Harvard Business Review

REVENUE-GENERATING CIOs:
SMART STRATEGIES TO GROW THE BUSINESS

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If you're a CIO, then your mandate from the CEO has probably changed in recent years. CIOs are following a new set of orders, and organizational leaders are now asking them to drive competitive advantage for the business. Increasingly, that means finding ways for IT to make money.

Leading CIOs are rising to the challenge. They're focused on generating revenue rather than cutting costs. They're seeking ways to continually improve rather than deploying and moving on to the next project. And they're doing so with the company's external customer journey in mind rather than focusing narrowly on internal stakeholders. This evolution of responsibilities requires both a 180-degree shift in mindset for many leaders—and an IT cultural transformation emphasizing speed, innovation, and revenue-generation.

This Harvard Business Review Analytic Services research, sponsored by Red Hat as part of The Enterprisers Project, makes it clear that this shift is no longer optional. IT organizations and CIOs are adopting a revenue-generating mindset in four common ways—from embracing agile methods and DevOps for improved speed to adopting a product mentality to bringing critical technical skills into the organization. But none are standing still. Or, as the CEO of GE put it: "There is no backup plan."

As I read the results of these interviews with 15 CIOs and industry experts, one point stood out for me: Traditional leadership functions and top-down hierarchy are things of the past. Leading CIOs aren't looking over their shoulders at their CMOs or chief digital officers and worrying that they're gunning for their budget or their job. Instead, partnership, collaboration, and open communication are critical to success in the digital future. At Red Hat, we've seen firsthand the transformative, positive effects on the business when collaboration starts at the top.

If you're aspiring to become a revenue-generating CIO, then this report will provide a framework for you to get there. Through the practical insights and experiences of your peers, we hope this report will inspire you, put you on the path forward, or inform your existing strategies. We plan to continue exploring the unique ways CIOs are making this shift in their own organizations at The Enterprisers Project, our online community of IT leaders. We invite you to join us there to continue the conversation.

Jim Whitehurst
President and Chief Executive Officer
Red Hat

REVENUE-GENERATING CIOs:
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CEOs INCREASINGLY WANT their CIOs to help generate revenue for their organizations. Almost two-thirds (64 percent) of the respondents to the 2017 Harvey Nash/KPMG CIO Survey of more than 4,600 CIOs say their CEO wants the information technology organization (IT) to focus on how to make money rather than save money.

However, while shifting attention to the top line, CIOs still have to watch costs and balance them against likely returns. This requires a deep understanding of their organizations' business and customer needs, as well as staying on top of the latest technology trends. CIOs who have experience running a P&L or a startup bring much-needed experience to this new role.

Harvard Business Review Analytic Services interviewed 15 CIOs who are using IT to increase their organizations' revenues. Here, we share some of their approaches to turning IT into a revenue generator, including four essential things they do especially well. IT and business leaders who are being asked by their CEOs to contribute more to the top line will gain useful insight and ideas from their examples. These CIOs deployed IT in four areas to generate revenue:

Digital products and business models: This means a shift from selling the equipment that runs a factory, for example, to selling performance information about that equipment along with insight about how to optimize its performance. GE has become a popular exemplar of this, as it leads the way to the digital industrial future. By the end of 2017, revenue growth from information-based products will be double that of the rest of the product/service portfolio for one-third of Global 2000 companies, according to IDC.

Digital operations: Transformation of everything from the supply chain to customer engagement. CIOs contribute significantly to their organizations' balance sheets by helping run the business better. Examples include enrolling more customers online faster at CVS Health and making field engineers more productive to increase revenue from service contracts at GE Power. Sometimes, as in GE's case, that capability then gets turned into a product to sell to customers.

Software sales: Companies that have developed exceptional software for their own internal use are finding new revenue streams by refactoring it for use by customers and other third parties. Union Pacific's CIO runs a subsidiary of the company to do just that.

IT services: Land O'Lakes Inc. launched a business in 2016 to provide IT services to agriculture retailers across the country.

While these four areas may seem distinct, they're often intertwined. Selling software and selling services are really subsets of new products and business models, with the difference being that software and IT service subsidiaries are more likely to be run by the CIO. And companies that are betting their futures on new digital products and business models realize they can't get very far without also transforming their operations. For instance, realizing the full value of GE's transformation to a "digital industrial" will come from breaking down silos and creating an enterprise "digital thread," according to CIO Jim Fowler.

"If I can connect the data across the process silos, that's where the next four percent of productivity is going to come from," he said.

This is one reason the CIO is essential to digital or technology-enabled revenue generation, becoming what some CIOs refer to as the "competitive capabilities champion," according to Martha Heller, CEO of Heller Search Associates and author of *Be the Business: CIOs in the New Era of IT*. IT organizations across industries now are being repositioned and redesigned to enable new ways of doing business and to create new information-based products and capabilities that can be sold in the marketplace.

CIO ADVICE

"Tie innovation efforts to driving business growth or customer outcomes."

CLAY JOHNSON | ENTERPRISE CIO AND EVP, GLOBAL BUSINESS SERVICES, WALMART

The degree to which companies have embraced revenue-generating IT varies, depending on their market. But it's a mistake to think that industries that have been less driven by IT in the past can be complacent today. Smart CIOs and their business partners look beyond the immediate horizon to create competitive advantage.

"Agricultural and CPG [have been] some of the laggards in technology adoption," said Mike Macrie, CIO of Land O'Lakes. But this has provided an opportunity: the chance to observe the impact of new technology on other industries that are more on the cutting edge, like banking, trading, and retail. Macrie has used the insight gained to move even more quickly now. "We have to adapt, or we're going to be relegated to lower -margin opportunities," he said—a sentiment shared by all the CIOs interviewed for this report.

Making the shift starts with a vision of the future. At Land O'Lakes, this came from the business leader of the company's WinField business unit—one of the largest distributors of agricultural inputs in the U.S.—seven years ago. "He had a vision that technology was going to dramatically change the way we went to market and the way farmers would make decisions in 15-20 years. And he painted for us a very strong vision of what he thought it would be."

Vision backed by strong commitment can move mountains—and by any measure, GE, the 125-year-old, $130 billion global conglomerate, fits that description. GE put in place a number of structures and resources to drive its transformation. But one of the strongest levers for change may have come from a simple statement by the CEO. When asked by an investor what his backup plan was for the digital industrial future, CEO Jeffrey Immelt said there was no backup plan. "When Jeff stated that, people realized we've got to figure this thing out; there is no lifeboat here," said Clay Johnson, former CIO of GE Power and now enterprise CIO and executive vice president, global business services for Walmart. "The culture has really shifted, but it took Jeff saying that."

Land O'Lakes: R7® Tool by WinField United

A software platform sold to retailers and, through them, to growers. It provides advanced, near-real-time capabilities for farmers to analyze the history and productivity of their fields and to select the right seeds based on that and proprietary Answer Plot® data. Accessed through a mobile device, it helps both retailers and farmers in the field make better decisions and react faster to changing conditions.

CATEGORY	Software sales and new product/business model
PRODUCT LEADER	Partnership between CIO Mike Macrie and WinField EVP and COO Mike Vande Logt
BUILDING ON THE PLATFORM	The R7® Tool has served as the launch pad for additional products, including:

- R7® Field Monitoring tool, which monitors the progress and growth of a field over time. Using satellite imagery, it can detect anomalies and notify farmers to check fields for problems

- R7® Field Forecasting tool, which, with economic variables, enables farmers to predict the yield of a field with a standard error calculation and anticipate what the impact on yield and return will be of any corrective actions taken

- DataSilo™, a cloud-based system that enables farmers to exchange geospatial and other data with their retailers, partners, and online SaaS firms specific to agriculture, while retaining their data and privacy rights

These new products help farmers identify problems in real time and make improved decisions on what to do to mitigate issues, changes, or problems during a growing season.

Making the change to revenue generation requires that CIOs do four things extremely well. These are addressed in the sections below.

- Adopt a product mentality
- Increase the speed of development and delivery
- Hire, develop, and retain exceptional tech talent
- Collaborate deeply with business owners and digital officers

ADOPT A PRODUCT MENTALITY

When it comes to revenue-generating capabilities, all parts of IT must shift their thinking about what they are accountable for from a focus on projects to managing all aspects of product development and delivery, according to the CIOs interviewed for this report.

There are three main aspects of adopting a product mentality:

- Ownership and accountability beyond the usual boundaries of project delivery
- Heightened focus on the user experience, often by taking a design thinking approach
- Different metrics to measure success

For Mojgan Lefebvre, CIO of the Global Specialty business unit at Liberty Mutual, this means being involved from the start in ideation, managing development (increasingly as part of a multi-functional agile team), and providing ongoing service and support for diverse users once the product goes live—basically, owning the entire life-cycle of the software product in a way that few IT organizations have in the past. "A project has a beginning and end," said Lefebvre. "The project ends when we put the product in users' hands."

The same shift is taking place at CVS Health. "The vast majority of work that we do is not once and done," said Stephen J. Gold, EVP of business and technology operations and CIO at CVS Health. "It's build and enhance; it's a product mindset, not a project mindset."

Macrie also has redefined roles from project to product managers for his commercial endeavors at Land O'Lakes. "It's a higher expectation level," he said. "My product managers own the product from birth to death. And their main goals are whatever objectives the business has set out for them. We've got to build the right thing, and we've got to get it adopted by our customers. If it is exclusively a revenue-generating opportunity, they're also aligned incentive-wise toward generating that revenue."

Priorities change when IT starts driving revenue, according to Macrie. "When you're providing a system for employees, functionality and cost are king," he said. "When you're talking about an external-facing product...the user experience can make or break your brand in the eyes of your customers."

This challenge has driven Liberty Mutual to adopt a design thinking approach to IT development—a concept made popular by the design firm IDEO that focuses on three core areas: a product's desirability to customers, its feasibility from a technical perspective, and its viability as a business venture. Liberty Mutual formed a small innovation group, which worked with IDEO to learn the process, then brought that into the larger group, according to Lefebvre. "One of the very first areas that they focused on was creating a culture of innovation," she said.

Curt Carver, CIO at the University of Alabama at Birmingham, has embraced crowdsourcing "to create a voice for the customer and allow them to coauthor solutions." This closes the gap between finding out what customers need and deploying customer-prioritized solutions.

Developing IT for customers and partners also requires a different approach to architecture, according to Johnson. "It's not architecture of just internal apps. How do you develop and deliver commercially available apps?" he explained. "How do you scale them across multiple industries?

CIO ADVICE

"Tie performance metrics to business outcomes and adjust compensation to reflect shared accountability."

MARTHA HELLER | CEO, HELLER SEARCH ASSOCIATES | AUTHOR, *BE THE BUSINESS: CIOs IN THE NEW ERA OF IT*

GE FieldVision

A persona-based mobile app that aggregates data from 86 different systems to make field engineers more productive at customers' sites. Engineers who want to access a drawing, get work instructions, collaborate with another engineer, or track time or parts only need to access this one application.

CATEGORY	New product/business model and digital operations
PRODUCT LEADER	The project was initiated by Trey Keisler, a senior IT leader in the power business, who spent time with the field engineers to understand how they did their work and design a better process. As the product grew, a team was pulled together within GE Digital to look at the horizontal applications of FieldVision. This was led by CIO of field services Bobby George.
ENHANCEMENTS	The company has improved data collection and analytics on the FieldVision platform through the use of thermal imaging and algorithms that do comparative analysis to see if heat signatures on power plant equipment have changed. This alerts them to potential problems before equipment fails, allowing for predictive maintenance. The use of drones has taken this a step further, enabling such analysis and monitoring even when a field engineer is not on-site—especially helpful in remote locations. Similarly, the use of 3D imaging and virtual reality lets on-site customer employees take 3D images of parts and work with GE engineers through the cloud to help diagnose and potentially resolve problems rather than waiting days to fly in an available engineer.
OUTCOMES	The company realized productivity gains of $200 million. The application has since been rolled out across GE, not just in the power business. And in the ultimate application of top-line IT, such internally developed capabilities, including FieldVision, are being further developed to be sold as services to customers.

Before, we always developed applications that just fit our business or one site or one location. Now we're really taking it horizontally across our businesses; it's just a different mindset."

As IT's role in competitiveness increases, its focus will increasingly be outward. At CVS Health, the systems IT works on are almost all externally facing. Gold outsources or uses the cloud for many internal systems, like HR. "We want to spend our energies on capabilities that drive revenue," he said.

Adopting a product mentality and running IT more like a commercial entity also requires adjusting your metrics and thinking about costs in a new way. For example, when it comes to revenue-generating opportunities at Land O'Lakes, Macrie says, "very rarely did they care whether it was

10 percent more or 10 percent less. It was, 'Did it do the job that the customer needed?' It was measured on time to market, creativity, customer intimacy, and customer adoption rates." On the operations side of IT, by contrast, it's all about how to get the cost down. This has caused Macrie to segment his department into a number of different groups, each with its own goals and metrics.

However, being low-cost is still a virtue, according to Lynden Tennison, CIO at Union Pacific.

"In a competitive marketplace, if you have equal-to or better quality and you are also a low-cost provider, it's very hard for others to compete against you," he said. "We strive very hard to drive ourselves to a very, very low-benchmark cost structure." See sidebar on this page

Tennison and other CIOs who have run a line of business or launched a startup say it provided them with valuable experience for the opportunities they face now. Tennison rotates IT staff through Union Pacific's for-profit tech subsidiaries in order to spread this P&L type mentality throughout IT. "They not only see we have to build really good code but we also have to consider

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IN FOCUS

Union Pacific PS Technology
A for-profit technology subsidiary that takes technology Union Pacific builds internally, modifies it for external use, and sells it in the marketplace.

CATEGORY	Software sales, new business models, and digital operations
PRODUCT LEADER	CIO Lynden Tennison
CURRENT REVENUES	$35 million
CHALLENGE AND OPPORTUNITY	Repurposing technology that was created for internal use requires building commercial-grade software from the beginning, with all that entails. "A lot of what we build will find its way into the commercial marketplace, and so we know we have to put a different level of capability and sophistication into our design, our standards, a lot of the things we do." This helps hone UP's IT capabilities overall, increasing quality to all parts of the business. This in turn has helped attract and retain better talent.
WHY IT'S IMPORTANT	While PST revenue is relatively small in the context of UP's $20 billion business, PST is only one of the ways in which IT contributes to Union Pacific's revenue. The capabilities developed through building commercial-grade software have enabled a number of other subsidiaries that are data- and technology-driven, such as Streamline, a door-to-door intermodal service. While Tennison leads PST and two or three other revenue-generating operations, in cases where IT is more of an enabler to a transportation business, he partners with his peers who own those businesses to drive top-line growth. (See story for how this is structured.)

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our cost structure," he said. "We could build really good code, but if our cost structure is too high, we're not going to be able to sell it for a profit anyway."

INCREASE THE SPEED OF DEVELOPMENT AND DELIVERY

Another factor in this shift to commercially driven IT is the growing adoption of the concept of minimum viable product (MVP) when launching new innovations. Lefebvre points to digital-first companies as an example. "The first solution Uber put out didn't have 80 percent of the capability it has today," she said. The idea is to "build the minimum viable product, put it in the hands of users; see what they think; then adjust from there." This is clearly a shift from the traditional project-based, once-and-done mindset.

MVP is useful in selling new ideas internally as well. Joe Drouin, CIO at Pulte Homes, presented an idea for a home configurator several times using spreadsheets, mock-ups, and wireframes. This was something consumers could use to specify aspects of a new home (adding a porch, for example) and that would then drive through to building contracts with suppliers. But it wasn't until he created a working prototype using real data that the idea took hold.

"As soon as I could show the CEO a working prototype using real data, he got it." This is only feasible taking an MVP approach, says Drouin. "I don't have resources to spend a year building something that may or may not take flight. So I've organized my team around product and embraced agile and the idea of MVP so we can quickly bring something to at least a demonstration of value."

Indeed, agile methods and DevOps (an approach to software development and delivery that emphasizes speed and collaboration among previously separate groups), are central to delivering a minimum viable product. GE's FieldVision "was really just an IT project when we first started building it," said Johnson. See sidebar on page 5 But when it became clear this was going to be a revenue-generating product for the company, "we completely moved it to a DevOps model, with eight pods running two-week sprint cycles. [It went] from being an IT project that runs on the database to a full commercial product that sits on Predix"—GE's cloud-based platform-as-a-service, or PaaS. The first commercial release was in fall 2016.

When it comes to innovation, small, diverse teams can move faster than established organizations. It is now common for traditional companies to set up innovation centers and groups apart from the daily operations of the business. CVS Health has an innovation center in Boston where IT and digital business teams are co-located to experiment, test out, and learn from new consumer-facing innovations, such as the Integrated Pharmacy Experience, or CVS Pay. These efforts are co-led by two people: the chief digital officer, who reports to the president of CVS Pharmacy, and a direct report of Gold's, who is responsible for building and supporting the company's digital systems.

"Innovation is less about strategy and more about experimentation and discovery," said Vaughan Merlyn, co-founder of the Business Relationship Management Institute and a longtime advisor to CIOs. Setting up an innovation office staffed with the "best and brightest, with a mission to

experiment and break the rules, is one of the most important things a CIO can do" in this role of revenue generator, he said.

Liberty Mutual has started its own venture capital arm and has invested in a number of startups—the kinds of companies that might create the kind of industry disruption Liberty Mutual hopes to stay ahead of.

Union Pacific has an innovation group focused on using technology to run the business better. Tennison and the company's COO run a joint monthly technology-driven operations meeting. "It's our targeted R&D for technology to drive change in the operations of our railroad," Tennison said. The group directs millions of dollars annually to do targeted R&D in areas where technology can differentiate the company's products or operations, or that will drive efficiency or safety over the next five to 10 years. Participants include representatives from engineering, transportation, and IT. Promising ideas are funded to create a proof of concept, with around a dozen under way at any given time.

"This is a very tight merging between the day-to-day operational people and my technology group to dream about how lasers could change the world, how ground-penetrating radar could change the world, how speech recognition could change the world," said Tennison.

In parallel with such dedicated innovation efforts, many large organizations are attempting to transform the whole enterprise's culture to one of speed and innovation. "To change all of Liberty Mutual, with its 50,000 employees, requires a more fundamental effort to become more agile," said Lefebvre. This will mean restructuring IT and taking a more agile approach to software development, with small, cross-functional teams of eight to 12 people working together all the time. Each team will have a dedicated product owner from the business.

"Many CEOs I've spoken with say, 'Digital is fast and our IT unit is slow,'" said George Westerman, principal research scientist with the MIT Sloan Initiative on the Digital Economy. At some organizations, this has led to businesspeople working around IT. But the organizations that MIT's research has identified as "Digital Masters" have found some way for business units and IT to work together. "That has meant changes on the business side and the IT side." For IT, it means becoming more business-aware and delivering faster and better, often in a bimodal fashion, Westerman said.

HIRE, DEVELOP, AND RETAIN EXCEPTIONAL TECH TALENT

Companies need exceptional technical skills to compete on their use of IT. "This is a big focus for us," said Lefebvre. "We need people who are more technical." The use of smaller, cross-functional product teams that include members from business functional areas means they no longer need IT people to serve as intermediaries to the business. "These teams are working together. The IT people need to be really technical, to build or configure based on the business need," she said.

At the same time, the drive for speed means that IT professionals must have a broader range of skills. For example, a software developer must also be able to test the product.

HBO Go

A streaming service of HBO content available to HBO subscribers through their cable, telco, or satellite provider.

LAUNCHED	CATEGORY	PRODUCT LEADER
2010	New product/business model	Then-EVP & CIO Michael Gabriel

WHAT WAS AT STAKE	In the year 2000, it was clear that digital distribution of content would disrupt the video industry just as it already had the music industry. HBO needed to develop a digital service while not disenfranchising the distribution affiliates upon which the company depended for distribution and promotion.
CHALLENGES	Reassuring affiliates this wouldn't disrupt their customer relationships. Ensuring consistent high quality across a wide range of affiliates.
SOLUTION	HBO would control and absorb the cost of development and the architecture for distribution but build in an authentication mechanism that allowed partners to validate through the app that the person was a customer of theirs who was paying for HBO.
KEY PARTNERS	CEO Jeff Bewkes (now CEO of Time Warner) and CFO Bill Nelson for the vision and executive support; Time Warner's digital media management committee for developing standards for digital libraries; the broadcast technologies and operations group for execution. IT handled software development, rights management, financial systems, and affiliate distribution systems. Tech ops owned the standards for encoding the content, asset management, and the process of getting assets to distributors. "They were the supply chain; we were the factory," said Gabriel. Business development, marketing, creative services, program planning, business affairs, finance, HR, legal, and affiliate sales departments were also involved.
LESSONS LEARNED	While a number of HBO's executives believed in the digital future, others feared its impact on their existing revenue streams. But because HBO started early, it had time to roll things out in stages, design the digital supply chain, and work with both internal and external stakeholders to address their concerns.
	While Gabriel understood what the technology was and wasn't capable of when they began, they couldn't predict the timing of when full streaming at high quality would be viable. But by being the leader, they had the opportunity to establish their own standards and do things the way they thought they should be done.
BOTTOM LINE	HBO's influence in building industry momentum to leverage rather than fall victim to internet distribution was significant. HBO Go, HBO Now, and the value of HBO's content were mentioned as key factors in AT&T's intended acquisition of Time Warner.

Former GE Power CIO Johnson agrees. "The skill sets that GE is looking for have completely changed compared to the skill sets that we had just two years ago," he said. "We're really focused on software engineering. If you look at the whole makeup of a DevOps team in terms of the architecture, all the requirements—mobility, user experience, all this stuff—the whole team makeup is completely different."

When it comes to skills, CVS's Gold looks beyond the new tech skills his business will benefit from (AI, machine learning, DevOps, digital, security) to ensure his team has the right competencies when it comes to working in teams, leadership, customer focus, and accountability, he said. He promotes the acronym ACT with his team: Accountability to deliver on commitments; Collaboration, working closely with business colleagues and customers; and Tenacity.

"We know we're going to run into things that don't work exactly as expected," he explained. "We try to minimize that with an appropriate risk strategy, but there will always be speed bumps. We focus on how to overcome them and avoid repeat occurrences."

More than ever, the caliber of talent is critical. At Land O'Lakes, Macrie puts many of his highest-potential talent on the company's for-profit IT businesses. "They're not just great engineers; they also think creatively. They think about the business objectives and solve problems in new and innovative ways." These high-potentials also communicate and influence effectively across their business relationships. "Those are the people you really need to focus on for these opportunities," he said. Macrie has put in place a comprehensive talent development program, with transparency about what's required for different roles and opportunities to move around.

Some of this can be accomplished by retraining/reskilling existing people, but "not everyone is cut out for this environment," said Tennison. "You'd better be recruiting world-class technologists if you really want to play in that game."

The good news is that CIOs who are making this transition are having more success competing for top talent. "What's been amazing for me is, we're actually attracting people and competing against the top companies," said Johnson. "We used to go to a college recruiting fair and we'd be stacked up with Facebook and Google. They'd have candidates lined up out the door, and GE would have five people in line. Now it's the other way around—GE has the line out the door, and I think it's a lot of the commercial and marketing things that we've done."

CIOs focus on three things when it comes to their recruiting message. First, they emphasize their IT unit's technical prowess and focus on commercialization. As Johnson notes, you don't have to go to Google to work on cool projects anymore.

Second, they stress the mission and impact of their company. At CVS Health, that translates to helping people on their path to better health, said Gold, citing the company's mission statement. "There aren't a lot of companies that can say that, especially at the scale we do it."

Third, they create an environment that is challenging and rewarding both professionally and emotionally, said Gold. "I always tell people, 'I guarantee you, after you've spent enough time with us and learned from our disciplines, you'll be doing stuff you never thought you would be able to do.'"

COLLABORATE DEEPLY—AND THE ROLE OF THE CIO

Organizations today need to have clear leadership for digital transformation, according to MIT's Westerman. "Whether you call that person a chief digital officer (CDO) or something else, someone needs to be in charge of driving the transformation." Sometimes the CIO assumes this role, but often, especially in large organizations, the CIO now works hand in hand with the CDO as well as other business leaders as they leverage IT in new and different ways to drive their business. Digital requires a lot of partnering and collaboration. "At the Digital Masters, digital leaders are working closely with IT," said Westerman. "When you've got a good CIO, they're either the CDO or they're the best friend of the CDO." The idea that hiring a CDO means the CIO isn't doing his or her job is a false assumption.

GE has a corporate CIO and CDO, and they replicate that pairing through each of the lines of business. CVS Health's CDO reports to the president of the pharmacy (retail) business, while his IT counterpart reports to CIO Gold.

Whatever the roles involved, collaboration starts at the top and runs all the way through the organization. There are a lot of mixed reporting relationships and new roles. Gold runs both IT and client service operations at CVS Health. Then, for example, the person who runs the eligibility group—a hybrid IT/operations team—reports in a solid line to one of the heads of IT development and dotted line to the head of business operations—both of whom report to Gold. Having a mix of solid-line and dotted-line reporting is becoming the norm.

At Union Pacific, the role of the CIO in revenue growth varies depending on the expertise of the executives involved. "In our subsidiary companies, I am clearly not the expert, nor is my team," said Tennison. "We can be the experts on the technology and we can understand how the technology can be applied, but we are not as close to the customer side of the business as, let's say, our marketing and sales people are." In that instance, he believes, "the key is to really understand how to make very strong alliances, how to be able to have open, candid conversations with your peers. And how to help them be the hero and win, and play a supporting role in that situation." However, when it comes to new technology subsidiaries, "that is an area where we know the market as well as or better than anybody else in the business. That's where we tend to take the lead."

When it comes to being a revenue-generating CIO, there's no either/or about what's more important, business or technical knowledge. Johnson believes the CIO "has to know the business better than the business."

CIO ADVICE

"Recruit world-class talent."
LYNDEN TENNISON | CIO, UNION PACIFIC

Gold believes that while both are essential, deep technology knowledge is what sets the CIO apart from other company leaders, and that it's easier to learn the business than to pick up technology later in one's career. Tennison cites his standing as "an unabashed capitalist; I love

competing in the marketplace" as a key to his success in this new role. And all cite their experience running a business or working closely with startups as key to being successful as a revenue-generating CIO.

Being a revenue-generating CIO also requires a shift in thinking and the language used to talk about what IT does and whom it does it for. As a business, SunTrust Bank is moving away from being product-focused to being client-focused, delivering capabilities that span many different products. As a result, talking about products with his business partners doesn't work for CIO Anil Cheriyan. Similarly, he and many of the CIOs interviewed for this report reserve the term "client" to talk about the organization's end customer, not internal stakeholders. "Our clients are at the center of everything we do—from the solutions we provide to the processes we follow to the technology we implement," said Cheriyan. "As a purpose-driven organization, we all work as one team to ensure we meet their needs. The client is our client; our business partners are our teammates."

CONCLUSION

The advice to run IT like a business is not new. But what that means has changed substantially in the past few years. Today it means developing software and systems for use by external entities, with all that entails. It means owning the life cycle of the "product" and continuing to evolve it with new capabilities as needs and expectations change. It means understanding when to invest and how to weigh costs and returns from a commercial perspective. And it means deepening relationships with business peers and working collaboratively from the C-level on down. Revenue-generating CIOs do all this and more. The four things they emphasize most heavily:

• Adopt a product mentality (think user adoption, support, and evolution, not just project)

• Increase the speed of development and delivery

• Hire, develop, and retain exceptional tech talent

• Collaborate deeply with business owners and digital officers

IT's revenue-generating contributions aren't just tied to new products and business models. CIOs are enabling their businesses to operate in radical new ways. In some cases, as with CVS Health, this has led to a combined role of CIO and head of client service operations.

Depending on the organization, CIOs' roles in driving revenue will vary. But whether the focus is on selling new commercial products or enabling the business to operate in new ways, the CIO has indeed become the business world's competitive capabilities champion.

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