PharmAI – Industry Is Smartening Up To Potential Of Artificial Intelligence

Exploring Pharma Deal-Making For AI And Machine Learning Technologies

Executive Summary

AstraZeneca’s pact with the UK-based artificial intelligence leader BenevolentAI, in April 2019, is one component in a string of recent deals that have highlighted big pharma’s desire to embed AI and machine learning within the R&D process. In total, 13 such collaborations have been tracked in the past 24 months, according to the Strategic Transactions database.

Artificial Intelligence (AI) has enormous potential in changing the delivery of health care and improving patient outcomes, with applications in pattern detection, patient monitoring, disease diagnosis and treatment selection. The rationale is that AI can be used to enhance the decision-making process, taking into account far more data than are available to physicians via conventional means. The addition of machine learning (ML) algorithms enables the AI to become better over time, increasing the accuracy or timeliness of its recommendations. Recognizing this broad potential, the FDA has recently sought to spur the industry with its discussion paper on regulating Software as a Medical Device (SaMD) products.

The application of AI and ML techniques to the pharmaceutical industry will have less of a direct impact on patients, although may be fundamental to improving R&D productivity and sustaining the current pace of innovation. Leading pharma companies are almost universally detailing such digitalization initiatives in their investor-facing materials, showing that they are at the forefront of this vital industry trend.

Pharma Companies Are Accelerating Adoption Of AI-ML Technologies

Deal-making between pharma and AI specialists is becoming increasingly commonplace, as the industry seeks external pioneers to validate the technology, in addition to building internal data science teams. Over the past two years, to Informa Pharma Intelligence’s Strategic Transactions has noted 13 such alliances with specific mention of the AI or ML learning capabilities that one partner brings. Of these, 10 deals have occurred in the past 12 months, pointing towards an acceleration in the adoption of such technologies (see Exhibit 1).

Among these deals are notable big pharma examples such as Roche, Pfizer Inc., AstraZeneca PLC, GlaxoSmithKline PLC, Bristol-Myers Squibb and Sanofi. The alliance between bluebird bio and Gritstone has the highest potential deal value, with milestone payments of up to $1.2bn, in addition to $20m upfront. Exscientia has now concluded several major deals, each with different pharmaceutical companies, showing that these platforms are being applied to individual discovery programs and are not being used in exclusive arrangements with a single licensee. Furthermore, the approach is not restricted to any particular therapeutic area, with examples spanning oncology, immunology, central nervous system disorders, cardiovascular diseases and metabolic disorders. The extent of collaboration is so far focused towards early preclinical research, such as target identification and lead optimization. Still, the potential for AI-ML is certainly broader.
Exhibit 1. Major Pharma-AI/ML Alliance Deals In The Past Two Years

Artificial Intelligence DEALS IN PHARMA

Over the past two years, pharmaceutical companies have signed an increasing number of alliance deals with specialists in artificial intelligence and machine learning. This is a snapshot of key deals and their focus.

1. Target Identification
   HOW AI-ML IS USED: Using systems biology to understand disease etiology
   BENEFITS: Associating existing targets with new diseases

2. Lead Optimization
   HOW AI-ML IS USED: High-volume in silico classification of drugs via computational chemistry
   BENEFITS: Better drugs progressing faster to clinical stage

3. Clinical Trial Design
   HOW AI-ML IS USED: Understanding patients and prognostic biomarkers
   BENEFITS: Prospective trial stratification and enrichment to increase trial success rates

4. Patient Engagement
   HOW AI-ML IS USED: Personalizing the patient experience using data and technology
   BENEFITS: Improved adherence and outcomes

KEY

Artificial Intelligence/Machine Learning (AI-ML) Inputs Into The Traditional R&D Process

ALLIANCE DEALS

Upfront Value (Maximum Deal Value)
### 2019

**APRIL**
- **AstraZeneca/BenevolentAI**
  - Long-term collaboration to understand mechanisms of chronic kidney disease and idiopathic pulmonary fibrosis and identify new targets.
  - AI-ML Scope: Not disclosed

**APRIL**
- **Gilead/insitro**
  - Using ML, human genetics, and functional genomics to generate and optimize in vitro disease models for non-alcoholic steatohepatitis (NASH) and drive drug discovery.
  - AI-ML Scope: Not disclosed

**JANUARY**
- **Pfizer/Cytoreason**
  - Using data and ML to reconstruct cellular information from bulk tissue, train an immune-specific NLP engine, and integrate multi-omics data.
  - AI-ML Scope: Not disclosed

**JANUARY**
- **Otsuka/Click Therapeutics**
  - Licensing deal for the digital therapeutic CT152, which encompasses an AI-powered patient engagement platform to be regulated as an SaMD.
  - AI-ML Scope: $20m ($302m)

**JANUARY**
- **Roche/Exscientia**
  - Using AI capabilities to design preclinical drug candidates to meet prespecified potency, selectivity, and pharmacokinetic criteria.
  - AI-ML Scope: $29m ($60m)

**JANUARY**
- **Lundbeck/Numerate**
  - Multi-target collaboration to identify small molecule candidates with ideal ADMET properties for psychiatric and neurological indications.
  - AI-ML Scope: Not disclosed

### 2018

**AUGUST**
- **Bluebird bio/Gritstone**
  - Uses Gritstone’s EDGE AI platform and biopsy sequencing data to identify mutations and tumor-specific antigens amenable to targeting via T-cell receptors.
  - AI-ML Scope: Not disclosed

**AUGUST**
- **Vertex/Genomics plc**
  - Vertex gains access to ML platform to discover new targets; Genomics plc has developed an analysis engine linking genetic variation to disease outcomes.
  - AI-ML Scope: $20m ($1.220m)

**JUNE**
- **Genentech/Microbiotica**
  - Using AI, Microbiotica’s microbiome platform can identify gut bacteria tied to disease phenotypes. Genentech has various licensing options in IBD.
  - AI-ML Scope: Not disclosed

**MAY**
- **Boehringer Ingelheim/Batevo**
  - Identifying small molecule therapies matched to human samples in neurodegenerative and mitochondrial disorders.
  - AI-ML Scope: Not disclosed

**FEBRUARY**
- **Bristol-Myers Squibb/Sirenas**
  - Identifying drug candidates using an AI tool to mine large data sets to find small molecule metabolites derived from microbiome libraries.
  - AI-ML Scope: Not disclosed

### 2017

**JULY**
- **GlaxoSmithKline/Exscientia**
  - Agreement spanning up to 10 targets across multiple therapy areas for the AI-guided discovery of novel selective small molecules.
  - AI-ML Scope: Not disclosed ($42.6m)

**MAY**
- **Sanofi/Exscientia**
  - AI approach to analyze synergies of target combinations and design small molecules that can be used as bi-specific agents for metabolic diseases.
  - AI-ML Scope: Not disclosed ($274m)
Artificial Intelligence Deals In Pharma
AI-ML As Means To Improve R&D Productivity

Many of the current deals between pharma and AI-ML experts have a specific R&D project in mind, aiming to bring better compounds into clinical development at a faster rate, thereby shortening development timelines and improving the eventual likelihood of approval. It may well be that better understanding of complex diseases will yield previously unknown drug targets – and potentially entirely new, differentiated breakthrough therapies. Nevertheless, the core business case behind pharma’s adoption of AI-ML techniques is as a productivity initiative, allowing pharma to realize a higher return on its R&D investment. With estimates for the cost to bring a new drug to market continuing to spiral upwards – the most recent calculation by Tufts Center for the Study of Drug Development places the figure at $2.6bn – anything that can reverse this trend is sorely needed. As AstraZeneca R&D chief Mene Pangalos simplified in an interview with Scrip: “It takes many years to get a candidate into the clinic so could you write an algorithm that could speed that process up and do it more efficiently?”

While AI-ML does not replace basic research into human biology and disease etiology, its great strength is that it is able to make connections within complex data sources that no human brain could realistically hope to make, without any prejudice. The intuition of scientists can be augmented by the processing of unfathomable amounts of information to arrive at the best solutions based on the data available. This allows an unbiased approach to the question at hand, with any new data and insights generated further strengthening the underlying AI-ML platform. This is immediately useful for diseases that are currently poorly defined or understood, potentially discovering new targets whose relationship to the disease state is not obvious. BenevolentAI itself has created a drug discovery program for amyotrophic lateral sclerosis based on a target previously evaluated in breast cancer. AstraZeneca has pivoted the development of saracatinib away from hematological cancers and into idiopathic pulmonary fibrosis based on the insights of digital health and AI pioneer Joel Dudley at Mount Sinai in New York. The microbiome field is another rich resource for AI-derived insights, considering the innumerable interactions between human biology and the 10-100 trillion symbiotic micro-organisms within each of us, increasingly being recognized as an organ in its own right, or even our second genome.

Even with a sound scientific basis for a drug discovery project, the design and selection of the best drug candidate is limited by the resources available. There is a trade-off between the time spent on lead optimization and the need to progress a candidate into the clinic, which inevitably contributes to the failure of drugs due to unforeseen pharmacokinetic, toxicity or efficacy shortcomings. Existing knowledge around drug-like properties and the target interaction can be distilled with AI into better drug candidates for preclinical testing. UK-based Exscientia claims to deliver clinical-stage drug candidates in one quarter of the time of traditional approaches, suggesting the reason for its popularity as a partner for pharmaceutical companies.

A drug’s success can hinge solely on the design of its clinical trial program, which is another area in which AI can help to plot the best course. A more complete understanding of the disease state, target, drug and patient characteristics can enable prospective patient stratification for treatment responders. This increases the likelihood of a favorable outcome in the clinical trial, or avoids the scenario in which expensive Phase III trials are repeated after the best design is only uncovered due to retrospective analyses. Even if a drug reaches the market, razor-thin differences between competitors can be exaggerated by clinical trial design, yielding vastly
different market prospects. Taking the current
crop of programmed death-1 (PD-1) inhibitors,
it is commonly asserted among prescribers that
the drugs within the class are extremely similar.
The correct choice of patient group, biomarker,
background therapy or comparator arm in a
pivotal clinical trial may potentially be worth many
billions of dollars over the lifetime of the drug.
While the advent of AI-ML may have come too late
for the likes of Opdivo (nivolumab; Bristol-Myers
Squibb/Ono Pharmaceutical) and Keytruda’s
(pembrolizumab; Merck & Co) initial development,
it can absolutely shape the next wave of immuno-
ondology, matching non-responding patients
to the most appropriate drug regimen based
on biomarker data and known mechanisms
of PD-1 inhibitor resistance. Pfizer instigated a
collaboration with IBM in December 2016 with this
in mind.

**Reconciling The Hype Of AI-ML And Shortcomings in Drug Discovery**

There is undoubtedly an element of “fear of
missing out” driving the adoption of AI-ML
that accompanies the uptick in deal-making
lately. Early pioneers such as Exscientia and
BenevolentAI are clearly striking the right chord
with their technologies, marketing them as
essential solutions for modern drug discovery.
However, we are still yet to achieve proof-
of-concept for an AI-enabled drug discovery
program to result in an approved, successful
product. And even when this does occur, it will be
difficult to quantify the exact benefit that the AI
approach added in terms of timelines, R&D spend,
and clinical benefit, unless a lesser-informed,
competing pharma company opts to become
the placebo. It will only be with many approved
examples that it would be possible to validate
claims of better drugs and higher likelihood of
approvals, but arguably AI-ML will come up short
in terms of fixing the true bottleneck of drug
discovery: translating preclinical research into
clinical proof-of-concept at Phase II. The AI can
only be as smart as our basic understanding of
human biology allows, so drug discovery is always
going to be an iterative process, with failures
being a necessary component. Perhaps tellingly,
IBM is now stopping sales of its Watson AI in the
field of drug discovery, with previous reports
that its application in oncology clinical practice
has not been able to live up to IBM's own lofty
expectations.

Regardless of how much AI-ML is actually able to
deliver, if these technologies can help to better
understand diseases, create fully optimized
drug candidates and test them in patients in
the smartest way possible, it would be negligent
for pharma executives not to make use of its
capabilities.

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Reimagining IT: Bausch Health Puts Customers First In Planning For A Data-Driven Future
An Interview With Bausch Health’s Chief Information Officer Chuck Hoyt

Executive Summary
Information is the lifeblood that sustains drug development – but the ability to disperse, differentiate and make sense of it is what delivers success in the marketplace. Bausch Health Companies has decided to make global alignment through the strategic application of IT the centerpiece of its effort to shed the legacy of its acquisitive predecessor Valeant Pharmaceuticals.

• Bausch Health’s chief information officer (CI) Charles (Chuck) Hoyt is building out a new globally integrated IT strategy focused on mobilizing the company’s information assets to enhance its competitive lead in drugs and devices for eye care, gastroenterology and dermatology.

• Despite the association with novelty and innovation, the IT space can be as hidebound and resistant to change as any other biopharma business function. It explains why CIO Hoyt believes an adaptive internal culture – emphasizing people over product – is necessary to keep IT relevant in a competitive business climate.

• So what? A strategic, outward-looking orientation is key: the CIO role is destined for oblivion if it is seen as just a supplier of the latest fancy software package.

Bausch Health Companies Inc., the renamed 2018 successor to the upstart Valeant Pharmaceuticals and its nearly two century-old acquired subsidiary, Bausch & Lomb, is pursuing an ambitious plan to become an entirely new company focused on in-house innovation. Assets have been divested to pay down Valeant’s debts, new products are being launched, while an overhaul of the legacy business model is underway to secure global scale and reach. Aligning information flows to support the restructuring in all its phases has been tagged by the new management as critical to success. To gauge the state of progress one year in, In Vivo met recently with the new company’s CIO Hoyt, a veteran IT strategist whose work will provide much of the detail behind what Bausch Health CEO Joe Papa describes as the “turnaround opportunity of a lifetime.”

Q: In Vivo: Information is arguably the most valuable currency in biopharma today – a trend that makes management of that information a mission-critical skill set. What in your background prepared you for the high-profile role you now hold as CIO at the new Bausch Health?

A: Chuck Hoyt: I started my career more than 30 years ago, when I was among the first to inhabit a new job category called computer programmer. Its main function was to run automated data processing systems, often at night. My first job in the health care industry was at Becton-Dickinson, which I followed with a long stint at the personal care company Carter-Wallace. There I was given responsibility to reprogram the company’s automated entry systems on inventory and warehouse management. I managed this transition at a time when technology was still based on the computer mainframe.

A pivot point in my career came in 1996, when Carter-Wallace asked me to launch
a new enterprise service group centered on the PC. It was a big cultural leap for the company because the PC was an individually empowering and very user-friendly technology. Even though it took a while to shift decisively from the main frame, I knew the PC was the wave of the future and would therefore be a good career move. After Carter-Wallace was acquired by specialty pharma MedPointe in 2001, I had another big opportunity, with an assignment to introduce the SAP enterprise resource planning (ERP) program, starting small with a test run at one manufacturing location. From there, I built a dedicated team and together we introduced the ERP architecture for the entire organization. That was a great learning experience for me because, instead of having to improvise and clean up an existing architecture, I was able to create something entirely new. When MedPointe was acquired by the Swedish specialty pharma Meda AB in 2010, my role expanded further. I received my first title as CIO and took on other functions, including facilities management, logistics and transport, travel and entertainment, and security. The broader remit helped me understand that the value in the CIO role lay in serving as a constituent part of the business. I realized that a strong CIO must have an external strategic orientation rather than an internal back-office mindset, which only reinforces silo thinking. Ever since, I have approached the CIO role as being the head of a full-service support to the business, where I strive to position information as a creative and very diversified product offering. Today, just like any business, we are constantly sizing up our market and figuring out which of our products work, and which do not. I define my customer as every fellow member of the executive management team reporting into the CEO of Bausch Health. It may not be precisely how other biopharma CIO’s look at their role, but it works for me. It’s a unique and differentiating skill set.

**Q:** It appears that you always stayed a few steps ahead of a very disruptive transition in information technology, from the bulky computer main frame to the versatile PC right up to almost limitless, low-cost accessibility of the cloud. What learnings did you take from successfully navigating this revolutionary era in the information bandwidth?

**A:** I would say the common thread in my career is to seek ways to be relevant. I have volunteered to take on new roles rather than wait to be asked. I liked building teams and pursuing a mission that might be seen as beyond the scope of the IT portfolio: strategy and operations were my preoccupations, not just managing data services. I brought good people along with me and encouraged them to see how our working together would result in a better path forward for themselves too. The sense of momentum I set for myself also reinforced that I needed to do right for the group first. It is hard to get ahead in a large organization unless there are others to vouch for you. Over the years, I have created a network of colleagues where we have shared exposures to the business and think the same way – it is a rich resource, one I continue to rely on today.

**Q:** What are the key trends defining the role of the CIO in biopharma today? What is different from the world you experienced a decade ago?

**A:** What makes the CIO role today different than it was in the first years after the new millennium is the vastly higher flow rate of data – to more than 2.5 quintillion bytes per day worldwide, with about a third of that attributable to the healthcare space. The sheer volume limits our capability to analyze even a portion of it. Biopharma companies spend inordinate amounts of time attempting to create the clean data sets necessary to solve a specific
research question. It follows that improving data quality through targeted aggregation, search and scrubbing technologies is one of the biggest challenges confronting the industry today. From my current perspective as a CIO, I see only modest operational breakthroughs to enable that to happen. It is essential that the CIO team work effectively with others in the business to instill the confidence and trust that regulators and payers must have in our data. It is also critical to think strategically on how to address emerging technologies like artificial intelligence, machine learning and predictive analytics. We are already seeing these novel platforms applied productively in some clinical applications, but there is much more to be done, extending to at all stages of the product cycle. I see my role as balancing the risk between anticipating what is coming and finding a cost-effective way to use these new tools, while avoiding a situation where we fall behind our competitors because we fail to invest in the technologies that best enhance our value proposition to customers. Investing in the wrong technologies can be a career hazard as well. For big pharma, this is really a roller coaster ride. Navigating those peaks and valleys is hard because, in the information system space, change involves betting enormous sums of money on infrastructure that cannot just be walked back. Getting the decision calculus right depends on encouraging an organizational culture that recognizes innovation and is prepared to do what is necessary to embrace it – full stop.

When I am asked what “IT” stands for, I say it means “Innovation and Transformation,” not “Information Technology.” It is not the conceptualization of my role that people expect, so it tends to spark some spirited conversations and hopefully a change in mindset. I find talking this way gives us all a better idea of what our company can accomplish with technology, and what it cannot.

Q: How might Bausch Health CEO Joe Papa define your position as CIO?
A: I think he is very aware that the title is no longer fixated on services like data processing. Instead, the CIO is a strategic partner in re-making the holding company that used to be Valeant into an innovation leader in specialty drugs and devices. Actually, the CIO is a unique position. You will see significant variations among big pharma companies in how they define it. It is compounded by the fact that the CIO skill set and responsibilities are worlds apart from what they were just a decade ago. Back then, the job description focused on a senior person responsible for keeping the lights on and the servers up. It was an operational function with virtually no forward-looking responsibilities beyond creating relationships with vendors.

The CIO position has also been affected by the growing importance of digital health applications on the commercial side as well the rising impact of cyber security issues, leading in many cases to the creation of two adjacent C-suite titles: the chief digital officer (CIO) and chief information security officer (CISO). More recently, we are seeing companies respond to growing regulatory pressures on the use of personal information through the establishment of the chief privacy officer (CPO) position.

What this means in practice is that the CIO has had to move closer to the strategy side of the business. The CIO has an opportunity to lead a larger internal discussion on setting out a vision for turning information into an asset that can be used to support R&D, advance drug development and achieve commercial objectives in the marketplace. He or she must be a business driver – and own that
space, especially as all these other “chief” acronyms reflect a trend toward specialization in corporate functions. It means the CIO has to improvise and claim that “big picture” landscape as the company’s technology leader with information as the ambient product. The job is what you make of it. It is tricky: if a CIO chooses the fallback position and focuses on installing systems software I’d say that person risks being replaced by a robot in the next five years.

**Q:** What is important for In Vivo readers to know about the strategic re-positioning underway at Bausch Health?

**A:** I am part of a management team that is committed to far-reaching change from the former Valeant era, both in company culture and how we conduct business. Under CEO Papa, we have engineered a complete transition away from an M&A-focused enterprise bent on accumulating assets to achieve short-term financial targets. Bausch Health has replaced that with globalized business units whose mandate is to improve our competitive lead in specific therapeutic areas. We combined that with a customer-based performance management culture committed to the patients who use our products. It is a work in progress, but there is a clear perspective on what we do want as opposed to what we don’t want. Top of mind for me right now is to leverage the company’s information assets to raise our competitive positioning in key product areas. We are striving to innovate. Achieving this requires making investments in areas that have been starved for capital in the past, such as R&D. Hence we have got some catching up to do. Right now, I am reorganizing the IT function to emphasize mobile and cloud-based connections. I have also recruited for a new position, VP for commercial IT, dedicated to helping the sales and marketing teams apply information more consistently to identify opportunities and build productive relationships with customers.

**Q:** Your current signature initiative is called “Re-Imagining IT.” What is the rationale – are there specific goals and objectives to measure success?

**A:** Re-Imagining IT is an ambitious plan to put information technology at the forefront on what our CEO calls the turnaround project of a lifetime. When Bausch Health was founded as the successor to Valeant, we inherited what was really a collection of small companies doing separate things. Hence the first element of the re-imagining program is very grounded and practical: to deliver a globally aligned and integrated IT services platform that meets the needs of the entire Bausch Health business. That is easier said than done. We had to confront the fact there were more than 30 ERP systems in place to handle our core business processes. When I took a first look at the situation, I likened it to hurling a set of jacks up in the air and then catching and rearranging them in place before they hit the ground. We have started with the big things, setting out a new funding and contract model built around a single integrated IT budget. The next step is looking at the products and portfolio strengths in our five geographic regions – Europe, Canada, the US, Latin America and Asia-Pacific/China – to decide what IT technologies works best in bringing these businesses together. We must decide how and where we need to update our existing IT services capabilities with substantial new investments: some of our legacy infrastructure on IT is more than 20 years old.

However, this, by itself, will not achieve the transformation our executive management team is looking for. Getting there requires a change in culture because if people do not
buy into the project it will stall and we will eventually fade back to the status quo. My career experience shows that if you want to change technology, you first have to change the culture that surrounds it. There are so many instances where that flashy new tool never takes root because it was not designed around the workflows, values, mindset and incentives that drive individual and group behavior in large organizations.

I am devoting most of this year to going out and talking to colleagues to convince them why a re-imagined IT unit is a resource worth having: to drive innovation, to increase the relevance of IT to all parts of the organization, and to abandon that old order-taker mode, instead establishing ourselves as a real contributor on strategy. Most important, we must make the customer a priority, externally and internally. And when I reference that focus on the customer, I am not talking about telling people to visit our web site. We must make our IT people the go-to source for everyone in Bausch Health who want answers in real time, on matters big and small. We will not succeed in the task of delivering IT services globally if the culture perpetuates silo thinking and disincentivizes diversity and the cross-fertilization of ideas. To reinforce the change, individual performance metrics will now relate to priorities like responsiveness to the business in resolving problems and how effectively colleagues work in cross-functional teams.

The good news is I have a mandate to build a refreshed IT leadership team with global reach. The company has abandoned the old structure where each business had its own person in charge of IT as well as a separate operations manager. In addition to the position of VP for Commercial IT, with a business-wide remit, we have a VP position responsible for cyber security issues. There is a VP assigned to manage a globalized governance, risk and compliance (GRC) strategy too, an area where IT will be closely involved. The bottom line, I expect all my reports to liaise with and participate in leadership meetings with key personnel like the head of supply chain, finance, clinical development and of course commercial operations. We want to be involved in new product launch strategy as well. There must be no doubt that IT is positioned as a supportive partner in all facets of the business.

Q: Looking farther afield, what do you expect to have achieved as a consequence of the “Re-Imagining IT” platform?

A: The stock answer is simple: to deliver results on time and on budget. But providing real value to the business is a critical component too – so time, cost and value together will define our success. One very important measure is moving beyond what we inherited – a business with a strategy based on a series of disaggregated bolt-on M&As – to a modern, fully globalized IT infrastructure that complements a profitable, innovative and globally competitive business. Within five years, the plan is to deploy a state-of-the-art ERP decision support structure throughout the global organization. We will have in place an advanced IT architecture centered on “smartware” operating systems, deployed through the cloud and compliant with emerging international requirements on good practices. Finally, we will decide and execute a global strategy on data center resiliency to protect our systems, networks and data storage capabilities from external disruptions.

Q: With reference to the latter point, what is your perspective of the role of the CIO in an era where there is likely to be more threats to the safety and integrity of data. Is it the objective of the CIO to share data or to protect it?

A: Overall, as an asset to the business, I see
the task of the CIO is to enhance the ability of the organization to share data and raise the quality of the knowledge we can bring to decision-making. In that way, we distinguish our remit from the dedicated, highly focused role that a CISO must play to ensure we keep pace with rising threats to cyber security. In fact, one of the effects of the growth of these adjacent C-suite assignations will be to accentuate the CIO’s focus on attaining direct knowledge of the business – to assert the generalist, commercial advocacy and support portfolio to differentiate from the specialized status of these other roles. In my view, the CIO has to occupy the turf around information as the driver of better customer engagement and business process innovation. There is absolutely no future inhabiting the back-office vendor space. Today, the PC is a throwaway item; servicing the PC is becoming as obsolete as the TV repairman.

Q: Are there any wild cards that might complicate your transition to a more strategic orientation for the CIO in biopharma? Are there developments in the external environment that could prevent you from doing what you want to do in the business?

A: One issue worries me – the ability of large, inherently risk-averse organizations to adapt to the revolution taking place in information, technology and the science of medicine. Change is a constant. It is already evident that drug company business models are having to evolve as researchers race toward the development of one-time cures rather than long-term treatments. I can readily see what I must do to remain a forward-thinking CIO: “skate to where the puck is going next.” The question is whether I can bring the rest of the organization, with its often conflicting priorities, along with me. The regulatory scrutiny facing drug-makers today is intense, competition in therapeutic categories is fierce, and the price tag to innovate is high, and rising. Can my company afford to keep the pace – or, indeed, can it afford not to? Will my technology choices become a target for budget cuts? The only answer to these questions is to educate senior management on what’s coming – and position the CIO to provide the best strategic advice possible. The other lesson I take is to ensure you have the finger on the pulse of your own people. It’s essential to keep driving an internal culture of excellence and investing resources in people more than machines. Most important, you have to recognize that resistance to change can be every bit as pronounced on the IT and tech side of the business as it is in other parts of the organization.

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