Expert Insights

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The speed of smarter architecture

Hybrid cloud unlocks digital business value and mitigates execution risks

IBM **Institute for Business Value**

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Experts on this topic

Hans A.T. Dekkers

Chief Digital Officer and
Vice President Digital Sales
EMEA at IBM
linkedin.com/in/hans-a-t-dekkers
Hans.Dekkers@nl.ibm.com

Hans leads the digital teams across this sizeable geography, and works with clients and partners. He is determined to combine deep technological insight with a new sense of business reasoning. In January 2019, Hans moved to Madrid with his family, but he has lived and worked in various parts of the world—30+ countries—and has developed a strong interest in cultural differences, and how they affect our way of living and working together.

The ability to move faster than industry incumbents is critical to competitiveness.

Key takeaways

Speed is a critical factor in today's digitally-driven businesses, where the faster devour the slower. *The speed of smarter architecture* is critical to unlocking the strategic value of cloud computing.

Open hybrid cloud technologies are the foundation of smarter architecture: architecture that makes an enterprise's highest-value digital initiatives more feasible and less risky. Smarter architecture is not just an enabler of the highest-value digital initiatives, it's a prerequisite.

Smarter architecture introduces a new way of operating. For large incumbents, the principles of smarter architecture need to extend throughout the enterprise.

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Four types of speed are important to digital business

Today, in our conversations with large-enterprise clients, the theme of speed comes up often and in different ways. The most common way is in conversations about *software delivery speed*, sometimes called *developer velocity*. Concerns about software delivery speed are oftentimes the motivation behind agile or devops initiatives, for instance.

The second way speed comes up is with c*oncept-to-cash lead time*—how long does it take to turn a good idea into a digital product that is up and running and generating cash? This kind of speed includes everything that happens before software development begins and everything that happens after a first working version of software is deployed. Measuring concept-to-cash lead time often reveals that good ideas are taking twelve months or more to make their way through portfolio management and funding bureuacracy before developers start developing anything.

The third type of speed has gotten a boost of attention from the COVID pandemic: how fast can we respond effectively to changes in the business environment? Let's call this kind of speed *business agility*. Business agility applies to the entire enterprise (not just the IT organization) but is highly dependent on an enterprise's digitally-supported "sense and respond" capabilities. Data analytics play a big role in business agility, as does organizational structure, decision governance, and a data-driven culture.

Each of these types of speed are critical in a digital age where the faster tend to devour the slower. Consider the so-called FAANGs (Facebook, Amazon, Apple, Netflix, and Google)[1] They each employed all three types of speed while rising to dominant industry positions. Today they are large enterprises, but fairly recently, they were all small ventures with one thing in common: the ability to move much more quickly than the industry incumbents they displaced.

New tech supports the “speed of smarter architecture” to enable both faster software delivery and new digital strategies.

And it’s not just the FAANGs: outside of the “born digital” world, improving speed may be even more critical to large incumbent enterprises. When we see the average lifespan of companies on the S&P 500 drop from 60 years (in the 1960s) to *under 20 years* (today),[2] with an accelerating trend towards even higher turnover, we’re seeing the effects of having—or lacking—all three types of speed.

Smarter architecture is a fourth type of speed that becomes possible with hybrid cloud

The purpose of this paper is to propose a complementary fourth type of speed we call the *speed of smarter architecture*. Smarter architecture is a way for large enterprises to use hybrid cloud computing technologies and some related business technology (digital) practices to do two things:

1. Improve the *speed of software delivery*, decrease concept-to-cash lead time, and improve business agility
2. Make new types of digital strategies—such as building customer platforms and improving customer lifetime value—feasible sooner and with less execution risk.

The speed of smarter architecture is new because the technologies that make it possible are new. In general, new levels of speed are possible via the way cloud makes it easier for developers to experiment and innovate without the constraints of conventional on-premise infrastructure. But specifically, new speed at enterprise scale is possible due to new cloud container technologies that free applications from the hardware they run on.

It is also true that the hybrid, horizontal nature of smarter architecture creates new needs for speed throughout the enterprise technology stack. The hybrid underpinnings of smarter architecture create new speed-of-change opportunities that can only be realized by a decoupled platform architecture and associated operating model.

These opportunities show up in current challenges with data and regulatory compliance: if it takes a building full of people to change a configuration because of tightly-coupled architecture, it’s hard to get faster. But if every development team can make those changes without triggering a host of dependencies, everything goes faster.

Over the last three years, the combination of container technology, open source cloud software, and hybrid cloud architecture have made a new, better way of deploying and managing applications at scale possible. Possible, but not easy... large businesses that may have already made investments in cloud adoption may be getting only a fraction of the value available. Let’s explore why.

Case study: A typical high-impact digital opportunity with associated challenges

We can illustrate the speed of smarter architecture in terms of the problems it solves in large enterprises by using a "blinded" case study. This case study is based on a mash-up of recent client engagements focused on cloud adoption and digital transformation.

Imagine a company called KindaSlowCo (KSC), a USD $20B multinational firm with 20,000 employees. Its growth rate and profitability put it in the middle tier of its industry.

Like most industry incumbents, KSC and its peers face competition from new, smaller, more nimble market entrants. In response, the top-tier players in KSC's industry have been making large investments in digital reinvention programs, albeit with mixed success.

KSC has maintained a conventional means of managing business technology:

- The enterprise IT organization is separate from "the business"
- IT is organized around silos of functional specialties (such as architecture, development, and operations)
- Most business technology investments are defined and funded as projects that have distinct starts and stops, rather than an ongoing stream of funding and execution
- IT is managed as a cost center.

A failed digital transformation led to the departure of the enterprise CIO, and the new CIO has been "in the chair" for less than a year.

Building and operating a digital customer platform can improve customer lifetime value

KSC has not been a flat-out digital laggard. It has pockets of strength in customer-facing application development teams and in centers of excellence (CoEs) for agile development, DevOps, and data analytics.

KSC's business and geographic units have been active investors in cloud (each of the public-cloud hyperscalers have contracts with KSC, as do some of the large SaaS providers), but KSC made these investments without a coherent enterprise cloud adoption strategy.

Today KSC has "hybrid IT:" a mix of multiple public clouds from different providers combined with conventional, on-premises data centers, applications, and stores of data. As with most hybrid IT models, each public cloud runs the workloads that were the easiest to migrate to each provider (moving Microsoft workloads to Azure, for instance). Most of KSC's core business applications remain unchanged in the data center.

KSC's leadership and investors have become concerned about KSC's competitive posture, especially as COVID has exposed a lack of maturity and scale in its digital capabilities.

In response, the CIO and a group of senior KSC leaders have sponsored a large initiative to build and deploy a KSC customer platform that it calls Marketplace. Marketplace will fulfill some basic, but compelling, digital value propositions for KSC customers, who will be able to:

- Select and order products online, track product shipments, and manage their accounts with KSC
- Access a broad range of KSC product information and online support
- Connect with independent service vendors that offer after-sale installation and customization
- In addition, independent service vendors will be able to download software development kits that let them offer services on Marketplace.

Application modernization isn't easy, but it has to happen before the window of opportunity closes.

KSC's vision for Marketplace is to drive improvements in customer lifetime value (CLV). The idea of CLV is not new, but it is becoming top-of-mind in the world of large-enterprise digital strategy. It can act as the golden thread that connects a variety of digital value propositions (in this case, building and operating a customer platform can leverage related investments in CRM systems, customer service workflows, and artificial intelligence).

Consider the definition of CLV: *the total amount of money a customer is expected to spend in your business, or on your products, during the lifetime of your relationship with the customer.* If an enterprise's digital strategy is focused on improving CLV, it's probably on the right track.

For instance, a "digital superpower" attributed to Amazon is its ability to add the next customer at zero incremental cost. Amazon's Prime services are a straightforward CLV play, executed at tremendous scale.

Enterprises with well-developed digital capabilities will be able to execute CLV strategies by:

- Expanding the digital offerings available to each customer (cross-selling, upselling)
- Redesigning customer delivery value streams and making workflows more intelligent
- Improving margins (digital products and services are more profitable)
- Reducing the cost of customer acquisition
- Retaining the customer over a longer period of time.

Simply put, focusing digital strategies on improving CLV can confer durable, structural advantages over less fully digital competitors. Speed to improved CLV via digital products such as KSC's Marketplace is hard to argue with as a business strategy (see sidebar, "The back-of-the-envelope business case").

Smarter architecture improves speed by changing the operating model for deploying technology

In our case study, executing the KSC Marketplace will require a lot of software development. That work will encounter several challenging requirements, including:

- Enabling speedy, multi-threaded development and safe, secure, compliant operation
- Using customer data that resides in many different locations: data centers, applications, SaaS applications, core business systems of record, and mainframes
- Using data that has been migrated to multiple clouds
- Deploying Marketplace applications to multiple clouds, and in a variety of countries, each with different data privacy and data residency regulations
- Modernizing some existing KSC business applications, including systems of record, so that they can run on multiple clouds.

None of this is easy, especially the work of application modernization, but it can't take forever: the window of opportunity for Marketplace won't remain open infinitely. *This is where the speed of smarter architecture comes in.*

The back-of-the-envelope business case for a digital customer platform

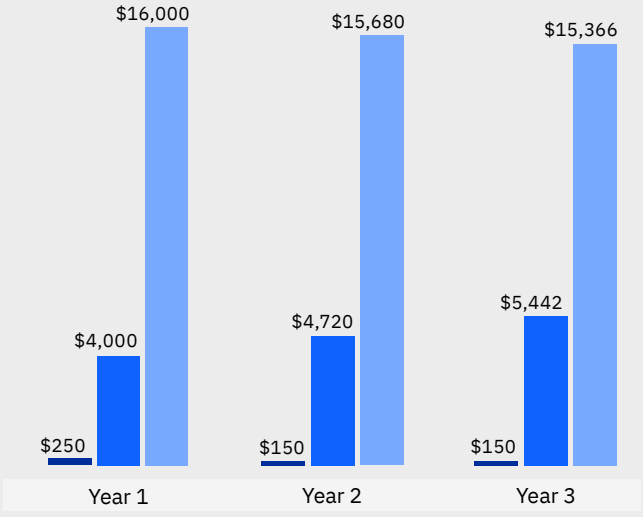
The business case for a digital customer platform such as KSC's Marketplace is very strong. Some very simplified back-of-the-envelope math illustrates how the numbers work:

- If KSC spends 5% of total revenues on investments in business technology (the IT budget), that's $1B.
- If 75% of that IT budget goes to business-as-usual IT spending, that leaves remaining 25% of $1B for a portfolio of IT-powered growth initiatives: $250M.
- Let's say all of that IT growth spending goes to a well-integrated portfolio of investments in the Marketplace product in Year 1, and then *half* of it again in Year 2 and Year 3: that's a total three-year investment of $500M.
- To realize a 5X return on that investment, Marketplace needs to deliver $2.5B in benefits over three years.

For a $20B business with modest profit margins, a scant 2% improvement in revenues combined with a 2% decrease in costs (specifically, reducing the costs of customer acquisition and service delivery) can deliver a 5X return on investment dollars that are *already in the IT budget*.

As with most sound digital value propositions, the question isn't "Are the returns worth the investment?," it's "Can we execute it?"

Smarter architecture Marketplace case:
5X return on funds already available in IT budget



When skills encounter the organizational complexity of a vertical operating model, the value of those skills diminish.

Moving from a vertical operating model to a horizontal operating model unlocks speed

Smarter architecture starts by solving a fundamental operating model problem that we see with many large enterprises today (see Figure 1). In our case example, KSC's current cloud "footprint" looks like the left side of Figure 1: a set of vertical pillars of organizations, data, and applications that are further hardened by adding clouds to each one. This vertical pattern may not be intentional, but most organizations, because of the way they're organized, will optimize cloud adoption in each pillar. They will optimize workload migration, security and compliance processes, application modernization, and even try to optimize the business value realized within each pillar.

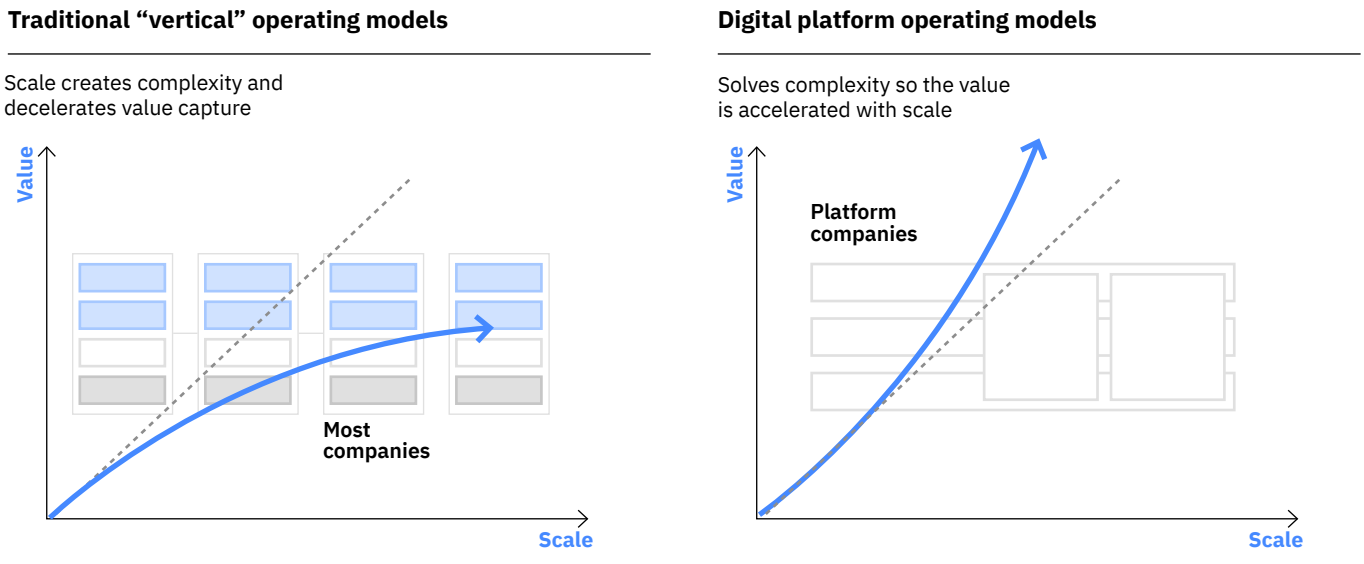
One effect of a vertical operating model is that as enterprises invest in becoming more thoroughly digital, the operating model pushes back. As businesses like KSC try to scale new digital capabilities, they get diminishing returns because it gets harder and harder to work across the vertical pillars. Collectively, the silos become bigger and less lean, and the complexity of managing work across multiple clouds and cloud service providers becomes prohibitive.

Another key characteristic of traditional, vertically organized organizations is that by optimizing in pillars, they suboptimize the digital skills and talent that successful execution requires. When skills encounter the organizational complexity of a vertical operating model, the value of those skills diminish. In a business environment where the scarcity of digital skills is recognized as a primary barrier to successful digital transformation, most large organizations are employing a digital architecture that is actually *diminishing* the value of those skills.

Figure 1

Scaling with accelerating returns

Operating model design influences how digital initiatives create value at scale



By contrast, the right side of Figure 1 shows a horizontal pattern that is typical of so-called platform companies (such as Netflix, Uber, Apple, and the like). As they scale, their returns increase; the operating model acts to *accelerate* growth and value. This is not a theory— just five platform companies comprise 20 percent of the Fortune 500 today and took an average of only six years to get there.[3] That is the power of speed.

Moving from separate pillars to a single hybrid cloud platform

The left side of Figure 2 shows a simplified four-pillar vertical operating model. A large enterprise like KSC today is more likely to have ten or more pillars, as it has acquired clouds from different providers without a clear enterprise cloud architecture or strategy.

KSC's vertical architecture means that even with the right vision, the right sponsorship, even the right level of multi-year investment, KSC will be unlikely to succeed in its implementation of Marketplace. At every turn, it will be confronted with the effects of a vertical operating model and years of optimizing within each pillar. None of these pre-existing conditions would prevent an initiative such as Marketplace from getting started, but progress would be so slow and so halting that the program would very likely be cancelled in Year 2, if not earlier.

By contrast, the right side of Figure 2 shows a *smarter architecture*, one more likely to lead to the success of KSC's Marketplace. The horizontal design of the operating model is critical to the productive work of Marketplace product teams, which can develop products from end to end without handing off work from silo to silo. Every avoided handoff improves speed and safety.

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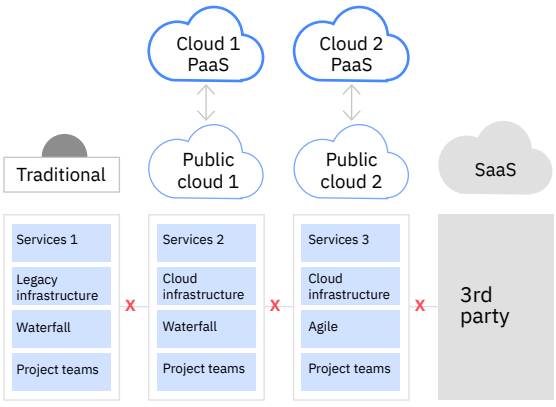
Figure 2

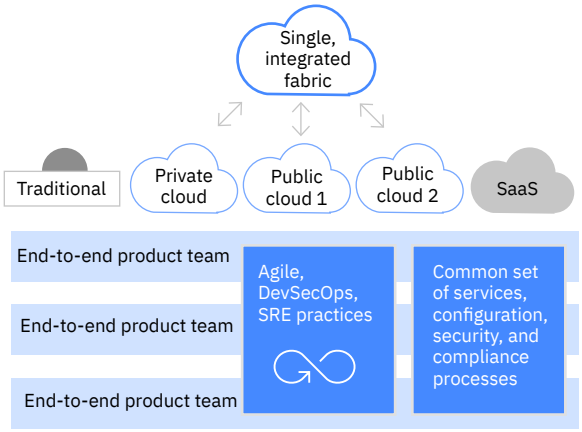
Moving from silos to flows

Horizontal operating models remove barriers to speed and deliver value

Vertical silos in a traditional operating model



Single hybrid platform and operating model



Greater “strategic optionality” means that innovation opportunities at the top of the technology stack aren’t constrained by middle or lower layers of the stack.

Each product development team can employ common but “loosely coupled” agile, DevOps, and Site Reliability Engineering practices, some of which can be automated as a means of improving software development speed. The same is true of configuration management processes and services, some of which can be automated and can employ “governance as code” to further improve speed, safety, and reliability.

Note that the right side of Figure 2 still shows multiple clouds, including a private cloud, public clouds that may be from different providers, as well as multiple SaaS applications. *Don’t these multiple and heterogenous clouds reintroduce the silos we see on the left side?* Or, put another way, d*oesn’t a horizontal operating model require going “all in” with a single cloud provider? No.*

Smarter architecture deploys a single integrated fabric that scales horizontally across all pillars, providing a common set of services, conflict, security, and compliance processes that can scale across all “vertical” instances of clouds from different providers. One single abstract hybrid fabric allows the enterprise to operate in and across multiple clouds consistently and with less complexity.

Build once, deploy anywhere, manage consistently

For example, if a product team applies a security policy, that policy can be applied across the entire enterprise cloud estate, versus having to apply it to each cloud separately. If a team creates an application and deploys the application once, that application can then be scaled across the enterprise and its multiple clouds.

As product teams mature offerings, products, and workloads, they can deploy them on the infrastructure that fits best, based on the product’s operating costs, security requirements, and/or regulatory requirements.

Smarter architecture provides complete freedom of choice: an end-to-end ability to create, deploy, run and manage the enterprise’s full technology stack. Being able to create an application once, deploy it anywhere at scale, and manage it consistently across the enterprise means that for large enterprises, size can be an advantage. Developers can spend more time developing, running, and improving digital products and spend less time on non-value-adding cloud administration, compliance, and configuration work.

Smarter architecture—an open hybrid cloud platform—also confers greater “strategic optionality.” This means that at the top of the technology stack, where applications are interacting with customers, partners, and ecosystems, opportunities for innovation are not constrained by the middle or lower layers of the stack. Strategic optionality means having far fewer conversations that begin with “It’s a good idea, but we can’t do it because…”.

Real management innovation requires challenges to fundamental mindsets about how the enterprise distributes power and perpetuates "ownership" of organizational silos.

Cost modeling shows the cost advantages of a horizontal operating model

Our work with clients has required extensive cost modeling based on actual enterprise experiences with cloud adoption strategy and implementation. We were—and continue to be—very interested in how clients that have implemented single clouds (or multiple clouds from the same provider) have fared in contrast to clients that have chosen a hybrid cloud architecture.

According to a study commissioned by IBM, we found that—other factors being equal—clients that invested $1B in an application running on hybrid cloud realized up to 2.5 times the business value versus running the same investment on a single public cloud.[4] This source of value overlaps a little with the other sources of value we've explored in this paper—for instance, our study assigned some business value to "strategic optionality," which is not completely different than "business agility"—but, in general, the 2.5X advantage is based on *operational cost advantages* of hybrid cloud *when it's used to deliver material value*.

Material value turns out to be a critical distinction. Many independent studies show that for most organizations, "cloud adoption" remains limited to running 20% or fewer applications on the cloud. The rest are still in the data center.

Unfortunately, the real business value available from cloud computing lies in the core business systems that have not been moved to the cloud, as well as with new applications that will operate by cutting across today's vertical pillars and even across the boundaries between enterprises in partnerships and ecosystems.

So if a single public cloud is hosting some greenfield, cloud-native applications that run with few dependencies, those cloud services will be relatively inexpensive. But if the enterprise is designing $1B modernized core business systems to operate horizontally across the enterprise's vertical pillars—work that is typical of cloud's transformational power—a single-cloud model simply won't work, and a siloed, multicloud model becomes complex and expensive very quickly.

Management innovation removes the barrier to entry

At this point the reader may be asking: if the business value available via speed and smarter architecture is so compelling, why do we find that most organizations are struggling to get value from their digital transformations and from their investments in cloud adoption? Why do we find that all the tech industry hype about cloud is countered by data that shows many enterprises moving "easy" workloads to the cloud but doing much less of the kind of high-value cloud work we explored with the KSC case study?

In our direct experience, when industry incumbents seek to join a club of enterprises that compete successfully on the basis of speed and smarter architecture, there are barriers to entry. And of course a strong business strategy wants barriers to entry: investing time, talent, and energy in getting faster is no good if there's no real barrier to keep the competition from doing the same thing.

The obvious barrier—even for those who accept arguments for speed and smarter architecture—is being able to design and implement the architecture and the technology required for a horizontal operating model. There's no shortcut for the level of smart tech and talent required to build and operate something like Marketplace or to reinvent the core business systems that run the enterprise.

But the highest barrier to operating as a more thoroughly digital enterprise is the requirement for real management innovation. We are used to thinking about *managing change*, but making speed and *smarter architecture* work at scale requires *changing management*.

It means challenging fundamental mindsets and beliefs about how the enterprise distributes power and perpetuates "ownership" of organizational silos. The horizontal operating model we've explored in this paper is a big step forward, but the next level of digital business performance requires will moving decision-making power and influence to the edge of the enterprise, where customers and ecosystems live.

On the left of Figure 3 is a conventional hierarchical bureaucracy, the basic shape of most large enterprise incumbents today. To the right is the shape of the near future: a market-oriented network of customer-facing teams on the periphery of the enterprise, and a center that serves, but does not direct, the market network. Customer-facing teams act as mini-enterprises, with all the speed and agility we associate with small, born-digital start-ups that are shortening the life expectancy of large enterprises around the globe.

The digital organization of the future is already here, it's just unevenly distributed for now in the early history of the FAANGs, in some digital unicorns, in fintechs, in organizations such as SuperCell, Valve, W.L. Gore, and DaVita. Broader distribution will require large enterprise C-suites and the next couple of layers of management to let go of the concentrated power, wealth, and privilege that the pyramid provides, so change won't happen right away.

It is likely to happen two ways: first slowly, and then all at once. So for the would-be survivors of an accelerating extinction-of-the-slow trend, the best time to plant a tree was twenty years ago. The next best time is now.

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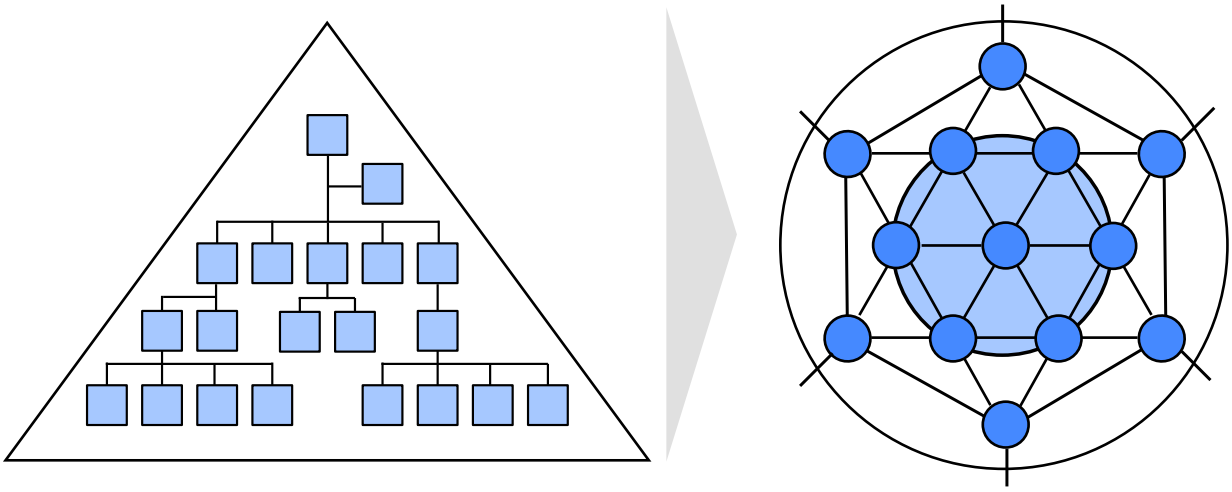
Figure 3

The shape of things to come

Moving from the organizational pyramid to the market-oriented network



Source: Adapted from Pflaeging, Niels: Organize for Complexity.

Action guide

Leveraging the speed of smarter architecture

In this short paper, we've taken two very persistent themes—persistent questions—that come up in our work with clients. How do we make progress on our digital journey? How do we get real strategic value from our adoption of cloud computing?

We've offered some answers in the form of the speed of smarter architecture, and we've proposed that large incumbent enterprises that choose to couple smarter architecture and management innovation can position themselves to thrive through a period rapid digital evolution.

For readers wanting to explore these ideas further, we recommend these actions:

Take a hard look at the digital initiatives in your enterprise investment portfolio. How many are designed to deliver 5X value? How does each investment support each other investment, creating a well-integrated portfolio? Which investments require smarter architecture in order to succeed?

Understand how fast your organization is today. What are your performance baselines for concept-to-cash? How do you know if software development velocity is getting better? What effect are vertical pillars and a vertical operating model having on delivery speed?

Define the business value you are capturing with your cloud adoption. Take a snapshot of cloud investments across the organization and how clearly the path forward is defined. Are your expectations for cloud business value high enough? What is your planned path to realize those expectations?

Experiment with management innovation. Imagine even one part of the enterprise that could begin to work as a self-directed market-oriented team that the center of the organization supports with services, but doesn't manage or "own." Let willing early adopters volunteer to create some validated learning, and experiment with how to balance accountability with safety to make some mistakes and some upside for success.

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