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Digital Strategies Roundtable

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Innovation, R&D and IT

Key Insights and Summary

Center for Digital Strategies
Tuck at Dartmouth

Innovation, R&D and IT

Digital Strategies Roundtable
An executive roundtable series of the
SDA Bocconi School of Management at the Università Bocconi and
the Center for Digital Strategies at the Tuck School of Business at Dartmouth College

Innovation is the lifeblood of growth, providing the new products, services and business models that keep a company competitive, increase market share, satisfy customers and challenge talented people. Although capitalizing on innovative ideas while running core operations has always been a balancing act, the current pace of change forces the question of how to innovate intelligently at speed, including how to incorporate omnipresent new digital technologies.

CIOs and their R&D and business strategy colleagues from Airline Reporting Corporation, the American Bureau of Shipping, Chevron, Owens Corning, Sidel, Tetra Pak and host Eaton Corporation, along with faculty and Executive Fellows from the SDA Bocconi School of Management, met to discuss the relationships between R&D and IT, and how they can better work together to drive product and service innovation.

Key Insights Discussed in this Article:

 This overview was written by Hans Brechbühl, Associate Professor of Practice at SDA Bocconi & Director, Digital Strategies Roundtable, and Stephen Plume, Executive Fellow, Digital Strategies Roundtable. The Digital Strategies Roundtable publication series is edited by Hans Brechbühl.

Ladies and Gentlemen, Place Your Bets

Hans Brechbühl, Associate Professor of Practice, SDA Bocconi School of Management, framed the day's discussion:

> It's a challenge to innovate smartly: to tap the abilities of your people, but not harness them too much; to meet market needs and satisfy customers while at the same time incorporating new technologies — all at a breakneck speed. We all have to get to market much more quickly than we've ever had to before, because threats are not coming just from your traditional competitors, but occasionally from left field.
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> How are your products and services changing, and what directions are you being pushed to because of what's happening in your industry, with customer or competitors or technology?

"We sell about 9 million products to 25 different verticals: aerospace, military, construction, oil and gas, automotive, residential, commercial. Our stuff is in everything," answered Bill Blausey, CIO of Eaton Corporation.

> There are opportunities in all those verticals: how circuit breakers work, how to conserve power, the digital ways they can be managed. Practically everything we make has some ability to have a sensor, and all of them are ripe for information to run differently — we have hundreds of options for where we could invest to create differentiating value. So the first question is, what is the additional value that can create and deliver services that customers will pay for?
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> The challenge for us is, which platforms can we win? Where do we have enough presence, enough of the right kind of partnerships, the right positioning, to change our value proposition and the business rationale? And where do we have enough market intelligence and understanding to make the right calls? Because there are numerous ways to go about it.
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> We have a sense for the physical products, but our ability to accurately assess the market's willingness to pay for value in the digitization/IoT space is not yet particularly mature.

"Many of our businesses don't have direct interaction with the end user," explained Blausey's colleague Mark Roces, Business Relationship Manager for Electrical Products. "Our business runs primarily through distribution (electrical distributors) and OEMs, so our businesses are organized around products, not verticals. But when we look at these new applications, many of them go across the verticals more than into a single product or solution set. These are the hills we have to climb to figure out how to get transformative with our digital products."

Mark Meyer, head of Global IM for Tetra Pak, described a similar situation:

> We are in three businesses in the liquid food industry: processing, packaging, and services. We've been thinking about all the digital things that could turn into add-

ons, for example if we printed a unique code on each one of the 200 billion packages that our customers produce every year, that's tied to a database that collects all kinds of things: Which forest did the paper come from? Where was the cow when it was milked? How was the milk transported? We can spin off all kinds of cool stuff.

But we have the same question that you have: How do we actually turn all that cool stuff into revenue that significantly impacts the growth of the company? And we're beginning to recognize that the advantage might not be in selling the code, and might not be in selling an app. It might be that if we have control over this whole system, we can ensure that alternative providers of packaging material don't get into the business. In other words, we can use all these innovations to protect, and even to grow, our core business.

"So I'm wondering," Meyer concluded, "If you've thought about not what you could do that people would buy, but what the advantage would be if you had all the pieces in place around your core?"

"Yes, that's exactly how we think about it," Blausey agreed.

We don't control everything in this office building, or in your house, but we have enough parts and enough connectivity that we can discern from the power patterns that you're not exercising enough because I can see that your treadmill isn't turning on. Multiply that by the 500 places where our products sit, and there are all kinds of things we could do.

The challenge is which ones to bet on: You can't not put sensors on the equipment, so *everything* is getting digitized. The struggle comes when there are 12 feeds off a particular motor, and we can only handle three of them. We're trying to figure out what to do with the rest.

"And because of the diversity of our catalog, the newer elements of software change the definition for every type of product," added Blausey's colleague Vish Krishnamurthi, VP IT Innovation at Eaton. "So what can we monetize is the challenge, and it's different for every product based on where we have a right to play."

"The question in your conversation that I don't have an answer for yet, is, 'What data is my intellectual property versus your intellectual property?'" asked Jim Beilstein, VP of Advanced Manufacturing for Owens Corning.

Asset performance in a manufacturing facility is not just a function of the equipment itself; it's also a function of what we are doing with the equipment and how we are running it. And *that* is intellectual property for us. I have a lot of service providers saying they can monitor and maintain our equipment and tell us how to run it, and in certain areas I'm completely willing: shrink-wrapping a pallet of insulation is not core to my business, I just need it to operate at 99.9% efficiency. That's all I care about.

> Now deeper into our business, when we are melting glass, I don't want anybody else to have that operating data, because it's core to our process. That's key intellectual property and how we do it is a competitive advantage.

"Are there tiers that you have to think about?" proposed Bill Braun, CIO of Chevron. "One category where you have an exact value-add; one where you need the data for your own operational ability, but you're only ever going to have a very narrow view; and one where you're so isolated there's really nothing you can do, but you still have to feed the data to someone, or at least allow it, because if you're not going to give us the data off that thing, we're going to get it from someone else."

"That's right, that's one way to segment," agreed Ray Huber, SVP of IT at Eaton. "We're not going to own all the information coming off a truck transmission, but we have to give it to *someone* who can digitize it, manage it, and automate it. In that case we are part of a broader ecosystem — and the question is to find the scenarios where we can win broadly."

"The whole digital conversation is a really interesting journey for us, because we don't make a single product that has any electricity running through it at all," pointed out Steve Zerby, CIO of Owens Corning.

> Much of our interesting digital stuff is happening in manufacturing, but when you look at our market-facing activities, our digital framework has three big pieces: Engagement systems, which are about efficiency and stickiness with existing customers; digital marketing, which is around customer acquisition; and online selling, which we are not going to do.
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> To give a simple example from the roofing business, the control points for whether or not our roof goes on your house are the 1,000 roofing contractors in America. They're the second tier of innovation, protecting our core, and for them, leads are gold. So our digital activity is mobilized around driving leads to our most preferred contractors, and in making our ability to fill *their* digital shelves better, easier, and faster than anyone else's.

Braun compared Chevron's situation to Owens Corning's:

> Our products are mostly hydrocarbons, and it's similarly hard to make those digital. So we tend to think about things more as a consumer and integrator, and we're having similar conversations around our service providers. Some are asking for data, and some are being cut out of the loop and they're struggling as the model changes and they lose visibility. It's putting a lot of pressure on the system. We are getting more strategic about helping them understand which data we care about and which we don't.

Running on a Very Fast Treadmill

"Digital is changing the competitive landscape," agreed Braun's colleague Brad Middleton, Chevron's CTO.

> Ten, twenty years ago if you were big and you had a lot of money you could develop widgets that other people didn't have, and you could use them competitively. Now even a very small player can come in and do exactly the same thing. So we are all going through figuring out where we can create competitive advantage versus where we have to run on a very fast treadmill just to keep up. Digital makes staying ahead of the technology curve a real challenge, and we see companies going out of business around the world because they can't keep up.

"Does this relate to the question of what you need to do to maintain, or maybe to protect, your core products and services?" Brechbühl asked. "Things you just need to do to provide a buffer?"

"Our competitors are announcing all kinds of digital software initiatives, from spinoffs to new product lines, and we've been wondering how to think about that," Blausey answered. "At our last management meeting, some of the most respected analysts in our space made two points:

> Number One, Don't get ahead of yourself. Don't start talking about all the wonderful things you're doing in software development, and the new services you're going to create, before you can actually *sell* something.
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> Number Two, Don't use technological obsolescence in your product lines, and the resulting changes that you have to make, as a differentiating factor. Yes, your business is becoming more digital, because everything is sensored, but you don't get credit for it: This is *survival*, not differentiating value.

"What's clear in our industry is that we have three big categories of customers," explained Emmanuel Cron, CIO of Sidel.

> There are people who just don't care about the digital stuff, and they're going to run their operation just as they always have, and okay, we'll wait till it breaks to fix it. There's nothing much that we can do, and maybe over time we can show some value to them and shift them.
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> The middle tier consists of customers who are interested in maintenance contracts and the whole value chain around maintaining their equipment.
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> And the third group pushes our limits: How do we do augmented reality, remote assistance, remote management, those sorts of things. We need to pick the right ones, but how do we do that across all product lines, at the standards that we want, at the level of customer expectations for service? Historically, we're a very strong mechanical engineering, product-driven company, and we've digitized our data relatively well. Where we need to catch up is in automation.

"In our case, digital is becoming a requirement," agreed Maria O'Neill, CIO of the American Bureau of Shipping.

> We've always been a company that looks at everything physically: We go on-board a vessel and do a physical inspection in order for the owners to obtain a

class certificate, which is required for insurance. But now the owners are digitizing all of their assets, and it's forcing us to look at how to change, because we can't be a physical inspection company going forward.

We have to be able to ingest the IoT data, interpret it, and make a decision as to its condition. If we don't become digital, then pretty soon some other type of industry will, and there won't be a need for a class society like us anymore.

"What's really worrisome is the disruption element," agreed O'Neill's colleague Patrick Ryan, SVP Engineering and Technology for ABS.

A core process for us is to review the CAD drawing. What happens when someone comes along and says, "Don't submit your CAD, just rely on your IoT?" That disrupts how ABS monetizes its review, which is the actual engineering hours required to look at the design. How do we change our business model to take advantage of IoT delivery instead of CAD delivery?

The speed is the scary part: Before, there was a natural governance that slowed things down, which was your physical ability to move at a pace. Technology integration just didn't allow you to move any faster. Now that barrier has shifted drastically: With the speed that you can stand up technology platforms, that you can bring technology solutions to the table, the governance has gone away.

Now how do you determine where to spend your time and energy, because the speed is there? You can go as fast as you want to, and all of a sudden, you've wasted millions of dollars on ten different things, because there wasn't any governance to determine what those ten things should have been. You wanted to go fast, and you went fast, and what did you get? Nothing. So how do you put governance back into play — not to slow down, but to ensure that the bets are justifying the risks?

"In the old world, there was a sort of natural governance that slowed things down," observed Alva Taylor, Associate Professor at the Tuck School of Business at Dartmouth College.

Now it's really clear that we've got to manage the speed of change and the difficulty of choice: the difference between what we *could* do versus how not to waste our resources. That's a shift from a management perspective. What are people willing to pay for, both in terms of where we create value and, as importantly, how we communicate value? We can do ten things, and they'll all make life easier for our customers, but customers will only be willing to pay for two of them. That changes your strategy.

Another thing that companies often underestimate is the speed of reaction. If you screw up and your new product doesn't get a good review, the reaction from customers is faster than it has ever been before. So you have to make sure that you can respond at the same pace.

New Tricks for Old Dogs?

"One theme I've heard a lot so far is that data matters hugely," Brechbühl observed.

> Many of you are creating services around data, even if data isn't really core to those services, because that's what your business partners want out of you. A second theme is that determining where innovation matters most, or can yield the most, is a really difficult task for everybody. And related to that theme, there are lots of things you can do, but there's still plenty of innovation, almost re-invention, to be done around the core.
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> So products and services are being offered together, and leveraging each other, but it's not clear that the development process for each is the same. What do product innovation and development processes look like in this new world?

"We have several different processes," responded Elena Moruzzi, VP D&E Automation & Digital at Tetra Pak.

> In "early innovation" we use design thinking to look for feasibility, viability, and desirability. We're trying to move towards the minimum viable product concept and introduce it to either our product or technology development pipeline.
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> Then we have "product creation," which is a cross-functional process that includes product management, design, supplier management, and recently IT. In product development we involve the customer. In technology development, Engineering may see future needs that the customer doesn't recognize yet, and then we start to look at improving or changing or disrupting.
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> What this structure loses a bit is overall priorities for the company – innovation strategies *across* product groups, rather than within product groups. So recently we created teams to look for everything in packaging, for example, and more will come. Product management is going to become more strategic, and look not just at categories but at the whole market.
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> This is also our opportunity to integrate more service development into the product creation process. Today we have similar but separate processes for products and services, reflecting that services is a different business pillar, with a different business owner. But predictive maintenance, for example, requires IT infrastructure, condition monitoring, and analytics that cross business pillars.
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> We now have a lot invested in securing that the true innovation is not just product innovation. We are really looking to balance short-term product innovation with long-term technology development.

Moruzzi's colleague Meyer explained further: "Some years ago we realized that a non-system supplier could go in and produce equivalent packaging material in specific categories. One way we changed innovation was to get away from single products that can be repeated. We moved to items that are much more difficult to reproduce as an external

supplier. So now our ultimate measure of the innovation portfolio is how diverse it is: What market share do we have of the new formats?"

"From an innovation perspective, we're also looking at connected products, at figuring out where we are adjacent with customers and partners, and making modifications to our product development process to insert key things associated with digital," Eaton's Roces picked up the thread.

> First and foremost is the design thinking piece, and making sure that we're capturing the value proposition properly, and being honest about how we evaluate it. It's a bit of a learning curve: If your business opportunity calculator talks about one particular stakeholder perspective, but your design thinking focus is on another set of stakeholders, how are you reconciling the two? In general, there's a concern about where we play in the stack. There's a default that everyone has to be a full-stack provider — that's a key question.

Owens Corning's Beilstein continued:

> In our R&D organization the portfolio is organized into two major categories: productivity for businesses, to drive gross margins and improvements in operations; and customer-facing product attributes. And with the cultural stuff, what we're trying to drive is the speed of both of those wheels, and how to make them spin faster. On the productivity side, we measure clear targets of growth in market, in sales, in revenue. On the other side, we have a "vitality metric" — the only people who look at it are the R&D leaders and the CFO, because he wants to know that he's getting his money's worth.
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> Another thing we've done is to re-structure the portfolio to prioritize 100-percent focused teams who drive the results to the end, rather than everybody having a hobby of 25 percent. We review quarterly to make sure we're allocating resources appropriately. We have rewards and recognition, but we're filing a lot fewer patents. What patents we do file are in products, because we can defend them easily. But we have a lot of intellectual property in the way we manufacture, and those are mostly trade secrets. So we have a process to recognize and reward people for generating trade secrets, because we need to document those to keep our competitive advantage in case someone else tries to patent them.

"What different concepts are you using that often don't fit into a traditional big company?" Brechbühl asked. "Things like a lab concept, or using a venture capital approach to sorting things out, which touches on the question of make versus buy?"

"We use a lab/garage concept, where people are focused on how we can apply technology in the long-term future," Moruzzi answered. "We have had good experiences with the technology, but where we've failed in the past is in moving the concepts that have been created into the pipeline of product development. We've been good at testing the technical value and the customer value, but finding the business problem to solve that can be monetized has been weak so far."

"We don't call it a 'lab,' but Eaton has a group of people who dedicate 100 percent of their time to looking at emerging technologies, and where they can apply," Krishnamurthi

added. “The early stages of filtering include business as well as technology, and that helps some of them see the light of day faster, where the opportunities exist.”

“We have the same thing at Sidel,” Cron agreed. “We have a digital innovation lab, and separately, each of the functions has their own roadmap for digital optimization. They look at tactical choices in the short term to optimize supply chain service or R&D or whatever, and we look for strategic moves that are more than just optimization, they’re digital disruption.”

The Edge of (Ad)Venture

“There’s a lot of real blue-sky stuff going on in the world,” Middleton observed, “Stuff that’s so far out there’s not a near-term payout, but if it works out, it’s very important to our business: Some of it could be accretive, some of it could be disruptive, some of it could create a different competitive landscape for us. So we use venture capital as a way to buy into areas that are not our core business, but are adjacent. They could be opportunities or threats, and getting into these businesses in a small way informs us and helps us understand our landscape better.”

“Extending the VC thought to a general innovation theme,” Braun began,

> Start-ups have played an important part in innovation over the last 10 or 20 years because our internal innovation has been low, and our partners’ innovation level has been low, and that set the stage for this need that’s been fulfilled by start-ups.”
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> Our third-party tech suppliers have now gotten a lot better at innovation, and they’ve gobbled up a lot of the start-ups. So now we have AWS and Microsoft and others that are capable of creating competitive products quickly enough that what it means to be a start-up is shifting.
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> At the same time, we’re building internal innovation capability. So now there are three streams of innovation all working at the same, and we’re getting a better understanding of which one to use when. The delivery paths for innovation are shifting in a pretty large way.

“There is more collaboration happening in innovation with partners,” Krishnamurthi agreed. “The partners are sometimes our suppliers, or could be start-ups. And our large suppliers want to partner much earlier. That leads to going to market in a different fashion: Instead of going to market as Eaton, we’re now going to market as Eaton plus a large technology supplier.”

“Historically, we’ve been more active in M&A than in VC,” Tetra Pak’s Meyer said.

> We’ll pick up capabilities that are missing in our portfolio, whether it’s a start-up or a long-time vendor. It takes many pieces, so we’ll ask if we should build or buy, and often we’ll just buy.

> The VC perspective would be interesting if we were to make a platform play. Then it would be worth investing in start-ups that add to the ecosystem — not to buy them, or take them over, but to make sure they feed the ecosystem that we're trying to create. Because ultimately we don't want to do anything other than collect a fee on every transaction in our ecosystem — the rest of it isn't the same business. I can see the techniques of how venture capitalists look at their portfolios being applied internally to the way we look at our portfolio.

"When and how do you make the decision to commercialize?" Brechbühl followed up. "What mechanisms do you use in the middle of the development process to decide that something is actually worth taking to market?"

"We drive real customer involvement in the early ideation processes," answered Dickie Oliver, CIO of Airline Reporting Corporation (ARC).

> We don't build it and hope they will come; we get them, we bring them to the table, and say, "You're first in. You get to help us figure out what this thing is." So once we get through the different stages, the commercialization becomes much easier, since we're not out searching for a customer to go live with — the customer has been with us the entire journey. This isn't the only approach, but it helps mitigate the uncertainty, and to have real revenue coming in for the investment we've made.

"The first couple of approaches we've gone through for the digitization of the class process have been hand-in-hand with clients," Ryan concurred. "The disruption case is harder. We should be investing in the development of that approach, but it's a bigger challenge to find a customer who's ready for disruption of the main business."

"Usually when we start product development it's because we have an identified need," Moruzzi chimed in.

> The business case of course evolves during the project, but we start with an idea already in mind. There are exceptions, especially in digital, where we start a project because we believe it's strategic. But this is a struggle, because how can we continue with the costs if we don't have a forecast of the volumes? The problem of starting product development connected to something that can't be monetized is that you start to believe *everything* is "strategic," and then nothing gets a proper business case. Many of the digital products go across the value chain, and so we need new financial tools to evaluate them.

The Fast and the Fearless

"Who drives innovation at the executive level?" Brechbühl asked. "Is there an executive who is responsible? The head of R&D? The CTO?" "Does anyone have a Chief Innovation Officer?" Taylor added. "Who has a Chief Digital Officer?" Braun continued. "And who reports into that position?" Oliver finished. "If they're not running their own business, their own P&L, who reports to that person?"

“I’ve heard of such things, but no,” Huber answered.

“Six years ago, we had a Chief Innovation Officer who sat on top of three R&D teams, one for each business,” Zerby explained. “The hope was for a synergistic effect by having them all report somewhere that offsets the speed another layer might achieve. But we found that not to be the case, so we de-layered it, and took out the innovation officer. Those three R&D organizations now report into the business P&Ls, and they find their agendas. They’re tied together horizontally by an executive council.”

“To answer the first question,” Middleton replied,

> We are very de-centralized. We try to empower the whole organization to innovate, and to do as much innovation in the business units, as we can. There are mechanisms for employees to generate ideas and put them into the system, and then governance around the hundreds of ideas that are submitted so that we’re going to do these and not those.
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> So there’s a way for the masses to influence the digital projects we’re going to do. We *want* the operators in the field to innovate, and they’re coming up with great ideas. The role of the center, of “R&D,” is to do strategic research on how we do our business, *and* to field ideas that are too big for the business units to build. We try to unleash 50,000 employees on this: that’s the culture.

ABS’ Ryan built on the culture commentary:

> I’ve just taken the helm of the technology organization at a new company, and we’ll be trying to create a culture modeled after TPM, or lean: First, a culture of learning. From learning you build standards, and from standards you build continuous improvement. From continuous improvement you build transformation, and from transformation, you build innovation.
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> Our big focus will be continuous improvement, because we are still challenged on the digital side with a project approach, rather than a continuous improvement approach.

“So what do we need to do, what skills do we need, to be able to continue to innovate — even to turbocharge innovation in this environment?” Brechbühl inquired.

“It’s aptitude and mindset as much as skill,” Oliver suggested. “You can train skill; you can’t train aptitude.”

“I always look for people with sound judgment,” added Keith Sturgill, retired CIO of Eastman Chemical and an Executive Fellow of the Digital Strategies Roundtable. “Judgment is the only leadership attribute that is totally uncoachable. You either have it, or you don’t. Everything else you can coach.”

“It’s been interesting,” Beilstein observed.

> The most creativity happens when we put five people together, with the right capabilities to work on the right problem, with very little money, and give them

> four weeks to come out with a concept. We tell them, "If you learn something interesting, we'll keep going. If we learn what the pivot point is, we'll pivot. If we decide that it's not good, we'll stop." Then we've expended limited resources against that question.
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> When we map the capabilities the right way, we can match a 30-year employee with deep knowledge with four new hires, and they'll run circles around a group of 30-year employees who have looked at the problem eight times and come back with the same "We can't do it, it'll never work" answer over and over. And then we make more progress in 18 months than we did before in 5 years, by just forming the teams in the right way, and building the learning plans differently, and using agile thinking around the whole thing. And digital technology is going to help us turn the wheel even faster over the next 12 months.

"The best teams we've ever had combined people with experience with kids right out of college," O'Neill agreed. "If you get a group that's been there/done that, with all the same level of experience and maturity, they've kind of given up on new ideas. The young people bring a lot of energy and excitement, and they're always asking, 'Why this, why not that?' The more diverse a set of people you have, from different backgrounds, the better the idea generation."

"If you take a snapshot of your top innovators," Zerby concluded,

> They tend to be fearless. They know a lot, or a little about a lot of things, sometimes a lot about a lot of things, but always a lot. So that lets them go left or right without many boundaries. They always wind up being the hardest-working people in the organization, so when the seams have to be closed up, they use their broad knowledge, their curiosity, and their energy to help close those seams out.
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> Their fearlessness lets them experiment, and they find ways to get things done that you never thought about, that are not in the standards manual. If you think about the people in the organization who have achieved a lot, director-level to way below director level, these are the folks that are the most innovative. These are the people you love to give things to, because you know you're never going to see it again until it's done right.

Level Up!

Moving from individuals to organizations, Scott Gillespie, Managing Director of Strategy & Analytics for ARC, launched the conversation about how IT and R&D can collaborate better:

> We in R&D can do better at helping IT understand what our forecasted needs will be, both from a technical perspective and a business perspective, and in short cycles and in long cycles. And we should differentiate what's needed for infrastructure and what's needed for transactional business from what's needed for meatier data analytics, where the lines get pretty blurry between R&D and IT.
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> That will help us do a better job of clarifying roles that each of us should take,

including R&D, IT, IoT, the business owners, the chief digital officer: what are the responsibilities for each, and where do they merge into other functions?

And that all leads to a conceptual model of three layers of functionality and ownership:

- A foundational/infrastructure layer, probably owned by IT
- An enabling layer, owned by R&D: Developing understanding of what this tool or this app or this project is expected to do
- An engagement, or interface, layer, owned by the business units, to give them more say and control over their operations

"But as this scenario is moving, can we really define roles and responsibilities as clearly as in the past?" Moruzzi objected. "It's really difficult to set a boundary today that will be applicable tomorrow as well. We need to accept that the boundaries are changing, and to focus on moving towards a more collaborative approach."

"Yes, you need collaboration," Blausey agreed, "But you don't want gaps and overlaps. Where you get gaps and overlaps, you get confusion and friction."

"You need functional strength in all these areas, and cross-functionally, having the framework is key to performance," Middleton answered. "10 years ago, R&D may have been all engineering, and now it's 50 percent digital, and that has really blurred the lines."

"And do you see any cases where a blurry boundary between these roles is a positive thing?" Sturgill asked.

"There are very few products that can go to market now that don't have technology embedded in them," Oliver observed. "30 years ago, that wasn't the case. So today we have the need to have technologists embedded in those product teams."

The other switch that needs to occur is that IT has been looked at as a service organization that takes orders, and doesn't always have the right skills, so business leaders say, "That group is not really what I need," and they go hire what they do need. While the IT group is saying, "All of this is going to come back together and we're going to have to make it work, make sure it's secured, support it, maintain it, manage it."

So IT teams have to raise their games, to get to the level needed to support the business leaders. Then when you embed IT resources onto the product teams, they're able to connect back to the mothership and make sure it all works at the end of the day.

"And the business units aren't ever going to stop doing clandestine things as long as IT is the place you go to hear "No," as opposed to the place you go to learn how they can help," Taylor added. "That's a change that has to happen, and once it does, all these people will come to see you so that you can help them do it right."

"I've been a fan of blurred boundaries," Sturgill confessed. "My goal was to have a person

with a digital skill set from my team sitting on every leadership team in the company. They were *not* there to wear the IT hat: They were there as business leaders with special skills in digital technology, to contribute to the strategy of that business or R&D function. If they were labeled as 'the IT guy,' that wasn't a success."

Chevron's Middleton presented the case from the IT perspective:

> R&D and engineering and business partners need to better understand the effort in scaling up. IT runs into the trap of showing a prototype of something on a Friday, and running into the expectation that by Monday we'll have a full-scale production solution — when all we've really done is demonstrate that something is technically possible. We need communication and expectation-setting to understand the effort in scaling up. It's great that solutions can be stood up quicker, but remember that someone still has to support it after it's done.
>
> And in general, be more cyber-aware: What applies in the physical world also applies in the digital world. Security is now going to be a big piece of your product quality and reliability: A security "spill" is no different than if you have some sort of physical product spill.

"What's the most helpful top priority?" Gillespie asked. "Because we can only do so much at once."

"Bring IT in sooner: Don't wait until you're ready to deploy and then ask us to do this or that," Huber answered. "Bring us in sooner, so that we can work with you and understand what you're doing, so if there's a process that takes longer, we can start that process earlier, versus at the end, where it's difficult."

"This whole idea of 'bringing in sooner' is fundamentally wrong," Meyer protested.

> Projects should be *born* jointly. I can't decide to bring on 50 or 100 people just in case, so that I'll be ready when you show up. They have to be tied to something. The ultimate is joint resource prioritization, because then there's never a request to be fulfilled or denied. The decision to do IoT needs to be the same decision that allocates the resources that will be available to achieve it. Being on the team means that you planned from the beginning and you argued for the budget together, so that you can't have a request that doesn't have the people to support it.

"Part of the reason we have seams is because the world has changed and these organizations haven't," Huber asserted. "We've got to continue to make decisions about who covers the seams as different types of technology emerge, as different processes emerge. Time causes things to change, and if our models don't change, they become outdated from where they need to be. We kind of leave these areas for dead sometimes, because they're not in our faces enough."

"There's a cultural divide that we haven't reached across yet," Beilstein mused.

> We've had long discussions over many years on what innovation means. The language of R&D begins with a concept that I'm going to tinker with and innovate

around, and put something together quickly that tells me if I'm on the right track or not. Not everything I do in R&D will scale up. I may be doing something very quickly to answer some very specific questions.

On the other hand, the culture of IT comes with building solutions, getting to an MVP, and the mindset is always that it's going to be broadly deployed across every aspect of the business or the platform that I'm working in. With digital coming into R&D, we're having a hard time bridging these gaps between the tinkerer mentality and the scale-up mentality. Maybe we need a bridging concept just like there is a sandbox environment: a safe place to experiment.

We need to think deeply about the problem we're trying to solve or the opportunity we're trying to chase. What are the learnings we need to generate in order to achieve the earliest value proposition? What capabilities do we need to organize around to drive the teams towards plans that are short time cycle, tightly-resourced, and low-financed, so that we force people to work differently?

"You can get wrapped around organizational structure, or process, or whatever," Beilstein concluded. What innovation comes down to in the end is just having really interesting problems to work on and solve."

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