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Driven by disruption: Are you ready to embrace change?

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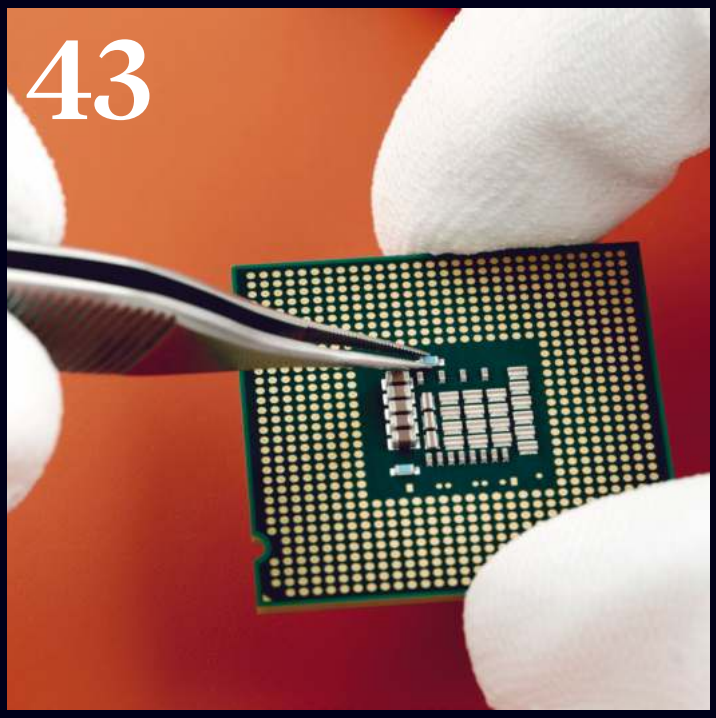

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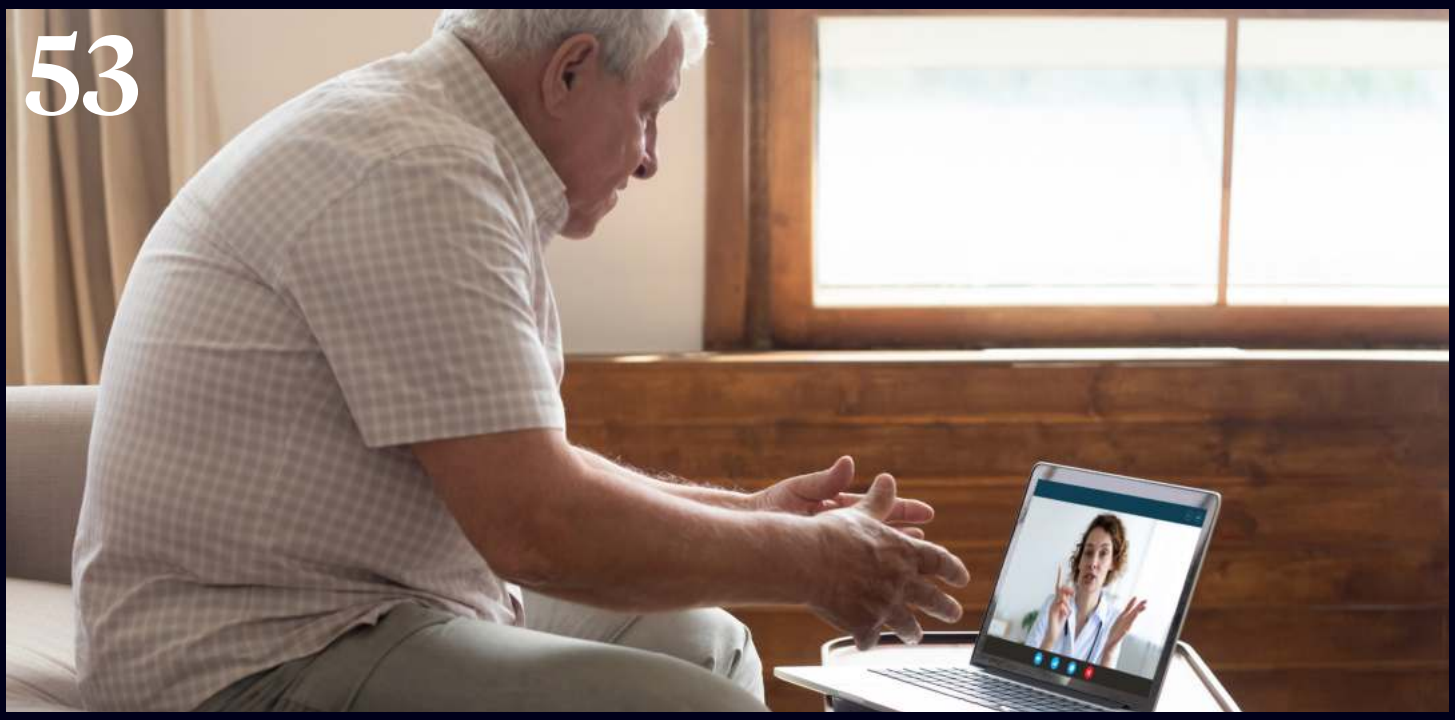

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INTRODUCTION

From challenge to change: Healthcare's post-pandemic opportunity

By **Pratap Khedkar**

While the public health crisis of 2020 brought many aspects of life to a standstill, it has prompted healthcare stakeholders to accelerate solutions that have been on the drafting table for years—thereby overhauling the industry's traditional approach. Throughout the past eight months, physicians, payers, life sciences companies, provider organizations and the government have worked side by side to solve patient care disruptions in ways that we couldn't have imagined in 2019.

Telehealth is the clear winner among tools that have become part of standard care despite having difficulty gaining traction under "normal" circumstances. It's not surprising that demand for telehealth has soared: On top of lower exposure risk, patients benefit from dedicating fewer resources to travel and transportation, childcare and time out of work. And physicians are on board, too, so long as the reimbursement scenario remains viable. Just how widespread telehealth becomes in the post-COVID-19 days will depend on how well we can work through, or around, some of its drawbacks. From a purely technological standpoint, the health systems with the right tools in place will be able to ramp up their telehealth services more quickly post-crisis than others.

At the same time, ambulatory surgery centers, home care agencies and specialty hospitals are seeing a greater share of patients, primarily to offset the current burden on acute care facilities. Like telehealth, alternative sites of care were already growing more attractive as healthcare continues to move to a value-based care model. Coronavirus exposure concerns and overtaxed health systems introduced a sense of urgency that has helped solidify this trend.

Moving non-clinical, in-person interactions to virtual settings has been another uniting force for stakeholders. It's incredible how quickly we've become accustomed to connecting with one another from our respective living rooms—and how easily we've formed more personal connections as a result. Empathy now has a natural place in physicians' peer-to-peer interactions and in their exchanges with pharma sales reps.

Each of these innovations came to be because all healthcare entities united against a common enemy: COVID-19. Some of the work we've done will carry over to the post-crisis world, but there are other forces at play that will work in tandem to shape the future of healthcare.

For one, more consolidation on the provider side—largely due to COVID-19-related financial struggles—will give way to bigger, more powerful health systems and potentially less patient choice and higher costs. On the vertical integration front, Teladoc Health's purchase of Livongo is a great example of responding to changing needs in the market—and could spark more M&A deals in the digital care space. There's no question that these newly created entities will have more control. In

fact, a ZS survey found that in a post-crisis world, nearly 75% of healthcare administrators expect to have more influence over healthcare decisions like determining where patients receive care, how long they stay in the hospital, and what products are included in the drug formulary or available for procedures.

The expectations and behaviors that patients are developing will carry over to post-COVID-19 healthcare. There will be no turning back on certain conveniences, like prescription drug delivery, early medication refills, curbside vaccines and in-home infusions, that bring care directly to patients. Today's consumers want a better healthcare experience, but they also expect quality medical services at affordable prices. When the system is focused on reviving the sick, patient preferences take a back seat to outcomes and costs go up.

Even though affordability could be a tall challenge for the foreseeable future, we can still work toward a model that focuses on wellness and preventive care. By engaging patients when they aren't sick, we not only keep them well but also achieve better outcomes, improve quality of life and lower costs. With this approach, we'd see patient preferences become the prerequisites for good outcomes, and isn't that the ultimate goal of patient-centered care?

During the pandemic, in many cases, we've delivered a better patient experience. But now we need to come together to deliver that experience more broadly, and not as a temporary measure. We need to create the best healthcare experience we can—one that takes patient satisfaction, cost and quality into consideration in every encounter, in every setting.

To get there, we need a long-term transformation plan that leans heavily on powering tools like artificial intelligence with the right data to enable population health management and usher in care delivery improvements, cost reductions and better health outcomes. Data needs to become the key to engaging patients in a way that identifies and heads off healthcare events before they happen. In an ideal world, the "right" combination of data would be collected from electronic health records, payer claims, social determinants of health and consumer health apps.

Collectively, the healthcare industry has been open to change and partnered to quickly solve disruptions to patient care. The pandemic has given the healthcare industry the nudge it needs to cater to patients differently in the future. The trick is to keep the momentum going by resisting the urge to return to our siloes and begin pushing our own agendas. Let's rally around one common unifying principle, long after the virus has faded into the history books: our patients.

The insights assembled for this publication provide a taste of how organizations across each sector of healthcare can make meaningful, long-lasting change in this environment. To read more ZS insights, please visit zs.com—and let us know what topics you'd like us to cover in the future.

Health plans' role in value-based care just got more complicated

By **Peter Manoogian, Anand Rampuria** and **Kal Achanta**

As the public health crisis continues to unfold, health systems and independent provider practices are under increasing financial strain while their ability to deliver high-quality care is decreasing. These circumstances could unwind any progress that healthcare has made in replacing the traditional fee-for-service reimbursement model. During these extraordinary times, health plans can take immediate- and long-term steps to support these critical partners while furthering the shift to value-based care.

Despite the government's fresh round of fiscal support to keep providers afloat, we still may see a prolonged period of financial turmoil for these entities due to loss of elective procedures, and record unemployment moving members to Medicaid. Declines in annual wellness visits for older adults, screenings, along with expected closure of independent PCP groups and family practices that serve as the first line of preventive care, bodes concern for patients' long-term physical and mental health.

Immediate-term support: Health plans can offer protection

Health plans across the country have deployed various measures to support

providers during this pressing time, with most of them focused on financial assistance in the near-term. In some instances, plans are going a step further to launch concierge-like programs that aim to assist providers in completing small business loan applications. This financial protection is critical in the immediate term as health plans look to maintain adequate networks in the communities they serve.

As we look beyond the immediate term, a few potential scenarios come to mind. While needed now, advanced payments and funding could leave an unintended effect by continuing to prop up the old fee-for-service healthcare model. Providers possibly could sour on risk-taking contracts that public and private payers have touted as critical to align incentives. And finally, financial headwinds could lead providers to close or consolidate—by joining large, local health systems and practices—and further erode price competition.

Long-term support: Health plans can preserve, position and plan to build lasting trust

Looking ahead, health plans must continue taking additional steps to build long-term trust with providers that will create more durable uptake of VBC programs. Why is trust so important (beyond the obvious reasons)? A ZS survey found that PCPs who are highly trusting of health plans are more than twice as willing to engage in partial- or full-risk sharing. A key building block of trust lies in health plans supporting providers in the ways they want to be supported. The survey also found that only a third of PCPs received the support they desired, but those who did were twice as likely to report feelings of high trust with their health plan.

Moving forward, health plans must take a partnership approach and continue to build trust by evolving the role they play to retain providers in VBC contracts and create positive experiences for providers still on the fence about moving down the risk "glide path." We see three areas for health plans to explore:

- **Preserve existing contracts:** Health plans can simplify metrics and calculation methodologies to make it easier for providers to better comprehend VBC program characteristics, while keeping some guard rails. Now may be the right time to further streamline calculation and qualification methods—especially as regional indices and patient attribution may be irrelevant or challenging to execute at present. Doing this will ensure providers are exposed purely to performance risk rather than actuarial risk.

- **Position support offerings to fill gaps:** Most providers are operating on a tight capacity focused on providing care and in many instances furloughing support staff. During this time, health plans can step in with support targeted at tasks that providers may be challenged to complete now. For instance, plans could perform many of the patient engagement functions that administrative staff ordinarily would handle (such as playing "matchmaker" with telehealth). This not only will mitigate the risks of long-term health but also assist providers in proactively addressing patient needs.

- **Plan for new engagement models:** Clinical/practice transformation personnel are key resources for provider partners in their transition to value. Historically, however, they have heavily relied on in-person meetings to engage with providers. Health plans should take this opportunity to evaluate their methods of connecting with providers and consider a greater mix of non-personal and digital channels. Moreover, this may create a forum for listening to provider sentiment on an ongoing basis—and from a broader group than those individuals selected to meet with the health plan periodically as part of a provider council.

Pursuing any of the avenues outlined above comes at a financial cost along with the time and effort required to create the desired impact. COVID-19 will leave a disparate impact on providers, and as a result, their needs will vary. Therefore, a one-size-fits all support model is both costly and ineffective. Health plans need to more deeply profile their provider partners—through supplementing internal data with secondary and third-party information—to better align supportive functions based on the provider's unique needs and situation.

In many respects, the providers that are farther along the risk-taking continuum are better equipped to weather the near-term financial storm caused by COVID-19. The health plans that spend as much time preserving, positioning and planning their VBC program resets as they do providing financial protection to providers will be well-positioned to facilitate the shift to value-based healthcare.

What does the future hold for healthcare market research?

By **Allen Titto, Fiona Taylor** and **Deepika Goparaju**

As COVID-19 continues to disrupt businesses and consumer behavior worldwide, many companies are struggling with the need to keep themselves up to speed with their customers' evolving needs. Healthcare companies are no exception and are grappling with questions that range from orchestrating effective launches to understanding evolving stakeholder needs to designing ways to support their customers most effectively.

To navigate the new normal, pharma companies need an effective insights engine that spans different functions and stakeholders. Marketers need to have a better window into how the treatment paradigm is evolving based on changing regulatory and provider priorities, as well as patient needs and preferences. This understanding is vital for effective product launches, tracking brand performance, better scenario planning and, in general, staying ahead of the curve. They are also looking for insights that have a longer shelf life and help bring agility to decision-making. Therefore, pharma companies need an agile, flexible approach that would enable insights to be as real-time as possible and available in an ongoing manner.

Here are four ways to achieve agile and reliable customer insights during these uncertain times and into a post-COVID-19 future:

1. **Put your customer in the driver's seat.** Particularly for healthcare customers who may be currently on the frontline of patient care, let them set the terms for how much (or little) and when they want to participate. Provide them with app-based research tools or invite them to online research communities so that they can opt in to share their thoughts, at a time of their choosing. This allows them to continue to participate in shaping the future of healthcare while minimizing any research burden. Within such approaches, a mix of research techniques can be applied. Short (two- to five-minute) "pulse"-type surveys allow customers to share their current perceptions easily. Reduce the burden by allowing customers to dictate or record their responses. And lastly, design your questions such that they are simple and easy to answer vs. complex and with a high cognitive load.

2. **Plan for an ongoing engagement to stay on top of evolving trends.** As the COVID-19 situation unfolds, an "always on" approach can give you an agile view into changes in perception and can be a leading indicator to behavior changes. This will also help you learn as you go and build on the richness of the insights through targeted follow-up probes. You can create a more frequent—sometimes even a weekly—engagement with customers so that we continue to learn from them as the "new normal" emerges.

3. **More heads are better than one.** Online panel discussions, or "e-forums," can also help surface differing opinions. Hearing a diversity of views can help you better calibrate brand plans during uncertain times. Furthermore, these techniques allow you to bring customers together to help solve challenging problems. In these complex and rapidly evolving times, customers themselves face the same uncertainties we all face and may be struggling with ambiguous choices. They likely won't have fully thought through what they will need in the new normal. Ongoing e-forum discussions help in bringing these uncertainties to the forefront and will enable

customers to imagine different potential futures so that you can better scenario-plan and anticipate how to best meet emerging needs.

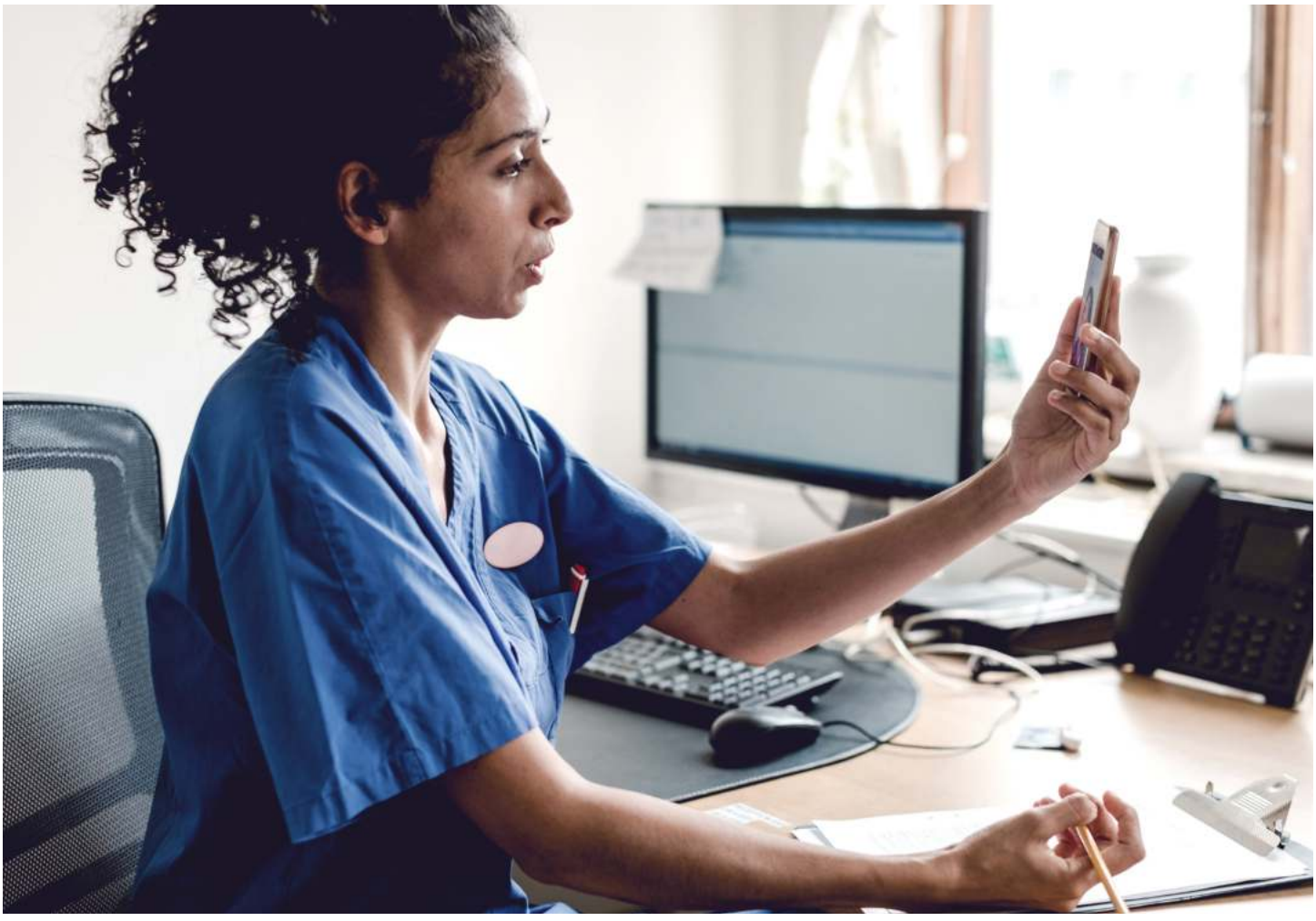
4. **Simulate real-world interactions to understand influences in decision-making.** The new normal will likely be more complex as people adapt to virtual interactions and emerging paradigms that affect decision-making. Traditional "ask and tell" approaches might not be effective in capturing these complexities in how our customers are making decisions. One way to get deep beneath the surface to understand our customers' new world is by immersing our customers in real-world scenarios and simulating interactions. Understanding behavior through potential scenario testing and analyzing the rationale provided can help you better prepare for how the future might pan out.

To engage respondents better, primary market research platforms are evolving to be more mobile-based, allowing respondents to engage anytime and anywhere: for example, allowing bite-size interactions through unconventional means like voice-enabled diction and simulations. However, to maximize the potential of these next-generation platforms, companies need to ensure that their overall approach integrates these four methods of gathering agile and reliable customer insights. This would allow insights teams to engage a diverse set of stakeholders over longer periods of time with an array of research modules ranging from short "pulses" to virtual panels to simulations. The outcome would be an insights program that would vastly improve decision-making even during times of extreme volatility, uncertainty, complexity and ambiguity.

Every crisis presents an opportunity. Having a front-row view into customers' minds during the COVID-19 crisis allows customer insights teams the opportunity to play a critical role in steering company strategy via timely, actionable and rich insights.

COVID-19 and pharma's in-person sales model

By **Pratap Khedkar** and **Daniel Brox**



As the world continues to monitor the spread of COVID-19, industries of all kinds have little choice but to change on the spot: Educational institutions are quickly transitioning their lessons online and dine-in restaurants are joining the delivery service industry. As measures like lockdowns and social distancing continue to be enforced amid the public health crisis, pharma needs to figure out what that means for the traditional rep-centric model. Putting a stop to in-person physician promotions would reduce traffic across sites of care (for locations that haven't already restricted access), thereby lowering the spread of disease to healthcare workers, patients and the reps themselves. It's the responsible thing to do but enforcing a work-from-home mandate—even temporarily—will be challenging. Big disruptions like these are sure to affect everyday business, but they also hold opportunities to rethink existing approaches and try out new ideas.

It's time to flip the digital switch

Healthcare systems around the world are feeling the effects of COVID-19 at varying degrees: Hospitals are feeling pressure from extreme spikes in care while physician practices are treating a dwindling number of (non-COVID-19) patients. The pandemic is shifting healthcare providers' focus and leaving some with less time and fewer resources to care for patients with other chronic conditions. New patients with noncritical needs might be turned away, and existing patients might begin to delay routine checkups or refuse care for other conditions to avoid potential exposure. All of these factors affect how providers will interact with other stakeholders in the healthcare ecosystem for the foreseeable future. When it comes to the role of the pharma sales rep, there's certainly no manual for how to proceed during times like these but it'll be critical to carefully navigate their relationships with physicians and help them put patients first.

Physicians are turning to telehealth to contend with the high number of virus-related requests and to reduce the spread of infection, and in all likelihood, the job duties of pharma sales reps will be conducted from a remote location. The question is how reps will stay engaged with their customers during these times of changing needs and constraints—and ramping up digital deliverables could be the answer.

According to ZS's 2019 AffinityMonitor findings, 47.3% of physicians engage well with in-person pharma rep meetings, but just 9.6% of physicians engage with digital tactics. The new environment could provide a chance to level the playing field a bit now that reps likely will be coordinating the customer experience entirely via digital channels. The key is to ensure that online engagement helps rather than overburdens physicians. For example, third-party vendors and others likely are pushing out materials through digital channels, too. Our research shows that pharma already relies on digital outreach two and a half more times than rep calls, so companies need to be careful not to add to the noise.

Other customer-facing roles like medical device sales reps, nurse educators and key account managers (both provider-centric and payer-centric) will be under pressure, too. Presumably a good portion of the KAM function can be done remotely, but are other roles like customer service reps expected to report for work in an otherwise empty building, or is remote work an option? The challenge isn't just about making sure that the functions can be performed remotely, but ensuring that individuals have the tools and technology to do so.

Our research shows that pharma already relies on digital outreach two and a half more times than rep calls, so companies need to be careful not to add to the noise.

Same job, different approach

Determining how best to respond to physicians' changing needs will ensure that these customer-facing roles are armed for success while sequestered. Just like the new virtual teacher-student relationship is sure to hit some bumps in the road, sales reps' virtual approach to product promotions will likely go through a few trials and tribulations. In addition to understanding and being sensitive to customer needs that change by the day, sales reps will need to find ways to reallocate time typically spent arranging, preparing for and traveling to in-person meetings with physicians.

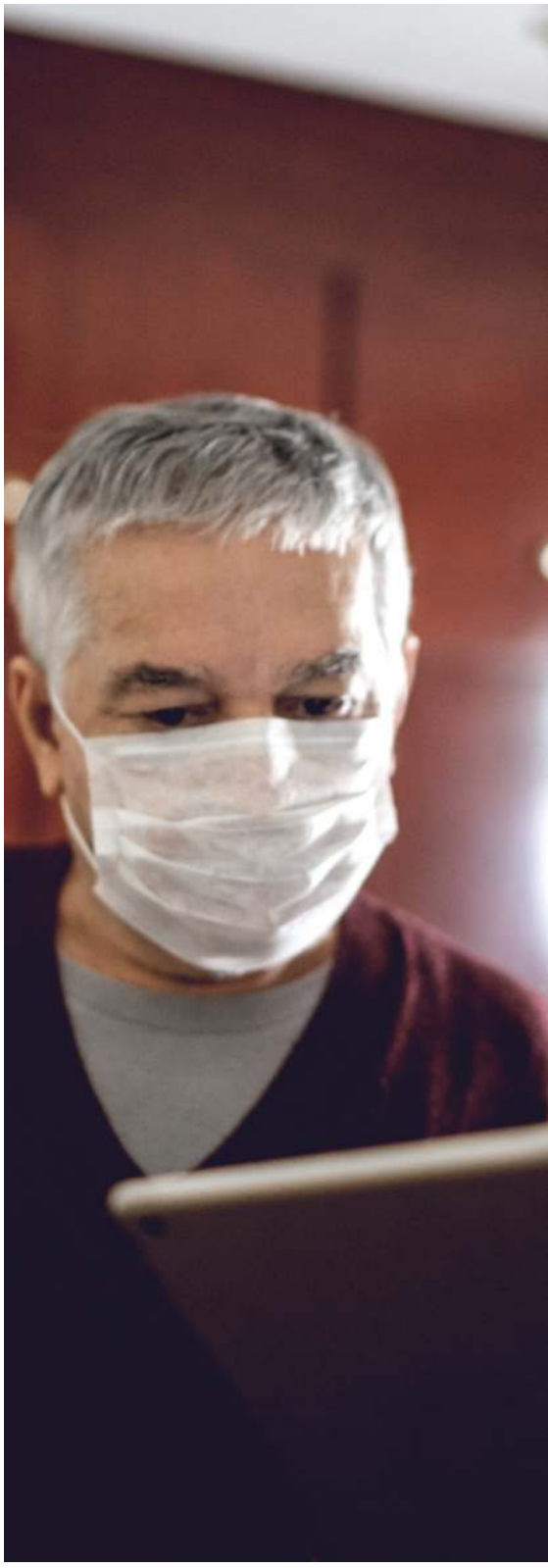
One silver lining is that pivoting to fill reps' workdays with tasks that don't include knocking on office doors could help pharma fulfill its desire to be more tech-minded. In transitioning to a fully digital approach during the outbreak, partnering with marketers to create relevant and targeted messages that engage physicians is more important than ever. And the frequency and timing of digital messages needs to be carefully weighed against the demands of physicians' unusual case load. With those factors in mind, here are a few ways that sales reps can continue to effectively reach their customers from a home office:

1. **Play a more active role in directing non-personal promotion.** Most physicians are open to receiving useful messages from pharma, and now many of them also will be working virtually. With the advent of technologies like artificial intelligence, much of the non-personal promotion function is handled without humans. But there's an opportunity for reps to use time usually spent in the field to further personalize the machine output—with the goal of further individualizing the customer experience. Customers tend to be more receptive—in some cases, five times more receptive—to rep-triggered emails because of the personalized approach. Companies that have this capability established will have the edge.

2. **Help provide support to existing patients.** Brainstorm with customers about ways to support patients in therapy areas that may get less attention due to the all-consuming nature of the pandemic. One example is determining how to help support patients with existing chronic conditions who may be having trouble accessing their doctors' offices for non-virus-related appointments.

3. **Create even more personalized content—now and down the line.** The current climate is a good opportunity to show that pharma is equipped to clearly articulate and respond to customer's individual behaviors and preferences. In the daily grind, reps often don't have time to build the documentation function by entering notes that could fuel these insights. With the rep's input into who a customer is, marketers can create more personalized messages that better engage the customer through virtual channels and address patient needs in the short term. For example, marketers could figure out how to optimize digital channels to provide direct support to patients on specialty medications and ensure that they have an uninterrupted supply.

4. **Sharpen remote detailing offerings.** Typically serving as a complement to in-person promotions, tele-detailing is in a good position to pick up some of the slack. For e-detailing to be successful, reps need to find ways to bring the personalization of face-to-face meetings to video-based calls. Although it's unlikely that we can expect widespread interest (customers are dealing with the demands of their own switch to digital on top of everything else), it could be a good time to try it out with any offices that may be open to an e-detailing approach.



5. **Coordinate messaging campaigns across the organization.** One trap to beware of in the "new way of working" is overwhelming or crowding physicians with too many messages. When physical details were the norm, it was unlikely that three reps would end up at the same place on the same day (but it did happen). When messages are being pushed out via email, it's very likely that all rep-generated emails could show up in a doctor's inbox on the same day.

6. **Brush up on skills.** This is a great opportunity for reps to log some product training time, schedule regular account planning meetings with their teams to identify any overlaps in promotional campaigns and continue learning to optimize customer relationship management systems and other tech tools of the trade.

Give work new meaning

Beyond looking for ways to optimize job duties, there's an opportunity for pharma companies to lean on the expertise of these customer-facing roles to help fill gaps in other areas and build some industry trust along the way. When hands-on action becomes impossible, nurse educators, MSLs and sales reps could use their communication and people skills to connect various stakeholders with relevant information.

A few volunteer opportunities that come to mind are coordinating patient outreach programs for populations that might be neglected due to the all-consuming nature of the virus, ensuring that product shipments are fulfilled and on time, and setting up and staffing patient resources like helplines. Another idea is assisting key accounts by delivering critical supplies to homebound patients—and taking precautions, of course, to reduce the risk to their own health and prevent the spread of disease. In addition to possibly having a lasting impact on pharma's reputation as an industry, these acts of good are just the right thing to do as we all adjust to a new normal.

It's hard not to look down the line and consider how COVID-19 might permanently alter the way that pharma works. Just look at the food industry: In a matter of a few hours, restaurants that operated for years on a dine-in model began offering delivery. Will those restaurants be able to revert to their former business model, or will customers come to expect delivery from now on? For pharma, some of the changes we've outlined above will remain even after the crisis has ended. Once the industry and its customers learn to function in a world without face-to-face detailing, we may see the digital switch flip with physicians preferring to engage via digital channels. In the meantime, marketers shouldn't be afraid to experiment with multiple channels and treat the current operating environment as a learning opportunity.

Post-COVID, is it time for medtech to stop relying on a single sales channel?

By **Maria Kliatchko**

Sales and marketing have changed a lot over the last 10 years. Most industries, from the technologically advanced to the most basic, have introduced a variety of sales and marketing channels, from telesales and emails to ads, videos and social. Even in healthcare—one of the most constrained and conservative industries—pharma manufacturers, providers of all sizes and insurers have been gradually introducing and perfecting the art and science of multi-channel sales and marketing for many years. Many are so sophisticated and comprehensive by now, they call it "omnichannel engagement."

And yet most of the medtech industry has barely started this journey. It has had a single, rep-based go-to-market strategy for so long, and there was no urgency to try something else. And then COVID-19 hit, and the whole sales relationship was pulled from under medtech's feet. Not only have hospitals restricted physical access, but customers, from doctors to hospital administrators, have realized that digital means of getting information are much more effective. Additionally, the whole premise of the rep-doctor relationship, with the rep just helping the doctor with clinical product info, is no longer enough. Doctors are trying to figure out how to care for struggling patients under stressful and risky situations, and rather than product help, they need help with developing new COVID risk-lowering protocols and financing. So sales reps, many of them not medically trained and not empowered today to offer any additional help, find themselves in need of programs, webinars and new protocols developed by the companies they work for and provided via variety of digital, on-demand channels.

One may think that the pandemic will come and go, yet ZS's COVID-19 survey showed that 43 to 47% of providers strongly prefer email communication, on-demand video and online tools to personal conversation, and that two-thirds of them believe that this preference will continue after COVID-19.

Said in another way, a medtech company that doesn't master at least these basic channels is at risk of missing an opportunity with about

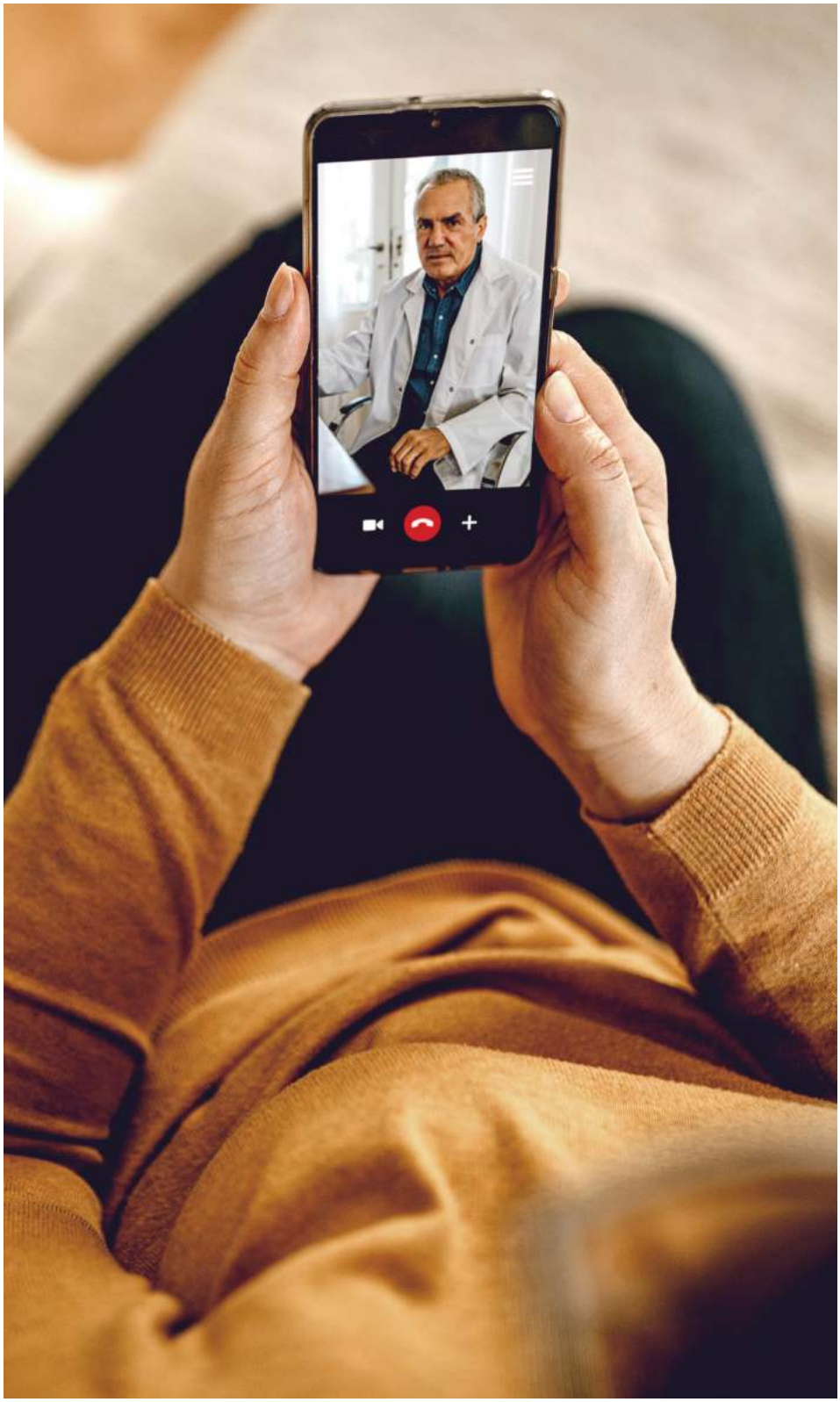
half of their customers. Those that offer all of these ways to engage with their customers in a 24/7 way can handily win, even in competitive and differentiated markets.

Moreover, it's not all about access. Variety and on-demand pull are important too. A new potential customer may not be immediately impressed by a direct sales pitch, but many if not all respond well to a balanced and tailored mix of various tactics.

We've seen a new-to-product sales lift as high as 4 to 8% through a customer-centered omnichannel program. That's why companies that have invested in multichannel programs not only have an easier time adapting to COVID-19, but will be more successful in the long term.

So what are the right steps for jumpstarting your omnichannel capability?

- **Understand how customers want to engage with you.** Through market research, evaluate the potential of the 10 to 12 most common channels and understand which content lends itself to which channel. Consider all types of content: marketing,



We've seen a new-to-product sales lift as high as 4 to 8% through a customer-centered omnichannel program.

educational and case support, as well as financial and practice management help. Understand different cohorts of customers. While the older ones may still prefer face-to-face interactions, or at least a call or Zoom meeting with reps, younger doctors more and more want to get their information completely digitally, on demand, when it's convenient for them. Specialty and place of practice may also dictate preferences: Our research on access and preference for personal vs. non-personal channels shows that some specialists were already much more accessible via non-personal promotion, even before COVID-19.

- **Pull the customer data together.** As scary as it sounds to veterans of data battles, there's now a good selection of third-party data providers, including Definitive Health, Symphony Health and AHA, which can provide data on institutions. Axciom and others can provide data on doctors and patients as consumers. Although tying sales and all the different data points across an organization is helpful, it's not necessary to completely clean and match all the data before starting a

digital program. A comprehensive list of all the customers from a third party could be a good enough start.

- **Organize the content.** While you may have lots of content developed, new channels such as emails, webinars and training videos may need new content, or old content reorganized for better consumption. Matching customers to content is a first step. Then, monitor customer preferences to understand not only what content each customer wants to use, but also at what frequency and in which form, and even preferred visuals. In our analytic work with multichannel marketing organizations, we found that some customers may respond better to text, while others to infographics. Some prefer images of people, while others respond better to images of the product or abstract pictures. Personalizing the message can improve responses significantly.

- **Develop omnichannel marketing analytics and orchestration tools.** Developing a few webinars and email templates sounds easy enough, and there are many marketing platforms, such as SFDC Marketing Cloud or Adobe, that can make deployment easy. But there's nothing more annoying for a customer than being bombarded by the same messages too often, or through non-preferred channels. In response, customers may disengage completely. A good orchestration system allows you to constantly monitor customer engagement with different channels and content and develop "best next action" sequences, suggesting or even directly executing the right activity with the right customer in the form and channel that the customer can best engage with, and help sales reps orchestrate the complete multichannel customer engagement, while at the same time staying closely connected and relevant, even as the dynamics of the situation change for the customer. While this may sound intimidating as it often requires AI/ML capabilities, platforms like these can be easily acquired and configured in just a few months.

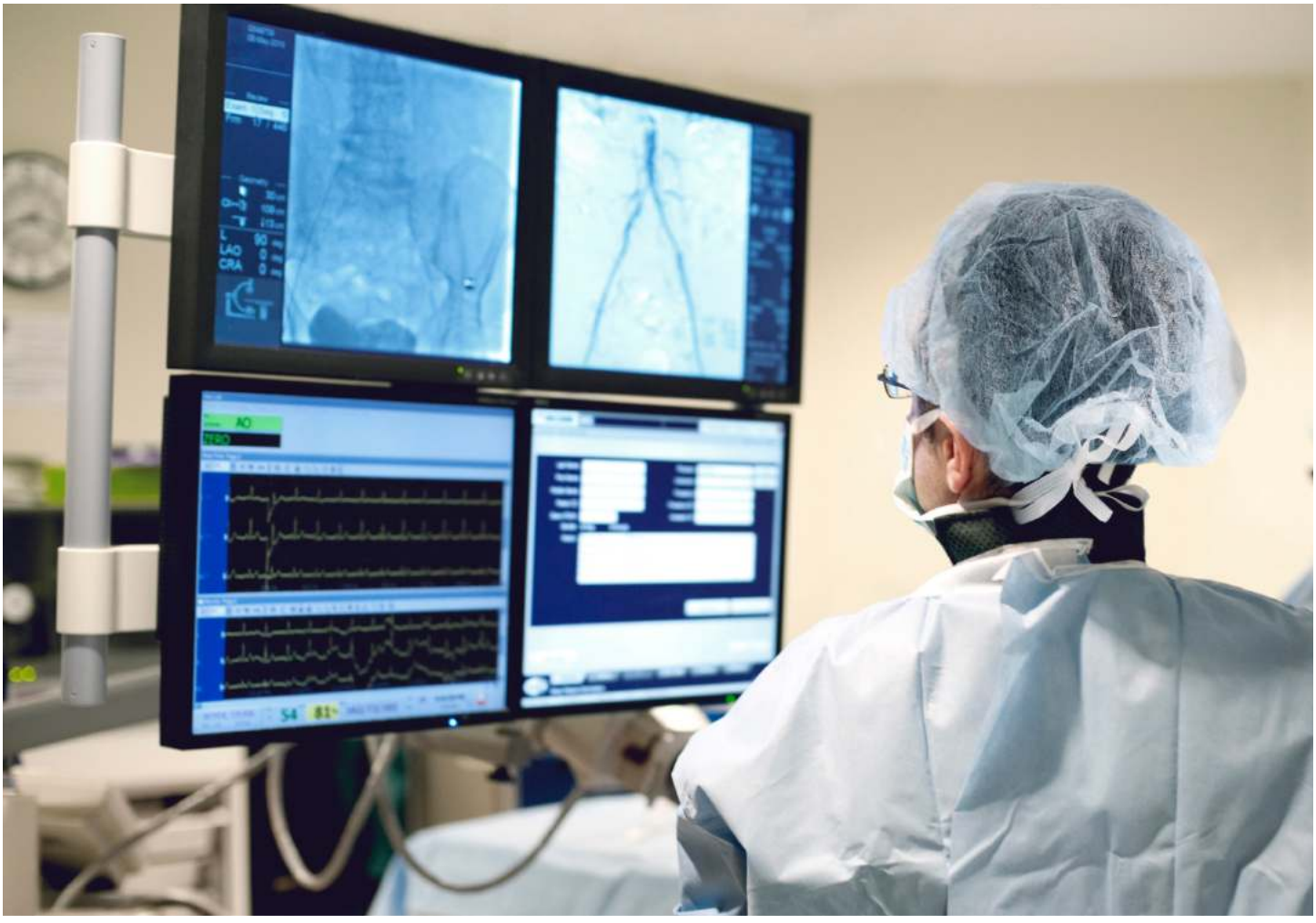
- **Expand the scope of the sales rep role to an orchestrator.** The role of the sales rep should transform from a single point of contact to an orchestrator of the customer journey through many channels and events. Such "hybrid reps" would play a more active role in non-personal content development, helping to optimize and personalize machine-driven content for their customers. They would also coordinate messaging campaigns across the organization and represent their whole organization and all of its offerings, from clinical to financial, to patient education and practice management. Understandably these skills won't appear magically, but will require training and perhaps even different people with sharper digital and organizational expertise.

Most importantly, don't wait any longer. Omnichannel sales and marketing is no longer a luxury. It's a fundamental capability without which no company can be in business. A majority of customers now expect to engage digitally when it's convenient for them, and the sales lift and therapy adoption from improved engagement is dramatic. It may be a three- to five-year journey to master all of the channels and full orchestration, but in three to six months, perhaps before the active phase of COVID-19 ends, you can enable a few key channels and services, and help your sales reps to fully enage with your customers in this uncertain and fluid time.

The role of the sales rep should transform from a single point of contact to an orchestrator of the customer journey through many channels and events. Such "hybrid reps" would play a more active role in non-personal content development, helping to optimize and personalize machine-driven content for their customers.

Launching into the new reality: How COVID-19 is reshaping medtech's launch strategy

By **ZS Editors**



Innovation continues to excite people, even though the global pandemic has ground business as usual to a halt. As COVID-19 continues to reshape the healthcare market, many medtech companies are debating whether to launch and how to drive launch excellence in this new market reality full of changes and uncertainties.

ZS's Duo Wang sat down with a panel of leaders in ZS's medtech practice; the group has a mix of deep expertise in medtech and launch strategy: Sundeep Karnik, Brian Chapman, Tim Joyce, Matt Singer and Sudhanshu Bhatnagar. They discussed how COVID-19 is impacting launch strategy for medtech. Their conversation has been edited for length and clarity.

Duo Wang: Many medtech companies highlighted their pipeline in their recent earnings calls. However, all were cautious about providing specific guidance on launches. Some cited delays due to interrupted clinical studies and regulatory processes. Should medtech companies continue to launch products over the next year or two given the disruption by COVID?

Sundeep Karnik: Let's first clarify the definition of a new product. As described in a previous blog post, "New Product Launches: Some Matter More Than Others," there is a wide range of launches based on the level of innovation. Will this launch introduce a truly innovative, new-to-the-world procedure? Or is it a new product in an existing category? Or is it more of a line extension with nominal improvement of features?

DW: Great clarification. Given the differences in new products, how should medtech companies prioritize what to launch over the next year or two?

Brian Chapman: A ZS survey last year showed that only 20% of hospital executives saw significant advancements in newly launched medical technologies. If a new feature isn't as consequential in the post-COVID world as before, this could be a good reason to consider pausing. For some new procedures, it may be impossible to get sufficient market attention or gather supportive evidence for a while. On the other side, if the new product focuses on delivering clear-to-see financial benefits, now can be a great time to launch. It all comes down to value proposition.

Tim Joyce: Agree. Companies should continue to launch "disruptive innovations" that bring the costs down for customers, and even more so now given the financial challenges. The "should you launch" decision also depends on the portfolio, specifically the role of the new product in the portfolio. Some products will be sources of profit. Others will be sources of revenue. It will be difficult in this environment to launch a product whose primary goal is to drive profit growth through price increase. Companies need to assign clear portfolio roles for their new products and stick to them during execution.

SK: A product launch is an investment decision and medtech is in a cash crunch right now. The less compelling the value proposition, the less attractive the ROI of the launch will be. Companies need the financial discipline to make the hard decision about what to launch versus not.

DW: Let's assume that a company made the right decision a year ago to launch this year. Is it possible that the company would make a different decision now amid COVID-19?

Matt Singer: We have always recommended that medtech companies ask two fundamental questions when they determine how to prioritize and customize their launch strategies: 1.) How compelling is the new product's value proposition from the customer's perspective? 2.) How large is the realistic, addressable market opportunity for this product?

For every company that has new products set for commercial release over the next six to 12 months, I would strongly recommend that they revisit these two questions. Look for the reasons why the answers could be different, not why they should be same.

Clearly the healthcare provider's world has been turned upside down lately and will continue to evolve in the foreseeable future. The strength of your value proposition may have changed as customer priorities shift. In this case, can you find a narrower segment of the market where your value proposition remains strong and clear? Your addressable market could be different as the patient flow you rely on slows down or gets diverted elsewhere. For example, as more patients are expected to move to ambulatory settings at a faster rate post-COVID, can you delineate

your portfolio between hospital and ambulatory?

If you can find ways to recast your value proposition and reshape your addressable market, then you should definitely move forward with the launch. If not, your organizational energy may be better spent somewhere else.

TJ: Companies definitely should revisit their decisions, but in reality many won't or don't know how. Few organizations are set up to pivot so quickly under so much pressure and so many uncertainties, as in the COVID situation. One of the big learnings from this crisis is that we need the capability going forward to react more quickly. We can't afford to be caught off guard again. Portfolio governance structure and strategic planning process exist in most medtech companies. We can redesign the process to be more agile and capture both strategic and tactic changes. We can also develop analytical tools that enable the governance body to make better decisions. Launch is as much an organizational decision as a product one.

DW: When would you consider not launching or delaying? What kind of products are at risk of gaining less traction than desired?

Sudhanshu Bhatnagar: I'd caution against launching any products with a price uplift but only marginal improvement. With the financial pressure, customers are more likely than they may have previously been to challenge and reject premium-priced product upgrades unless they can bring significant, measurable improvement in clinical outcomes or procedural barriers. Customers, including clinicians, are paying more attention to the economics associated with new products. Launching a marginal improvement with a price uplift also poses the risk of alienating customers; customers could view such actions as self-centered and tone-deaf to their needs.

MS: In this environment, products with compelling value propositions will be the winners and those without will be the losers. I would recommend that companies reconsider a launch if its value proposition centers around either physician preference or some long-range, yet-to-be-proven clinical outcome with no clear financial metrics.

DW: If a medtech company decides to launch, how should they adjust their launch approach in today's world?

MS: Companies need to take a long-term view around launching a new procedure in today's world. Uptake curves from most medtech product launches follow an "S" shape. Revenue is typically disproportionately small relative to the resource and energy spent on the new product, even before COVID. It takes time to collect data, build cases and establish market access. Companies must be laser-focused on maximizing the long-term value proposition and long-term addressable market, which may mean not maximizing sales or margin for that product this year. Companies can compartmentalize people and budget devoted to the launch while the rest of the organization can concentrate on the near term.

TJ: Companies can leverage their portfolio and contracting if there's a reasonable market but not enough appetite for the new product right away. A multi-year, multi-product contract that gradually shifts the mix from older and cheaper to newer, more premium products may help customers bridge immediate budget constraints and allow the company to secure share and drive new product adoption in the long term.

SB: This is the time to think locally. Healthcare market dynamic has always been local. COVID exacerbated such variance and the path to recovery will be very local too. Certain places, segments or channels might be more willing and conducive to product launch. If a company has a product whose value proposition is particularly strong in selective markets and such markets also represent a decent size opportunity, a segment-focused launch may work better than a "one-size-fits-all" national or global one.

BC: Medtech needs to go beyond traditional means to overcome the challenges in the current environment. The bar will be much higher now to prove and communicate your value proposition. Let's assume you have a new product that has meaningful economic benefit but requires some explanation, such as lower lifetime disease burden, better efficiency across departments, etc. You may need a key account manager with business acumen and account expertise to pitch the message and help your rep who is used to selling features rather than value.

Similarly, assuming you want to launch a product that delivers great clinical outcome but requires a lot of in-person training or support from the rep, such access is no longer possible with COVID. That doesn't mean that you have to

cancel the launch. You just need to find another way to deliver training and procedural support at scale before you release the product. Maybe you need to create a virtual-reality-based procedure simulator or deploy an online platform for reps to "remote" into and assist clinicians in real time.

DW: How should medtech think about their launch strategy if they are launching into a new procedure versus an existing category? What about capital equipment?

MT: It's a challenging time for new procedures. You will need to think about market development both comprehensively and creatively. Market development means removing adoption barriers across stakeholders: providers, patients, payers, etc. With the disruption from COVID, you may encounter additional challenges. For example, as patient flow slows to a trickle, can you find ways to engage patients, raising awareness and motivating them to act? As the scrutiny around procedures increases, can you demonstrate real-world evidence to a payer that your procedure is a better alternative to cheap medical management? Maybe you should wait until you figure out how to remove these barriers. Or you could do a limited launch instead of a big splash, with a focus on gathering data evidence.

BC: Budget constraints are real. Hospital operating margin in the U.S. dropped 150% in Q1 compared to last year. HCA already announced they would postpone certain capital expenditures. Medtech companies in the capital business may need to explore different revenue models to remove the high upfront costs: rental, leasing, subscription. Also, move the focus from features to financial values; communicate and prove how your devices can help customers increase revenue, and improve efficiency or reduce cost of ownership.

DW: What's your "elevator pitch" to a medtech leader who's seeking advice regarding a potential launch in the near future?

SB: I'd recommend breaking down the decisions into "Should I launch?" and "How should I launch?" For the former, ask if the value proposition will still resonate in the new market environment. If not, can it be pivoted? What are the business objectives for the product? The second question is a downstream decision. How do I communicate the value and target a segment? What alternate channels can I use? And importantly, do I have the discipline, the information, the resources and the mindshare to launch the product right?

BC: Both the financial stakes and risks are higher now. Therefore, the decision whether to launch or not is critical. I would recommend that the individual reconsider previous assumptions. After that, if the decision is yes, go all in. It's about launching fewer but better things in the near term, and making sure the launches make sense and are fully supported in the new environment.

The CIO's path to a new normal

By **Mahmood Majeed**

As life sciences firms respond to the shifting realities of the COVID-19 crisis, they need to prepare for the long-term impact on the healthcare landscape. Many digital responses, such as telehealth, are likely to remain. Life sciences must adapt to and embrace these new digital realities across every aspect of their businesses, from R&D to commercial. The customer journey is broken and will be reimagined multiple times as we adapt to changing customer behavior during the crisis. Market conditions will be extremely volatile, varying greatly over time and by therapy area, locale and customer. In addition, the pandemic has compelled health systems to more strongly consider strategic partnerships with manufacturers. As a result, key account management and IDN partnership strategies will take a more prominent role. Therefore, as pharma rebounds and finds a new normal, it's critical that life sciences CIOs and technology leaders push the boundaries on long-term technology imperatives (such as digital transformation, data, analytics and customer centricity) to position the business for future success.

We've put together a summary of long-term, technology-driven imperatives on which life sciences CIOs should increase their focus as they prepare for the new normal.

Modernize the data and technology foundation by ensuring flexible and scalable technology systems

To keep pace with the rapid evolution of business drivers in a post-COVID-19 world, life sciences CIOs and technology leaders need to implement a flexible architecture supported by modular platforms, enable data ubiquity and protect systems through advanced security. They should embody a data-first, cloud-first, global-first and experience-first mindset when modernizing their technology foundation.

- **Consider constructs to move to a more flexible, modular architecture.** Modular architectures consist of compact, self-contained, service-based components that are linked with easily configurable APIs. This accelerates time to market and facilitates quick responses to evolving business requirements, especially in times of crisis. Concepts such as containerization and micro services are being embraced by best-in-class IT organizations in the life sciences industry. In addition, as the focus on multi-cloud is only going to increase, applications' architecture will also be expected to seamlessly support multiple cloud platforms.

- **Prepare for real-time, data-driven decision-making.** As historical data is likely to become less relevant in the post-COVID-19 world, technology leaders need to ensure that data analytics continue to drive decisions

at scale and on a real-time basis. Alternatives may include accelerating the use of partial or incomplete data, as well as a wider variety of data such as text, audio, video and customer sentiment analysis rather than deep or voluminous (and more historical) data; harnessing relationships within data sets more effectively such as by leveraging graph techniques; and training AI models with newer techniques varying from reinforcement learning to continuous, embedded learning.

- **Create an enterprise-wide data strategy to enable connected decisions across business functions.** The COVID-19 crisis has underlined the value of cross-functional teams and decision-making for a faster and more effective response to changing market needs. This is a great opportunity for life sciences CIOs to invest in enterprise data strategy and enable connected decisions. CIOs can provide a business interface for all the cross-functional stakeholders to share and democratize data at the enterprise level. While there will be sensitivities and nuances in sharing data across business units, data can be shared effectively through a business interface that allows data owners and business units to design and control certain aspects of data sharing, such as access and protocols.

- **Set up the right practices and approach for security, data privacy and business continuity.** Security and privacy considerations should be integrated within the solution development cycle, not after

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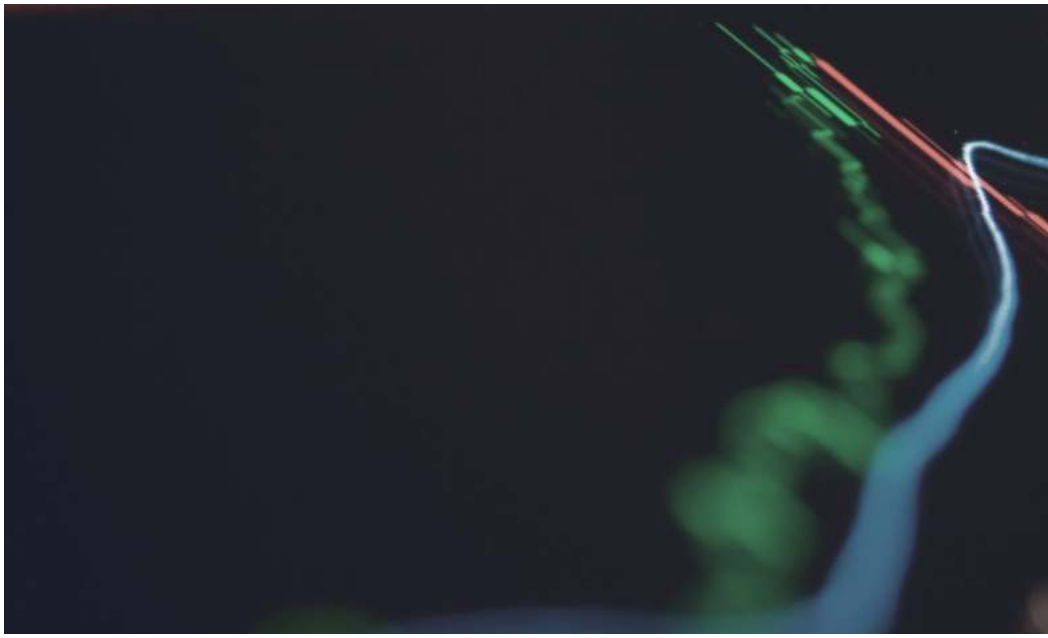


the conclusion of development. Supporting areas such as regulatory and compliance should be considered key requirements while data access is virtual.

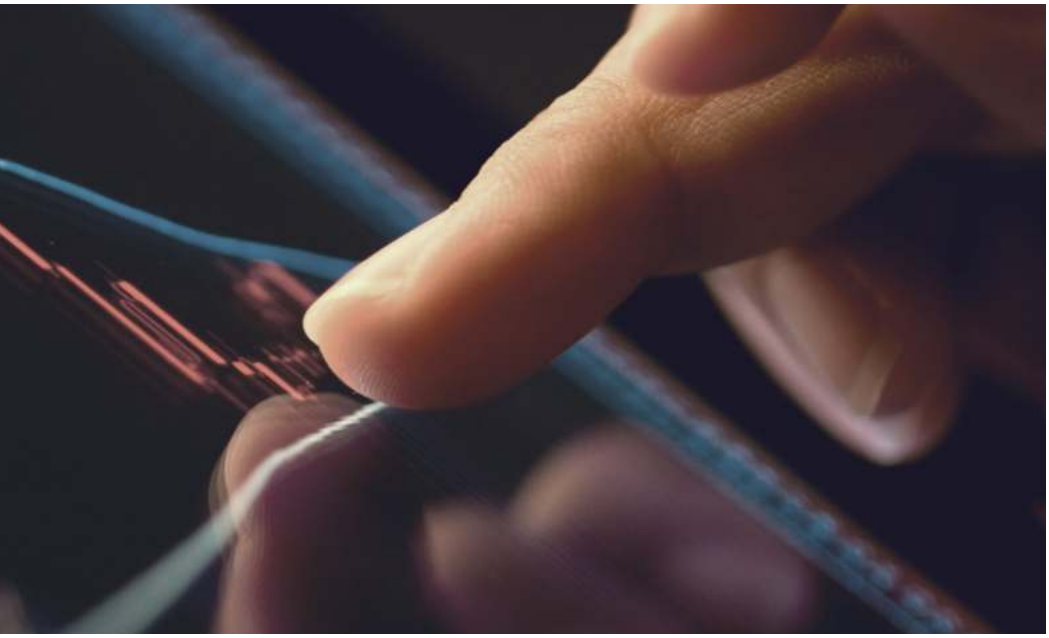
- **Propagate a re-skilling mindset to ensure that your organization quickly adapts to newer technologies and skills.** Life sciences firms already are making organizational plans for approved digital technologies, allowing employees to make purposeful choices about which new skills they need to learn to improve their abilities and evolve. With uncertain times ahead, companies that adopt a re-skilling mindset will be more successful at integrating innovative technologies and agile ways of working because they'll foster a culture of continuous learning.

CIOs and technology organizations need to embrace agility, improve service delivery with next-generation capabilities such as AI and automation and develop flexible technology partnerships with service providers.

- **Embrace user- and product-centric delivery approaches.** As life sciences firms reimagine customer experiences and journeys for a post-COVID-19 world, IT will play a critical role in enabling the newer experiences and will need to reinvent their delivery paradigm. For a long time, IT has focused on project-centric ways of working (such as ITIL and waterfall), which does not always align with digital and human design experiences. Adopting more user- and product-centric approaches such as agile delivery models, design thinking and continuous delivery will help IT become nimbler, more user- and business-oriented and deliver better service and experiences.

- **Put automation and intelligence at the heart of technology delivery.** While the current crisis, with its social distancing and isolation, might have triggered renewed focus on automation and intelligence, the investments here will create a lasting advantage for firms, not only in delivering savings but also creating room for ongoing innovation. In life sciences, we are already seeing the increased demand for intelligent data management, augmented analytics and cognitive RPA (intelligent robotic process automation), as well as a focus on hyper-automation that leverages dev ops teams for now, with the goal of eventually reaching "no ops" (no operations) models.

- **Focus on building talent and strategic service provider partnerships.** CIOs and technology leaders need to reinforce the importance of hiring top talent and equip them with successful growth paths and re-skilling opportunities. In addition, they should look for



innovative models to collaborate with service partners. For example, companies can partner with strategic providers to not only deliver the technology product but also enrich their in-house people skills during the process and continue to foster innovation as a key service expectation.

Envisage the role of technology as a business and innovation partner

Life sciences CIOs can establish IT as a value creation partner to enable business in pursuing transformations by reimagining the use of data, analytics and digital technology as a key differentiator.

- **Reimagine the technology service and operating model.** While IT has historically worked in a shared service model to optimize the cost, other models are now being considered depending upon the anticipated value for business. These can vary from integrating many of the domain-dependent, non-commoditized IT services within lines of business to design a product or platform-centric model that ensures the tight coupling of business and IT into the product life cycle. A product or platform-centric model has been a huge success in other industries such as financial services and can help technology organizations within life sciences improve the consistency of the business experience.

- **Enable data and digital monetization for business value beyond operation excellence and decision-making.** During the COVID-19 crisis, digital technologies have been thrust into the limelight and are expected to have a long-term impact on customer engagement and other pharma operations. As firms accelerate their digital investments, CIOs and technology leaders should aspire to create digital products and services that can either have tangible impact on health outcomes or enable direct monetization. Examples may include solutions focused on optimizing the patient or healthcare provider experience (improving loyalty and trust, thus impacting revenues) or truly transformational digital therapies.

- **Track the business value of technology investments and rebalance accordingly.** Technology investments usually tend to deliver value only implicitly, which leaves them prone to scrutiny. If IT aspires to become a value driver and to establish a seat on board, it's critical to devise shared objectives and goals to link technology investments to business value—both the value derived from selling new tech-enabled products and services (such as digital therapies), and value gained in the form of operational efficiencies from embedding technologies into business processes.

Many CIOs are already playing a key role in navigating the COVID-19 crisis. After the first emergency response, there is a tremendous opportunity to shape the path of life sciences companies' reinvention coming out of the COVID-19 crisis. From managing the initial implications of the disruption, to preparing for and managing through the downturn during the "business unusual" phase, to positioning the business for future success once the recovery happens, CIOs now can change the role of IT from merely a support function to business partner and value creator.

After the pandemic, don't simply automate. Innovate

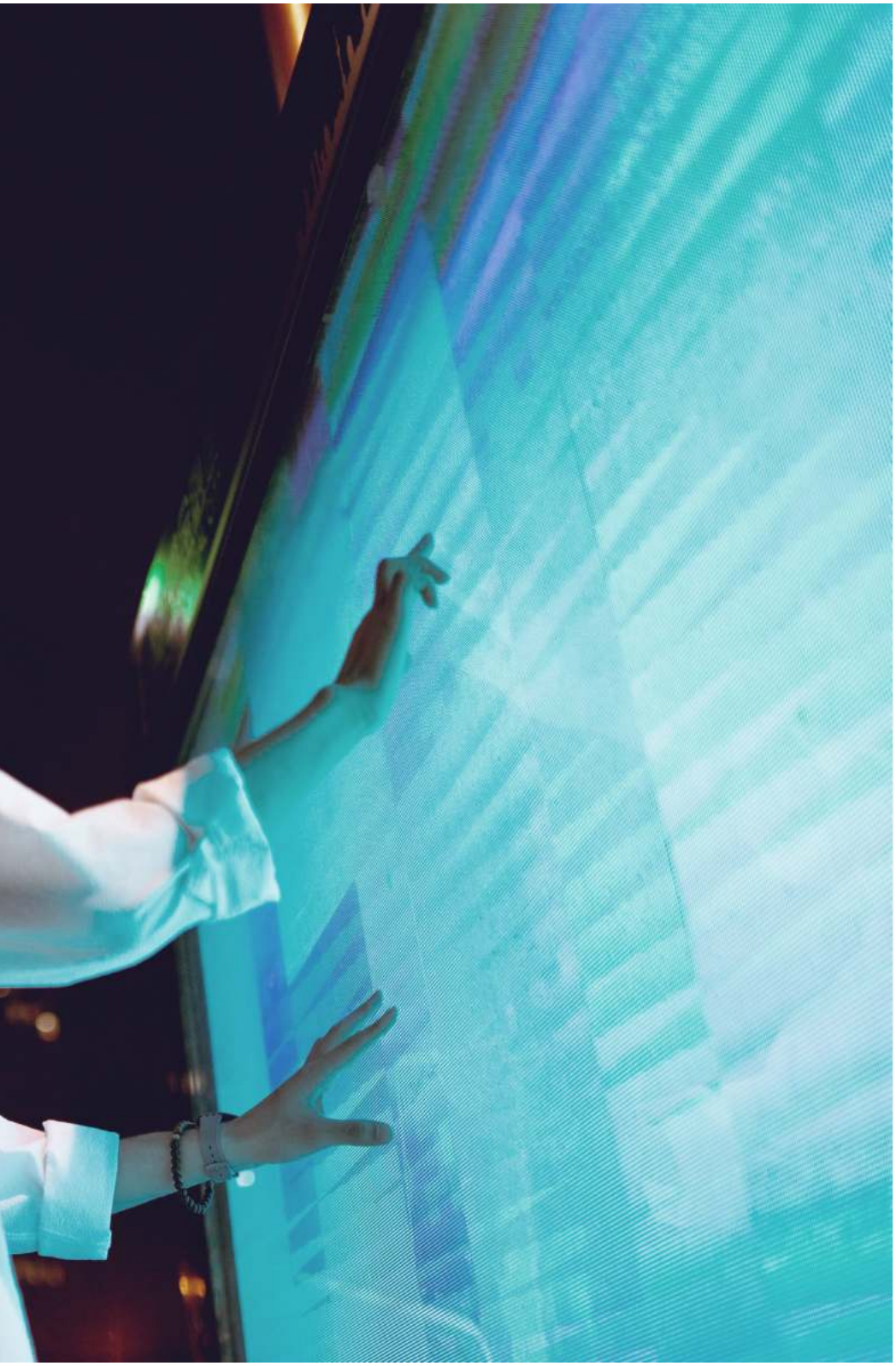
By **Arun Shastri**

After the pandemic, many believe that automation will accelerate—and for good reason: In the three recessions that have occurred over the past 30 years, 88% of job losses took place in highly automatable occupations. We're facing the twin realities of potentially the worst recession in generations and a mature automation technology that is ripe for deployment. Lost revenue means leaner workforces. Lean workforces drive the need for automation so that smaller teams can accomplish more with fewer people. For example, we've been seeing automation in call centers for years now. This will surely accelerate. In a cruel irony, the state of Texas recently acquired chatbots to handle inquiries to an overwhelmed unemployment system. I can only imagine how it feels to call the number and be met with a machine doing what was historically a human's job. But given how lean the team was and how high the call volume was, the state felt it had no choice.

As you respond to this crisis and create a road map to your future, be wary of only planning for cost-cutting via automation. Increasing industrial or business process automation makes sense, but your business's future should also feature AI prominently, which means you must first look to scale AI across the enterprise. Before the pandemic, companies were turning to AI to drive growth and profitability, but they were largely struggling to scale their experiments across the enterprise. Now is the time to repair those struggles. Second, find ways to leverage AI to respond to the tailwinds that the pandemic will likely leave behind. Give yourself the time to think through impending market forces that may require you to rethink key aspects of your business processes.

Scaling AI solutions

Going forward, it won't be enough to think innovatively; you'll also need to turn your ideas into real, functioning solutions. In an Accenture report that surveyed 1,500 C-suite executives in 16 industries, 76% of respondents said they were struggling



to scale the technology across their businesses. Only 5% of more than 200 manufacturers surveyed by the MAPI Foundation said they have a clearly defined strategy for AI. I've seen many reasons for these struggles, including infrastructure requirements, cross-functional collaboration challenges, and a lack of standardization and re-usability of tools across use cases. To overcome stumbling blocks and plan for the unique challenges ahead, focus your AI strategy around these five actions:

1. **Define the problem.** Take a consultative approach to identifying business needs, solving the right set of problems and focusing on the ones that can drive meaningful value at scale. At times, this may require revisiting hypotheses or making meaningful trade-offs between enhancing existing solutions and exploring new ones. A sales organization, for example, might focus its attention on the loss of accounts, or churn, as acquiring new customers is much more expensive than retaining existing ones. Defining churn is the first and most important stage. Could AI help you predict customer attrition by identifying risk factors such as reduced customer consumption or engagement?

2. **Pay attention to building the right data pipeline.** Your AI is only as good as the data that you provide to it. Scaled solutions require data that will continuously inform new outcomes. You need to be thoughtful about how and when data will refresh, always maintain quality and ensure you can create the most relevant features. In keeping with

the sales example, data that could enhance predictions include account characteristics, user patterns, sales conversations and more.

3. **Increase the sophistication of your modeling.** Revisit the model after the design phase and consider whether all features are still relevant, whether new models could be assembled to improve outcomes, and when and how to retrain them.

4. **Don't underestimate the power of explainability and transparency.** AI can be critical to decision-making, but you must be able to explain its choices to whomever asks. You need to ensure that explanations are relevant for the business, balance specificity with simplicity and frequently communicate the impact to gain buy-in from all levels of the organization. A salesperson, for example, would want to know why an account was flagged as a potential candidate for churn and what she could do to address it. Providing those explanations is important to build trust and adoption.

5. **Monitor the solutions continuously after deployment.** Deploying the solution for the first time may feel like half of the battle, but consistently monitoring its reliability is critical. Look for ways to identify if the algorithms are working as intended, manage and triage errors, and prevent model biases by being proactive and helping your data science teams avoid ad hoc and manual efforts. In a sales organization, you could incorporate feedback from reps that leverage AI recommendations to improve the predictions that the model is making.

Post-pandemic tailwinds

Much of the "disruptor class" will have been set back by the virus, but others are still working in their garages with low or no overhead to slow their efforts. Others will be born from the crisis. Venmo, Uber, WhatsApp, Groupon and Instagram all sprang from the ashes of the Great Recession. The world was already in a rapid state of change before COVID-19. In many ways, we don't yet know how we'll be impacted by the pandemic, but there are some trends that we know are likely to accelerate and will become more important than ever. We should prepare for them now.

Work from home is a new normal. Tata Consultancy Services, India's largest IT services firm, has announced a new initiative called "25/25." By the year 2025, no more than 25% of its workforce (448,000 globally) will be expected to work in its offices. The remaining are expected to work from home. Months spent sheltering in place will lead to more comfort with all forms of digital consumption. For example, we're seeing telehealth emerge as a viable alternative to visiting the doctor's office. When things move forward again, we can be certain that some of these experiments will lead to permanent change.

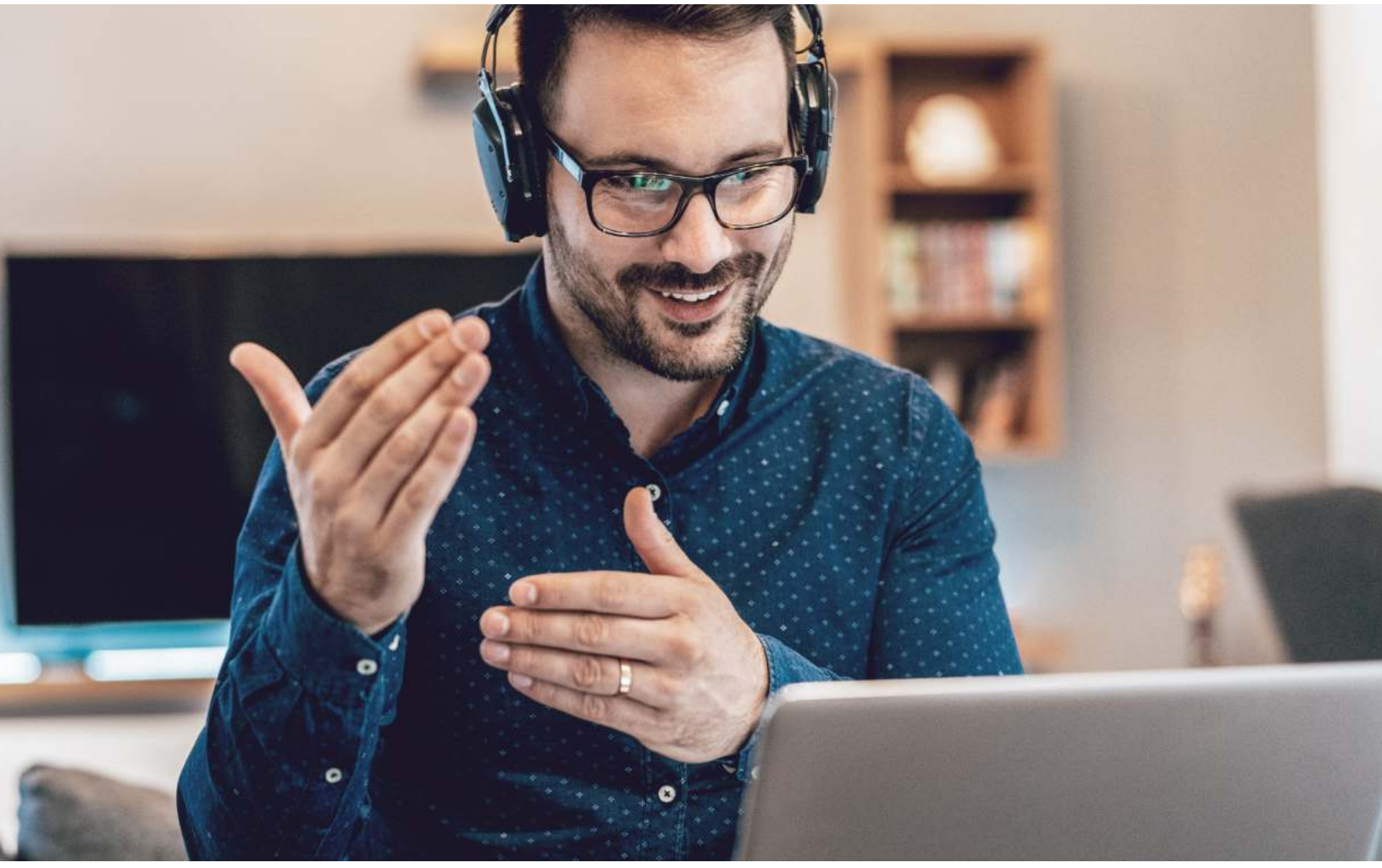
Personalization is likely to become more important than ever. Your consumers are much less willing to listen to or appreciate thoughtless outreach. A lack of personalization could lead to frustration and resentment. Finding ways to reach consumers is key to winning their trust and business. AI can help a retailer learn more about a customer's needs, better understand her wants, and design a message and an offer that resonates for her.

Traditional roles are likely to be disrupted in meaningful ways and, again, AI can help. Field sales roles will likely remain changed for the foreseeable future. Given that customers will look to digital channels to consume information, there will be

less travel for sales representatives and therefore a greater number of customers that can be effectively managed. AI is the perfect tool to help us achieve such scale as it can orchestrate actions across channels and gather intelligence on the customers.

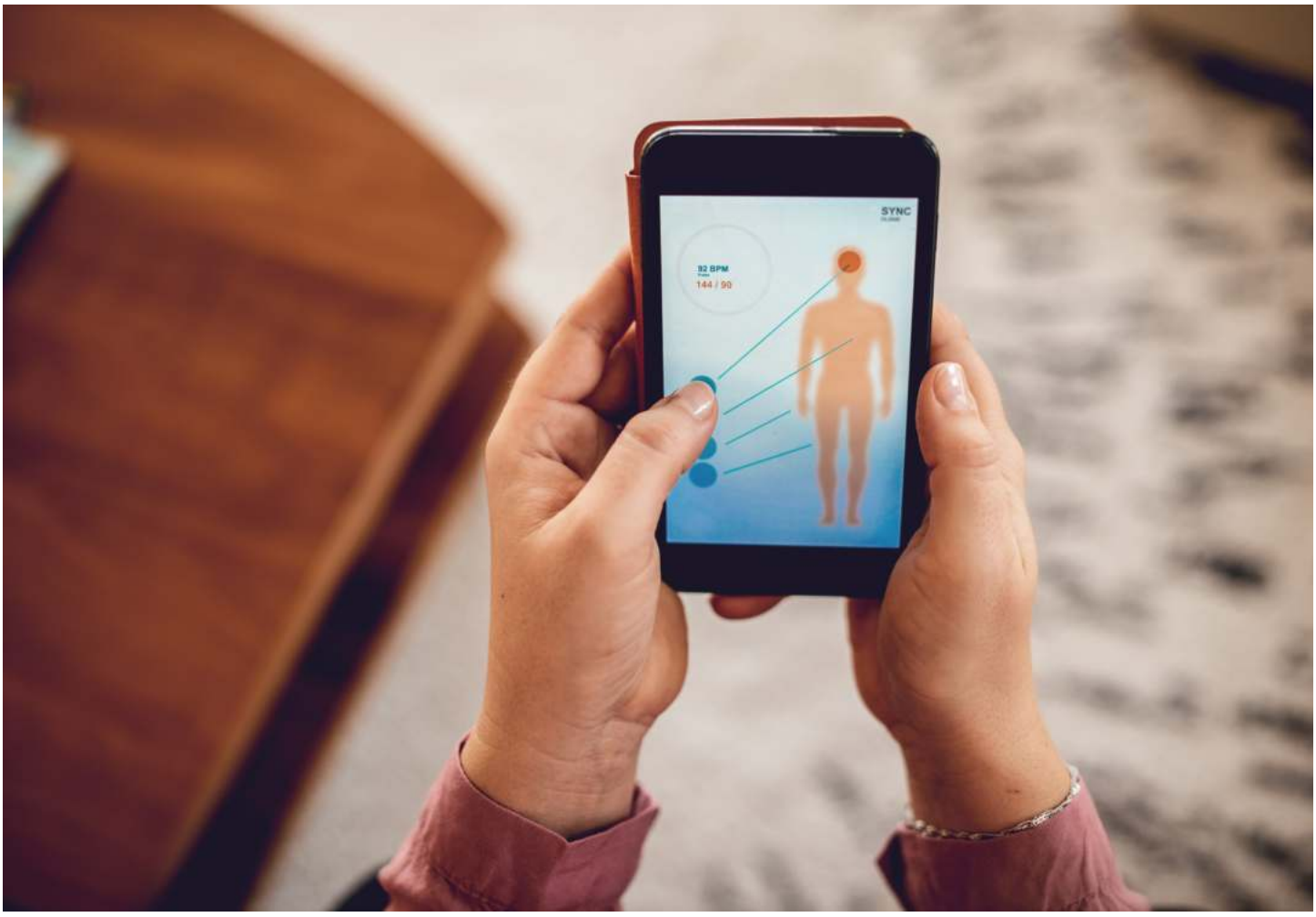
Organizations will have to adapt and rethink their processes and offers—instead of simply turning to automation to thrive in this new reality. Further, don't simply use AI to help you do business as usual. Treat AI as architecture, not a collection of features. With AI, you have the capacity to re-imagine how you do business entirely. If grocery stores innovated within the bounds of their existing business model, they'd add AI features like an expensive system that did the work of a cashier. Companies like Amazon, however, are leveraging AI to re-imagine how the checkout process works by doing away with that step entirely. Failing to have an architecture mindset can make you vulnerable to disruptors as well as poor investments that quickly become obsolete. (I hope no one invested in robot cashiers.)

We are living in unprecedented times, so we must be deliberate as we navigate through them and keep investing in AI. Continue to automate where feasible but don't stop there. Continue to focus on bringing your innovations from proof of concept to scale and adapt your business to the new realities that will spawn countless disruptions and disruptors. Doing so may be a matter of business survival.



Four key actions clinical operations teams can take now to avoid disruptions

By **Sharma Ramanathan Deva Devesa, Ronald Du, Mike Martin** and **Arvind Chavali**



In accordance with recommendations from the FDA, there are four key actions that biopharmaceutical sponsors can take immediately to offset disruptions:

- **"Virtualize" clinical trials.** For clinical studies currently in flight, sponsors need to virtualize their trial operations[1] to avoid jeopardizing the safety of patients as well as site staff. In a purely virtual setting, patients are in contact with study teams and trial physicians through smartphone technologies[2], and investigational products are shipped directly to patients' homes. Patients can self-administer therapies if feasible. For more complex procedures and interventions, sponsors can collaborate with third-party home-trial vendors[3] or incorporate at-home nurse visits. Obviously, the feasibility and logistics of this approach need to be analyzed thoroughly. For example, does a protocol involve procedures that cannot be conducted outside of a hospital setting?

- **Monitor sites remotely.** If clinical research associates are unable to access sites because of global travel restrictions or local quarantines, sponsors should enable remote monitoring and oversight as the FDA recommends. If not already in place, sponsors may need to enable virtual workspaces for sites to upload the necessary documents for centralized monitoring. The Association of Clinical Research Organizations (ACRO) recently laid out emergency guidelines[4] for sponsors, clinical research organizations and sites on conducting trial oversight during the pandemic.

- **Engage patients and investigators through proactive communication.** Developing a communication and remote engagement strategy with patients and investigators that can be sustained throughout the pandemic is vital to ensure motivation and reduce burden. Virtualizing trials or monitoring sites will only be successful if sponsors frequently engage and empathize with patients and sites in order to assuage concerns caused by COVID-19.

- **Assess the overall clinical portfolio and evaluate study design, feasibility and operations as the pandemic evolves.** For each clinical trial in the portfolio, sponsors need to conduct a thorough assessment exercise aimed at answering key questions related to design, feasibility and operations in the immediate term, short term and long term. For example, in the immediate term, sponsors should determine which of their in-flight trials need to pause enrollment and which of their new planned trials need delayed starts. In the short and long term, sponsors should think through:

  - Protocol modifications to incorporate remote patient and site assessments or other virtual elements
  - Patient visit requirements and anticipated data collection challenges
  - Effective resumption of activities when the pandemic situation improves
  - Improvements to risk management planning[5]
  - Overall impact on clinical trial and clinical program timelines (including time to approval)

These are just a few questions among many that need to be sorted out. To plan for the short- and long-term scenarios, sponsors should go back to the drawing board and reevaluate overall clinical study design, including patient eligibility, feasibility, enrollment, timelines and budgets against the evolving global landscape.

Sponsors should note that these strategies may require amendments to study protocols, and the FDA guidelines urge sponsors to engage with institutional review boards (IRBs) as soon as possible. However, in cases where protocol changes are made to directly eliminate hazards to patients, these may be implemented[6] without IRB approval. Finally, alarming projections indicate that social distancing countermeasures may need to be in place well into 2021[7], which means that biopharmaceutical sponsors should make urgent decisions now to plan for continued clinical research in the coming months.

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How UCB transformed into a more agile, data-driven organization

By **Anita Moser, Michael Davis and Dharmendra Sahay**

Today's business environment is increasingly complex, with a growing volume of data available for guiding decisions. When UCB was preparing to launch a new epilepsy product three years ago, we recognized the market had changed considerably. We could no longer rely solely on prior institutional knowledge or intuition: Healthcare had become more focused on the challenge of delivering patient-centric value, despite a decrease in access to physicians. At the same time, data analytics and computing power had grown significantly. The key to success was to pursue an agile, data-driven decision-making model that would guide our business strategy and execution.

At the time, pharma's most common method for making this pivot was to develop sophisticated data and advanced analytics capabilities first. However, this required commitment, vision, and discipline to see the change through, which often made organizations wary of pursuing this kind of innovation in the first place. At UCB, our approach is to focus on what patients value and to enable people living with severe diseases to access the medicines they need. We believe that to achieve this goal for patients, it takes data-driven decision making that will help us reach the right physicians. To successfully scale the AI, we decided to pursue a measured approach.

- **Starting small:** Understanding holistic business performance drivers by leveraging all our available data was critical to helping us prioritize focus areas. Our first step was to integrate different primary and secondary data sources to create a

360-degree view of our customers' needs, attitudes, behaviors, potential, and access, among other factors. Next, we focused on developing an algorithm through a supervised machine-learning approach that blended parametric modeling and tree-based methods. This algorithm showed us areas where physicans were treating patients in a similar fashion based on more than 100 different criteria. The results were eye-opening. For example, the algorithm showed that while our initial hypothesis of patient access to medicine was important, the main concern was really affordability. The results also offered a natural road map to the next stream of analytics that could improve the trajectory of our business performance.

- **Paving the way to enabling machine learning for critical decisions:** The analysis of our business performance drivers built confidence in the power of machine learning among UCB senior leadership. Next, we aimed to embed analytics in our day-to-day execution and expand the approach across the entire portfolio. We focused on using algorithms to turn reactive, one-off analysis into proactive insights that would support a host of interconnected decisions. This integrated infrastructure greatly reduced our lead time to generate insights and provided a framework for high-priority focus areas. Over time we were able to optimize promotional spend based on ROI, refine product messaging based on what we were seeing in the ecosystem, and enhance targeting strategy. As we continued to look for performance drivers and successfully address existing issues, the algorithm grew smarter, which showed us the process was working.

  In this step, the momentum of data-driven decision-making also began to reach the level of executive decisions, and soon leadership meetings were structured around insights gleaned from advanced analytics. Suddenly, the idea of being a data- and analytics-driven organization that deployed machine learning on a routine basis had gone from visionary to reality.

- **Replicating the success across the portfolio and with new product launches:** When UCB was preparing to launch another product, we now had a framework to drive commercial excellence through advanced analytics that we could apply to the launch. The new product was for a rare disease with no one clear definition for treatment, which made it difficult to identify in the data. Instead, we leveraged the algorithms to parse physician-entered notes that identified event and treatment markers associated with the disease. The primary insights and secondary data evidence helped us target the appropriate patient population with reasonable confidence, understand drivers of early adoption, and define a go-to-market model around patient needs and point-of-care locations.

- **Making the leap to real-time decision-making:** By 2019, we had seen tremendous progress in using advanced analytics and machine learning to enable business decisions. Our new north star was using analytics to drive actions. Our next opportunity was in leveraging analytics at the point of action, where it could have the most impact. We set a goal to replace our process for quarterly targeting and call plan with dynamic targeting that could provide just-in-time recommendations based on predicted patient events, disease severity, the location and the propensity of physicians to prescribe our products. After four months of iterative learning, our proof of concept included a robust algorithm that recommended who to call, when to call, and what to say in real-time. By putting UCB in front of physicians with the right messaging at the right time, we were able to help those physicians better serve their patients, delivering on our core patient-centric objective. Furthermore, the algorithm continued to learn from usage and feedback, evolving into a more sophisticated AI tool.

By starting small, targeting the right business problems, and embedding data-driven decision making into how we operate every day, we've seen success. Enabling AI-based analytics capabilities and continuing to refine our algorithms and dynamic targeting has allowed us to get our medicines to the patients who need them as quickly as possible. Regardless of approach, the journey requires perseverance and patience. The most important thing we learned is that AI works if we create the right path.

What's the secret to becoming patient-centric? Look outside of pharma

By **Hensley Evans, Sharon Suchotliff** and **Jennifer Ntiri**

Now more than ever, amid the new challenges and changing patient needs brought about by COVID-19, pharma organizations seek new opportunities to improve the patient experience. Many companies have quickly responded, sharing research and collaborating with others, pivoting call center approaches to answer patient questions, providing additional or more flexible financial support, and adjusting services to better support patients needing remote care. While this proved that pharma can act quickly within regulatory guidelines, it has also highlighted the fact that many in pharma are still struggling to develop the strategies and capabilities to be truly patient-centric.

To date, ZS has benchmarked the patient centricity capabilities of over two dozen companies in our Patient Centricity Index. Our validated framework to assess patient centricity is grounded in four dimensions: leadership and culture, structure and practices, data, analytics and technology, and cross-industry collaboration.

Because no pharma organizations have reached "transformational" patient centricity capabilities yet, we are frequently asked what good looks like—what transformational patient centricity might entail. Recently, we applied our framework and capabilities to illustrate what transformational customer centricity maturity looks like for three industry leaders outside of pharma: Disney Theme Parks & Resorts, Amazon and Best Buy. We believe that pharma can gain key insights from the customer-centric successes of these exceptional companies.

Areas of excellence from outside of pharma

Disney Theme Parks & Resorts, Amazon and Best Buy all performed better than pharma organizations within each of the dimensions of patient centricity maturity (or "customer focus" in the case of these companies). The following four characteristics define the customer-centric approach of these companies and enable a true focus on the customer:

1. **Enterprise-wide alignment on the customer-centric mission and its importance:** In all three of the companies benchmarked, we were able to see an articulation of a clear value proposition for a company's customer-centric culture. Companies did this by defining what it means to be customer-focused, gaining alignment across functions and levels and collectively building toward the long-term vision. The vision is backed by sustainable external and internal resourcing and enterprise-wide participation.

   At Disney, customer centricity is instilled as a core value that begins with the hiring process. Disney hires for a customer-centric focus by requiring that job candidates demonstrate authentic passion for customers and provide multiple examples of successfully delivered, customer-centered impact. The company encourages employees to improve on the customer experience by constantly putting themselves in the customer's shoes and framing all project work around the customer story it is meant to enhance. Primary and secondary customer feedback is continuously leveraged to define that customer story and further elucidate opportunities. Additionally, Disney University provides individualized onboarding and training experiences over several months to further instill a customer-focused employee mindset.

Leadership & Culture	Structure & Practices
Strategic Vision Cultural Mindset Portfolio and Pipeline Strategy Resourcing	Business Practices Governance and Decision-Making Key Performance Indicators Education and Development Plan
• **Organizational mindset** around patient-centric activities and goals • **Where patients fit** in the organization's overarching strategic development plan	• **How company structure** affects patient centricity • Link between patient centricity in employee **training and development** • **Key benchmarks** for organizational performance link to patient centricity
Data, Analytics and Technology	**Cross-Industry Collaboration**
Knowledge Management and Insight Sharing Technology Data and Analytics Strategy Primary Market Research Insights	Healthcare Ecosystem Partnerships Regulatory Road Map and Engagement Plan
• Approach to capturing, acquiring and working with **patient quantitative and qualitative data** • The **infrastructure and applications required** to deliver upon key patient needs and services	• Process of **identifying potential partners** to ideate, foster, pilot and implement patient centricity initiatives • **Plan to identify opportunities for collaboration** with regulatory bodies to support patient-centric solutions and outcomes

What this could look like for pharma:

- Patient centricity is treated as a clear, feasible and worthwhile core principle by all employees
  - Company A interviewed employees and leadership to find out how much the definition of patient centricity varied across roles. It then executed a plan to create a unified internal POV of patient centricity and build marketing communications to align employees across roles and functions.

- Hiring practices apply behavioral interviewing to better assess a candidate's commitment to patient and demonstration of patient impact
  - Company B uses its interview process as a tool to ensure it is bringing in talent with a demonstrated focus and passion for improving patient experiences. As part of interviews, candidates are asked how they would use their role in the company to champion a patients-first approach to business that improves patient quality of life.
- Onboarding of new employees is centered around the patient experience and how their role supports it
  - Company C has created a training curriculum for employees in roles that directly connect them to patient advocacy groups. Content is focused on teaching best practices in empathetic listening, advocacy group engagement, and advocacy group relationship management.
- Individual employee performance measures include specific metrics around patient value
  - Company D has a human healthcare objective included in every employee performance review, and this accounts for up to 5% of review criteria.

2. **A trusted and flexible process for working toward the connected mission by business unit:** Amazon, Disney Resorts & Theme Parks and Best Buy put in place the resources, structures and business practices to help make customer focus actionable. At all three of these companies, we observe business units translating customer-centric organizational goals into functionally relevant department focuses. This ensures that each business unit is working within their areas of expertise to deliver value along the customer journey.

   Best Buy's biggest strength is the ability of its workforce to regularly connect and actively problem solve with customers in its physical stores. All employees, even the CEO, are encouraged to support robust in-person concierge experiences that create transformational brand value for customers. As CEO, Hubert Joly worked at a Best Buy store for a week to understand the in-store experience firsthand. As part of his efforts as CEO, he engaged frontline employees most familiar with customer pain points in dialogue on how to improve the customer experience.

   At Best Buy, bottom-up customer insights inform an organization-wide customer focus. Through the creation of an internal strategic growth office where all ideas are welcome, Best Buy's workforce is encouraged to collaborate and share feedback to help direct leadership's strategic focus. The idea for the Best Buy signature "in-home advisor" offering was a notable output of this office's open and authentic ideation and dialogue.

   Joly leans on his personal bicycle theory to motivate employee participation in customer-centric value creation. This theory is based on the idea that the best way for a bicycle rider to build up any movement-generated momentum on a bicycle is to get on and start pedaling. The momentum will grow naturally, but only after the bicycle rider converts intention into action. After enough momentum is built, the rider can then channel it in the preferred direction. This theory encourages all employees to keep an open perspective and engage in creating the necessary momentum for company change wherever and however they can by taking immediate action to improve customer experiences and value delivery. The result of employee collaboration with the strategic growth office and the commitment to this working style has been an enhanced brand experience that ensures customers feel as if they have their very own personal chief technology officers at their service.

   What this could look like for pharma:

   - Employees at all levels recognize their potential to impact the patient experience and connect with patients, patient-facing employees, and patient-focused centers of excellence to ensure that every initiative delivers value to patients as well as the business
     - At company E, employees are responsible for bringing a balanced perspective to projects that is inclusive of patients' emotional, functional,

and community needs. Patient insights and patient support and services functional groups are available to assist employees with developing this perspective and are embedded within teams across the organization to fortify workstream support and accessibility.

- Employees at all levels, whether patient-facing or not, take clear and measurable steps to understand and improve the patient experience within the purview of their role
  - Company F invites patients to share their experiences managing their condition and shares powerful quotes and videos from these exchanges with employees as part of the kick-off of every internal meeting. For employees, this helps bring to life the downstream impact of projects and department priorities on patient lives.
- More employees are given opportunities to engage directly with patients to understand their perspective
  - Many companies already offer volunteer opportunities in patient communities. This provides a level of access, authenticity, and exposure with patients that helps broaden and deepen patient-centered perspectives for employees and further inspire company strategy. Company X developed

a program where the entire department focused on a given condition attends a day camp for patients with that condition and there's an expectation that comes from the CEO, that news ideas on how to support people with this condition are developed from the interactions of that day.

- Patient-facing employees are engaged regularly by various divisions of the organization to share experiences, insights and expertise that help workshop the patient experience and develop patient-focused strategy
  - At company G, employees in functional areas focused on patient advocacy group engagement make a point to visit patient organizations. Teams engage with patients via town halls, leading to a rich exchange of experiences and insights.

3. **A commitment to "collaborating and conquering" to elevate customer experiences:** Throughout our research in patient and customer centricity, we've seen that collaboration and partnership, both within an organization and externally, are critical to actualizing focus on the end user. Evidence points to the importance of creating a culture of collaboration and an emphasis on shared goals. In fostering and supporting collaboration, organizations can exponentially enhance value for the customer.

   Amazon's organizational culture fosters shared goals, jointly built KPIs and collaboration among business units on projects. Any employee can contact specific business teams to

propose new ideas and participate in the collaborative effort to develop them. This results in increased business relevance, accountability and commitment to excellence in customer-centered project design.

A famous output of this effort is Amazon Prime, an idea that an engineer submitted through Amazon's digital employee suggestion pathway because he thought customers might be willing to pay more for a subscription that guaranteed faster shipping. CEO Jeff Bezos took on this opportunity to improve the customer experience and collaborated with a group of executives to explore it further. They gathered the necessary customer data to inform the proposal, and a project team was pulled together to build the initial concept.

At Amazon employees are tasked with working together to constantly refine the value proposition of new tools and programs, including Amazon Prime. As a result, to this day teams within Amazon continue to collaborate with one another to find ways to enhance the Prime offering and serve customers with an expanding array of crossover applications.

Amazon engages in ecosystem partnerships that help it deliver more value to customers wherever they are in their journey. One example of this is Amazon's vendor partnership with Best Buy, which helps it distribute Amazon products as part of brick-and-mortar in-store experiences.

However, partnering with those outside of Amazon's core business can also be a strategic pathway to acquisition. When Amazon identifies a way to enhance customer experiences through a larger ecosystem, it brings that competency in house, typically through acquiring the partner. Amazon then embeds that competency into customer journeys in ways that create a more seamless customer experience. Notably, it acquired IMDB in 1998 to enhance the marketing and circulation of its Amazon Video service. It did this by tapping into IMDB's user base with concentrated interests in media and entertainment, offering high-quality entertainment options and on-demand trivia delivered in real time as video content is being viewed, in what is calls its "X-Ray" feature.

What this could look like for pharma:

- Cross-functional brainstorming sessions, workshops and meetings held regularly to enable opportunity exploration and concept development with other divisions
  - Company H has built a culture focused on innovation and agility in order to keep up competitively on value offerings to patients. The company grounds its annual strategic planning process in the patient journey and has set up processes to facilitate cross-functional brainstorming to better connect with and provide value to patients.
- Centralized processes and protocol to facilitate partnerships, including a framework to jointly build and measure shared KPIs

- Company I created a PRO strategy toolkit to incorporate patient voice early through systematic literature reviews, social listening, patient focus groups, field research, online patient communities, and advisory boards. This required engaging with patients, regulatory, and payer bodies early and often for feedback.

- Mechanisms to enable broad insight-sharing across initiatives within the company. This is especially critical across the R&D and commercial sides of a pharma organization.

  - Company J began hosting a high visibility Patient Centricity employee summit to share insights and best practices across the organization and encourage cross-functional collaboration. This stemmed from it recognizing that in order to expand organization-wide patient centricity efforts, it needed to create a strong network of engaged employees and turn them into internal advocates.

4. **A bias toward customer data and insights as the foundation for innovation:** At the heart of the CX success of Amazon, Disney Resorts & Theme Parks and Best Buy is a relentless commitment to appropriately capturing and using customer insights and data to inform business decisions. At all three companies, we found evidence of a deliberate strategy to develop and enhance an infrastructure that helps to answer business unit questions about how to improve customer experiences and business outcomes. This includes a strategic focus on not just using technology to learn about what customers need and want but also using technology to deliver exceptional experiences.

   For Disney Theme Parks & Resorts, My Magic +, a suite of RFID technology embedded in a simple wearable band for guests, enables real-time service customization and journey enhancements. Guests can view wait times for park attractions, see an interactive map of what's happening near their current location, or even access or charge purchases to their resort hotel rooms via the service. On the back end, access to guest data in real time provides significant operational benefits by offering easier visibility into and control over individual guest journey highs, lows and details. With this magnified view of unique guest experiences ranging from restaurant dining and hotel access to fast passes and wait times for park rides, business units could track the impact of their work at the guest level. The combination of direct access to guest data and analytics and a center of excellence to help business units act on insights has proved powerful and helps employees explore, evaluate and pursue customer-centered opportunities.

   What this could look like for pharma:

   - Integrated "patient 360" data sets that capture information about all patient interactions and help ensure seamless engagement across multiple stages of the patient journey and asset life cycle

     - Today, some companies track marketing metrics and some health behavior metrics, such as adherence as a corollary for patient experience. To truly understand and benefit from understanding the patient experience, companies should work to connect real-world-date (RWD) with marketing engagement data, and patient experience measures, reported by patients.

   - Predictive analytics that identify the next best action or content for a specific patient based on previous experiences and secondary data integration

     - Some companies are starting to close the loop between content and service engagement and RWD. Establishing this connection can help brands identify and predict the most useful content or service for patients at a given point in time to drive outcomes. With the power of advanced analytics, the right patient data can be used to propel an AI-powered multi-channel engagement strategy.

   - Closed-loop measurement of patient experience to ensure awareness and accountability for patient impact across the organization

     - Linking RWD at the patient level with marketing and

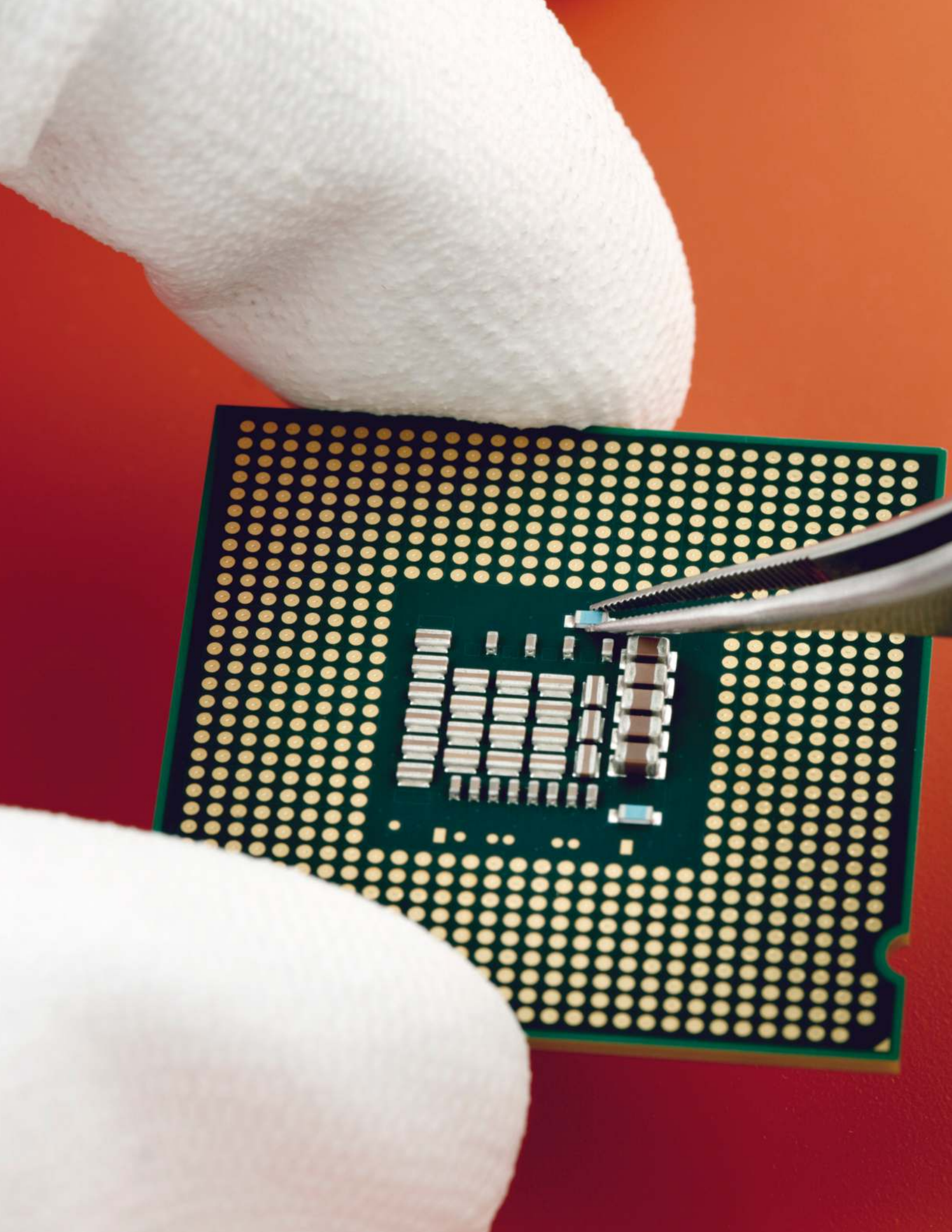
engagement data allows for quantification of causal links between activity and impact. While not directly describing patient experience, these causal links can provide specific measures that can help pharma account for value of the patient.

A force for change

As we see with Disney, Best Buy, Amazon—and many other customer-obsessed organizations globally—customer centricity (or patient centricity in healthcare) isn't about altruism. It's about driving outstanding business results as a direct consequence of delivering an exceptional end customer experience.

Patient-centric improvements are attainable relatively quickly when an understanding of current capabilities, industry best practices and business context are all brought together. Not every tactic is appropriate for every company; the business context, current company culture and existing infrastructure of capabilities will help determine where a company should invest first to have the most impact. Some gaps may be relatively easy to address while others could require significant long-term investment.

Together, these elements can illuminate the most important areas of focus that will drive benefit for the company and for patients.



AI and pharma

By **Arun Shastri**

AI has been here for many decades, but the buzz around this latest wave of AI is louder than any I can remember. You can find articles about AI in every publication and medium. These articles deal mostly with broad themes, rarely delving into how AI might be applied in our work lives. There are plenty of stories about self-driving cars and the latest human expert to be outwitted by an algorithm. But what about the unsexy business that most of us find ourselves in? How can we apply AI to the clinical and commercial activities of pharma?

As a leader of the analytics practice at ZS, I have the good fortune of seeing many applications of AI across clients, industries and practice areas. In this series of interviews, I talked to thought leaders at ZS who have implemented and operationalized AI with our clients, so you can hear more specific examples of AI in practice. We'll discuss how AI can be considered for product launches, clinical trials, analytics consumption, enterprise applications, user experience and real-world data. While not comprehensive, it's a good start to a deeper examination of the role AI can play.

AI and pharma: Start small, but think big

While pharma may have a reputation for operating behind the innovation curve, this recent wave of AI has many in the industry motivated to dive in. So where in pharma are we seeing the most traction? Where are the greatest opportunities for AI? And for those who are committed to embarking on this journey, where do they begin?

Naturally, I turned to the leader of the pharmaceutical practice at ZS to help me answer these questions, my good friend and co-conspirator on all things AI, Pratap Khedkar.

Q: Pratap, this is the third wave of AI over the past 25 or so years. As you work with AI in pharma companies, what feels different this time around?

A: There are three elements that are different. The first is simply the impact of better-performing AI, what it can solve for, what it can do. It's noticeably superior. When I compare it to the second or the first wave, the wide range of problems that are falling to AI is markedly different from a broad perspective.

The second piece is that the data itself has exploded thanks to the internet, thanks to the fact that everybody's got a phone, thanks to the fact that the paper economy is disappearing and everything is digitized—even digital healthcare records. None of that existed 20 years ago. Because the data was not in electronic form, the algorithms were essentially starved.

A third factor is that AI algorithms themselves have been improved. New ones have been invented, starting around 2004. So, over the last 10 or 15 years, we've seen a profusion of new techniques as well.

Q: Do you see applications of AI spanning many functions in pharma or favoring a few?

A: You can use AI for everything from producing the product, to designing the product, to manufacturing the product, to selling the product. And then there are underlying enterprise applications—HR, for instance. In these areas, I think what we're finding is you can get good use cases if you look hard, but I would say that the two that are the most exciting now are R&D and commercial.

There has been a lot more excitement in R&D because there was a lot more data from clinical trials and consumer activity. But because of the focus on R&D, a lot of commercial uses of AI have been under-served. What the industry needs to do is fire up more uses of AI in commercial, where there's more room for using AI to make good decisions, from micro-decisions to macro-decisions. You just need to gather specific use cases.

One small example: Perhaps I want to use AI to help a rep. It could be that a rep has to consume 40 reports. That's a lot of information. If I can ask the AI to sift through these reports and give me the top three insights for a doctor for today, then that's a very specific use case.

It takes years to see the impact from AI in R&D. In commercial, if you solve the problem, you can see the impact in three months. There is a lot of opportunity for AI to work its magic in commercial.

Q: What advice do you have for AI practitioners within pharma companies?

A: Don't start with, "Oh, I need to hire 15 people and get a $20 million budget." Start with clear, specific and even small use cases. What are the three, four, 10 use cases I can think of to start with? Maybe two or three good ones in sales, two or three good ones in marketing for a given brand, or maybe there are a couple of use cases for outpatient services. Go into manufacturing and R&D as well. Go pick out these use cases, brainstorm, do feasibility studies, do some "hackathons." Without these use cases, your AI will not succeed.

Second piece of advice: Use cases cannot be solved without data. Now, in pharma, we've fallen into the trap of saying, "Well, data is only useful if it's 90% complete and 90% accurate." Pharma needs to get over that mindset because AI works when you have a lot of broad data. The depth and accuracy are not as important. Being quick and dirty is better than trying to be very precise with the data itself because when the data is a little off, the algorithm can compensate by being a little smarter.

And then the third piece of advice I would give you is around organizational mindset. It's about getting the human to adopt, use, understand and trust this AI output. You can solve a problem well, but nobody uses the AI. That's quite common, so how will you change human minds in your organization to use this AI output? Work on that, and put energy into adoption and change management from the outset.

AI and clinical trials: Poised for disruption

We always tell our clients to start small with AI. As Pratap Khedkar shared, it's important to start with clear, specific use cases. For some aspects of the business, it may take some time to carefully consider what these specific use cases are and what opportunities AI can create. Clinical trials present no such difficulties. The opportunities to improve efficiencies are numerous and clear, and AI has begun to make an impact. The industry is aware of the inefficiencies that abound in clinical trial design and execution, and is eager to solve them.

To delve into what AI can do for clinical trials, I spoke with my colleague Venkat Sethuraman, who is the global clinical lead for ZS and sits at the forefront of AI adoption in the clinical trials space.

Q: Where do you see the most promise for AI in clinical trials?

A: The greatest potential I see for AI is in clinical development. You can

use AI to design trials in an intelligent way and this is where you start to see a potential cure for clinical trial inefficiencies. AI can scan clinical trial data in literature in real time and give you a landscape view of how your trials are performing and evolving, and it can alert you to challenges as the landscape shifts. You can predict the potential impact of design decisions before making them. For example, how should you sequence indications within clinical programs to maximize trial success? Also, having such rich landscape data enables organizations to better advance clinical development plans that have been archaic and mostly static in nature. When there's new external information and topline results, the view can be refreshed, and design recommendations can be made by AI, which can then be further validated by a researcher.

Q: How has AI changed the way that pharma companies are approaching clinical trials?

A: There are a lot of opportunities for AI in clinical trials, which are typically run and analyzed in old-school ways. For example, companies have access to vast historical clinical trial data. To gain insights, you still manually pull data from multiple clinical trial studies and translate the data so that it meets a single data standard. You may have some fields that say "gender" and others that say "sex," and you need to resolve these variations when you pull the data together. We are working with clients to automate this process with AI and their efficiency rate has improved tenfold. Once you bring data into one common data model such as CDISC standards, you can gain rich insights.

Companies need to trust AI to improve productivity, but it's hard for them to believe that they don't need humans to do this work.

Another area where AI can drive impact is in authoring clinical trial protocols or extracting value from a written protocol. Most companies have standard templates and processes when it comes to authoring protocols. However, "human variation" leads to review delays, amendment issues and increased time to train investigative sites. Algorithms can learn protocol writing from existing protocols. You can develop a process to structure 75% of a protocol with AI and thereby save at least four to six weeks from authoring and review. Most pharma companies have not leveraged AI in this space and that's why it's due for disruption.

All of this requires adaptation to new technology and a new way of thinking. Clinical trials have nowhere to go but up, so why not embrace this latest technology? Cars can drive themselves and many people have started to trust them. Pharma companies need to jump in and start experimenting with AI rather than questioning it and over-thinking how they may use it. That's the advice I give most of my clients.

Q: In laying the groundwork for AI in clinical trial operations, what are the critical elements to consider?

A: There are three that come immediately to mind: diverse data, problem design and solution, and an adaptive mindset.

As is the case with most AI, it all begins with data. Most companies have

Clinical trials have nowhere to go but up, so why not embrace this latest technology?

historical clinical trial data, but today there is a wealth of newer sources, both structured and unstructured data, including real-world data (RWD), that is emerging as a valuable.

We have to leverage this data to say, "I know we can complete this trial on time with this global footprint and these investigators." In addition, we should be able to say, "This particular trial will excite this investigator, and we know that there are patients in this ZIP code who need this particular treatment and, therefore, we can connect these two together." The critical element here is being more specific and understanding what the trial requirements are rather than working on a one-size-fits-all approach.

And, finally, develop an adaptive mindset. Typically, companies plan for a certain patient population and then launch the trial. As the enrollment data emerge, we have to adapt models as well as our approach. Clearly, having real-time data and making frequent adjustments requires an agile mindset that's lacking today.

AI and analytics consumption: Insights on demand

The past few years have seen an explosion of data, and with it, the need to make use of it. Gathering and

stitching together internal and external data sources presents one set of challenges, but what about the analysts who struggle to leverage all of this data? How can they keep up with increasing demands for data-driven insights from the entire organization? How can we empower the whole organization to have access to these critical insights? Here's a hint: AI is part of the solution.

To delve into the role that AI is playing in analytics consumption, I spoke with my colleague Mahmood Majeed, leader of ZS's business technology practice, who has extensive experience exploring innovative ways that AI can augment analytics consumption.

Q: As organizations become more data-driven, what's the response you're seeing to the increased demand for insights?

A: The increased demand for insights means we're seeing more analysis shared, and in more forms than ever before. But with so much information coming our way, it's hard to discern what's useful and leverage it to drive decision-making. Searching through every data point and report that's available wastes time and effort. The challenge that organizations face is to deliver the most pertinent insights in a timely manner and in the most suitable format with an amazing user experience.

Can someone converse with their device, asking it questions about performance to unearth the insights most relevant to them? Can they subscribe to insights in the form of a news feed the way we subscribe to information in our social channels? I see organizations leveraging new and exciting ways to do that with conversational analytics, AI and natural language processing (NLP). These technologies allow us to scan through data and extract insights through natural conversation and text, and offer specific and personalized suggestions. It's getting more traction now because of disruptive NLP Technologies like Amazon's Alexa, Google Assistant and Apple's Siri as well as AI to decipher personalized and relevant insights from large volumes of data. If I'm able to integrate conversational tech into my personal life, why can't I bring that to my work life?

Q: Where should companies be focusing their investments in the next few years?

A: Analysts are saying that in 2020, 50% of analytics queries will be generated via search, natural language or voice queries. This speaks to the user's need for more consumable analytics. To meet that need, companies should be shifting now toward generating suggestions and insights rather than sending data and reports, but they need to go further and completely disrupt dashboards and reports as they will need to be augmented through contextual insights that are personalized to the user and the role.

Take salespeople, for example. The concepts of call planning, targeting, execution, performance monitoring, sales reporting and other forms of customer insights will all be combined into what I call contextual insights. They're actionable, near real time and are embedded in the context of sales processes and fueled by relevant data from across the entire sales enablement process. It' relevant and contextual to what the salesperson is doing at the time. It simplifies the complexity that exists today between 25 to 30 different systems and turns all that data into powerful, easy-to-digest, useful insights.

If routinely asked questions will be answered more effectively by leveraging machines, this will free up analyst capacity, which can be directed towards solving more challenging business questions. We believe that within 18 to 24 months, we'll see a significant shift in the way information is consumed and decisions are made in commercial pharma. AI will work side by side with humans to bring this vision to light.

Q: If that's the trend, how should pharma companies adapt?

A: Start small, and do simple experiments, proofs of concept or pilots at first. This is disrupting the way we work, so significant change management is required. The algorithms also take time to learn and to get better, so patience with such initiatives is a must. AI is less about moonshots and more about a collection of ideas that create impact.

AI and the enterprise: The pursuit of faster, cheaper and better

The latest wave of AI continues to break across many industries, including retail, self-driving cars, agriculture and manufacturing. While tales of driverless cars are likely to catch your eye, there's a less newsworthy but no less important demand for leveraging

AI behind the scenes in the workplace. How can non-commercial enterprise functions improve efficiency and enable better decision-making?

To learn more about how pharma's enterprise functions are adapting to this trend, I spoke with my colleague Shankar Viswanathan, who leads ZS's advanced data science team in India and has been named one of the top 10 data scientists there.

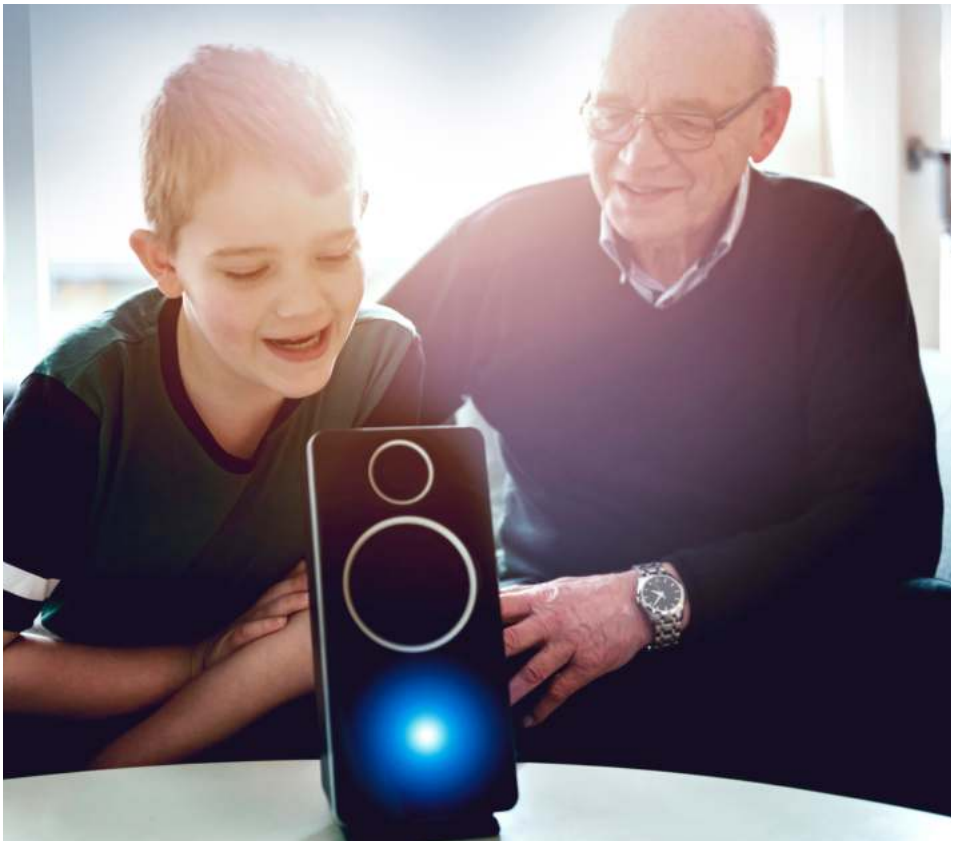
Q: We often hear how AI can be applied in commercial, clinical or R&D settings across pharma. What applications do you see in other enterprise functions?

A: There's interest and use across manufacturing, finance, HR and even functions like regulatory and compliance. Centralized groups like enterprise IT are looking to build cross-enterprise AI capabilities that can be leveraged by multiple groups within an organization. Some are looking at leveraging natural language processing and text-finding capabilities that can be applied to different types of unstructured data like operator notes in manufacturing and digital profiles of job candidates for HR. Also, you can use AI to analyze quarterly funding reports from finance or scan for adverse event signals for regulatory and compliance purposes.

Q: Is the aim of these AI programs different from what you see in commercial programs?

A: Well, there's a stronger bottom-line focus in the key aims of AI in these situations. For example, optimizing operations, especially at scale, is important. In manufacturing, there's a focus on using AI and AI-based systems to predict and mitigate lower-yield batches. Analyzing large volumes of data and sensor data, and combining it with unstructured notes from operators is a priority in manufacturing.

Another priority for AI in these functions is driving agility, again at scale. Finance teams across industries are looking to forecast short-term demand for stock. They're often dealing with thousands of SKUs across many geographies, countries and regions in the face of both internal and external business changes. This, in turn, feeds downstream decisions such as inventory optimization and site-level manufacturing



planning. This is why agility is key.

Another key aim is to derive insights efficiently to enable better decision-making, again at scale. In HR, AI-based systems pre-screen candidate profiles to predict their likelihood of success at an organization. Performance review systems are being augmented to mine feedback notes for talent across the organization and synthesize personalized insights for coaches to leverage with their direct reports. Intelligent automation systems are scouring through reports and prioritizing signals for human review.

In these enterprise functions, there is, therefore, a stronger emphasis on optimization, automation, efficiency and agility, all with a more bottom-line focus. That's why enterprise IT groups are actively exploring AI algorithm-as-a-service options that can be configured for different contexts across the enterprise.

Q: Are there any key considerations for organizations as they build these types of AI capabilities across the enterprise?

A: Yes. Keep the focus on the human in the loop—the financial analysts, the HR recruiters and the manufacturing operators. Make the predictions and outputs of the AI systems clear and transparent to the humans involved. That's critical for adoption and impact. People have a hard time trusting recommendations from AI without a clear explanation behind each recommendation. That's why "explainable AI," or XAI, is a hot area for research with significant focus and funding from organizations like DARPA. The future of human/AI collaboration requires transparent and clear explanations in order to engender trust.

AI and user experience: As always, the user comes first

User experience goes beyond simply developing a relevant and usable interface for software. UX is a discipline that requires a thorough understanding of users' needs and the context in which they use technology. Whatever solution you may roll out to users, good UX is about meeting those needs.

With the proliferation of AI-driven solutions and proofs of concept, it's easy to focus on the data science and forget that what you're developing eventually needs to serve a person on the job. Within pharma companies, the finished product is often the visualization of complex data that appears in software on a laptop or mobile device. However, if users can't understand these insights or the insights aren't valuable to them, then the data science was a wasted effort. That's where UX comes in. More specifically, that's why UX should have come in a long time ago.

To better understand the role of UX in developing AI solutions, I spoke with ZS Principal Natalie Hanson, leader of our UX practice, whose team has helped develop multiple AI-driven solutions for clients.

Q: Can you share some best practices and lessons

learned from visualizing data in AI-driven solutions?

A: It's not that different from user experience work in any other complex domain. However, when you're working with AI or machine learning, it's important to work closely with subject matter experts and data scientists. In other words, experts can look at data and see something exciting in what they've found because they deeply understand the domain and the data. To design a compelling visual for data, we really need to deeply understand the story we're trying to tell.

What's more challenging about this kind of work is that the data visualization tends to be more dimensional. The data might be better viewed in 3-D or represented across time, for example. In these cases, we may find inspiration from a non-adjacent field, like a video game or the way weather is represented to consumers.

Q: When you think of AI-driven tools such as a recommendation engine, what are some of the key UX components you should keep in mind and how do these components differ from work on other solutions?

A: Again, I'd say there are more similarities than differences. On a recent AI project for a sales audience, my team helped understand how reps wanted to see and interact with the data. The people who were working on the solution were focused on extracting value from the data we had, and that was a hard problem. But then we had to figure out how to share those valuable insights in a way that would be useful to this audience. The data scientists and machine learning engineers didn't know anything about what a salesperson's life is like. We can't expect them to make that last-mile jump between all this amazing data and how it should be visualized and organized, so we looked at where the reps were in their daily lives when consuming data. Having a good understanding of the context was key because that affects how the data should be represented.

For example, we had a client who had all these amazing, robust, sales-related data points and they had pushed it to iPads for their reps. But the tool, when teams logged into it, started them at the national level, so they had to drill down to a region, drill down to a territory and then drill down to a physician. They had this massive amount of data to wade through, and they're on iPads, sitting in a parking lot. Suddenly, it becomes onerous to make use of that data in that context.

We saw all kinds of crazy work-arounds for that. Reps were doing things like opening the physician view and grabbing a screenshot and saving it to photos or printing it out and putting it in a binder. Basically, what they were saying is, "The data's good, but it needs to be more accessible at this point in my day." Our job was making sure that we were providing the right information at the right time in the right way.

We also look at what we call information architecture or taxonomy. How do the reps think about these kinds of insights? How can we organize the information according to their mental models? And we also consider what we call progressive disclosure. That's about how much information is really needed at the outset before someone wants to dig deeper.

Q: What are your thoughts on new innovations like conversational AI, which lets you hear spoken insights, or augmented reality (AR) and virtual reality (VR), which let you consume information in 3-D?

A: A lot of this has to do with users, and context is key. What we saw with reps, for example, is that they don't want to talk to a chat bot because of privacy issues. They can't be in a public place with their phone saying, "Hey, tell me about physician so-and-so," and having it talk back to them. That would be disclosing their physician's information. Also, many reps have security protocols on their devices, so we thought about helping to make optimal use of their time in the car, but many of the reps can't use their devices while driving.

I think we're just in the infancy of exploring what AR and VR might do. For example, if you're a rep serving a large hospital and you're trying to build new relationships, how do you find a physician, a head of purchasing, a head of surgery? Could there be an AR solution that helps them locate these people?

What's exciting and challenging about creating solutions in augmented or virtual reality is we have to design for multiple senses in a way that we haven't done in the enterprise context before. We're drawing on design that may be familiar to gamers. For example, sound plays a more critical role, as do sensory cues like vibrations. The use of these different elements has to be done in a thoughtful way that

informs and guides the user without overwhelming them, and in a way that's appropriate for the context of use.

But it will be a long time before users will want the next generation in data visualization. When you think of the era of mobile reporting that started around 2013, we're just now at the point where users have a strong point of view about how they like to see data and what helps them and what doesn't. I don't know if there's any kind of guidance on how long that evolution takes, but I would say that if you want to think about bringing AR, VR or other innovations, be practical and realistic about your audience's readiness and how quickly they will adapt to it. What might make perfect sense for a young patient may not work for a seasoned sales rep operating in a hospital setting.

AI and real-world data: A perfect union

Real-world data (RWD) is as old as data itself. It was relatively useless, however, until it was digitized. And then once it was digitized, we struggled to analyze so much data at scale with any kind of efficiency.

Enter our ability to store and analyze large volumes of data and advancements in data science, algorithms and technology. With the help of AI, it's now possible to truly leverage RWD and begin to understand patient populations in holistic ways that have so far eluded pharmaceutical companies. It's accelerating the use of evidence across healthcare to support the focus on patient health outcomes.

To better understand the relationship between AI and RWD and its potential, I spoke with Principal Asheesh Shukla, who leads ZS's real-world data and patient insights practice, and has worked extensively with AI.

Q: What's your definition of RWD, and what's its current state across pharma? How do you see AI playing a role?

A: RWD is any information that's generated by the healthcare ecosystem as healthcare is delivered to patients. That includes data from outpatient settings, hospitalizations, clinics, pharmacies, labs, and increasingly wearables and other devices. Regulatory and service authorities like the FDA or CMS have adapted well to the digitization of healthcare, and they acknowledge the many opportunities that RWD has opened up for healthcare delivery.

I think the overhype behind RWD has died down now and we're shifting from post-disillusionment to becoming more informed. We're aware of the problems we may encounter with RWD. For example, we lack universal identifiers to help us distinguish patients so we can match them between data sets. We need to improve data capture accuracy and consistency. We need better and more consistent population coverage. And that's where the story converges with what's happening on the AI side. As the storage and computing costs continue to shrink, many of these AI methods that have been around for a while are making a resurgence. We're working around the known issues with data quality and still generating relevant insights. We're predicting events with increasing precision and relevance.

AI methodologies are hungry for data. Machine learning requires us to deal with a large representation of what happens in real life, and there are very few examples of such data sets in the marketplace, so machine learning has to discover connections across data sets and corelate events in patients' treatment journeys, continually making refinements. That's where AI is most effective and RWD offers the best fodder for AI methods.

Q: How can companies leverage AI in real-world data?

A: I think it's worthwhile to first look at where RWD can be leveraged. Historically, real-world data was used to develop what we call "potential value." For example, which disease areas should we invest in? What kind of product profile should we target? It was also used to validate and prove the value of a product to various stakeholders such as regulatory authorities, payers and providers.

Now we see how AI can be used across the pharma value chain. We started with potential value in research, then we moved on to proving the value during product launches. Now we're seeing value prediction in clinical development. We're seeing AI in trial design, feasibility and execution. Everything we're doing on the clinical R&D side incorporates more real-world data, like site selection, enrollment predictions, protocol design and so on.

The most exciting use of RWD and AI is in providing value to patients. In pharma, we've been hearing about value-based contracting, targeted patient services, and looking at identifying untreated and

undertreated patients with slow disease progressions. You can use RWD and AI to make better patient event predictions and provide more timely, targeted patient assistance. The patient journey is analyzed to make next best action and next best customer suggestions to the field so that reps' conversations with physicians stay relevant and value oriented.

Where AI really proves its worth is with prediction and providing value across healthcare, including with clinical decision support. Prediction problems work nicely with AI methods and techniques. AI is also used for tracking value over a longer period in longitudinal studies, looking at longer duration and demonstrating therapy outcomes to the payer population, providers and regulatory authorities. That typically requires tracking a large volume of data over a long period of time. And those are the two areas where AI is playing a critical role because the traditional techniques for data analysis just don't work as well in terms of the base they can operate from, as well as the cost and the time it takes to deliver results.

Q: What sorts of success or progress should companies expect with AI and RWD? Should they anticipate quick ROI or a long learning curve?

A: I think the answer is both. Pharma has always run campaigns for physicians and detailing for physicians. We've had campaigns for patients. We've run patient services. There are these existing processes, services and functional areas that have been around for a long time. We believe you can improve and reimagine these areas from multiple dimensions by infusing AI and real-world data at the same time.

The future, as I see it, is in the ongoing expansion in healthcare from disease management to wellness management.

For example, in clinical trial design, we're not only seeing RWD and AI methods that process and mine patient data, but we're also seeing clinical trial feasibility predictions based on historical and current patient data available around selected sites, recruitment viability, coverage and other parameters.

On the commercial side, next best actions and next best customer recommendations for the field are becoming prioritized programs where we use AI and RWD. We take real-world data and use AI methods to track a patient's journey and make predictions about potential events and confidence associated with the predictions informing sales and marketing decisions. In the pilots of these solutions, we're seeing companies have a lot of success with very good, even double-digit ROI, both in terms of sales as well as significant cost savings from targeted efforts of up to 30%.

I also believe we should look at ways that real-world data and AI can create disruption outside the boundaries of existing processes. For example, historically, post commercialization label expansion triggered a post-marketing clinical trial. These are expensive and difficult to execute. Now we have trials generating real-world evidence that can complement or in some cases replace them.

Reimagining existing processes and disrupting old processes should happen in parallel. We always recommend that clients focus on existing processes first because that's what fuels and keeps the momentum going in the organization and gets the funding required for them to experiment on the disruption side.

Q: What does the future hold for AI and RWD?

A: The future, as I see it, is in the ongoing expansion in healthcare from disease management to wellness management. RWD is population-focused right now, but can it also be more personalized? So far, there has been an either-or mentality, partly driven by privacy concerns, lagging regulations and data veracity. As we get precise and consistent in our ability to leverage real-world insights for key decision-making, the trust in RWD and AI methods will increase. As we're able to combine determinants of health beyond medical data and be inclusive of genomics, social determinants, environmental and other data sets, our ability to personalize prediction will improve. Can we shift to a disease management model where we're not responding to illness but predicting it and prescribing therapies to avoid the onset of disease? To me, that's always been the true promise of AI and RWD.

How COVID-19 will remake healthcare in the Western world

By **Brian Chapman**

Locked in our homes and nervously refreshing the Johns Hopkins website to see the latest numbers on the global pandemic, we are living in truly historic times. Some of us are worried about ourselves and our loved ones. Others are worried about employment, or their freedom, choices and the vibrant economy they forgot to enjoy. As we stay inside, now our houses are too small and our spouses too close, and our bored children are slowly atrophying from the lack of sun, friends and stimulation. Only the dogs are happy with this situation.

But around us the world of healthcare is being transformed. Digital health technology is having its best moment. Diagnostics are providing the insights that allow us to parse the "good" pandemic days from the bad. As health systems creak under the tremendous pressure being put on them, they are remodeling as we speak.

How should we function in this environment? We look at the certainties and avoid talk of doomsday. We look to the future, identify our "no regret" moves and plot a course to move forward in order to emerge from this in a better state.

No matter where we play in medtech, all of us should be listening, adapting and anticipating the future. Our goal should be to minimize the damage and emerge on the other end stronger. Here are five trends to watch for and get ahead of.

Technology and remote care is here to stay

As someone working in the industry, the lack of adoption of virtual tools has always baffled me. A big part of the job of a primary care physician or a pediatrician has always been going through a basic algorithm easily deployed by a computer to direct anxious patients and parents to the closest and most obvious answers, and occasionally to tests and simple treatments. Patients who have no need to travel will trek into the doctor's office to sit face-to-face with a doctor who

breaks eye contact 90% of the time to read a computer screen or tap on a keyboard. The U.S. suffers from a general practitioner shortage while at the same time keeps reducing patient reimbursement for routine checkups. We have had ready-made solutions for home monitoring, for both healthy patients and sick ones, that can provide the vast majority of the information collected in a visit. Now we're suddenly seeing the utility of all of this technology.

I believe that this is a transformative change, not a passing fad. Coming through this crisis will teach us some important lessons; a lasting one is the viability and benefit of digital health. Hastily adapting reimbursement mechanisms to care for patients during a crisis has suddenly given these solutions the air they need to thrive.

The bottom line for medtech: Tech companies may be a major part of the solution that frees us all from our homes and keeps the most dire predictions at bay. Pretending that regulation, privacy and provider relationships can keep tech companies out of healthcare doesn't seem so smart anymore. Digital health and remote monitoring are not a passing fad. There's a better way of doing things.

Within medtech, there's also a huge opportunity to add value to the physician and patient relationship in a way that was previously more theoretical. It means that remote monitoring and engagement solutions and diagnostics are growing in importance, but they will also become essential table stakes. Many patient monitoring and telehealth attributes that had been embedded in traditional medical devices have finally moved from being features to benefits.

Diagnostics will get a home makeover

The U.S. was flying blind in the early days of the epidemic due to tactical mistakes and a lack of supply readiness. Also, tests cost money. One of the most important tools in fighting the epidemic, as taught to us by the East, was knowing where the virus was. But we decided not to prioritize that in the U.S. The diagnostic test could be expensive to the insured and especially the uninsured. In addition to the cost, there was availability. When we did have an approved test, it was in a very large, high-volume central lab with slow turnaround time.

Diagnostic testing that's critical to tracking and managing an epidemic will need to be ubiquitous. How we achieve this ubiquity is where it gets interesting. There are really two routes: home testing or sampling, or localized clinics. This has been the vision of CVS for quite a while now, and with government funding for testing and a renewed mandate, maybe this is what really tips that strategy into relevance, or leads to new solutions for at-home testing and rapid answers. If local neighborhood clinics had the necessary diagnostics, a doctor could order tests to be conducted at the CVS MinuteClinic and then the routine consult could be handled entirely remotely.

The bottom line for medtech: In the future, testing or at least sampling will become ubiquitous, easily available and closer to the patient. This opens a whole new realm of testing needs for diagnostics companies and a new battleground for medtech to diagnose, manage and refer patients who need treatment for conditions much broader than just viral infections.

There's another point here about spending more on prevention. Some might be cynical about how much we can truly reform healthcare so that we're better prepared in the future, but hopefully at least the case for early diagnosis and prevention will be reinforced to payers.

Some might be cynical about how much we can truly reform healthcare so that we're better prepared in the future, but hopefully at least the case for early diagnosis and prevention will be reinforced to payers.

We will treat healthcare infrastructure as a national asset

For years we have seen headlines about overcapacity in the healthcare sector. Too many beds, too many hospitals. However, as this crisis has taught us, there's an important difference between having enough hospital beds and having enough ICU beds; ICU beds are a much more precious

commodity. Moreover, we've looked at occupancy and thought about it like the manufacturing sector—as if hospitals should operate at 90% occupancy or else be remodeled. Investments in infrastructure have not been directed by a master plan but instead by foundations and donors who might like to see their name on a building. Going forward, I expect that the decision-making around healthcare infrastructure will be treated as a matter of national importance.

We have seen a lot written about "peacetime" and "wartime," and while this analogy is not entirely fitting, it does provide a good context to review true national and local preparedness. In the relaxed summer of peacetime, we could afford for our resources to go into treating the rarest of rare diseases, adding months to cancer protocols, focusing on advanced features for hospital beds and extra modes to our respirators, and enhancing the patient experience on every visit to the hospital. We shut down excess capacity in the race for profits to propagate prestige. But the dark winter of wartime has shown us that those resources were misallocated. Images of makeshift rooms with draperies for isolation in a tent in Manhattan—while patients share a ventilator and volunteers sew donated masks—couldn't be a more vivid and gruesome illustration of my point.

I expect that the trend of moving away from financially independent, stand-alone practices is likely to continue. The patient volume drops we are seeing will make independence a thing of that past. And if ever there was a reason for moving procedures out of the hospital to ambulatory or office-based settings, it's now. We knew it was coming with the less-than-gentle nudges coming from United Health Care and CMS. I think COVID is going to be a hard shove to move out.

What's less clear is what becomes of the bricks-and-mortar hospitals. Drained of the "profitable" procedures, reeling from the extremely challenging situation they just got through and, if you follow my earlier logic that they will receive a national mandate to preserve infrastructure as a strategic asset, hospitals look to be in a bind. To survive, hospitals and hospital systems will prize flexibility and could also see safety in size and vertical consolidation. While none of this is all that surprising, the stakes are high.

The bottom line for medtech: An acceleration in vertical consolidation for health systems and an acceleration of procedures to ambulatory settings is extremely consequential to medtech. Ambulatory surgery and office-based labs will have very different priorities and demand new products or value propositions from the traditional settings.

Preserving and investing in hospital infrastructure will be an opportunity for some medtech companies. There will be a premium on flexibility in preparedness in hospitals while ambulatory centers focus on throughput and utilization. This means a shuffling of priorities and opportunities for medtech to meet those shifting priorities.

Purchasing and supply chain management strategies will be rewritten across secondary care

When the dust settles, we will realize that we left our healthcare workers very poorly equipped with the most basic of protective equipment. Not enough ventilators might be more forgivable. Not enough ICU beds could be chalked up to incentives. But not enough surgical masks? Surgical masks are the one thing that's used in every single hospital every single day without fail, in addition to saline, gloves and gowns. What could possibly have happened?

There has been a trend toward sole sourcing in hospitals, but it seems that this was a mistake. The warehouse is well-stocked with high-end medical devices but unfortunately doesn't have a whole lot of the high-volume stuff needed to make the hospital run—or to deal with a crisis like this.

In the end, we will see a lot of scrutiny placed on the supplier consolidation programs, and I think hospitals will become more thoughtful with how they decide to invest their working capital. Interestingly, this may also open up an opportunity for a consolidator or middleman, especially with supplies—a single source who is responsible for service levels, PAR levels, etc., and guarantees supply without the hospitals needing to contract with everybody. One of my colleagues thinks that this could lead hospital systems to take matters into their own hands and start their own manufacturing. I'm not ready for that, but I do think there's a business opportunity for tier-one suppliers like in the auto industry to drive supply chain management in a direction that provides much better protection from future PPE debacles.

The bottom line for medtech: Supply chain priorities are changing. It's time

to pay more attention to logistics and celebrate the simple over the complex. It's also time to roll back some focus on sole sourcing, but don't allow that to take the pressure off because new players are coming.

Governments stand to learn the most from COVID-19, and we should expect change

A lot of ink has already been spilled on the cultural acceptance of government intervention in daily life, the demographics of a population, the impact of generations living together, the prudence and clarity of politicians when we need it most, and a whole host of factors to explain why some countries are suffering more than others. But what interests me is how the setup of healthcare systems contributes to that performance. This reckoning is important because it may give insight into the inevitable reforms that will follow. It will be a long time before we can come close to parsing out the impact of testing on infection rates in order to put mortality into perspective, but I do want to put forth some speculative hypotheses.

In China, Taiwan, Singapore, South Korea and the U.K., central control has proven very useful. While the jury is still out, is it possible that the strong degree of central control in these countries allowed for rapid triage, load balancing, thoughtful deployment of resources and an all-hands-on-deck mentality?

Two of the hardest-hit countries, Italy and Spain, are also the two countries with a highly regionalized healthcare system. When dealing with this global pandemic that's resulting in local hotbeds of infections, how well does a system fare when it lacks central control and is fractured by geographic lines?

When dealing with this global pandemic that's resulting in local hotbeds of infections, how well does a system fare when it lacks central control and is fractured by geographic lines?

Germany seems to be doing very well; their system is perhaps the best equipped in terms of testing infrastructure, ICU beds, ventilators, staff, etc. Doctors are largely employed by the facilities in which they work, which puts more control in the hands of the hospitals. While they have a federated system with multiple payers and many private interests in delivery, they also have fairly strong central standards. Is this the right mix of central control and local flexibility?

Moreover, the marginal dollar in U.S. healthcare has recently been in end-of-life care and rare disease, but the most vulnerable in this epidemic turn out to be those with generally poor health, like patients with diabetes, obesity and uncontrolled blood pressure. It seems reasonable to expect a shift in priorities.

The bottom line for medtech: We need more consistent standards. I don't think we need central control to get better control over where the marginal dollar is spent, but as priorities shift, value propositions need to shift and opportunities will form.

I expect to see a reprioritization, with funding moving from rare diseases toward addressing chronic conditions with poor outcomes. But would it be naïve to assume that this won't also force a reexamining of value in the device purchasing process? If so, medtech companies would be smart to ensure that they're clearly aligned with these shifting priorities.

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About ZS

ZS is a professional services firm that works side by side with companies to help develop and deliver products that drive customer value and company results. We leverage our deep industry expertise, leading-edge analytics, technology and strategy to create solutions that work in the real world. With more than 35 years of experience and 7,000-plus ZSers in more than 25 offices worldwide, we are passionately committed to helping companies and their customers thrive. To learn more, visit www.zs.com or follow us on Twitter and LinkedIn.