. Department of Labor.

At the same time, for many (or perhaps most) organizations, data is also the biggest hurdle to reinvention.

In some cases, it's a question of organizing and connecting siloed data. "We had data puddles all over the organization and really no data pools or data lakes," said George Duchak, CIO & Innovation Officer for the Defense Logistics Agency.

Similarly, "We have a very fragmented data ecosystem, multiple data warehouses and multiple analytics and reporting tools," said Bharath Prabhakaran, Deputy CIO/Associate Vice Chancellor for the University of North Texas System. "As a result, we're not able to make data-driven institutional decisions, because we don't have those insights across the system for our leadership."

For big companies with a history of acquisitions, the data challenges are even worse.

"Having just gone through a huge, large integration, our data is so ugly from growing through merger and acquisition, doing things fast, that you never go back and clean up. Trying to get good insights out of data that doesn't make sense is super hard," said GDIT's Grinnell.

Even in those cases, however, data provides an opportunity not just in terms of delivering business insights, but also as a lens for understanding workflows and processes, Grinnell noted. "That data piece, when we can make everything connect and we see the process, then we'll fix the process, so we're automating efficiency rather than automating the old processes.

"But getting the data right to make those decisions is really, really hard."



Institutionalized data sources and system records are important. But you also want to enable agility for data analytics and data science, so you need to find that balance.





RECOMMENDATIONS:

Data problems resist simple bromides. Strong governance is clearly important, panelists agreed. "We have 15 key initiatives, and data governance across that whole data architecture, so that really wraps around the entire Industry 4.0 strategy," said Smith of Kimball Electronics.

For Grinnell, key governance questions start with "Who owns this data? How do you put that data in real context? And who should have access to that data? Because everybody wants access to everything, but some data is company-sensitive or customer-sensitive."

Duchak from the Defense Logistics Agency went so far as to say his group is "reorganizing around data, so data can drive our analytics and drive our Al. That reorganization really means architecture curation and getting the right folks on board." This is an area of particularly acute skills needs, he added: "As somebody mentioned, there's a talent shortage."

Cleaning data is also critical, but to Grinnell's point, doing so manually is just too time-consuming for big enterprises. Automation has to play a key part.

At UPS, "we're using what I'll call 'fuzzy logic within master data management products' to do some of the cleansing and create single sources of truth around curated datasets," said Finnerty, intentionally declining to call it "AI." He noted that IT should expect this kind of cleanup and consolidation to interrupt data pipelines. "Then you have to kind of reroute some of what used to be considered the authoritative sources, and redirect them to a different source of truth."



Reinvention challenge 4: Lack of agility

Business changes faster all the time. Products have shorter life cycles. Workflows and processes evolve quickly. Agility is the order of the day.

"IT has to get up over one mountain, see that there's another mountain range ahead, and have that agility to be able to keep moving," said Grinnell. "And that means we have to be creative in the way that we think about our organization, and think about your speed of adoption, your speed of innovation."

Needless to say, yesterday's technical infrastructure and monolithic applications weren't built for this rate of change.

While there are specific application changes to be made, several panelists referred to technical debt as the broader enemy of agility.

IDC's Pucciarelli described technical debt as "a stomach-tightening phrase" for many IT leaders. It lurks inside IT operations in many forms, from outdated software and dirty data to functionality compromises to inadequate hardware. The "debt" is the time and money that would be required to modernize those systems; as systems age and business demands change, that cost only rises.

"We do have technical debt; some of it is because we mostly kicked the can down the road and it's catching up with us, but some comes from hard decisions about where we spend the money," said Naidu.

In addition to hindering agility, technical debt also incurs risk, particularly as old software becomes vulnerable to new exploits.

Technical debt can never be fully resolved, because each new decision or layer of technology inevitably involves some tradeoffs. "What technical debt are we incurring now with the new technologies?" asked IDG's Knorr. "We've talked about the legacy stuff, but, for example, are people doing lift-and-shift to the cloud without properly refactoring those applications?"

companies that have successfully reinvented themselves several times over are characterized by three traits: business agility, customer centricity, and actionable insights.



— RAM CHAKRAVARTI,



RECOMMENDATIONS:

"An astute business should be taking a proactive step in owning and understanding—what is our cyber posture? How is technical debt impacting us? What are the risks by having this technology debt? And this is a board discussion nowadays. So I am certainly discussing it at a board level," said Naidu. "It's uncomfortable initially, but then it's something healthy."

Naidu's first recommendation is to get out in front of the discussion and make a clear connection between agility and technical debt. That connection can have a huge impact on organizational willingness to invest in addressing it.

"If you focus just on the cost and risk side, you get one reaction," he said. "If you focus on how it's impacting agility and limiting addition of new capabilities, with the balance of risk, then you get a slightly different reaction."

"We are also working to drive agility in our business applications. We go through a tremendous amount of change in the organization, and that's especially important to me, as I lead integrations. The transitions [between] pieces of our business and our platforms are quite inflexible," said Kimberly Smith, VP, Corp. Development, Veolia North America.

UPS's Finnerty noted that a cloud portability strategy and composable, reusable software parts are vital elements for avoiding or reducing creation of new technical debt.

Sue Lapierre, VP of IT Governance with ProLogis, emphasized that the key to reducing technical debt and increasing agility lies in reinvesting the savings earned through IT cost containment initiatives.

"Doing automation and AI and machine learning, this is our opportunity to say, 'Yes, while it is cost conservation, we need to use that savings to really focus on those innovative kinds of activities, so that we can reinvent ourselves," said Lapierre.

Reinvention challenge 5: Lack of customer focus

Fairly or not, IT has at times carried a reputation for inward focus, perhaps paying more attention to systems and technology than to business problems and, ultimately, customer needs.

Panelists noted that this isn't a mindset that can be merely waved away. CIOs in a variety of organizations said an internal focus is often built into the IT operating model, and sometimes the entire corporate operating model.

"IT has not always taken the leadership position it needs to in helping the company understand. We've been such a delivery organization, we haven't really helped the business understand where technology can make them better and where, if they are willing to change processes and help, we can really enable the business to move much faster," said Sharon Mandell, Juniper Networks.

IT leaders at multiple organizations said it's imperative for IT to become customer-focused or customer-obsessed. Internal customers are important, but the end customer of the business is critical for IT reinvention.

"Our two biggest priorities in terms of IT reinvention are, as we're driving a more customer-centric strategy, to build the platforms that allow us to better provide digital solutions to our customers and expose their data that we're collecting on their behalf, as well as help add value to them," said Smith of Veolia North America. "So we are investing in digital platforms and digital offerings and integration and data management to help support that."



When we find something wrong that affects the customer experience, then we'll put the money toward it.



— NICHOLAS GRECCO, VP/CIO, First Advantage Corp.



RECOMMENDATIONS:

As noted in the data challenge section above, exposing more customer data back to those customers provides a different lens for determining what's valuable.

For many, that means monetizing IT systems and data, and shifting from a traditional project focus to a product mentality.

"How do you monetize IT? Essentially, it's extending your outreach not only to internal customers within your organization, but also to external customers," said Maurice Tayeh, Global CIO, Hatch. "Any company is going to have tens to possibly thousands of applications. So how do you take these solutions that you developed internally and try to sell them?"

"Starting to think 'products' as opposed to 'projects' has really been good for us. Traditionally in IT, we think the customer is who I'm handing a laptop to. But it's about who makes our cash register work," said Ken Piddington, VP/CIO, U.S. Silica, a 120-year-old mining, processing, and logistics company based in Texas. Piddington's team has rolled out a mobile application for the company's third-party truck drivers in the past 18 months.

Using your organization's IT products and services as "customer zero" to run your own internal IT operations is a good starting place, GDIT's Grinnell and BMC's Chakravarti agreed.

But "seeing the through-lines" that affect the customer is often even more valuable: CIOs noted that the phrase "customer experience" can bring a knee-jerk association with front-end systems, and that may be the place to look for some easy wins, but the real work is behind the curtain.

"There's one piece which is the multichannel front end of that customer experience, but what we are finding is our challenge is not so much there," said Naidu. "The needle is going to move, for us at least, based on how we have made that experience to be seamless right through the back end."

The automation and seamless integrations of paperwork and process at the back end "is where we are really seeing the benefit of that investment to improve the customer experience," Naidu concluded.



Reinvention: Five big ideas

Whatever your challenges, reinvention requires big thinking. Here are five big ideas that came up in our CIO discussions. They won't work for every organization, but if one applies to yours, you've gotten your time's worth, many times over.





1. THROW OUT YOUR STRATEGIC PLAN

"I stopped using a strategic plan, 'This is what we're going to do in year one, this is what we're going to do in year two,'" said Rodney Nobles, from Waukesha County Technical College, Wisconsin. Instead, Nobles created a simple "brand statement" for IT: reinvent, rethink, repurpose processes and technology so people can have content anytime, anywhere, on any device.

That's easy to remember and gives the IT department a laser focus. Everything the team touches should focus on achieving that brand statement, Nobles said, "or we don't do it. We're education, so we're about enrollment, retention. and completion. And that's what we work towards—none of this other stuff that doesn't matter."



2. CREATE INTERNAL INCUBATORS FOR INNOVATION

Several IT leaders noted the use of incubators to help develop more significant ideas, with expectations set differently from the usual requirements and pressures for immediate ROI.

"Every single piece of work we're doing, one of the biggest questions is: How can we create intellectual property? How can we create IP licensing? How can we create internal startups so we can drive revenue back to the university?" said Lin Zhou, SVP/CIO, The New School.

BMC software takes this approach as well. "We established BMC Innovation Labs to seed organic product innovation, and this is about experimentation: who fails fast or who succeeds fast, you learn and move on to the next one," said Chakravarti. "That's a great way to explore leading-edge technology without investing a gazillion dollars."





3. CHANGE HOW YOU SOLVE PROBLEMS

At Erickson Living, Keller says reinvention is "less about what we're doing, and more about how we're doing it." Keller is working with his team to apply new disciplines to problem-solving. He describes their evolving method as an "intersection between design thinking, lean, agile, and visual collaboration."

The visual collaboration component is a particularly new element in this seeming grab-bag of methodologies. Keller says visualization "allows us to take very, very complex pieces and distill them into images so that we can get a better grasp on what people are trying to accomplish." IT departments that have struggled to find a common language for business objectives or needs might consider an approach like this one. "When we first sit down to tackle new problems, we're not 'solutioning' right away. It's about digging in and really understanding the problem first," building a consistent approach to getting everyone on the same page."

Keller says that of course Erickson is experimenting with RPA, AI, custom software development, and other technologies this year. "But next year that's going to be just a new set of things. I think the 'how' is the critical piece for us."



4. TURN IT INTO A DATA SCIENCE DEPARTMENT

As the cloud offers more easy-to-consume services, some IT leaders say less focus on infrastructure is required—UC San Diego CIO Kellen said he will soon have no data center under oversight, for the first time in his career. Kellen also said he is gradually changing the entire department to focus on information curation.

"The big purpose for a central IT shop is to convert data and information into meaningful action. And that last bit is now the land of machine learning and data science, so I'm gearing up our office, our unit, to be a data science operations group," Kellen explained. "Where knowledge is scarce and valuable to the organization, it must be curated in a team, not an individual."

Many panelists indicated a move to strengthen their data science capabilities—"that's where we see the most competitive opportunity," said Carhartt's CIO/SVP John Hill—but Kellen describes a more extreme kind of data-focused reinvention for IT.



5. DON'T HAVE AN IT DEPARTMENT AT ALL

At Ohana Biosciences, Nathan McBride is trying a completely new model for an IT department, which is very light and radically decentralized.

Ohana has only two people working across units: McBride as the CIO/CISO and "this infrastructure, middleware, DevOps kind of role that I'm creating to work with me." Each department then has a single "full stack" IT expert, reporting to the business, and fully empowered to apply technology to solve business problems (within certain governance requirements).

"Yes, it's more expensive up-front to hire these people," McBride said, but this model is more agile and responsive to the evolving needs of an increasingly tech-savvy business. As a bioscience company, McBride says Ohana employees use a number of highly specialized tools and services, so much so that it's harder for IT generalists to add a lot of value in managing that toolset.

"I have 20 computational biologists who can run circles around your best AWS guy" in using the cloud for their specific jobs, explained McBride. So, he sees no need to hire an AWS expert; instead, the light central governance model offers those biologists "somebody who can put in AWS governance and provide a framework for these brilliant people to work, and then let them go."

CIO TH?NKTÄNK

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Ken Finnerty, President of Information Technology, UPS

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