It’s a Whole New Digital World for Life Sciences

Embrace the change, establish a strategy and disrupt the industry

In this issue

Welcome 2
How Pharmaceutical Companies Can Prepare for a Post-Hadoop World 3
Research From Gartner: Life Science CIOs Should Embrace the Digital Commercial Model 10
Amgen Data Lake Success Story 22
About us 25
Welcome

Life sciences organizations today face unprecedented challenges. Bringing new drugs to market is becoming difficult due to fierce competition, shorter time-to-market, expiring patents, complicated patient needs and complex healthcare reforms. So, how do you change the way you go to market? Agile, informed and truly transformed teams lead with the right technology and a shift in behavior.

Modern technology has immense power to alter the future of a life sciences organization, it has the ability to create a digital world. There’s potential to strengthen relationships with traditional customers, proactively make operational decisions and enhance the productivity of commercial teams. Deploying right technology solutions is no more a choice, it’s a necessity for living in a digital world.

In this news briefing, you’ll learn what life sciences companies need to do in order to be successful in an ever-changing environment. We’ll share technology trends and recommendations, as well as a success story on a client that has already embraced a digital model.
How Pharmaceutical Companies Can Prepare for a Post-Hadoop World

No industry is immune to the changes brought by advances in technology, and the pharmaceutical industry is no exception. With the market landscape changing—and changing at an increasingly rapid pace—companies must evolve just to keep up, investing smartly in new technologies that can position them well to compete.

Information technology, of course, is an underpinning of a company’s ability to remain competitive. Pharmaceutical companies must find ways to become efficient and effective in bringing their employees together across all phases of efforts, from research and development, to operations, to sales and marketing, and patient support. Product pipelines are drying up, price and cost pressures weigh heavily on the bottom line, and customers (patients, physicians and providers) are all becoming savvier in how they interact with pharmaceutical companies. To support new strategic endeavors in light of these changes, pharmaceutical companies are investing in big data technologies to mine previously inaccessible data and unlock key insights from structured and unstructured data within significantly shorter time periods. Consider the ability to help scientists derive insights across the entire drug development life cycle, spurring collaboration and efficiency across functions that previously were disconnected due to data silos, while also reducing duplicative experiments. Or consider the ability to let process development engineers visually and statistically conduct root cause analysis in real time to provide insights into the cause of non-conformance in a matter of days, instead of weeks or months.
Innovative companies are replacing monolithic relational databases that utilize technology first developed in the 1980s with a plethora of emerging technologies that are pushing past previous performance benchmarks and shattering preconceived notions of what’s possible with a given budget.

**Hadoop and the Enterprise Data Lake**

While the pharmaceutical industry is evolving rapidly, the information technology landscape often seems to be changing at a neck-breaking pace. It’s not enough for pharmaceutical companies to invest in structured data warehouses and business intelligence tools; they must transition to a big data technology stack that includes Hadoop and a multitude of other tools. Combining the power of these individual components into a single platform such as an enterprise data lake (EDL) allows organizations to take further advantage of big data applications that drastically reduce processing times, and enable advanced search capabilities on top of text analytics. EDL platforms allow companies to bring all data into one place, access all information from one location, and leverage elastic infrastructure to realize the performance gains of big data. They reduce operational costs because companies can source the data once, instead of multiple departments subscribing to the same data, and they reduce infrastructure costs because companies only pay for what they need. The data lake also enables newer and more interesting forms of cross-functional analysis because all of the data is present on the same platform.

According to Cambridge, Mass.-based Forrester Research, on average, “between 60% and 73% of all data within an enterprise goes unused for business intelligence (BI) and analytics.” By investing in state-of-the-art infrastructure and leveraging open-source tools, the advanced analytics pacesetters (companies like Wal-Mart, eBay, Macy’s and several government institutions) have built advanced big data capabilities, such as enterprise data lakes, that bring together structured and unstructured data for analysis so that they can better understand their customers and identify competitive advantages faster than the competition. Life sciences organizations soon will follow their lead, and they’ll reap many benefits.

By investing in state-of-the-art infrastructure and leveraging open-source tools, the advanced analytics pacesetters have built advanced big data capabilities, such as enterprise data lakes, that bring together structured and unstructured data for analysis so that they can better understand their customers and identify competitive advantages faster than the competition. Life sciences organizations soon will follow their lead, and they’ll reap many benefits.
Every operational segment of a pharmaceutical company can benefit from big data. Take, for example, a real-world evidence (RWE) group within a pharmaceutical organization: It spends millions of dollars annually on buying data, but the group struggles to process large queries and share insights with adjacent groups. Often, there are FDA and senior leadership inquiries that are delayed due to the inability to process these large amounts of data in a timely manner. With basic big data capabilities, epidemiologists’ query run times, for instance, can be reduced from two days to two hours, which leads to improved compliance with FDA requests and the ability to deliver new insights to the organization. In a more advanced, post-Hadoop world, these groups will pair NoSQL databases with advanced analytics tools, allowing them to streamline insights with visual tools.

Broader groups in the organization will have the ability to analyze data on hundreds of millions of patient lives that previously were only available to epidemiologists and advanced programmers, for example. Additionally, the ability to combine different data types allows for more compelling insights. For instance, marketers can analyze statistics from structured claims data with physician insights from unstructured market research data to understand both real-world behaviors and physician perceptions (drivers of their behavior) much more quickly and efficiently than they can today.

Clinical trials teams, meanwhile, often deal with large data sets across a variety of trial operators, making it difficult to derive insights across studies. They also lack the ability to get deeper or more predictive insights.

Figure 1. Real-World Evidence Example

Digital technologies have had a profound impact on how customers hear about, evaluate, select, use, seek support for, and recommend products and services.
For many R&D groups that rely on “tribal knowledge” and interpersonal communications to find and connect insights across the full drug development life cycle, post-Hadoop outcomes mean more efficient drug discovery by providing easy access to years’ worth of research data, from search to meaningful insights. Insight proliferation can then occur through the sharing of important discoveries powered by “exploratory search,” so scientists would no longer rely on “coffee chats” to learn critical tribal knowledge; instead, they know instantly that a given condition affects the viscosity of a particular formulation.

Sales and marketing teams often lack the ability to derive insights about the same physician across disparate data sets from different providers, resulting in millions of dollars in market research findings sitting unused in PowerPoint slides. Imagine the
benefit of looking beyond traditional data providers to inform account potential, using sources such as PubMed, EBSCOhost or LinkedIn to provide sales reps more insights on physician spheres of influence so that they better understand their customers and their preferences. Imagine the benefit of marketers who can easily find related market research and derive new insights by quickly locating, comparing and analyzing market research studies that happened years apart. It’s possible in a post-Hadoop world.

In contracting and pricing, enterprise groups are expected to do more with fewer resources, all while delivering positive business changes powered by technology. With post-Hadoop world capabilities, these teams could create a common definition and repository for enterprise terms serving as master data inputs to search and other unstructured applications, resulting in a standardization of terminologies across the organization and providing a common language, and increased search accuracy and more efficient inter-system operability. A post-Hadoop world will usher in a breakdown in barriers, support of proactive business monitoring, and the ability to avert a problem before it cascades into a major business issue like lost batches or aborted products.

Beyond Hadoop

Forward-thinking pharmaceutical companies have already embarked on the fundamentals of changing the way that they look at data. They’ve already derived enormous benefits from the creation, curation and consumption of data-leveraging technologies developed in the last five to 10 years. They’ve already taken advantage of enterprise data lakes,
which ingest a firm’s structured and unstructured data, and store it in one location. The EDL enables firms to search for trends and derive insights across the entire company, and it provides a platform to test progressive analytical ideas in a more economical way than is possible with legacy systems. These leaders also are asking, “What’s next?” Effectively, they’re moving into a post-Hadoop world, which continues the evolution of their technology portfolios to further aggregate departmental data in order to create and understand context across the entire firm. This next phase enables more robust search capabilities, tailor-made to a subset of users who need specific functionality—for example, enabling research scientists to differentiate gene and protein expression studies among a sea of historical documents. It employs the latest in machine learning and natural language processing, and leverages taxonomies to provide master data at the enterprise level, reducing costs for everything from gathering requirements to configuring search algorithms. Finally, it employs real-time data ingestion, algorithm libraries and advanced analytical tools to bring predictive analytics to life.

Making It Happen

Knowing that these new capabilities are available, how can pharmaceutical companies take advantage of them and become part of the data elite in their industry? Follow these steps:

■ Build a center of excellence that focuses only on the cutting-edge big data technologies.

■ Increase collaboration channels between IT and business, as well as across business units. As the technologies evolve, so does the art of the possible, so constant communication is needed to understand business needs versus technical capabilities.

■ Adopt an agile philosophy in order to adapt to the unexpected and to constantly recalibrate based on business needs.

■ Identify a business champion and analytically savvy people who can understand the technology and apply it to generate insights with true business value.

These steps may seem daunting, but they’re necessary. The potential of big data has grown exponentially and is especially important to industries like pharmaceuticals where the risks and rewards are both high. Data has the ability to clarify decisions that may otherwise be murky, and the companies that make the investment in this post-Hadoop world will reap the rewards.
About the Authors

Sandeep Varma is a Principal in ZS’s Pune office. He has over 16 years of technology consulting experience in architecting and delivering innovative solutions for complex business problems. He is a thought leader and chief architect of multiple large-scale enterprise big data platforms, and he specializes in rapidly building high-performance teams focused on cutting-edge technologies and high-quality delivery.

John Miller is a business technology manager in ZS’s Los Angeles office whose work focuses on transformational program management and big data technologies. His work experience at ZS has been across all stages of the software development life cycle including strategy, change management, business process re-engineering, development and operations. John works primarily with clients in the pharmaceutical industry in North America across a variety of functions, including commercial, R&D and process development.

Vickye Jain is a business technology manager in ZS’s Los Angeles office, and his work focuses on large-scale transformational technology platforms for the enterprise. His work experience spans IT strategy, roadmaps, solution architecture, and end-to-end implementations of analytical platforms based on big data, search and semantics. He has significant expertise in sales, marketing, R&D and process development domains within life sciences.

Shiv Singh is a business technology manager in ZS’s Pune office and leads the delivery of large-scale, transformational big data implementations for the enterprise. He has extensive experience in program and project management along with designing and architecting enterprise analytics platforms. He also has significant expertise in sales, marketing managed care, R&D and process development domains within life sciences.

Source: ZS Associates
Reduced access to doctors, wide availability of health information to patients and outcome-based selling are driving changes to the life science commercial model. Life science CIOs must build a new technology platform to enable the digital commercial model.

Key Challenges

- Access to doctors is a constant barrier for sales representatives, with only 44% of U.S. doctors considered accessible in 2016.

- Patients are increasingly leveraging access to medical information from nontraditional channels and are more often challenging direction from their physicians, including prescriptions.

- Manufacturers are facing an increasing push for outcome-based relationships with payers (commercial and government), with some payers even receiving 100% reimbursement for unsuccessful treatments.

- Life science CIOs are now working with stakeholders to deploy digital services to surround drugs, devices and medical supplies with value-added services, but monetizing these solutions via the payer channel is complex and requires clear value and improved outcomes.
Recommendations

Life science CIOs seeking to improve life science customer engagement:

■ Lead the organizational transition from the brand-centric commercial model to the customer-focused digital model.

■ Articulate the emerging touchpoints and a 360-degree view on “moments of truth” for all customers engaging with the company.

■ Architect the new digital commercial model technology platform by using a service-based approach.

Introduction

Life science CIOs with tenure in the industry will recognize that a fundamental shift in the industry’s commercial model is in progress. Prior to managed care and restrictive formularies, the classic commercial model in life sciences was pretty simple. A sales rep talked to a doctor, since the doctor influenced the prescribing decision. The more conversations a rep had with the doctor the greater the tendency for the doctor to prescribe the promoted drug. The patient’s primary source of information about the treatment was the doctor, so this direction was usually followed. Over the past 20 years, new stakeholders and influencers have impacted the model causing a shift, which has been driven by trends in two major areas: cost and innovation (see Table 1).
Table 1. Trends Impacting the Commercial Model

<table>
<thead>
<tr>
<th>Trend Category</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost-Driven</td>
<td>Managed care and government influence on prescription and care choices through pricing, formularies, tender processes, reimbursement methods and outcome-based agreements</td>
</tr>
<tr>
<td></td>
<td>Increased costs for specialized and orphan-based therapies driving debate between patient access and need for controlling healthcare spend</td>
</tr>
<tr>
<td></td>
<td>Growing global impact on sales and marketing tactics by transparency (&quot;sunshine&quot; laws) regulations exposing financial relationship between drug companies and doctors</td>
</tr>
<tr>
<td></td>
<td>Increased percentage of drug distribution through powerful and influential chain drug stores, initially in the U.S. and now moving into other regions of the world</td>
</tr>
<tr>
<td>Innovation-Driven</td>
<td>High-cost specialized and orphan-based drug treatments approved at an accelerated pace</td>
</tr>
<tr>
<td></td>
<td>More complex biologic treatment methods available to treat disease via infused and injectable drugs requiring more patient and provider support</td>
</tr>
<tr>
<td></td>
<td>Blockbuster era of drugs which generated significant growth in the pharmaceutical industry is now followed by need for continuous innovation to maintain revenue base</td>
</tr>
</tbody>
</table>

Source: Gartner (November 2016)
Each of these trends has increased the complexity of the selling process for life science companies. The future demands a new model to engage with a diverse and expanding customer universe, as the doctor is now only one of many stakeholders influencing healthcare choices. Given the availability of medical information via the internet, consumers are also exerting greater influence on physicians. Integrating the engagement model with patients, who are growing influencers on their own healthcare, must occur for life science organizations to maintain momentum and improve the patient-customer experience.

In order to be successful in this new age of transparency, information overload and digital sources, life science organizations must change their legacy sales and marketing processes, and engagement methods. Customers, doctors, patients or caregivers expect companies to offer seamless and consistent, yet diverse, face-to-face and digital engagement channels. This research outlines key best practices life science CIOs must use to begin their move to the digital commercial model to meet and exceed customer experience expectations.

Analysis

Lead the Organizational Transition From the Brand-Centric Commercial Model to the Customer-Focused Digital Commercial Model

Across the world, the majority of sales engagement with doctors was always focused on the basic “show and tell” model. Prior to the introduction of the iPad in 2010 and its subsequent adoption craze in the life science industry, sales representatives would carry around boxes of glossy brochures to use during promotional conversations with doctors. Once the iPad was added to the mix, the amount of paper was reduced, but the model was still essentially the same.

The primary influencer in the decision to prescribe and offer medical guidance to a patient was a doctor. Of course, the doctor would also rely on peers, medical associations and therapeutic protocols for input to the medical recommendation. The supply chain (wholesalers and pharmacies) and payers (government and commercial insurance) were also involved, but the doctor reigned supreme. As such, life science companies focused their efforts on this relationship.

For many companies today, this basic model is still practiced even in light of the increasing number of stakeholders and influencers in a medical recommendation. Conversations with Gartner clients confirm that the shift away from face-to-face engagement to digital engagement channels requires organizational and cultural change management efforts to be successful. Many companies are still early in this journey, but they recognize change must occur.

Outside the U.S., the engagement model is also shifting. In Europe, gaining European Medicines Agency (EMA) approval of a drug does not translate to full market access for all EU countries. Price, outcomes and therapeutic impact negotiations must occur prior to actual drug availability on a country-by-country basis. The IMS Consulting Group reported a range of 3.5 to 21.3 months between regulatory approval and first sales across EU countries in 2014.1 Germany and the U.K. are the earliest with less than four months while Greece exceeds 21 months. Negotiations within each country ultimately impact the
engagement method used with doctors in each region and the positioning of the drug.

Life science companies recognize that health outcomes and the ultimate impact on therapeutic results will be part of the negotiations with health authorities. Clinical design decisions must consider the need for clear data and results to drive these discussions. Clinically relevant “beyond the pill” services and digital engagement solutions with positive outcomes can be part of the overall value statement used to negotiate market access with health authorities. CIOs have an opportunity to directly influence top-line results by delivering value in this area, but discussions with R&D functions must occur early in the development process to ensure clinical outcomes are measured.

Consumers are also exerting increasing influence on their own medical care by spending more time researching health-related topics via online sources. Although some of these sources may not be accurate, timely or even appropriate, the information is present and available for consumption. Doctors often end up having to engage with their patients and justify a medical recommendation. A recent survey of consumers found that 95% of respondents trust their doctors, yet greater than 50% say they will leave the doctor’s office and research alternatives online. Over 60% of respondents will suggest a specific brand name drug to a doctor, suggesting knowledge and awareness of the drug gained through other channels such as TV, internet, and friends and family.

The advent of outcome-based agreements is further shifting the commercial model and introducing a new era of information-based relationships between manufacturers and payers. New technologies and analytics-based solutions are required to develop, propose and manage such agreements. Payers will need to track real-world data based on specific outcomes and communicate the information to manufacturers. The manufacturer will need analytics to confirm results, much like market share agreements, but the data will be clinically oriented. Novartis recently set up agreements with Cigna and Aetna that require the payers to track hospitalizations of patients taking Entresto (a heart failure drug approved in July 2015). If the hospitalization rate meets expectations, the rebate Novartis is compelled to pay will be reduced. It’s a strange situation; to pay less, the payer must prove the drug is not as effective as promised. This is like buying a car and receiving a rebate if you can prove the gas mileage per gallon is less than what the manufacturer promised.

When you add up all of these elements — new stakeholders influencing health-related decisions, continuing healthcare cost growth, increased accessibility to health-related information, reduced access to doctors, and healthcare authorities’ need for outcome data — it is clear the commercial model has shifted dramatically. Even though this is completely evident, Gartner clients continue to share frustration over battling the cultural inertia slowing the migration from brand-centric organizations to organizations using a new engagement model centered on optimizing the customer experience. The life science industry focuses on innovation to develop new products (drugs and devices), but once this innovation has occurred, the risk-averse culture impedes change quite successfully.
**Recommendations for Life Science CIOs**

- Integrate patient engagement solutions as an element in the overall commercial model.
- Analyze readiness of revenue management processes and solutions for outcome-based contractual agreements.
- Lead your organization to a dynamic new commercial model to optimize engagement with doctors and other major stakeholders influencing care decisions.

**Articulate the Touchpoints and a 360-Degree View on “Moments Of Truth” for All Customers Engaging With the Company**

Earlier this year, in “Use MDM to Build a Life Science Customer 360-Degree View,” Gartner recommended that life science CIOs deliver solutions to gain a 360-degree view of a doctor and all affiliated customers. The expansion of stakeholders involved in driving health-related decisions, such as prescriptions, medical device usage and specialized therapies for orphan-based diseases, means the 360-degree view must include related payers, administrators, key opinion leaders, government entities, supply chain participants and even digital health players. Each time a customer engages with a life science company (directly or indirectly), it is a “moment of truth” to support a positive or negative customer experience.

Consider the Gartner definition of customer experience: “The customer’s perceptions and related feelings caused by the one-off and cumulative effect of interactions with a supplier’s employees, systems, channels or products.” And now consider the classic life science brand-focused or therapeutically focused sales and marketing organization. The concept of “customer” can seem quite foreign even when most companies’ strategic objectives include being more patient-centric. Gartner further extends the definition of customer engagement in healthcare as “Experiences where individuals have the information, tools and motivation to interact meaningfully and realize value for themselves and those for whom they are caring.” Few life science companies even have a role in their organization focused on managing customer experience. The engagement model is left to brand leaders, sales teams and account managers. In most cases, interactions across each channel and organization are not captured and shared across the enterprise, so the possibility of optimization and improvement is unlikely.

Figure 1 shows the dramatic increase in stakeholders, influencers and information sources bombarding the decision-making process in healthcare. Additionally, high-cost specialty drugs (often delivered via infusion) require extensive medical education, reimbursement and adherence support offered directly to doctors, nurses, administrators and patients. Companies selling such treatments must implement firewalls between patient-level information and sales representatives due to privacy regulations. Each interaction within this support structure is also a “moment of truth” impacting the overall customer experience.
Digital health is now a player in this diverse world, and new entrants enter this world frequently. As is the case in other industries, the barrier to entry has been lowered due to readily available cloud technology platforms. It seems everyone wants in on the healthcare dollar as can be seen when non-life-science entities such as Alphabet, Amazon, Apple, Facebook and Samsung are actively investing in digital health:

- **Alphabet (renamed Google)** — Verily (formerly Google Life Sciences) joint ventures with GSK and Johnson & Johnson, smart contact lenses, Calico partnership with AbbVie
- **Amazon** — Relationship with Philips and Amazon cloud services
- **Apple** — “Kits” for health data and research, Apple Watch
- **Facebook** — Organ donor program, acquisition of ProtoGeo (activity-tracking app Moves), Oculus platform
- **Samsung** — Digital health platform, wearables, mobile apps, UCSF-Samsung Digital Health Innovation Lab, Simband

*Source: Gartner (November 2016)*
Social media platforms allow singular stories to go viral with minimal investment — even when the players do not want this to happen. Listening in the social media space is a must for a life science company, even if the organization decides active participation is too risky. A life science manufacturer can make the decision to remain on the digital sideline and focus on product innovation — which may be a sound strategy — until a disruptor enters its world and challenges the status quo. The disruptor could be a new entrant, not previously seen as a competitor, treating disease in an entirely new way. Witness the recent agreement between GSK and Verily where the two companies formed a joint venture to invest in implantable electronics to treat disease.4

**Recommendations for Life Science CIOs**

- Architect a platform to capture all interactions with customers by leveraging master data management (MDM) solutions.

- Drive digital health efforts aligned with business strategies and objectives, both internally and with partners.

- Raise the organizational consciousness and understanding that managing and optimizing customer experience requires complete awareness of all channels and interactions, whether digital or nondigital.

---

**Architect the New Digital Commercial Model Technology Platform**

In “Top 10 Strategic Technology Trends for 2016,” Gartner explores platforms, solutions and architectures critical to enabling digital business. Now that we have established how the expansion of the life science commercial model necessitates a new enabling platform, the mix of strategic technologies offers an architectural solution. There is not (and likely will never be) one vendor to solve this complex global need for a life science company. Therefore, life science CIOs must lead their IT organizations to architect a mesh of technologies and services all capable of communicating and interacting with the customer universe as defined in Figure 1.

The new reality impacting life science CIOs begins with the commercial model shifting from brand-centric to customer-centric. The change accelerates far beyond this shift since consumer expectations in the digital era have increased. Digital technologies have had a profound impact on how customers hear about, evaluate, select, use, seek support for, and recommend products and services. These changes are also impacting the life science industry with a rapid increase in digital health solutions influencing customer decision-making processes. There are four primary components in the new life science digital commercial model: customers, channels, messages and actions (see Table 2).
Table 2. Components of the New Digital Commercial Model

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>Ensuring a customer focus requires recognition of the complete set of stakeholders involved in the decision-making process to prescribe, recommend, approve, reimburse, or actually use a drug or device. Figure 1 shows how the life science customer universe has expanded.</td>
</tr>
<tr>
<td>Channel</td>
<td>Customers engage with a life science organization using digital and nondigital methods. Face-to-face, telephone, chat, iPad presentations, mobile apps, websites, wearables, television advertisements, social media sites, webinars and even 3D printed materials are used to communicate with customers.</td>
</tr>
<tr>
<td>Message</td>
<td>Messages must be optimized and targeted based on the customer’s known information, predictive analytics and expected result. Since the life science industry is deeply regulated, the message itself must be reviewed and compliant with any relevant regulations.</td>
</tr>
<tr>
<td>Action</td>
<td>When the customer engages with the company via a channel, the opportunity to initiate an action occurs. The action could be the delivery of educational information to a doctor about a drug such as occurs during a detail using an iPad. An action could be a doctor’s signature to accept samples. A patient decision could be captured through a mobile app when the customer signs up for an adherence solution and confirms usage of a company’s drug. An action can also be smart machine-driven thus moving toward the goal of digital and algorithmic business.</td>
</tr>
</tbody>
</table>

Source: ZS Associates
The digital mesh revolves around three key trends that are bringing the virtual and physical worlds together and driving the expansion of digital business. Smart machines involve three interlinked trends anchored on data science and smart algorithms that are extending digital business into algorithmic business. The new IT reality consists of four trends that address key areas in which technology architectures and platforms must change. This change is necessary to support the world of digital and autonomous business that the digital mesh and smart machines enable. Together, our top 10 trends are forcing changes to the strategies, processes and tools used by IT professionals to deal with the complexities of digital and algorithmic business.

Each occurrence of these components, when combined, equals a “moment of truth” or interaction for a life science company’s customer. The “moment of truth” event represented as the intersection of these components aligns with the digital mesh architecture. Doctors, nurses, patients, caregivers, billing administrators and more all experience these interactions with the organization. Interactions are occurring today, but most life science organizations do not completely capture these events for all components in an integrated repository. CIOs in the life science industry must architect a new approach to support the move to the digital commercial platform. The monolithic systems of the past are not designed to operate in an agile and fast-moving digital world. A service-based model offers CIOs and enterprise architects in the life science industry design elements to enable the digital commercial model. Customers, channels and actions can be defined as a granular set of services available to stakeholders within the CIOs’ peer community. The services can then be linked together to define and operationalize distinct customer journeys designed to optimize customer experience.

In “Top 10 Strategic Technology Trends for 2016: Mesh App and Service Architecture,” Gartner explains mesh app and service architecture as follows:

The mesh app and service architecture (MASA) is the preferred application architecture for the digital mesh. In the MASA, apps or services running on device mesh endpoints connect to a broad set of back-end services, creating a multichannel application that delivers an ambient user experience.

Often legacy CRM platforms in the life science industry do not offer such architectural options to connect the system to other channel platforms. In many cases, IT organizations construct extract, transform and load (ETL) programs to gain access to information. This method does not offer the right level of granularity to support a flexible, agile and extensible environment to build a customer journey across each channel platform. To effectively manage, and ultimately optimize, a customer journey across multiple channels with a variety of actions, a service-based approach should be used not only to architect an overall enterprise platform — but also as a language system when engaging with vendors. “Software-defined everything” is a major component for this mesh approach, and driving the life science vendor community to develop solutions with open services (cloud, APIs, SOA) is a critical enabler. Consider how agile and flexible your organization would be if platforms offering customer-facing solutions embraced a software-defined pattern using APIs that virtualized and optimized utilization of application services. Figure 2 offers a high-level architectural representation of the digital commercial model.

Since the mesh app and service architecture exposes actions available via each channel, a customer journey can be designed and managed to achieve desired results. A customer — whether a doctor, nurse, patient or another stakeholder — navigates through the journey, and analytics integrated into the mesh as additional services can guide the customer to the optimal experience. The journey ultimately drives
toward a decision to ingest, infuse, inject or adopt the usage of a specific drug or device. Even though a doctor may be the individual recommending or prescribing a device or drug, a patient ultimately decides whether to fully adopt the therapy, so ensuring the patient-customer experience is optimal is also a critical success factor for the overall model.

Life science CRM vendors are beginning to offer the ability to construct and manage a customer journey, but the focus is on enabling management of their own channels and actions. The need for a more open architecture is readily apparent since the likelihood of one vendor supplying all channel solutions is essentially nil.

The service-based approach can also be applied to organization, governance and culture within a life science company. Consider that each geography, brand and function engages with customers using different channels. The company has its own mesh represented by people and processes. Customers experience a journey within the organization across this mesh, and in almost all situations in the life science industry the journey is unmanaged with suboptimal results. To be successful in the new digital commercial model, not only must technology radically change, but also the organization must shift from a historic brand- and geography-based orientation, and implement a culture where optimal customer experience is of paramount importance.

**Recommendations for Life Science CIOs**

- Lead enterprise architects to design a service-based approach to enable the digital commercial platform.
- Drive CRM vendors to instrument their solutions with services able to support customer journeys across diverse software systems.
- Engage with functional leaders to drive the change to optimal customer experience and optimal customer journeys.

**Case Study**

**Sunovion Optimizes Engagement With Doctors**

Like all life science organizations, Sunovion has the goal of improving customer engagement with doctors. The company recognized that the simple model to connect with doctors was rapidly changing. As described earlier, the pharma stakeholder and influencer universe has rapidly increased, and combined with massive amounts of new scientific information due to innovation, singular channel promotional messages are no longer adequate. The company recognized the need to implement advanced solutions to optimize targeting, messaging and interacting with doctors. New tools were needed for field-based representatives, and the combination of Aktana’s data science system and Veeva CRM Suggestions delivered the needed solution. Veeva CRM Suggestions offers a field-based tool to communicate suggested actions and informational insights to a sales representative. Aktana was selected as the data science partner to drive the suggestions and insights based on extensive customer information and sales rep feedback. The new life science digital commercial model requires such a design to combine interaction feedback, new data sources and predictive analytics to deliver results. The current Sunovion approach optimizes a field-based
representative’s actions. As the model matures, all interactions, regardless of channel, must go through an algorithmic analytic step to optimize the message and next step in the customer journey.

**Evidence**


4. “GSK and Verily to Establish Galvani Bioelectronics — A New Company Dedicated to the Development of Bioelectronic Medicines,” GSK.


Source: Gartner Research Note G00303095, Stephen Davies, 23 November 2016
Amgen’s Digital Enterprise in Action

CASE STUDY: Business Technology and Big Data

Accelerating the Speed to Market of New Therapies

Taking raw potential from a petri dish and manufacturing it on a commercial scale to meet patient needs involves heavy experimentation, complex analysis and constant innovation, all of which depend on data. At Amgen, this function is called process development, and it involves more than 1,500 scientists and engineers working across multiple functions within Amgen’s global operations from clinical labs to manufacturing, quality and supply chain. What sets Amgen’s process development function apart is that the company has been able to centralize and democratize its data and the associated analytics in order to significantly reduce the cycle time from discovery to commercialization of their drugs.

The Problem

“From raw material to patient, we’re leading a digital transformation across Amgen. We have a broad vision to accelerate the speed to market of new therapies and enable new patient insights to influence product and service design,” says Chris Nardecchia, vice president of information systems at Amgen. “One of the main obstacles to achieving this vision was that the functions within process development relied on data from processes and systems that were siloed and not ready for analytics.” He describes a common environment in pharmaceutical companies in which scientists, engineers and analysts are hindered by their inability to efficiently access, integrate and analyze large and complex sets of global data.
“You can imagine how much of the work was manual, or lost in terms of collaboration, and how much was repeated because one group had no idea that the other group had already done similar work,” Nardecchia says.

Suraj Pai, director of information systems at Amgen, helped lead the initiative to revolutionize Amgen’s global operations with the use of this data lake. “We needed our scientists and engineers to have centralized access to global data sets that were primed for analysis and put the power of analytics in the hands of each user,” but that isn’t a simple proposition, Pai says. There’s a high degree of complexity and variation in transactional data, systems and processes across sites, and there are also differences in the kinds of analysis that each group needs to do with this data. This is a common big data problem that hadn’t been elegantly solved on a large scale. In order help address this, Amgen decided to partner with ZS, a leader in the pharmaceutical big data technology consulting space. “We needed to design and deploy the platform in a way that would fundamentally change how business users leveraged data in their daily work.”

The Solution
The Amgen and ZS partnership was able to deliver, creating an industry-leading big data solution. Through an agile implementation focused on proof-of-concepts, incremental delivery and frequent business feedback for continuous improvement, the partners created:

- A centralized, GMP-compliant, searchable repository leveraging Hadoop, AWS and a wide variety of related big data technologies (an enterprise data lake) that integrates structured and unstructured data in near-real time across Amgen’s global operations to process it for analytics. Examples of data sets include manufacturing execution systems, quality systems, lab systems and ERP systems.
- An App-Store-like exchange from which users can access self-service applications used for data visualization and advanced analytics in the enterprise data lake.
- A peer-led adoption model that involved the creation of a “global data champion and liaison network” across Amgen’s sites comprising data scientists, data engineers, big data application specialists and business subject matter experts who could not only educate users and solve complex business problems using analytics, but also promote buy-in.

The Impact
“Our users were very impressed by the capabilities of the platform right from day one of deploying the solution, and we are starting to see strong acceptance by scientific staff,” Pai says. “For many, it is well on its way to becoming an integral part of executing their daily activities.” Amgen’s data lake has increased competitive advantage in three key ways:

- Efficiency savings: Amgen’s data lake has created significant efficiencies in process development. Analyses that took hours can be done in minutes or seconds, and what took days or even weeks can now be completed in hours.
- New insights: Amgen can now undertake analyses that were either impossible or too time-consuming
Therefore, life science CIOs must lead their IT organizations to architect a mesh of technologies and services all capable of communicating and interacting with the customer universe.

to realistically complete. For example, Amgen is now able to analyze historical product information across products and sites to predict overall performance and quality. Amgen also can predict the likelihood of successfully manufacturing additional batches without extending the production schedule. Other examples include near-real-time remote process monitoring as well as rapid information turnaround during regulatory inspections.

These are only a handful of examples of the many success stories that Amgen has realized. “Users are widely adopting this solution and finding new ways to leverage their data, and we owe that success to our agile, user-first approach,” Pai says.

Enterprise-wide capability: With the “one team” approach that Pai took in the design and implementation of the data lake, he was able to collaborate with several teams (across Amgen and with ZS and other vendors) to simplify the big data landscape and deliver a platform that was enterprise-grade. Most major business units across Amgen are planning to adopt the solution, so the same speed and innovation can spread across the whole enterprise.

Accelerating future innovation: With this next-generation data and analytics platform in place, Amgen is accelerating innovation in areas such as virtual/augmented reality, internet of things, and robotic process automation and simulation.

“Scientists can now focus on the science first,” says Patrick Dey, executive director of information systems at Amgen. “They get answers fast, meaning that they can ask more questions than ever before and avoid spending most of their time with spreadsheets, phone calls, emails and quality control checks.”

“I think [ZS does] a lot of things differently compared to many consulting firms—the way they’re agile in their partnership, pivoting when we need to, and operating in a world of constant technological flux,” Pai adds. “To be able to exceed delivery expectations on a project of this complexity and scale in a regulated environment is exactly what you need in a big data and analytics partner like ZS.”

Source: ZS Associates
About us

ZS is the world’s largest firm focused exclusively on helping companies improve overall performance and grow revenue and market share, through end-to-end sales and marketing solutions – from customer insights and strategy to analytics, operations and technology. More than 4,500 ZS professionals in 22 offices worldwide draw on deep industry and domain expertise to deliver impact for clients across multiple industries, including consumer products, energy, high-tech, insurance, medical products and services, and pharmaceuticals.

ZS’s Big Data services and solutions are led by Managing Principals, Dharmendra Sahay and Mahmood Majeed. Together, their teams guide clients through strategy and advisory services, provide tailored analytics across the enterprise, create new capabilities and technologies and offer packaged applications stemming from years of experience.

Contact us

To learn more, visit www.zs.com or follow us on: