EgonZehnder

IMS INSTITUTE FOR HEALTHCARE INFORMATICS

February 2016

New Strategic Information and Technology Roles in Life Sciences Companies

The Impact of Digital Transformation on the CIO

Introduction

Fundamental changes in the marketplace for medicines, as well as the rapid and continuing evolution of technology are bringing new challenges and opportunities for life sciences companies and their contribution to healthcare systems. These changes bring pressure on CIOs to play an increasingly strategic role in advancing business success and delivering digital transformation.

The purpose of this report is to explore the current role and profile of today's life sciences CIOs, and the impact of these changes. It highlights the extent to which CIOs have already delivered technological transformation using a newly developed ITTS Framework to measure company progress, and explores correlates of companies' overall transformation performance. In this report we also examine the current profile of today's life sciences CIOs and explore how the CIO role is being affected by new company needs and new information and digital technology roles. The skills and competencies that CEOs are now looking for in CIO candidates are also examined.

The study was produced independently by the IMS Institute for Healthcare Informatics in collaboration with Egon Zehnder as a public service, without industry or government funding. The contributions to this report of IMS Health Account teams, Vineeta Chawla, Onil Ghotkar and Christian Reich at IMS Health, and Natascha Jacobovits de Szeged and Chris Patrick at Egon Zehnder, are gratefully acknowledged.

Murray Aitken
Executive Director
IMS Institute for Healthcare Informatics

IMS Institute for Healthcare Informatics
100 IMS Drive, Parsippany, NJ 07054, USA
info@theimsinstitute.org www.theimsinstitute.org

Alain Serhan
Co-Leader, Digital Health Initiative
Egon Zehnder

Egon Zehnder
350 Park Avenue, 8th Floor, NY, NY 10022
www.egonzehnder.com

Find out more

If you wish to receive future reports from the IMS Institute or join our mailing list, please **click here**

Contents

Executive summary

Life sciences companies are now bringing a surge of innovation to patients and healthcare systems—launching products at a more rapid rate, and in a greater number of therapy areas. At the same time, operating budgets remain strained by the simultaneous investments required to support these launches. IT departments and their CIOs are finding they need to do more with limited resources even as they face rapid evolution of new technologies and proliferation of data.

Several changes in the marketplace for medicines have simultaneously created a more challenging commercial environment requiring new technological approaches. The rise of specialty medicines for narrow patient populations requires more precise and orchestrated customer engagement—often through digital channels—aimed at fewer and harder-to-reach treating physicians. Growing efforts by cost-conscious payers and health systems to optimize treatment and pay for patient outcomes are elevating the need for big data, and requiring manufactures and their IT departments to invest in large information systems that prove the role and value of their medicines.

The rapid and continuing evolution of technology is putting additional pressures on the IT organization to deliver innovation and efficiencies to their company. The rise of mobile, cloud, and other new digital and information technologies are now a new frontier of competition among life science companies, putting new demands on the IT organization and requiring new specialized knowledge and skills. Organizations must transform both strategically and operationally to capitalize on this technological innovation and at the same time ensure corporate profitability by reducing costs. This environment therefore brings opportunities for CIOs to play an increasingly strategic role in advancing life sciences companies' business success through transformation, and lead them along a path of technological innovation.

Company progress in technology transformation can be assessed using an Information and Technology Transformation Scoring (ITTS) Framework that incorporates strategic elements of Innovation & Disruption and Organizational Transformation, and operational elements of Big Data & Analytics, Infrastructure and Future of Work. At a high level, performance on the ITTS framework is positively correlated with company size for companies with pharmaceutical sales of more than $5Bn. Large companies outperform their medium-sized competitors across all elements, indicating that access to financial and other resources is a key enabler of transformation. However it is not a sole determinant, as performance is uncorrelated with size for smaller companies.

While most companies have completed centralizing their IT functions to achieve efficiencies, the simplification of their organizations through technologies such as the cloud is progressing slowly leaving complexity that hinders their ability to transform. On average, the 85% of companies with centralized IT functions outperform across all elements of transformation in the ITTS, and

companies that use cloud-based technologies for more than 25% of their software needs similarly outperform. However only 30% of companies have so far adopted cloud software to this extent, forgoing the simplifying effects of this technology.

Internal customers of life sciences companies, who report significant need for greater insights from big data, may also still find their systems fall short of what is needed. Company analytic systems, so important to simplifying big data are still primarily operational rather than strategic, with fewer than 10% of companies having systems that frequently have predictive and prescriptive capacities to guide user action.

As leadership in new functional areas within IT such as digital become viewed as critical to success, companies are hiring new CIOs and creating new digital and innovation roles. Almost half of the life sciences companies profiled have CIOs who have been in place less than three years, and 70% less than five years. For small companies, 41% of all CIOs were hired just within the past year. Companies with CIOs having a tenure of less than five years outperform on the ITTS framework overall and especially in key elements of Innovation & Disruption and Big Data & Analytics, suggesting there has been an evolution in the profile of CIOs hired. Over two-thirds of today's CIOs were hired from outside the company, with external hiring ranging from 82% for small companies to 52% for large companies, which have a wider pool of internal candidates to draw from.

Despite the critical role of the CIO in business transformation, the role has not been elevated to the C-suite, with less than one quarter of CIOs being part of the company's executive team, and only 14% at large companies. This may in part be due to a perception of IT as playing a limited role in innovation. Two thirds of life sciences companies view their IT function this way, and some have begun to look beyond the CIO to new strategic IT roles.

The CIO role has often narrowed in scope as responsibility for areas such as R&D bioinformatics, genomics, and Real-World Evidence have moved to the R&D or commercial organization. Now, over 82% of companies have established new IT roles around the CIO in digital, data and innovation functions. These roles challenge the CIOs role in innovation, although which roles will own future IT innovation remains unclear. Among companies that have an innovation program that includes IT, the CIO is currently involved in this program 53% of the time; much more often than the Chief Marketing Officer, Chief Technology Officer or Chief Data Officer. However, the Head of Digital Marketing is involved slightly more often—59% of the time, making digital competencies critical to retaining leadership of innovation.

The CIO is still is in the best position to lead technological innovation, but what life sciences

companies are looking to the CIO to deliver has changed. Companies are looking to CIOs to deliver digital technologies that build business value “around the pill”, embed change and innovation in their company culture, and deliver horizontal efficiencies. From a hiring perspective, the role of a life sciences CIO has already evolved, with CIO job role descriptions now reflecting the search for change using new words like innovation, trends, and transformation and the need for efficiencies using words such as cost-effective, KPIs, metrics, standardization and shared services.

With new “digital” competencies viewed as key for success, assessments by CEOs of CIO candidates increasingly focus on a combination of digital and core competencies. Core competencies of strategic orientation, results orientation, team leadership, and collaboration and influence remain essential. But in pursuit of future digital leaders, CEOs are also looking for candidates with consumer centricity, digital fluency, data orientation, adaptability, and change leadership. Since these digital competencies are difficult to find among CIO candidates, CEOs are shifting to a model looking at candidate potential to grow into the competencies needed for the digital age – and are testing whether candidates have traits to help bridge the gap. Ultimately, if CIOs develop skills for the new era of digital transformation, they can avoid new roles encroaching on their innovation efforts. The need for life sciences companies to rapidly embrace digital opportunities has laid the groundwork for CIOs to take on a truly strategic role.

Framing the future for the IT function

Changes in the marketplace for medicines

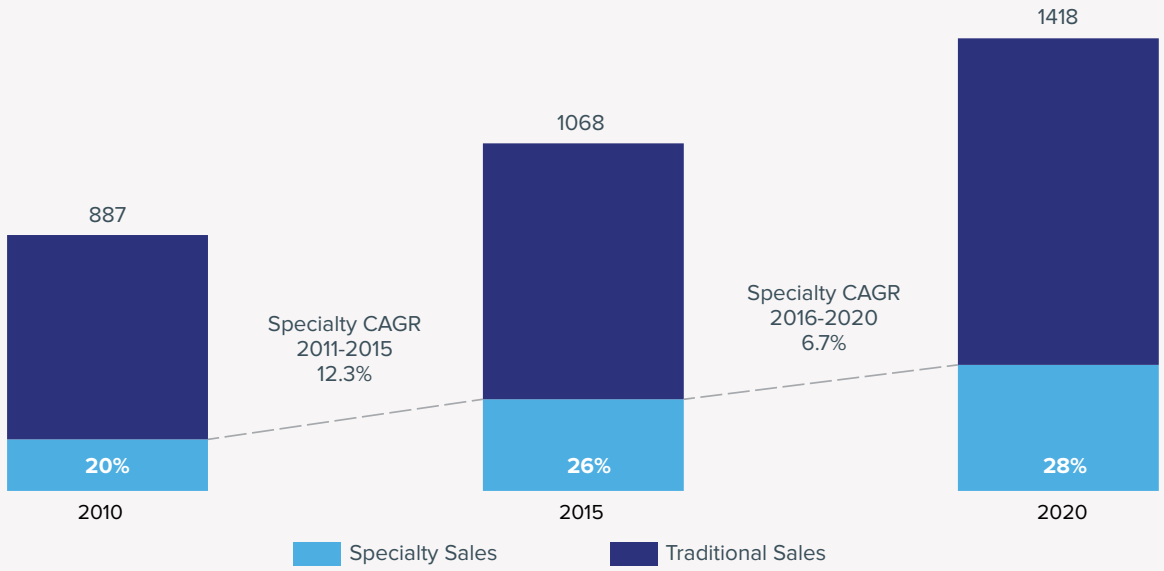
- Companies have been launching products at a more rapid rate since 2010, and in a greater number of therapy areas
- Operating budgets of branded manufacturers are being strained by the simultaneous investments required for upcoming launches, while budgets of generics manufacturers are being cut as fewer large drugs go off patent—IT departments find they need to do more with limited resources
- Product launches are increasingly of specialty pharmaceutical products, which require specialized knowledge from IT, support for account-based selling, and the development of more precise tools with more data to provide broader context, prove clinical value, and support precision customer engagement strategies
- Manufacturers now face greater requirements for evidence of health value, tighter regulatory and compliance requirements, and challenges to engage with more stakeholders in new and different ways
- With success now tied to capitalizing on a multiplication of new technologies and information sources, specialized knowledge and new non-technical skills are increasingly required from the IT function

Portfolio evolution

R&D pipelines of branded manufacturers are notably burgeoning—the result of valuable investment in innovation. Companies are now launching products at a more rapid rate since a low in 2010—with 225 New Active Substances (NAS) expected globally through 2020—and launching into a greater number of therapy areas.[1] The current top 15 companies launched an average of 2 products per company in the United States in 2014, up from a low of 1.1 products in 2010, and these fell into an average of 1.9 therapy areas versus 0.9 respectively.[2]

Operating budgets remain strained however, as manufacturers focus on simultaneous investments needed for upcoming product launches in a newly competitive environment—including those in information and technology. For generics manufacturers, as fewer large drugs go off patent, cost pressures are now increasing with billions in cost-cuts expected over the next few years.[3]

Exhibit 1: Sales and Growth of Specialty Medicines Globally, $Bn



Source: IMS Health, IMS Therapy Prognosis, September 2015; IMS Institute for Healthcare Informatics, October 2015
Notes: Sales based on US$ with variable exchange rates; growth in constant US dollars

Product launches are also increasingly of specialty pharmaceutical products—including treatments for cancer and other serious diseases—which are often injectable, high-cost, biologic, and require specialized distribution. Specialty medicines now make up 35% of the market in the United States in 2015, and 26% globally, reflecting a growth of 12.3% annually since 2010.[1,4] This segment is further expected to grow to 28% of the market in 2020 (see Exhibit 1).

Commercialization of these specialty medicines can be a challenge. Smaller treatment populations and fewer treating physicians for specialty therapies make communication with these high value physicians more critical and more difficult—both because they require deeper engagement, and they are harder to reach. For medicines treating cancer, each subsequent indication approval can require companies to engage with a completely new and separate set of doctors.

More constraints on commercial activities

Physicians have become harder to reach due to the limits placed by health systems on personal promotion to prescribers, and increased government regulation of this interaction, such as with the Physician Payments Sunshine Act for aggregate spend reporting. This has slowly altered the commercial approach of manufacturers away from the rep-driven model to non-personal channels, and account-based selling models, and increased the need for Orchestrated Customer Engagement (OCE) strategies leveraging digital technologies.

Proliferation of active stakeholders

An increase in the number of stakeholders across health systems globally and their differing needs for services and information adds to the complexity of marketing medicines and is elevating the need for data. Although physicians still make therapeutic decisions for and with their patients, they are increasingly influenced by cost conscious payers, provider organizations, and health systems or Integrated Delivery Network's (IDNs)—who may now tie their incentives to patient outcomes and cost savings in pay-for-performance arrangements, or set treatment algorithms to standardize care. New models of coordinated patient care within these health systems also bring another set of players on the patient care team, such as para-specialists and nurses, as well as pharmacists to communicate with.

Demands for evidence of value

Perhaps the most critical new requirement for information in the life sciences marketplace is evidence of the clinical value of medicines beyond that developed in clinical trials. Facing the rising health costs of an aging population, payers and health systems are increasingly scrutinizing a drug's impact on "total cost of care" and patient long-term health outcomes—such as patient adherence and adverse event prevention. By mining their own repositories of patient data or "Real-World Evidence" (RWE), they are examining the impact on populations and comparing similar therapies to optimize treatments. In the face of this seismic shift in evidence evaluation to look at populations over time, manufacturers find they cannot rely on clinical trial data alone to show benefit of their drugs, but must similarly match these data repositories to demonstrate the value of their innovative brands in the broader population. They are doing so by acquiring external sources of deidentified patient data and building RWE analytic systems.

New technologies and big data platforms

Big Data and the proliferation of data

The use of information within life sciences companies has changed drastically in recent years. Big data systems and analytic capabilities are now increasingly leveraged to make sense of complex data and build competitive advantage. The rise of big data in the life sciences links to a proliferation of transactional health data collected in digital formats over time and converted into non-identified patient data formats. Sources of this data include claims made to health plans or through pharmacies and physicians' offices, hospital EMRs, government programs, and even social media, mobile devices and wearable sensors. Companies are increasingly reliant on this data and complex analytic systems to better understand and communicate with their customers, and prove the value of their medicines.

Machine learning

Machine learning has also contributed to the value derived from big data by enabling systems to recognize patterns within big data and intelligently learn from query responses or make predictions. Intelligent analytic engines and supercomputers like IBM Watson and WolframAlpha, are notably able learn from mistakes to refine their suggestions among search engines, however, this capability can also be built in to sales and marketing systems, making customer engagement much more precise.[5] Applying this approach, life sciences companies are slowly shifting to a system of customer anticipation or predictive analytics—where the system can predict next best customer, channel or action.

Cloud

Cloud technologies, such as cloud storage and software, have been much discussed in the past several years in the life sciences as vendors have begun to create life sciences specific applications with advanced analytic capabilities that allow companies to leapfrog development cycles. Although adoption by life sciences and healthcare companies has been slower than in other industries, companies are now "clouding" various compute and storage resources to reduce complexity and achieve flexibility: both in scale and cost base.[5,6] Cloud is also increasingly a way to obtain external sources of big data without large infrastructure builds, facilitating access to de-identified EHR data for use as real-world evidence.[5]

Digital technologies

Mobile, wearables and other new digital technologies are now a new frontier of competition among life sciences companies, changing the way companies engage and support their customers and even launch their products.[7] The rise of smartphones and wearable technologies along with a growing consumer interest in fitness present a significant opportunity for companies to leverage mHealth apps in innovative ways and add value around the pill. The number of mHealth apps now exceeds 165,000 and manufacturers are looking at ways to leverage these across stakeholders, including apps for physicians that ease the use of complex products, or for patients to assist in disease understanding and management.[8]

The speed of innovation

Finally, the pace of innovation is a challenge unto itself. Technology companies are innovating faster, with new IT software versions and updates measured in days and months rather than years, and new hardware releases similarly accelerating. This pace of evolution means that not only must there be continuous investment in IT internally, but IT organizations must be organized to deliver this rapidly and collaboratively with its internal customers.

Consequences for the IT function and CIO

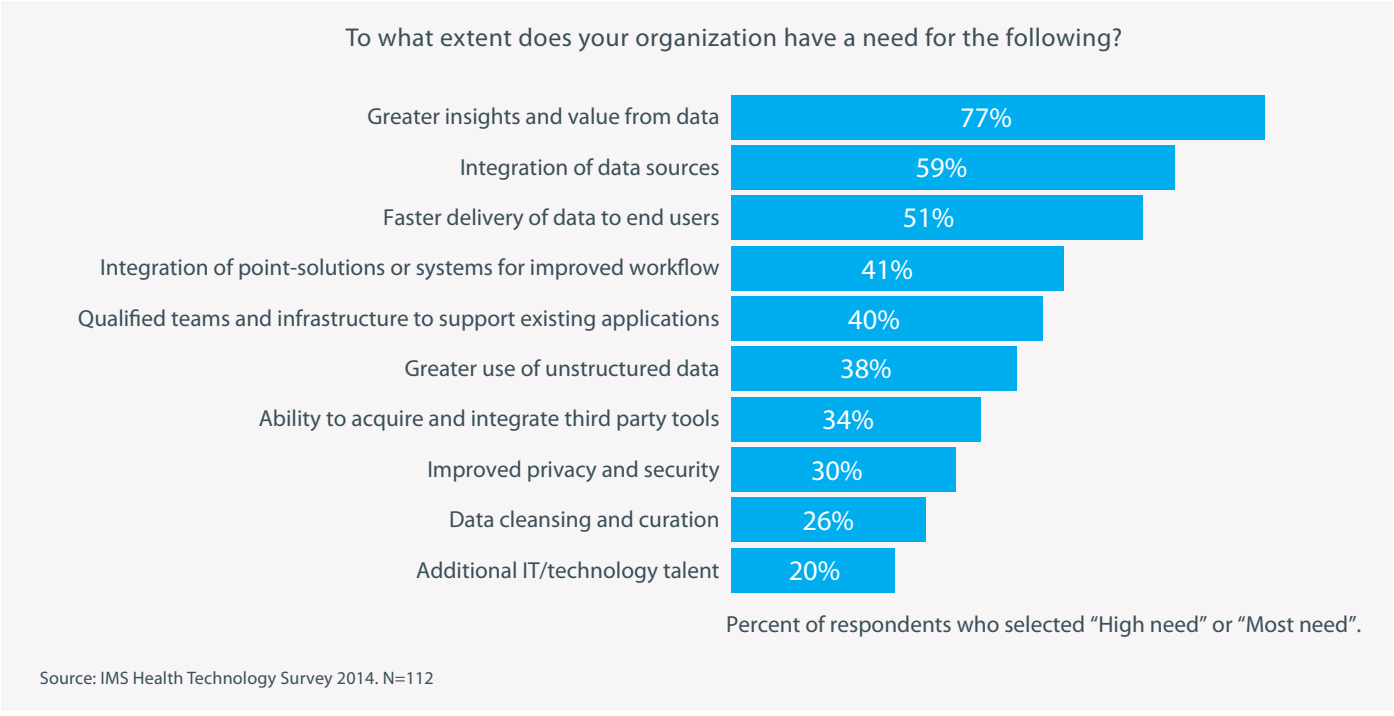
These changes in the environment are having significant impact on the IT function and the CIO, now asked to deliver new systems and efficiencies that require specialized knowledge and skillsets, and to do more rapidly than ever. The most critical needs of the organization are the need to deliver the following:

Complex analysis tools

The growing strategic value of information for life sciences companies makes it now the primary function of IT to deliver value in this area. Companies need new strategic data systems such as Real-World Evidence to examine the value of medicines, the use of unstructured data to better know customers, and the use of multichannel marketing to enable Orchestrated Customer Engagement and ensure sales and marketing functions coordinate to address customer needs.

Additionally, IT must deliver a new level of analytic tools that reduce complexity and enable non-expert users to derive insights easily. With the complexity and magnitude of new datasets, IT can no longer provide basic analytic tools and expect that business users will query data successfully. The systems must be built to include advanced predictive and prescriptive capabilities, such as alerts, that enable the business to respond quickly to strategic threats. Delivering these may require IT departments to either build at a more complex level, or to acquire these from vendor or cloud partners. A recent technology survey indicated that IT departments were falling short, with 77% of respondents indicating they had a high level of need for greater insights from data (see Exhibit 2).[5]

Exhibit 2: Technology Needs within Life Sciences Companies – Pressures on IT to Deliver



Source: IMS Health Technology Survey 2014. N=112

Data handling and management

The IT function also faces new responsibilities to ensure company data is clean, usable, and safe. Data systems, including those for compliance, can only be successful if underpinned by master data management (MDM) practices such as data standardization, cleansing, and mastering that improve data quality. They must also be successfully integrated with other systems across the organization to increase the value and utility of information, expanding the role of IT as strategic architect of data usage throughout the organization. The interaction with more and external sources of data (with different formats and risks) also expands the role of the IT function in information security. The uniqueness of health data and regulations means unique care is required. IT must be involved in overall data collection and analytics strategy, to ensure an effective and safe data environment.[9] Even de-identified health data sources require vigilance from a security, governance and access perspective to protect personal privacy—requiring IT departments to pay special attention to these and be more involved with governance.[10]

Precision customer engagement

In the life sciences industry with its complex multi-level client structure, companies win and lose based their interactions with patients, physicians and other stakeholders. IT departments are now responsible for helping companies engage these stakeholders at a new level. Companies increasingly find they need to use non-personal promotion through digital, mobile and closed-loop technologies to deliver messages to caregivers. This has increased pressure on the IT function to evolve sales and marketing systems and enable orchestrated customer engagement through multichannel and analytics. For the personal promotion that does continue, the IT function must support sales operations functions seeking to gain greater value from these interactions by equipping reps with digital tools that improve message impact and recall.[7]

Speed and value

Not only are the CIO and IT departments now being tasked with bringing new innovation to the business, but also to deliver this value more rapidly, on shorter cycles. This has meant the IT organization must be able to scale solutions up and down as needed and infrastructure agile enough to help the organization respond quickly to poor launches—or other commercial problems. Leveraging the agility of cloud technologies is a key component in meeting this need; however, cloud also poses a challenge to IT. While IT has always competed with outside vendors to supply solutions and services, the emergence of life-sciences-specific commercial cloud software now makes it easier for dissatisfied business users to go around the IT organization to obtain capabilities. If the IT department does not lead the adoption of best-in-class SaaS and Cloud technologies or deliver greater value than these, they bear risk that the businesses move forward to capitalize on this innovation without the IT organization; creating a shadow IT structure that increases costs and is difficult to displace. Maintaining discipline in procurement and deployment of solutions is therefore increasingly critical, as is greater knowledge of internal customers' business needs. Establishing more structured processes to obtain build requirements can help the IT function deliver more value and ensure solutions meet organization needs.[11]

Reducing costs through efficiencies

The IT function shares responsibility of delivering reduced costs and ensuring profitability. The simultaneous investments required for upcoming launches has meant that IT departments are being asked to do more with limited resources. Companies initially able to reduce costs by renegotiating with suppliers are now finding their ability to directly lower operating costs has diminished. This has meant the IT function and the CIO must now shift strategy to obtain operational efficiencies and greater performance from the resources they already have—to reallocate savings to new spending on innovation. Reorganization and centralization initiatives, and on-demand resourcing models have become a necessity to reduce organizational expenses.

Specialized knowledge and non-technical skills

With business success now tied to the strategic use of new technologies and information sources, the IT function now supports an ever-growing number of internal customers. New functional areas such as RWE data systems and digital solutions are being added to core ones such as sales and marketing, compliance, and supply chain and inventory management. To ensure systems and software applications are orchestrated around complex business needs across users, the IT function increasingly requires specialized knowledge and customer focus. There is an onus on IT to build a deeper knowledge of industry changes, data, analytics, regulatory requirements, external customer needs, company products, and even specific therapeutic areas. Expert IT roles have not surprisingly sprung up including data scientists, privacy and security experts, and precision medicine and RWE experts, but IT departments are also having to source talent very differently. IT professionals are being asked to function increasingly as internal customer-focused consultants, which demands a consultative approach. With the new environment more reliant on partnerships with services providers, IT managers also require account-management skills to manage relationships with vendors—more so than project management skills to manage software developers.

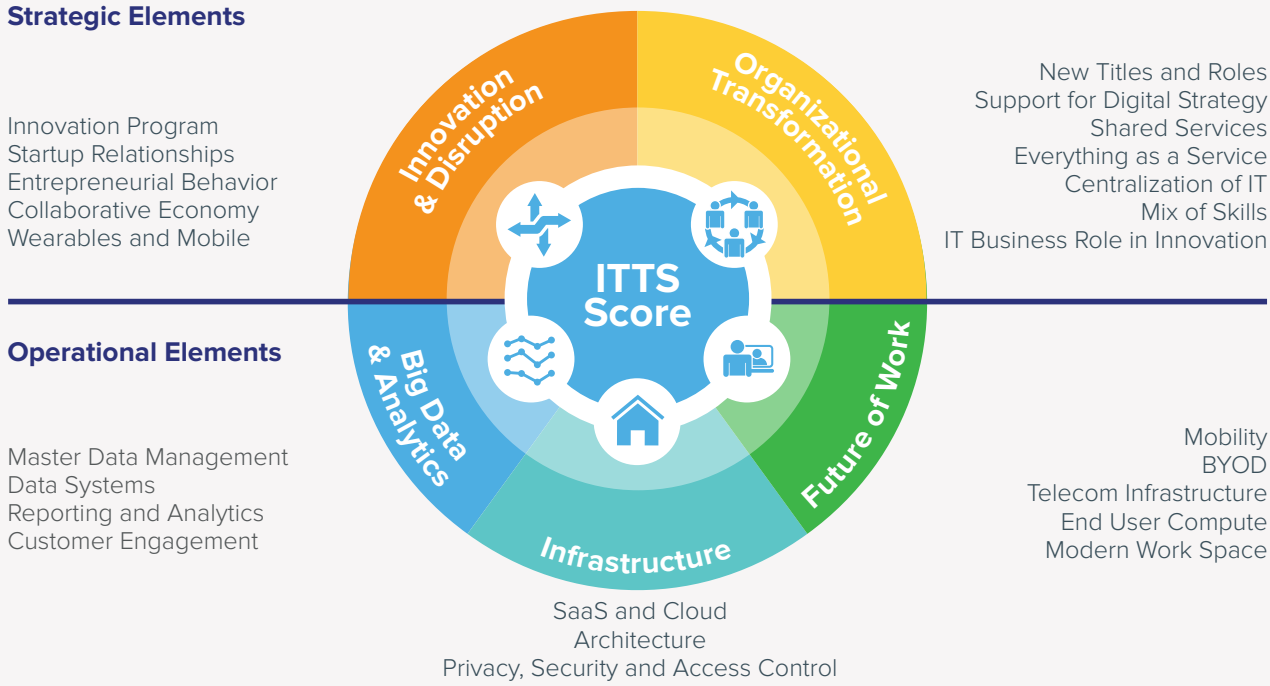
Assessing information and technology transformation

Elements of IT transformation

- A new Information and Technology Transformation Scoring (ITTS) framework can be used to assess progress in company efforts to meet their customer needs through strategic and operational change
- Most companies have completed centralizing their IT functions to achieve efficiencies; however, simplification of their organizations through technologies such as the cloud is progressing slowly leaving complexity that hinders their ability to outperform
- Companies that use cloud-based technologies for more than 25% of their software outperform the others across all elements of transformation in the ITTS, however only 30% of companies so far have adopted cloud software to this extent, forgoing the simplifying effects of this technology
- Although advanced analytic capabilities are needed to make sense of big data, company analytic systems are primarily operational rather than strategic, and fewer than 10% of companies have systems that frequently guide user action through predictive and prescriptive analytics
- The role IT staff play within their companies has not transformed as greatly as needed. Two thirds of companies have IT organizations that are perceived as playing a limited role in innovation

The race to deliver value to customers through technology transformation is a new element of competition between life sciences companies. Company progress in this regard can be assessed using an Information and Technology Transformation Scoring (ITTS) framework, which tracks progress along five areas of transformation grouped into strategic and operational elements. The strategic elements of transformation are Innovation & Disruption and Organizational Transformation, while operational elements include Big Data & Analytics, Infrastructure, and Future of Work (see Exhibit 3).

Exhibit 3: ITTS (Information and Technology Transformation Scoring) Framework



Source: IMS Institute for Healthcare Informatics, October 2015

Innovation & Disruption

How companies innovate and the routes they take to bring new and disruptive technological innovation into their companies determines whether or not they are likely to remain successful in a rapidly evolving marketplace. How aggressively and quickly companies experiment also indicates the strength of their intention to lead their industries and not be left behind.

To gauge this intent, the ITTS framework looks at methods of innovation and disruption, including:

- Formal innovation programs to accelerate transformation across the organization
- Partnerships with startups or incubating startups internally
- Monetization of their technology assets in entrepreneurial ways
- Capitalizing on disruptive business models such as the collaborative economy (e.g. applying the UBER and AirBnB effect to life sciences processes) or disruptive trends like mobile apps and wearables that shift customer engagement[12]

Organizational Transformation

Organization design can determine how digital and technological innovation is embraced to build competitive advantage.

Included within the ITTS framework are measures of organizational effectiveness including IT centralization, evolving hiring practices and resourcing models, and aspects of leadership. Key measures of centralization are:

- Reporting line of the IT organization into one Global or Corporate CIO with horizontal governance across all brands
- Centers of excellence (COEs) for IT functions to standardize and improve processes across the organization
- Centralization of hardware procurement and other technology capability under shared services, which helps the CIO to create efficiencies, deliver value consistently across the entire organization, and speed the pace of transformation by creating a common company culture[13]

ITTS also incorporates measures that indicate how agile companies are in adapting, including:

- Changes in hiring, such as the creation of new technology roles aimed at the future and the hiring of IT staff with critical non-technical business and customer focused skills
- Aspects of leadership such as the level of organizational support for a digital strategy and the role that the IT function plays in leading innovation within their organizations
- Use of Business Processes as a Service (BPaaS) outsourcing for on-demand resourcing, which allows the organization to be lean and agile, scale up and down rapidly, and focus on value added activities

Big Data & Analytics

New strategic data sources and analytic systems will be critical to guide precise business actions in a changing life sciences marketplace.

ITTS therefore measures the progress companies have made towards leveraging new data and systems, including:

- Global implementation of a data enabled OCE strategy
- Nature and extent of RWE use
- Breadth and extent of unstructured data use—e.g. to capture patient sentiment data or report adverse events
- Application of company master data management across regions and to different data types;
- Extent of data integration across systems
- Use of analytic systems (including sales and marketing systems) to simplify and reduce data complexity by, for example, offering predictions based on data trends, suggesting or prescribing actions to users, enabling what-if scenarios and offering modern visualizations

Infrastructure

Several elements indicate how proactive companies are in shifting their infrastructure to innovative and efficient business models. The ITTS framework measures whether companies have incorporated cloud-based software as a service (SaaS) into their operations; modernized their communications infrastructure so that guests and innovation-partners can safely access WIFI; and established modern privacy, security & access control parameters that allow employees and offshore staffing full remote-access to files and other capabilities. ITTS also considers whether the infrastructure speeds the IT function's ability to innovate, such as whether a protected technology sandbox environment has been established to speed the course of innovation, or whether policy and security roadblocks prevent productive experimentation that would allow the department to fail fast, early and cheap.[14]

Whether IT departments are now leading the use of cloud technologies—once considered a disruptive technology that threatened to replace earlier systems installed by IT—is a good gauge of how rapidly companies are embracing infrastructure-led transformation and looking to benefit from it.

Future of Work

The ability of companies to source and attract talent, both in IT and other domains, is critical for company evolution. It is also partly dependent on the creation of a modern work environment. Both Human Resources and the CIO are typically involved in hiring, but it is the CIOs responsibility to make the entire organization an attractive one to be part of from a technology perspective, and to provide a cohesive and seamless environment so that employees can move from one office to another and have the same experience. More than other areas, Future of Work elements are the ones that employees see, touch and help them succeed at their jobs.

The ITTS framework measures whether mobile work tools are available to employees, the extent to which employees can compute on devices other than their computer—for instance receiving and responding to work emails on their phone—and whether they are enabled to use their own personal devices through a flexible bring your own device (BYOD) policy. Collaboration systems are also critical for team-building among employees and external collaboration. Whether the company has installed systems for screen sharing, chat or videoconferencing on all devices is included in ITTS. Finally, the creation of modern work arrangements such as shared workspaces (cube farms, shared offices) or hoteling/office reservation models or roaming user profiles demonstrate whether the IT function (working alongside HR and Facilities) has been able to apply such disruptive models to achieve cost reductions.

Assessment of company transformation

The ITTS Survey

Most life sciences companies are making strategic choices to embrace digital and technological innovation and progressing operationally towards this goal. To understand how far companies have come along this journey, an internal survey of IMS Health account leaders for the top 50 life sciences companies was conducted to measure each company's progress along the ITTS framework, and across its five areas of transformation. Thirty nine usable company responses were received, and total scores for each company were calculated out of a maximum of 100 (see Methodology Section for additional detail).

Company total scores

The average company score on the ITTS framework is 50. At a high level, overall performance on the ITTS survey as measured by total scores appears closely tied to company size, and is therefore likely linked to overall financial resources (see Exhibit 4). However, companies in our sample with sales of $1–5 billion have wide-ranging scores uncorrelated to their size, making clear that resources do not solely determine a company's ability to transform.

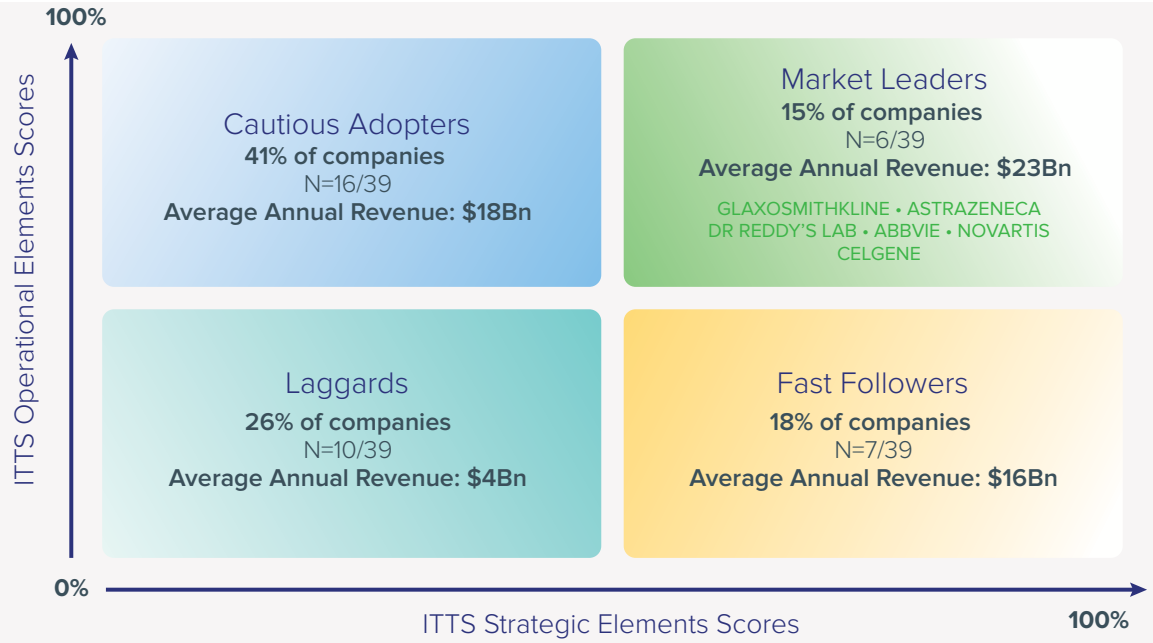
Exhibit 4: Company Size Versus ITTS Score

Source: IMS Institute for Healthcare Informatics, ITTS Information and Technology Transformation Survey, October 2015; IMS Health, MIDAS, June 2015
Notes: Companies N=39

Company transformation identities

Transformation identifies can be defined based on mapping company ITTS strategic elements scores (Organizational Transformation and Innovation & Disruption) versus ITTS operational elements scores (Big Data & Analytics, Infrastructure, and Future of Work)—See Exhibit 5. These quadrants are aligned to categories of Market Leaders, Cautious Adopters, Fast Followers and Laggards based on the 'Organizational Personas of Disruptive Tech Adoption Diagram authored by Ray Wang (see Appendix).[15] Although this model suggests that within an industry only 5% of companies will be Market Leaders—both proactive in carrying out new initiatives and transformational in applying disruptive technologies to business models, some 15% of our surveyed companies are considered Market Leaders.[15,16] This may reflect our sample of only large and medium-sized companies with the resources to achieve progress across both strategic and operational transformation elements.

Exhibit 5: Transformation Identities of the Top Life Science Companies



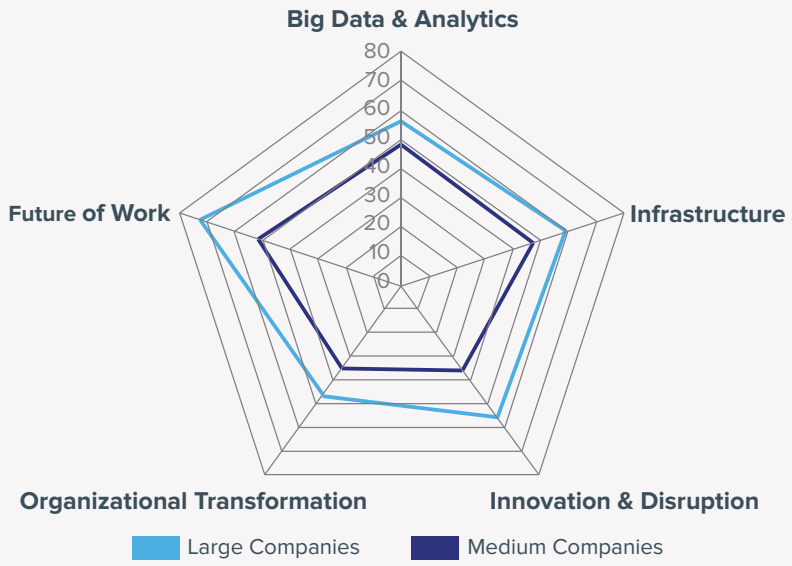
Source: IMS Institute for Healthcare Informatics, ITTS Information and Technology Transformation Survey, October 2015; IMS Health, MIDAS, June 2015
Notes: Survey results aligned to company categories established by Ray Wang, Constellation Research Inc.

N=39 medium and large life science companies

Factors influencing performance across ITTS elements

Although there is a commonly held perception that the largest companies are slower to adapt due to politics and legacy infrastructure, our data does not show this to be the case, with the largest companies in fact outperforming their medium-sized competitors across all elements including those tied to strategic transformation (see Exhibit 6).

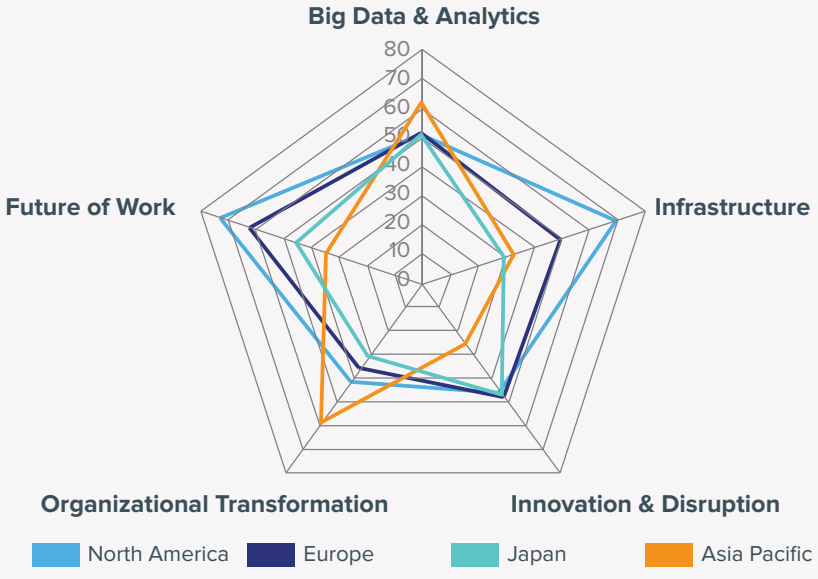
Exhibit 6: Company Size Versus Average ITTS Elements Scores



Source: IMS Institute for Healthcare Informatics, ITTS Information and Technology Transformation Survey, October 2015
Note: N=39. Large companies N=18, Medium companies N=21

Examining company scores by their headquarters location (see Exhibit 7), it appears that North America, Europe and Japan-based companies are similarly advanced in their use of Big Data & Analytics but are outperformed by Asia-based companies, perhaps due to these being predominantly generics companies in India and heavily reliant on technology to optimize their business performance. For Infrastructure and Future of Work, North American companies outperformed all other regions. On strategic elements of transformation, regions are equally matched on the extent to which they have embraced Innovation & Disruption, except for Asia, which is lagging on this dimension.

Exhibit 7: Company Headquarters Location Versus Average ITTS Elements Scores



Source: IMS Institute for Healthcare Informatics, ITTS Information and Technology Transformation Survey, October 2015
Note: N=39. North America N=15, Europe N=16, Japan N=5, Asia Pacific N=3

Company organizational transformation and strategy

Only 30% of companies scored over 50% on the elements of Organizational Transformation, which include support for a digital strategy. As suggested in an Egon Zehnder whitepaper, support for a digital strategy must come top-down from the Executive Committee to enable successful technology transformation.[17] However, only 26% of companies in our survey report that the organizational support behind digital strategy is strong or very strong while over 37% report it weak or very weak. Seven of the nine companies with a strong digital strategy performed above average across the strategic elements, indicating this corporate vision is likely what drives overall company strategic transformation.

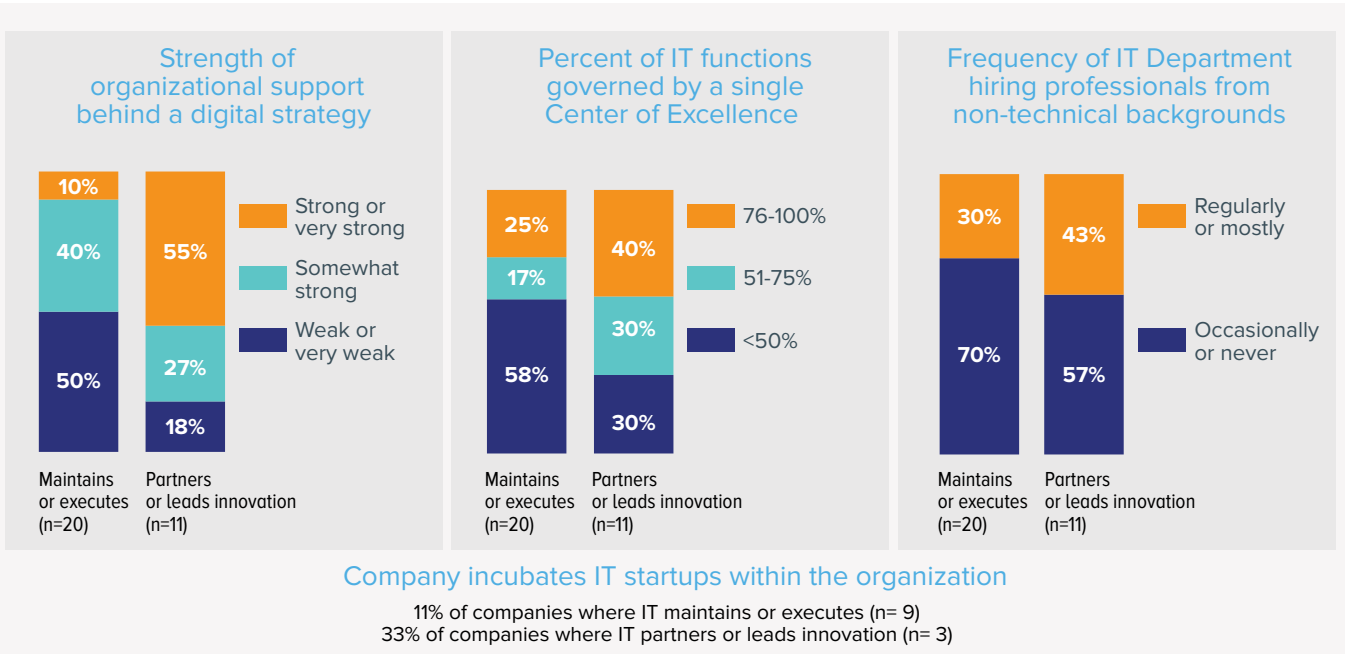
> "Digital transformation never is a simple task. It is difficult to identify which path to take, and, once on that path, the journey rarely is straightforward. If the organization is going to reach a digital endpoint, the company's Executive Committee must embrace this uncertainty as a company-wide issue..."
>
> *From "Making the Future Now", Egon Zehnder Whitepaper [17]*

IT role in innovation

The IT function is rarely perceived as leading innovation within companies. The IT organization is reported to play a limited leadership role and mostly 'keeps the technology running" (22%) or "executes projects on behalf of the business" (44%). Only 3% of companies reported that the IT organization "leads innovation and guides the business towards success and competitive advantage" and 31% said their IT department was a "partner in innovation with the business lines," indicating some companies have transformed the IT role.

Notably, companies where IT was perceived as a partner in innovation or leading innovation also had strong support for digital strategy. These companies were also more likely to have IT functions broadly governed by Centers of Excellence, hire IT staff from non-technical backgrounds and incubate IT startups (see Exhibit 8). These companies also tended to have strong analytic systems, and strong RWE and MCM strategies (data not shown).

Exhibit 8: Comparison of Companies with IT Functions Perceived as Leading Innovation Versus Those That Are Not



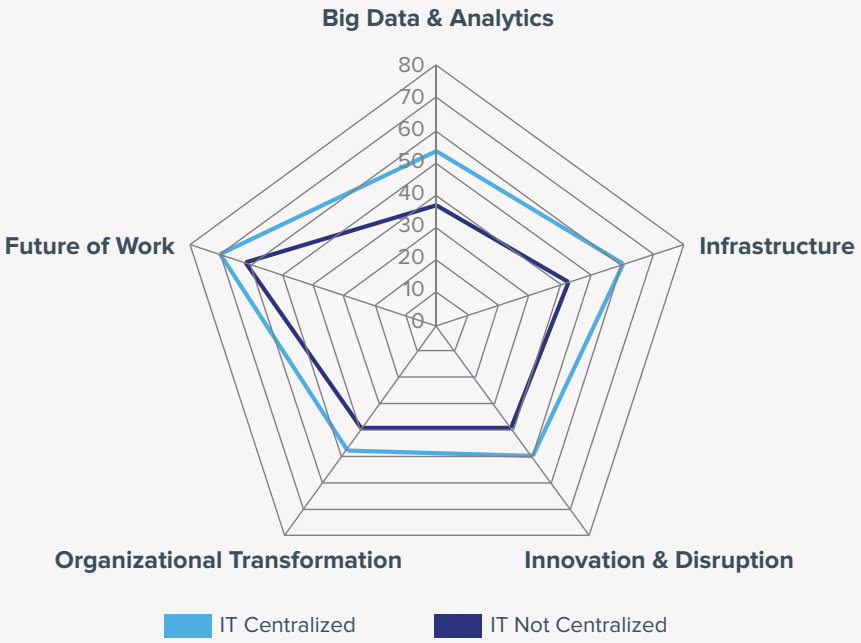
Source: IMS Institute for Healthcare Informatics, ITTS Information and Technology Transformation Survey, October 2015

Centralization of the IT function

Centralization is most often viewed as a means toward achieving efficiencies in a cost-pressured environment, but also is a key enabler of transformation. According to the ITTS survey, companies that have centralized their IT function tend to outperform companies that have not, as seen in Exhibit 9. Most companies (85%) have now merged their IT function under one Global or Corporate CIO with governance across all brands rather than maintaining individual brand CIOs or mixed models. Many companies have further centralized the governance of specific IT sub-functions into Centers of Excellence (COEs), with 33% of companies reporting that over 75% percent of their IT functions are governed by a single COE and another 25% reporting that COEs now govern 51–75% of functions.

The increasing responsibility of IT to promote cost cutting efforts is reflected in the shift to centralized purchasing of hardware. Over half (59%) of companies appear to use a shared service procurement function for at least 75% of the business. Cost efficiencies are also being achieved through optimization of other resources, such as office space, by enabling shared workspaces using hoteling or employee check-in arrangements. Most companies use this model in some or all locations.

Exhibit 9: IT Centralization Under a Global or Corporate CIO Versus Average ITTS Elements Scores



Source: IMS Institute for Healthcare Informatics, ITTS Information and Technology Transformation Survey, October 2015
Note: N=26. IT Centralized N=22, IT Not Centralized N=4

Adoption of disruptive technologies

The ITTS survey indicates some progress has been made by IT to incorporate disruptive technologies into the business model, but to a limited extent. For instance, only 18% are investigating opportunities to leverage or create a "collaborative economy" in healthcare to create new business value and profit, while mobile apps have been leveraged more widely with 68% of companies overall having deployed mobile apps or having a pilot project to do so. Over half (54%) of all companies have already deployed several apps.

Companies have also been experimenting broadly in the area of wearables and sensors that can provide a better understanding of their treated population, with 21% of companies collecting data from wearable sensors, another 17% in the process of rolling out apps for these devices. One-third are planning a first initiative relating to wearables.

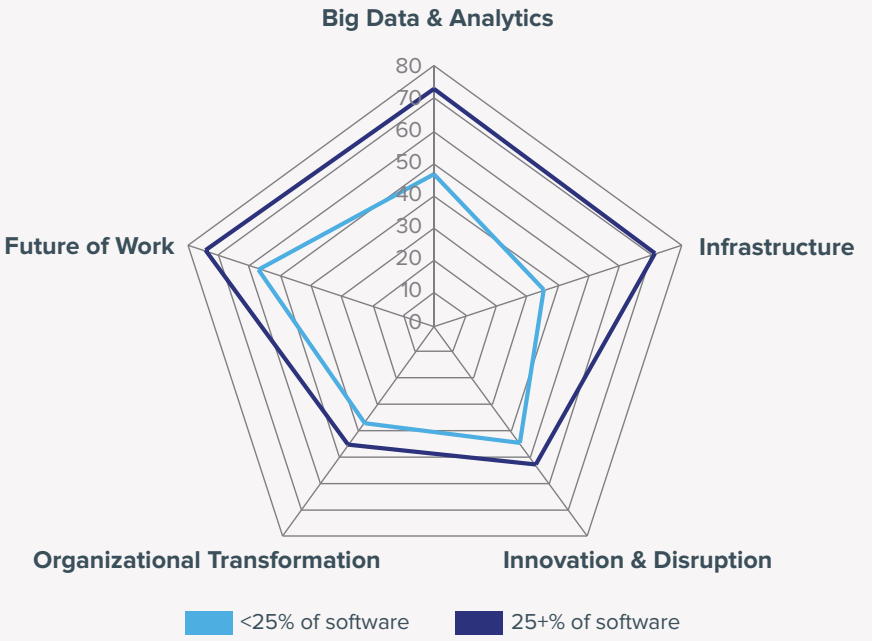
Cloud

Simplification of IT through the cloud is progressing slowly, leaving complexity that hinders company ability to evolve. Only 30% percent of organizations have adopted cloud-based technologies for more than 25% of their software needs. However, those companies using cloud software extensively appear to perform better across all elements of ITTS, including the score measuring Big Data and Analytics sophistication (see Exhibit 10). Most life sciences companies use cloud-based software only minimally (for 0–25% of their software), forgoing the simplifying effects of this technology, and indicating that

use of cloud software remains restricted to select systems. Still, the fact that IT departments were cited as leading cloud purchasing decision 68% of the time rather than the business lines or brands, indicates that cloud has become and established tool for IT, and more adoption is likely.

Some regions have made the shift more rapidly to the cloud, with 66% of North American companies (n=4/6) reporting use for over 25% of their software. Smaller companies that may be newly patching together their software infrastructure may also have a step up on cloud adoption as it was mostly smaller companies in our sample (n=3/20) with sales of $2.6–4.5 billion that reported having more than half of their organization's software cloud-based and outperformed on ITTS.

Exhibit 10: Company Percent Use of Cloud Software Versus Average ITTS Elements Scores



Source: IMS Institute for Healthcare Informatics, ITTS Information and Technology Transformation Survey, October 2015
Note: Companies N=20; For <25% of software N=14, 25+% of software N=6

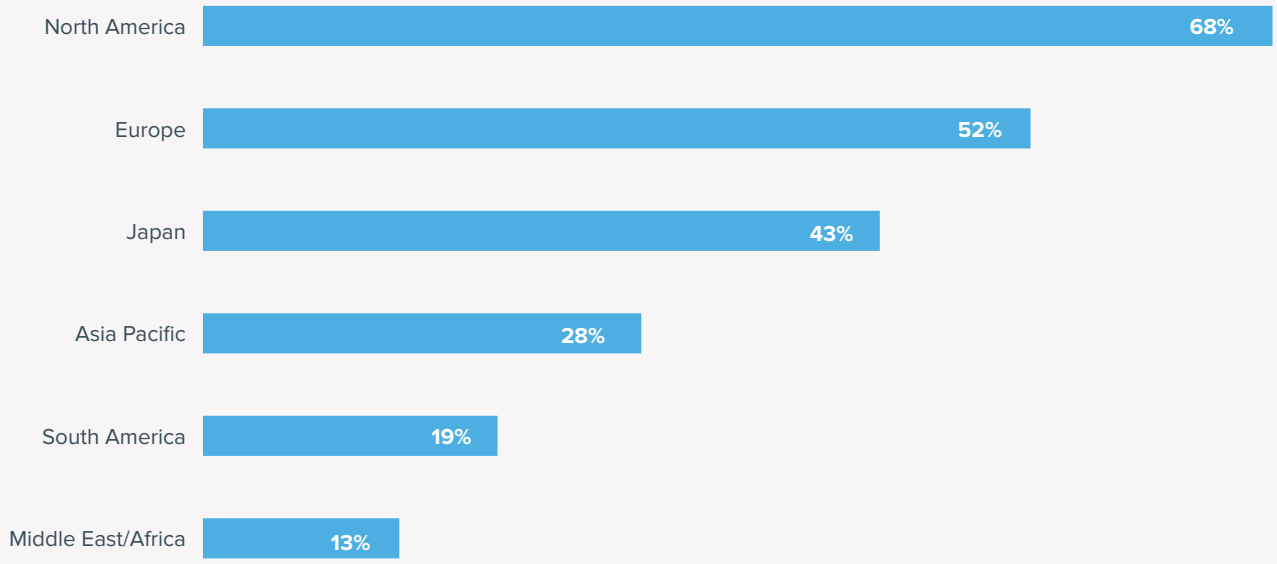
Big data and analytics

Company analytic systems appear to be primarily operational rather than strategic, with advanced predictive and prescriptive capacities remaining underused, despite much attention being given to the rise of big data and analytics. While 78% of companies have analytic systems that frequently or always perform basic reporting functions "showing occurrences and trends for users to interpret" and 53% frequently or always "enable users to form their own data queries to drill down below trends and find answers"; only 17% of companies say their analytics systems (excluding their sales forecasting system) are frequently or always predictive—"detecting data trends and predicting what will likely happen in the future"; and only 22% say their systems are prescriptive—"predicting what will happen and guiding users to take specific actions such as through alerts." Less than 10% frequently or always have both capacities. European companies possessed the most advanced analytic capabilities across all of these measures, with at least 26% and 31% of companies reporting their analytic systems "frequently or always" were predictive or prescriptive respectively.

Within sales and marketing systems, 80% of companies now have systems that use modern visualization tools, such as Spotfire, Tableau, Microstrategy or similar, but these systems frequently lack advanced analytic capabilities that enable customer engagement. While most companies (79%) have systems that do basic functions like recording calls, scheduling sample deliveries, and even enable use of media such as an iPAD to drive customer engagement, only 31% have systems that proactively guide reps or other staff to message customers by "recommending the best message, best customer, best time to target, etc." which are so critical in a competitive marketplace.

Despite companies finding it more difficult to reach physicians and being challenged to do so digitally, only 67.9% of companies have a multichannel marketing (MCM) strategy in place for North America, 52.4% for Europe, and 42.9% for Japan (see Exhibit 11). This suggests that orchestrated customer engagement and advanced analytics are yet to be fully embraced by the industry.

Exhibit 11: Percent of Companies with a Multichannel Marketing (MCM) Strategy for Various Regions



Source: IMS Institute for Healthcare Informatics, ITTS Information and Technology Transformation Survey, October 2015
Note: N=18-28 varying by region

The analytic revolution has also required companies to rapidly build new analytic systems leveraging new and different types of data. Almost all (91%) companies are now leveraging Real-World Evidence in regions where they have operations. In North America 81% are leveraging RWE, with 65% leveraging this data for both commercial and medical/R&D purposes. An additional 10% use RWE just for commercial purposes and 25% just for R&D.

A slight majority of companies are also now using unstructured data for either continual real-time monitoring (17.4%) or on a project basis (47.8%), with one-third using this to identify adverse events through social media listening. Some 40% of companies are also using this data to track patient sentiment—including 83% of North American companies—and another 40% of all companies report an initiative in planning stage.

Not all companies have similarly invested in the quality of the data underlying their analytics. While most companies have a Master Data Management (MDM) strategy in place in one or more geographies, still 12.5% of companies are reported to have no MDM strategy in place in any geography, indicating there are some companies whose analytic systems have a weak foundation—since only clean data can produce accurate responses. An additional 27% of companies are reported to have data that remains "not integrated" and 59% have data only "partially integrated" indicating companies still have a long way to go to gain the full value from their data and meet compliance requirements.

Attracting talent

The ability of companies to attract new talent is heavily dependent on "Future of Work" elements of ITTS, promoting perceptions of a company being cutting edge, and promoting employee quality of work-life. While work productivity has mostly been facilitated, still 13% of companies are reported not to enable employees to access shared folders remotely and 8% cannot access the intranet. From a mobile device perspective, not all companies allow their employees to use their mobile devices for work, with still 38% of companies allowing only select work teams, or select levels of employees, to use mobile devices for work—while other employees cannot—and one company was reported to allow no employees to use mobile devices for work. Only 9% of companies further have a permissive, and often attractive, Bring Your Own Device (BYOD) plan or policy that allows employees to use their own laptops or personal devices as a work device. From a communications standpoint, 16% of companies have no chat system and 27% have no video system in place on individuals' devices for internal communications, although this may be partially tied to cultural work norms.

Profiling CIOs of life sciences companies

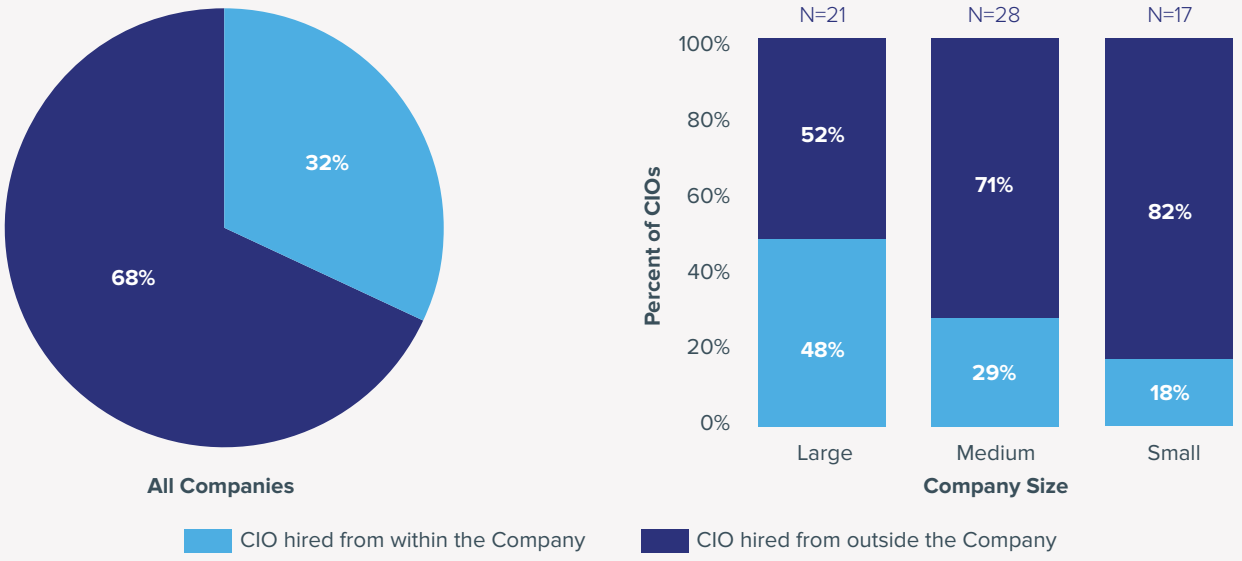
- Most CIOs of life sciences companies are new to their roles with almost half in place less than three years, and 70% less than five years
- Companies with CIOs of less than five years tenure outperform on the ITTS framework overall and especially in key elements of Innovation & Disruption and Big Data & Analytics
- Over two-thirds of today's CIOs were hired from outside the company, with external hiring ranging from 52% for large companies, to 82% for small companies
- Less than one quarter of CIOs are part of the company's executive team, including only 14% of CIOs at large companies
- Over 82% of companies have established new IT roles around the CIO in digital, data and innovation functions, mostly in the past two years; 75% have hired a Head of Digital Marketing, 29% a Chief Digital Officer, and 41% a Head of Digital Innovation
- Companies who have hired these roles or Chief Data Officer, Head of Innovation, outperform on four or all five of the ITTS elements
- In two thirds of companies with an innovation program that includes IT, the CIO is strongly involved in this program 53% of the time; however the Head of Digital Marketing is strongly involved 59% of the time

Today's life sciences CIOs

The average age of a life sciences company CIO today is 52 and most CIOs—as frequently discussed in the technology industry—are male. Only 7% of the 68 company CIOs profiled are women (see Methodology section for detail of the CIO Profiles Analysis). Two thirds of all CIOs are hired with advanced degrees—most commonly MBAs (43%), other Masters Degrees (17%) or PhDs (6%). CIOs who received higher degrees other than MBAs studied topics including Computer Science, Finance, Cognitive Science, Clinical Psychology, Industrial Engineering, Pharmaceuticals, Neuroscience, Information Systems, Technology Management, Engineering and Physics.

When hiring CIOs, life sciences companies tend to look outside their companies to find candidates with skills required in the new (digital) era, often pulling talent from other industries that are earlier adopters of innovation, such as Financial Services. Over two-thirds of life sciences CIOs were hired from outside the company, with external hiring ranging from 52% for large companies, to 82% for small companies (see Exhibit 12). Medium companies fell squarely in the middle with 71% of all CIOs hired externally. External hiring therefore varies drastically from large to small companies with large companies possibly hiring more from within as a result of having a larger pool of talent to draw from. Of the companies that have named CIOs from within their company, just over half of these CIOs were at their companies for 10 years or longer prior to their hire.

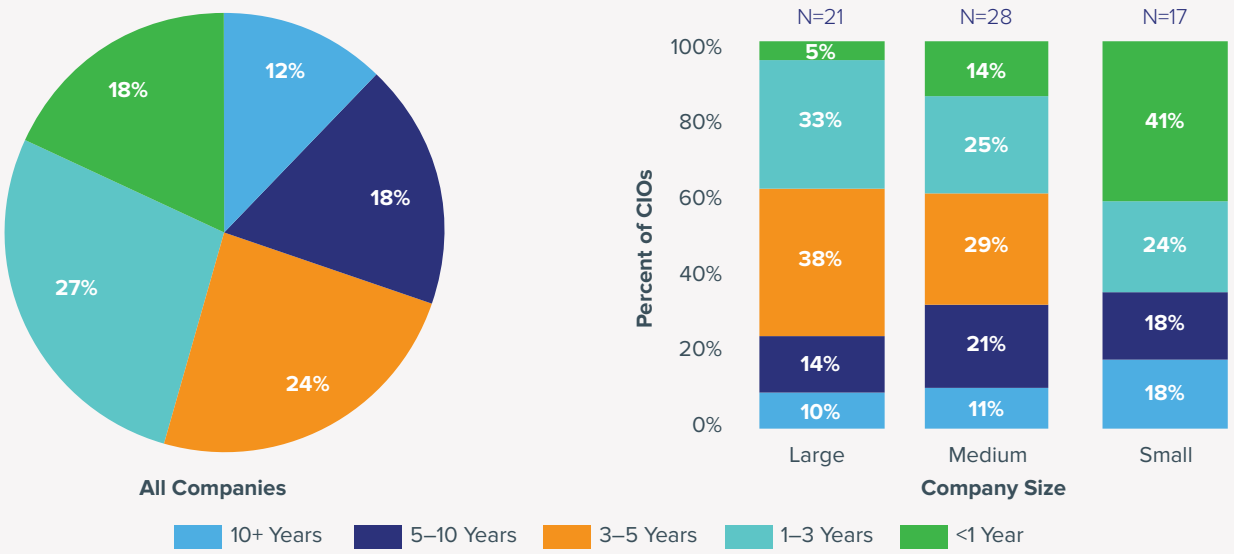
Exhibit 12: Hiring of CIOs From Within or Outside the Company



Source: IMS Institute for Healthcare Informatics, CIO Profiles Analysis, October 2015; IMS Health, MIDAS, June 2015
Note: Companies N=66

Almost half of the life sciences companies profiled (45%) have CIOs who have been in place less than three years, and 70% less than five years indicating these roles typically have a high turnover rate (see Exhibit 13). For small companies, 41% of all CIOs were hired just within the past year compared with 5% at large companies. Although small companies have the greater percent of recent hires, they also have the highest percent of long-term CIOs when compared with large or medium companies.

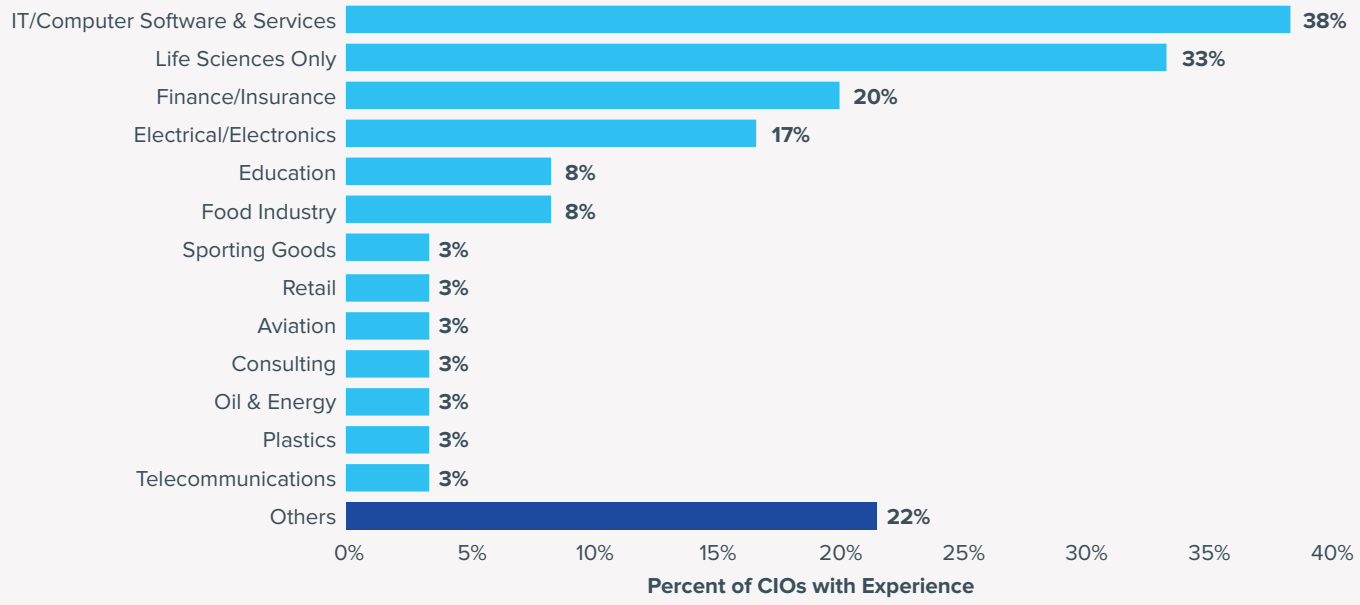
Exhibit 13: Life Sciences CIO Tenure at Their Current Company



Source: IMS Institute for Healthcare Informatics, CIO Profiles Analysis, October 2015; IMS Health, MIDAS, June 2015

Most CIOs have significant experience in the life sciences industry, with an average of 13 years and 9 months time in total. However, at least 27% were hired having held no other life sciences positions, while about one third spent their entire careers in the life sciences space. Among those in the role, approximately 40% had some experience in other IT or computer software and services including IT consulting and vendors, while the other major industries were the Finance and Insurance industries, Electronics, Education/Academia and the Food Industry (see Exhibit 14).

Exhibit 14: Experience of Life Sciences CIOs in Other Industries



Source: IMS Institute for Healthcare Informatics, CIO Profiles Analysis, October 2015

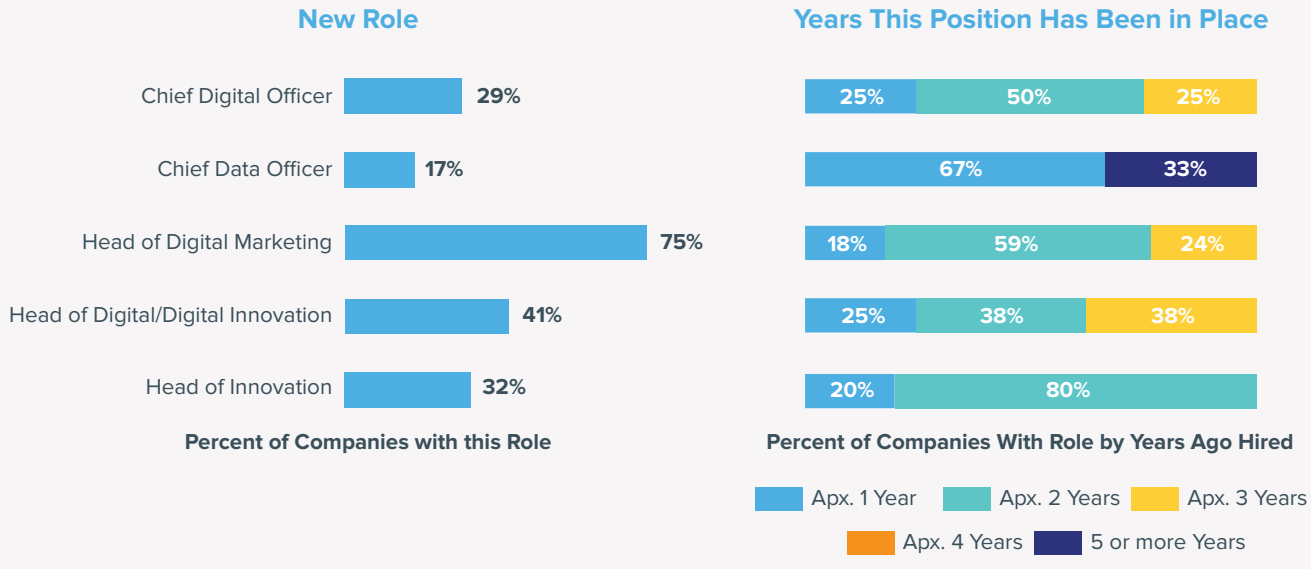
Note: Companies N=60

Organizational positioning

Although executing on technological and digital transformation is widely discussed as a critical need in the life sciences marketplace, the CIO role has still not been elevated among the C-suite, with less than one quarter (23%) of CIOs being part of the company's executive team. Executive committee membership is lower among large companies (14%) compared with medium (32%) or small companies (18%) and slightly higher for CIOs who have held their role over five years. A CIO on the executive team has a similar tenure versus those CIOs who were not, but has typically been at their company a longer time (11.1 years vs. 7.6 on average). Company CIOs are usually located in the same office as the CEO.

The absence of the CIO on the executive team may be partly due to the perception that IT is not a leader of innovation and business transformation. Today, two thirds of companies have IT organizations that are perceived as playing a limited role in innovation according to the ITTS survey. Perhaps for this reason, a number of companies have begun to obtain this strategic vision from roles beyond that of the CIO. Over 82% of companies have established new IT roles around the CIO in digital, data and innovation functions according to the ITTS survey, to maximize opportunities from the digital revolution and information technology, and hired these mostly in the past two years (see Exhibit 15). While less than a third of companies have yet hired Chief Data and Digital Officers (or equivalent title), this may be high compared with other industries.[18] Companies that have hired a Head of Digital Marketing, Chief Digital Officer, Head of Digital Innovation, Chief Data Officer or Head of Innovation outperform on 4, or all 5, of the ITTS elements.

Exhibit 15: Percent of Companies with New Technology Roles to Leverage IT and Digital Innovation and Years This Position Has Been in Place



Source: IMS Institute for Healthcare Informatics, ITTS Information and Technology Transformation Survey, October 2015,
Note: Companies N=19-28 depending on role; Years Position in Place based on available information

In those companies where the IT function is perceived as a partner in innovation or as leading innovation according to the ITTS survey, a Chief Digital Officer was less commonly hired—only 14% of these companies vs. 33% of companies where the IT function is considered just keeping the technology running or executing projects on behalf of the business. Similarly, no company described as having innovative IT functions hired a Chief Data Officer vs. 29% of other companies. However, looking at the data conversely, 50% of IT innovators had already hired a Head of Digital/Digital Innovation and 100% had already hired a Head of Digital Marketing.

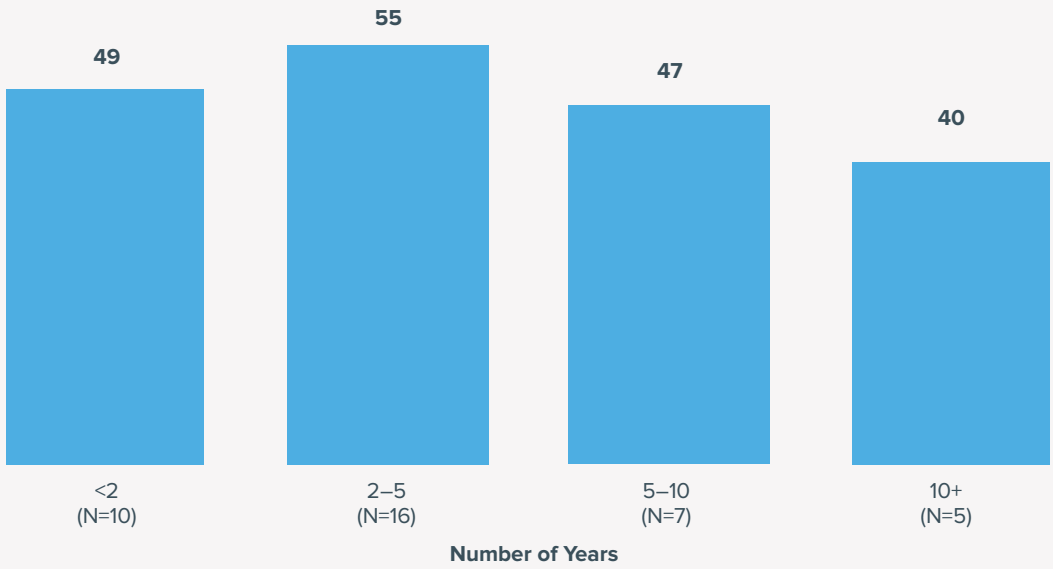
Although not included in our surveys, new IT roles—such as "Innovative Products" roles—with a mandate to create digital product wraparounds also exist and are being recruited for. These roles and the presence of a"Head of Digital Innovation" in some companies suggests the meaning of "innovation" within the life sciences is extending beyond molecules to also include commercial wraparounds to medicines.

These new roles are also encroaching on the CIO's traditional domain and sometimes appear to be taking it over entirely. Results from the ITTS Survey indicate that of the 67% of companies that have an innovation program that includes IT, the CIO is strongly involved in this program 53% of the time. However slightly more often (59% of the time) the Head of Digital Marketing is involved.

Correlates of transformation progress

In correlating CIO profiles to transformation progress, those CIOs having a tenure of less than five years outperform on the ITTS framework overall (see Exhibit 16).

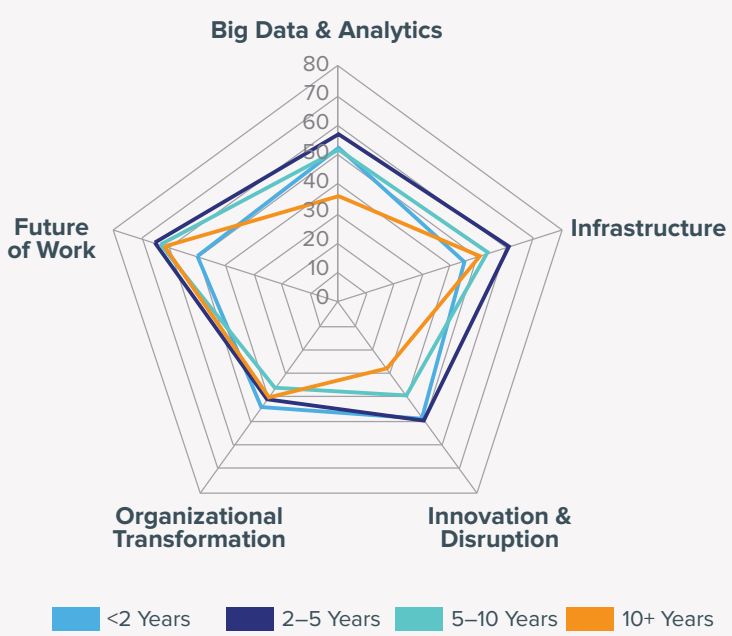
Exhibit 16: Life Sciences CIO Tenure at Their Current Company Versus Average ITTS Score

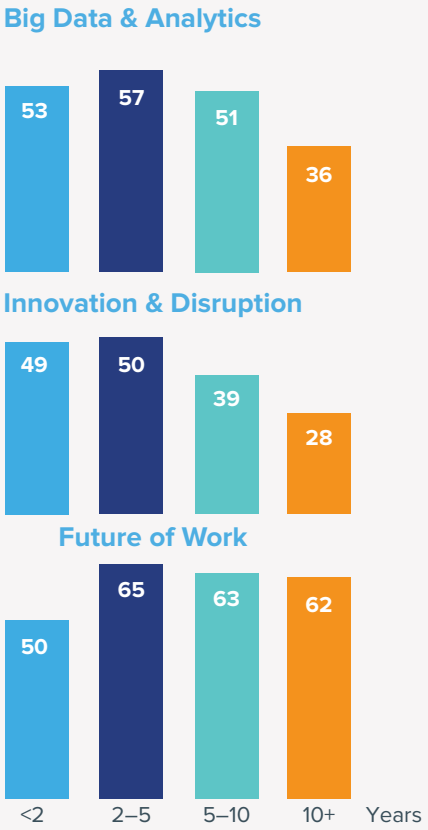


Source: IMS Institute for Healthcare Informatics, ITTS Information & Technology Transformation Survey, October 2015
Note: Companies N=38

Looking across key elements of transformation, this is especially true in key elements of Innovation & Disruption and Big Data & Analytics, suggesting there has been an evolution in the profile of CIOs hired in recent years to target these key areas of transformation. Overall the 2–5 year period appears to be an optimal time where CIOs are new enough to drive change and to deal with critical transformation issues but established enough to focus on elements like Future of Work that often take back-stage to more critical problems (see Exhibit 17). CIOs perform better on elements of Future of Work beyond two years in the CIO role.

Exhibit 17: Life Sciences CIO Tenure at Their Current Company Versus Average ITTS Elements Scores





Source: IMS Institute for Healthcare Informatics, ITTS Information & Technology Transformation Survey, October 2015
Note: Companies N=38

Shaping the future of the CIO

- The CIO still is in the best position to retain the role of leading technological innovation, but what companies are looking to the CIO to deliver has changed
- From a hiring perspective, the role of a life sciences CIO has already evolved, with CIO job role descriptions now reflecting the search for change using new words like innovation, trends and transformation, and the need for efficiencies using words such as cost-effective, KPIs, metrics, standardization and shared services
- In pursuit of future digital leaders, CEOs are shifting to a model looking at candidate potential to grow into the competencies needed for the digital age – Consumer Centricity, Digital Fluency, Data Orientation, Adaptability and Change Leadership – and are testing whether candidates have the traits to help bridge the gap
- The need for life sciences companies to rapidly embrace digital opportunities is now positioning CIOs to take on an increasingly strategic role

What companies are looking for CIOs to deliver

The CIO role is being affected by new company needs and goals. The CIO role in life sciences companies has rapidly moved away from an operational role of building and maintaining servers and storage to a critically strategic one. Companies are looking for CIOs who can deliver digital technologies to strategically build business value "around the pill," embed change and innovation in their company culture and deliver horizontal efficiencies.

- **Delivering digital around the pill** — To create competitive advantage in the digital age, wrapping digital technologies and services around the pill is becoming more critical. This may mean creating digital infrastructure to deliver capabilities such as adherence services, mobile health services or reimbursement support around the prescription, or even tools for tracking medication use tracking for elderly patients as medicines dissolve when swallowed.[19] Overall CIOs, alongside other digital roles, are being called upon to deliver competitive advantage through digital enablement.
- **A culture of change and innovation** — Digital leaders must be comfortable with continual shift, since the end state in technology is a moving target. The ability to adapt to technologic change is seen as key to creating competitive advantage and this may mean breaking legacy systems that have outlasted their competitive value. CIOs who can embrace uncertainty and to create a technology culture of change across the organization are likely to have the adaptability to succeed in the digital age.

- **Horizontal efficiencies** — Companies are also looking to CIOs to manage technology strategically to better utilize the technology that has already been adopted and make it more efficient. This means not just acquiring information systems but engineering valuable information flows between them, to gain operational efficiencies and greater performance.[11] This goes beyond building commonality between hardware and software systems through architecture, to improving the efficiency of the overall IT organization through centralization and purchasing control.

CIOs then and now

A shift in hiring for these new strategic goals has already happened as reflected in the role specifications of Egon Zehnder's CIO searches. Language used in these reflect the emergence and growth of company focus on business performance and efficiencies—using terms such as cost-effective, KPIs, metrics, performance and growth, along with standardization and shared services. New words reflecting the search for change include innovation, transformation, competitive, trends, current and future (see Exhibit 18).

A shift in the level of customer engagement now required from the role is also reflected in word such as customers, engage, relationships, colleagues and people. Words like compelling, motivating and articulate show that the CIO roles is more social, dynamic and motivational role than ever before and requires soft skills to be successful. Others words have diminished or disappeared since years past like operations, processes, enterprise, tools, development, program, governance and initiative and organizational words like matrixed and outsourcing.

Exhibit 18: The CIO Role 5 Years Ago…

…and Today

Source: Egon Zehnder CIO-Search Role Specifications; Wordle; IMS Institute for Healthcare Informatics analysis, November 2015
Notes: Largest common words on both sides, and some generic words removed prior to analysis including "CIO," "Information", "Technology," "IT"

New technology roles

Although the strategic components of the CIO role are currently growing, as the life sciences industry has moved towards greater complexity, the CIO role has sometimes narrowed in scope. The clinical and commercial organizations have sometimes created specialized IT functions when specialized skills and knowledge were perceived to be needed. In the late 1990s and early 2000s, for instance, with the emergence of large-scale document management and clinical trial management to manage digital information and FDA submissions, Clinical Informatics or R&D Informatics roles began to be created. These roles did not report to the CIO but rather to the Chief Medical or Chief Scientific Officer or the CFO, thus splitting off a first large system from the CIO's domain.

The need to deliver Big Data and Digital now poses similar challenges to the CIO in the level of expertise required. Life sciences companies seeking to embrace digital transformation are sometimes now meeting new talent needs by adding new roles such as Chief Digital Officer, Chief Data or RWE Officers, Chief Technology Innovation Officer and Head of Customer Experience. These pose a challenge to the CIO role since they remove strategic innovation aspects most tied to company evolution. For the CIO who wants to lead such innovation he/she must be a tool to convey the organization's commitment and path to a new digital-enabled vision if the hope is to forgo the creation of Chief Digital Officer or Chief Data Officer roles.

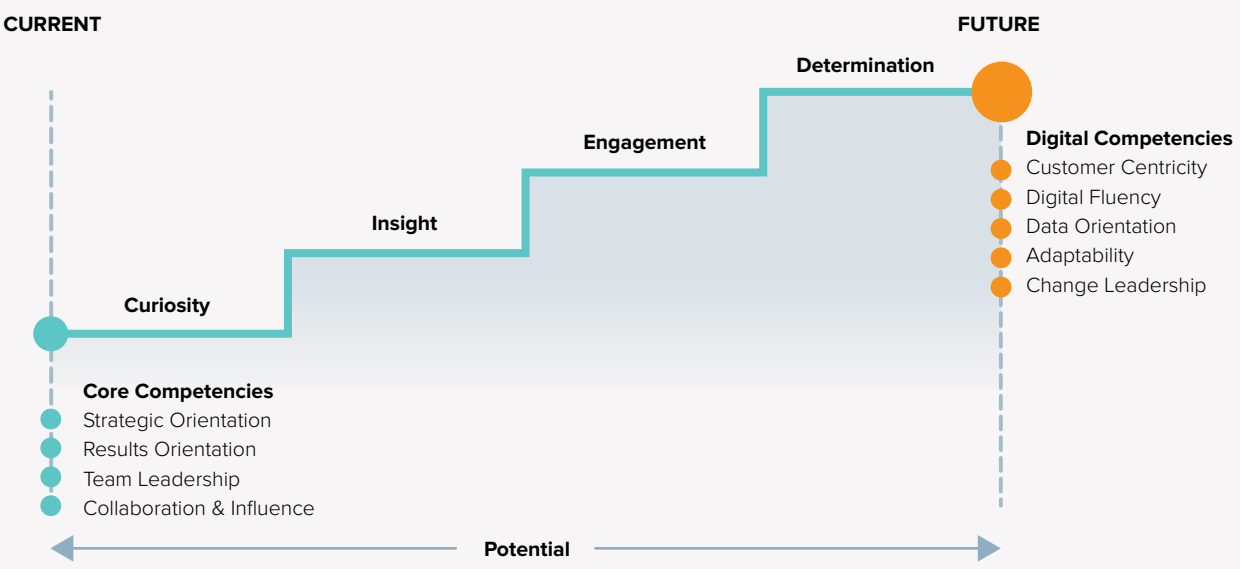
Although these digital roles are a threat to the CIO role, these new Digital roles are arguably stopgap positions that lead the transformation and build critical competencies that are seldom found in-house within marketing, corporate strategy and IT organizations. Just a few years from now, those new roles will likely be integrated within traditional corporate functions. As talent ramps up, required competencies will become more mainstream and the "Digital Health" category will naturally be referred to as "Health"—digital being pervasive. This is a rare and unique opportunity for life sciences CIOs to take on a leadership role in this digital transformation, moving from back-office support into the front line. CIOs who develop the relevant digital competencies will take on a seat amongst equals at the executive table, leading this transformation for life sciences companies.

Evaluating potential of a future life sciences CIO

As drugs, devices, data and analytics become equally important in delivering health, life sciences companies find themselves short of the required talent to integrate them all. Companies across industries are challenged by the transformation required for Digital relevance, even in the banking or telecom sectors, or the Tech industry itself, despite having technically-oriented marketers, product managers and Chief Technology Officers. The talent gap within life sciences corporations is wider still, which is paving an opportunity for forward-looking CIOs.

Traditional core competencies required for success at the C-level have and will always be critical for the CIO role, however, new "digital" competencies such as Consumer Centricity, Digital Fluency and Adaptability will quickly become key for success (see Exhibit 19). Finding these qualities among the existing pool of talent can be difficult as these competencies have not been required from life sciences CIOs to date and are therefore rarely found in candidates.

Exhibit 19: Evaluating Potential is the Key to Successfully Bridging the Talent Gap



Source: Egon Zehnder 2015

New emerging business models are requiring talent to integrate wearable devices, build new alliances, gather unstructured data, derive actionable insight and iterate quickly to tune the approach. Digital and Tech companies will often hire CTOs and technology oriented Product Managers to address those needs, however within life sciences companies it is the CIO who is closest to those profiles today, having the ability to elevate the role to play a strategic and core function on the executive team. Company CEOs are now seeking talent that has the potential to develop in the near future to bridge the competency gap, offering great opportunity to aspiring CIOs to grow and lead strategically.

Current Core Competencies of a CIO

The core competencies of a successful leader remain the same in the Digital transformation. Those have been pillars for successful executives irrelevant of economic cycles. Although acquisitive or organic growth strategies might slightly test one more than the other, they are nonetheless core staples in the executive and board rooms of traditional and new companies alike.

- **Strategic Orientation:** Forward looking vision, complex thinking abilities (both analytically and conceptually)
- **Results Orientation:** Demonstrated ability to achieve stretch goals in complex and fast-paced environments. A bias toward action, and an ability to actively manage trade-offs
- **Team Leadership:** Fostering excitement and positive motivation, and an emotional commitment to the team and the outcome
- **Collaboration and Influence:** Effectively engaging stakeholders and driving alignment across multiple functions to achieve results. Ability to recognize and channel new ideas

Required competencies of tomorrow's successful CIO and Digital leader:

In addition to the above-mentioned core competencies, the following five competencies will be critical in the Digital Health Era as CIOs are asked not only to adapt to new and rapidly changing technologies, but to understand multiple stakeholders in the life sciences and company engagement with these. Comfort levels with constant change and the ability to lead the organization to this culture of change will be critical.

- **Customer Centricity:** Understanding online customer behavior. Awareness of customers'/patients' constantly evolving expectations and inclination toward an empowered experience
- **Digital Fluency:** Understanding and measuring any form of digital media and its role in guiding marketing and influencing decisions. Understanding how patients or partners are playing key roles in influencing or adapting to those newer assets
- **Data Orientation:** Embracing analytics as input into decision making. Appreciation of the wealth of data created by digital platforms and thirst for data-driven insight
- **Adaptability:** Comfort with lean, iterative market interactions for quick results. The 'future CIO' can arrange the organization to continually evolve its model not just set a vision for a fixed target state[11]
- **Change Leadership:** Leading the cultural shift required to deliver on the above. Driving the Digital change through people, transforming and aligning an organization in a new direction

As these new competencies are rarely found in even the most successful CIOs today, life sciences companies will need to look beyond experience and rely on measuring Potential to identify the talent that will lead the Digital transformation of tomorrow.[20] The Potential Model developed by Egon Zehnder is used to bring structured objectivity and a common language for measuring potential, hiring and developing executives, including CIOs who will lead the digital health transformation.

> "While competencies provide an important inventory of a candidate's current capabilities, it also is critical to examine a leader's potential to adapt to new and unknown conditions and acquire other competencies as the situation demands."
>
> *From "Making the Future Now", Egon Zehnder Whitepaper [17]*

Potential—bridging the competencies gap

To get to the competencies required by the digital transformation, CEOs are now looking to several qualities that are "hallmarks of potential," gauging a candidate's behaviors that are indicative of a longer runway and ability to develop the required competencies in the near future.[17] Specifically, those behavioral traits are:

- **Curiosity:** Constantly updating one's self on an intellectual, experiential and personal level. Seeking out new experiences, ideas, knowledge and self-improvement. How do they keep current? How open are they to new information, even if seemingly out of the box?
- **Insight:** Leveraging the input from all this curiosity. Applying an analytical mindset to synthesize a large range of information, resulting in new insight and orientations. What could be the impact of this information dataset on identifying and engaging patients at risk? How would the business model evolve when combining current therapies with latent technologies?
- **Engagement:** Getting others equally excited by one's insight and vision. Resonating with others' emotions and intellect. Those who currently engage the hearts of their employees and colleagues without the need to rely on titles and status will have the higher potential to bring lasting change in the near future
- **Determination:** Remaining resilient in the face of challenges. Persevering to deliver on the insight and the required transformation, despite the hurdles on the way

It will prove difficult for CIOs to effectively deliver on today's challenges while developing new competencies to take on larger roles within an ever-changing digital context. Yet, CIOs are distinctively positioned to develop these competencies and elevate their role while helping their companies engage with stakeholders in an unprecedented way. Though a lack of therapeutic area knowledge has historically limited CIOs' advancement as a full member of the executive team, the need for life sciences companies to rapidly embrace digital opportunities is now positioning CIOs to take on an increasingly strategic role.

> "The [current] 'Good CIO' is able to make IT an integral part of the business but lacks the degree of Strategic Orientation in combination with Market Knowledge to be a full-fledged strategist…A CIO who is able to develop the same skills/competencies as the CEO will ultimately become a more valuable long-term member of the senior leadership team and potentially move beyond pure IT leadership roles."
>
> *From "Your Leadership Portfolio: Developing the Competencies of a Future-State CIO", Egon Zehnder Article* [21]

Notes on sources

This report is based on the IMS Health services detailed in the panel below.

IMS MIDAS™ is a unique data platform for assessing worldwide healthcare markets. It integrates IMS national audits into a globally consistent view of the pharmaceutical market, tracking virtually every product in hundreds of therapeutic classes and providing estimated product volumes, trends and market share through retail and non-retail channels. MIDAS data is updated monthly and retains 12 years of history.

IMS Therapy Prognosis™ Includes sales forecasts for major therapy areas in 14 key markets, 8 developed (U.S., Japan, Germany, France, Italy, Spain, U.K., Canada and South Korea) and 6 pharmerging (China, Brazil, Russia, India, Turkey and Mexico) and includes interactive modeling and event-based forecasts and comprehensive market summary.

Methodology

ITTS Information and Technology Transformation Survey

Details and Deployment

The ITTS Survey is an internally-fielded survey of IMS Health account managers serving the top fifty life sciences companies based on global pharmaceutical sales reported in MIDAS June 2015. All companies included were therefore large and medium-sized, where large companies were defined as those having sales over $10Bn, and medium as having sales of $1–10Bn. Thirty nine (39) usable responses were received and analyzed for this survey.

In line with the ITTS Framework, questions were developed to query company progress along each element. Company details were collected to allow for segmentation and the survey itself totaled 50 unique questions across ITTS elements as listed in Exhibit 20. The ITTS scoring system awarded a total of 100 points maximum, where Big Data & Analytics accounted for 40 points, Innovation & Disruption for 20 points, Infrastructure for 12 points, Organizational Transformation for 15 points and Future of Work for 13 points.

Exhibit 20: ITTS Survey Elements for Life Science Companies

Strategic Elements

Organizational Transformation

- **New Titles and Roles**
  - Hired Chief Digital Officer
  - Hired Chief Data Officer
  - Hired Head of Innovation
  - Hired Head of Digital/ Digital Innovation
  - Hired Head of Digital Marketing
  - Hired Chief Technology Officer
- **Support for Digital Strategy**
- **Shared Services**
  - Shared Service Hardware Procurement
- **Everything as a Service**
  - Business Process as a Service
- **Centralization of IT**
  - IT Under Global/ Corporate CIO
  - IT Functions with COE Governance
- **Mix of Skills**
  - Non-Technical IT Hiring
- **IT Business Role in Innovation**

Innovation & Disruption

- **Innovation Program**
  - Formal Innovation Program
  - Strategy to Acquire IT/ Digital Innovation
- **Startup Relationships**
  - Partners with IT Startups
  - Incubates IT Startups
- **Entrepreneurial Behavior**
  - Aims to Monetize Technology
- **Collaborative Economy**
  - Aims to Leverage the Collaborative Economy
- **Wearables and Mobile**
  - Leverages the "Internet of Things"
  - Breadth of Mobile App

Operational Elements

Big Data & Analytics

- **Reporting and Analytics**
  - Analytic Systems
    - Level of Sophistication
    - What-if Scenarios
    - Visualization
- **Orchestrated Customer Engagement (OCE)**
  - MCM Strategy Globally
  - Sales & Marketing Systems – Level of Sophistication
- **Master Data Management**
  - MDM Strategy Globally
  - MDM Application across Data Types
  - Data Integration
- **Data Systems**
  - RWE Use Globally
  - Unstructured Data Use
  - Unstructured Data for Patient Sentiment
  - Unstructured Data for Adverse Events ID

Infrastructure

- **SaaS and Cloud**
  - Use of Cloud Software
  - IT Department Leading Use of Cloud
- **Architecture**
  - Security Review before Piloting New Tech
  - Guest Access to WiFi
- **Privacy, Security and Access Control**
  - Remote Access

Future of Work

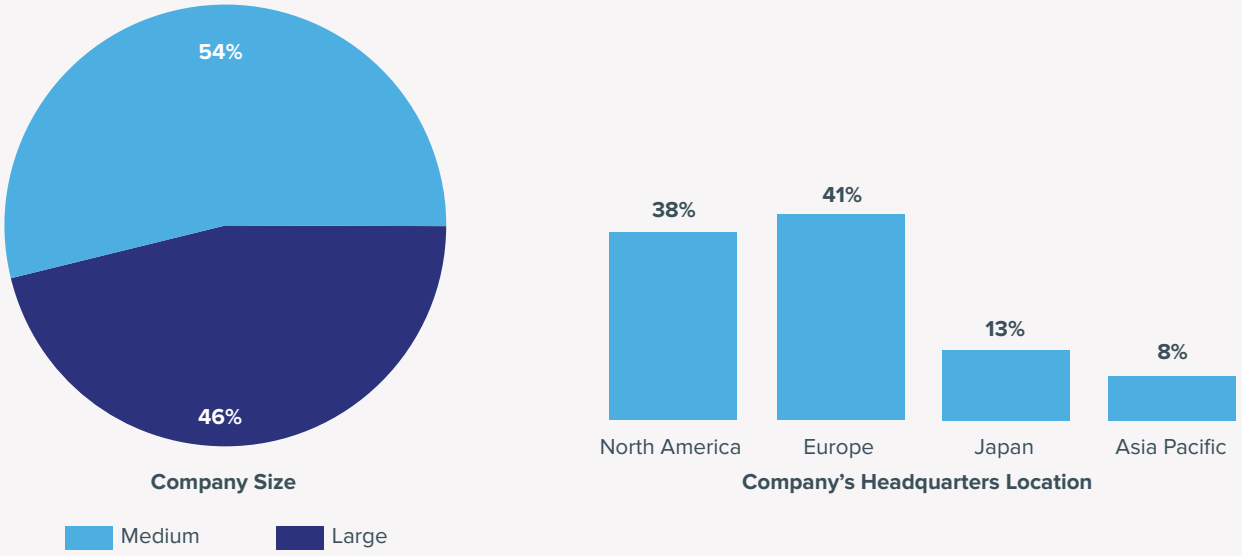
- **Mobility**
  - Mobile Work Tools
- **Personal Devices**
  - Bring Your Own Device (BYOD) policy
- **Telecom Infrastructure**
  - Chat System
  - Video System on Personal Devices
- **End User Computer**
  - Employee Use of Chat
  - Employee Use of Video Conferencing
  - Employee Use of Screensharing
- **Modern Workspace**
  - Shared Workspaces and Hoteling
  - Roaming User Profile

Source: IMS Institute for Healthcare Informatics, ITTS Information and Technology Transformation Survey, October 2015

Survey respondents were encouraged to select "I don't know" where applicable—which allowed the question to be eliminated from the survey. Where respondents provided no response a question, these were also omitted from the survey. Responses were then scored based on "total attainable" score of known responses, and adjusted to a scale of 100 points. While the N number for each question therefore varies, the maximum n# is 39. Within this document, n# is only cited where the number of respondents for a specific question falls below 20, or where the number of company responses received for a specific segment is low. Where not otherwise cited the number of total respondents ranges between 20–38.

Bias risk exists for this survey as responses are reported based on the interaction of IMS Health account managers with their clients and the areas of the business and teams they interact with. Another bias may also exist for respondents with poor knowledge of their company. To reduce such bias, six company responses where "I don't know" and blank responses accounted for >70% in terms of points were disqualified from inclusion in the analysis. Therefore, among the 44 responses received, 39 usable responses were analyzed across the companies listed in Exhibit 21.

Exhibit 21: Survey Respondents



Source: IMS Institute for Healthcare Informatics, ITTS Information and Technology Transformation Survey, October 2015
Note: Companies N=39

Company Names

Abbvie, Allergan, Amgen, Astellas, Astrazeneca, Baxter, Bayer, Biogen, Boehringer Ingelheim, Celgene, CSL, Dainippon Sumitomo, Dr Reddy's Lab, Eisai, Endo International, Fresenius, Gilead Sciences, GlaxoSmithKline, Johnson&Johnson, Lilly, Lupin Laboratories, Menarini, Merck, Merck KGaa, Mitsubishi Tanabe, Mylan, Novartis, Novo Nordisk, Pfizer, Pieree Fabe, Purdue, Reckitt Benckiser, Regeneron, Sanofi, Servier, Sun Pharma, Takeda, Teva, UCB

CIO Profiles Analysis

Proprietary research using public sources (as available in October 2015) was conducted to examine the profiles of CIOs of life sciences companies. The CIOs of top 50 life sciences companies based on MAT June 2015 global sales were included as well as 18 small companies with recent innovative NME launches for a total of 68 companies. The full list of companies included in the analysis is available below. Little or no CIO Profile data was available for Mitsubishi Tanabe and Vertex, resulting in final inclusion of 21 large companies, 28 medium companies and 17 small companies.

Company CIOs Profiled

Abbott, Abbvie, Actelion, Alexion Pharmaceuticals, Allergan, Amgen, Apotex, Astellas Pharma, Astrazeneca, Baxter International, Bayer, Biocryst, Biogen, Biomarin Pharmaceuticals, Boehringer Ingelheim, Bristol-Myers Squibb, BTG, Celgene Corporation, CSL, Daiichi Sankyo, Dainippon Sumitomo, Dr. Reddy's Laboratories, Eisai, EMS, Endo International, Fresenius, Gilead sciences, GlaxoSmithKline, Helsinn Healthcare, Hospira, Intercept Pharmaceuticals, Johnson & Johnson, Lilly, Lupin Laboratories, Menarini, Merck & Co, Merck KGAA, Merrimack Pharmaceuticals, Mitsubishi Tanabe, Mundipharma International, Mylan, Nestle, Novartis, Novo Nordisk, Otsuka, Pfizer, Pierre Fabre, Purdue, Reckitt Benckiser, Regeneron, Retrophin, Roche, Sanofi, Sarepta, Servier, Shire, STADA Arzneimittel AG, Sun Pharmaceuticals, Taiho Oncology, Takeda, Tesaro, Teva, The Medicines Company, UCB, United Therapeutics, Valeant Pharmaceuticals, Vanda Pharmaceuticals, Vertex Pharmaceuticals

In order to determine performance of companies based on CIO details, the data between the CIO Profiles Analysis and the ITTS survey were crossed. This narrowed the performance details to large and medium-sized companies included in the ITTS survey, but eliminated Mitsubishi Tanabe, for which survey data was available but CIO Profile data was lacking.

Time periods ranges were also examined, looking to the length of CIO tenure at their current companies (i.e. CIO hire date) and length of total tenure as a CIO in any company, and these were subsequently broken out into <1 year, 1–3 years, 3–5 years, 5–10 years, 10+ years tenures for the purpose of examining profiles. For data crossed with survey results examining performance, a broader tenure breakout was selected looking at four groups with <2 year, 2–5 year, 5–10 year and 10+ year tenures. Because the profiles reflect a current snapshot and includes only the CIOs that remain at the companies they are hired into, discussions of hiring may not reflect hiring practices at the time of hire. For instance, CIOs with longer tenure (i.e. still at their companies) may reflect only the most successful of these hires.

Appendix

Exhibit 22: Company Transformation Identities

Source: 2013, Organizational Personas of Disruptive Tech Adoption Diagram by Ray Wang, Adapted by permission from Constellation Research Inc.

Definitions

Specialty medicines are products that treat chronic, rare or genetic diseases. There are multiple characteristics that can further define a specialty medicine and IMS Health defines them as having the majority of these characteristics:

- Often initiated by specialists
- Generally injectable and/or not self-administered
- Require an additional level of care in their chain of custody, such as refrigeration
- Distributed by specialized wholesalers or pharmacies
- Typically very expensive, or treating very costly diseases
- May require payment assistance where applicable
- Requiring extensive or in-depth monitoring/patient counseling

References

1. IMS Institute for Healthcare Informatics. Global Medicines Use in 2020: Outlook and Implications. 2015 Nov.
2. IMS Health, Launch MVP, July 2015, Therapy areas based on ATC3. Company rankings based on IMS Health MIDAS MAT June 2015.
3. Thomas K. Generic Drug Makers See a Drought Ahead. The New York Times. 2012 Dec 3. Available from: http://www.nytimes.com/2012/12/04/business/generic-drug-makers-facing-squeeze-on-revenue.html?_r=1
4. IMS Health, National Sales Perspectives, Sept 2015
5. IMS Institute for Healthcare Informatics. Riding the Information Technology Wave in Life Sciences: Priorities, Pitfalls and Promise. 2014 Mar.
6. Etwaru R. Enough of the Cloud Already, What's Next for Enterprise Technology? Pulse LinkedIn. 2014 Apr 15. Available from: https://www.linkedin.com/pulse/20140415235145-4220955-enough-of-the-cloud-already-what-is-next-for-enterprise-technology
7. Iskowitz M. BMS' Phelan: The digital drug launch is upon us. Medical Marketing & Media. 2015 Oct 19. Available from: http://www.mmm-online.com/campaigns/bms-phelan-the-digital-drug-launch-is-upon-us/article/447816/
8. IMS Institute for Healthcare Informatics. Patient Adoption of mHealth: Use, Evidence and Remaining Barriers to Mainstream Acceptance. 2015 Sep.
9. Aitken M. Connected Healthcare: The Critical Role of Non-Identified Information. CIOStory. 2015 Dec 4. Available from: http://ciostory.com/cxo-perspectives/connected-healthcare-the-critical-role-of-non-identified-information
10. IMS Institute for Healthcare Informatics. Closing the Healthcare Gap: The Critical Role of Non-Identified Information. 2015 Dec.
11. Etwaru R. 10 Things Most Exceptional CIOs Never Do. The Huffington Post. 2014 Mar 29. Available from: http://www.huffingtonpost.com/richie-etwaru/10-things-most-exceptiona_b_5052245.html
12. Etwaru R. The Killer App in Healthcare is the Crowd. Pulse LinkedIn. 2014 Aug 20. Available from: https://www.linkedin.com/pulse/20140820142857-4220955-the-killer-app-in-healthcare-is-the-crowd
13. Etwaru R. So You Want to be a CIO? Pharma is Currently the Most Attractive Vertical. Pulse LinkedIn. 2014 Jun 19. Available from: https://www.linkedin.com/pulse/20140619014002-4220955-so-you-want-to-be-a-cio-pharma-is-currently-the-most-attractive-vertical?trk=mp-reader-card
14. The Group of 33, Godin, S. The Big Moo: Stop Trying to Be Perfect and Start Being Remarkable. New York. Portfolio. 2005 Oct.
15. Wang R. Monday's Musings: Understand the Four Organizational Personas of Disruptive Tech Adoption. 2012 Dec 2. Available from: http://blog.softwareinsider.org/2012/12/02/mondays-musings-understand-the-four-personas-of-disruptive-tech-adoption/
16. Mueller H. Constellation Research. How the Cloud Changes Everything in Social Business. Slide 25. LinkedIn SlideShare. 2014 Jul 31. Accessed on October 14th 2015. Available from: http://www.slideshare.net/SocialBizForum/mueller-01-07
17. Jacobovits de Szeged N, Sunderland R, Sznajer AA. Making the Future Now. EgonZehnder. 2015. Available from: http://www.egonzehnder.com/us/leadership-insights/making-the-future-now-how-financial-services-firms-can-adapt-to-a-customer-centric-world.html
18. Mathison D. Chief Digital Officer Talent Map. CDOs by Sector. Chief Digital Officer Club. 2013. Available from: http://cdoclub.com/publications/
19. Yirka B. FDA approves use of electronic chips in medications. Medical Xpress. 2012 Aug 1. Available from: http://medicalxpress.com/news/2012-08-fda-electronic-chips-medications.html
20. Fernández-Aráoz C. 21st-Century Talent Spotting, Why potential now trumps brains, experience, and "competencies". Harvard Business Review. 2014 Jun. Available from: https://hbr.org/2014/06/21st-century-talent-spotting
21. Patrick C. Your Leadership Portfolio: Developing the Competencies of a Future-State CIO. EgonZehnder. 2015. Available from: http://www.egonzehnder.com/leadership-insights/your-leadership-portfolio-developing-the-competencies-of-a-future-state-cio.html

Authors

Murray Aitken
Executive Director, IMS Institute for Healthcare Informatics

Murray Aitken is Executive Director, IMS Institute for Healthcare Informatics, which provides policy setters and decision makers in the global health sector with objective insights into healthcare dynamics. He assumed this role in January 2011. Murray previously was Senior Vice President, Healthcare Insight, leading IMS Health's thought leadership initiatives worldwide. Before that, he served as Senior Vice President, Corporate Strategy, from 2004 to 2007. Murray joined

IMS Health in 2001 with responsibility for developing the company's consulting and services businesses. Prior to IMS Health, Murray had a 14-year career with McKinsey & Company, where he was a leader in the Pharmaceutical and Medical Products practice from 1997 to 2001. Murray writes and speaks regularly on the challenges facing the healthcare industry. He is editor of Health IQ, a publication focused on the value of information in advancing evidence-based healthcare, and also serves on the editorial advisory board of Pharmaceutical Executive. Murray holds a Master of Commerce degree from the University of Auckland in New Zealand, and received an M.B.A. degree with distinction from Harvard University.

Alain Serhan
Co-Leader, Digital Health Initiative; Egon Zehnder

Alain Serhan is a core member of Egon Zehnder's Health and Technology Practice Groups and helps clients move seamlessly across these two segments. He works with Boards and CEOs on C-suite executive searches and succession planning for health-tech, IT services and Private Equity firms investing in this space. Prior to joining Egon Zehnder, Alain was Vice President, Sales and Consulting Services for IMS Health Canada, where he launched and grew the company's Consulting & Services group and led its sales team. Before IMS, Alain helped position, raise financing for, and build two start-ups including one in the distributed data space that was later sold to Sybase, and one in the online healthcare marketing sector. As a consultant at McKinsey & Company, Alain advised executives in the telecom, consumer goods, and life sciences sectors. He started his career as a manufacturing and automation engineer in Canada and Japan. Alain holds a Bachelor's degree in electrical engineering from École Polytechnique de Montréal, and an MBA from INSEAD in Fontainebleau, France.

Richie Etwaru
Chief Digital Officer, IMS Health

Richie Etwaru is IMS Health Chief Digital Officer, which is a role designed to help bridge the innovation and efficiency gap for healthcare stakeholders and life sciences customers using analytics and technology. He assumed this role in April 2015. Richie joined IMS Health as part of the Cegedim acquisition where he served in the same capacity as Chief Digital Officer. For two years prior, he was a member of the Cegedim Executive Committee serving as Group Vice President, Cloud and Digital Innovation. Prior to joining Cegedim, Richie worked for eight years in roles of increasing responsible and scope for UBS Wealth Management and Barclays respectively where he focused on innovation and technology.

A frequent keynote speaker at leading tech-related events and forums, Richie casts a vision of a technologically-enabled healthcare system in the near future. He is also a serial entrepreneur who has started several companies, as well as an author and regular contributor to Forbes.com and Huffington Post. Richie was a former Clinton Global Initiative delegate and currently serves as a board member for multiple not-for-profit organizations. Richie earned his Bachelor degree in Management Information Systems from Queens College as well as his M.B.A. in Technology Management from University of Phoenix where he's currently pursuing his PhD in Organizational Leadership.

Deanna Nass
Senior Researcher, IMS Institute for Healthcare Informatics

Deanna Nass is senior researcher and project manager at the IMS Institute for Healthcare Informatics leading the development of reports and performing analyses of biopharmaceutical and healthcare trends. Deanna joined the IMS Institute in 2013 and has 16 years of experience in the Biopharma industry. She has worked at IMS Health since 2004, first as a Senior Consultant responsible for market assessments and subsequently as a Senior Account Manager responsible for business development. Prior to IMS Health, Deanna worked as a freelance market research consultant and writer of industry publications for Medical Data International, Clinical and Theta Reports. Deanna holds a B.A. in Biology from Yale University with a specialization in neurobiology and a Certificate in International Affairs from NYU.

About the Institute

The IMS Institute for Healthcare Informatics leverages collaborative relationships in the public and private sectors to strengthen the vital role of information in advancing healthcare globally. Its mission is to provide key policy setters and decision makers in the global health sector with unique and transformational insights into healthcare dynamics derived from granular analysis of information.

Fulfilling an essential need within healthcare, the Institute delivers objective, relevant insights and research that accelerate understanding and innovation critical to sound decision making and improved patient care. With access to IMS Health's extensive global data assets and analytics, the Institute works in tandem with a broad set of healthcare stakeholders, including government agencies, academic institutions, the life sciences industry and payers, to drive a research agenda dedicated to addressing today's healthcare challenges.

By collaborating on research of common interest, it builds on a long-standing and extensive tradition of using IMS Health information and expertise to support the advancement of evidence-based healthcare around the world.

About Egon Zehnder

Founded in 1964, Egon Zehnder is a global leader in executive search and talent advisory services with more than 400 consultants in 69 offices across 41 countries. The firm provides senior-level executive search, executive assessment and leadership development, board search and advisory, CEO succession, and family business advisory to the world's most respected organizations. Egon Zehnder's clients range from large corporations to emerging growth companies, family and private-equity controlled entities, government and regulatory bodies, and major educational and cultural organizations. For more information visit www.egonzehnder.com and follow us on LinkedIn and Twitter.

Research Agenda

The research agenda for the Institute centers on five areas considered vital to the advancement of healthcare globally:

The effective use of information by healthcare stakeholders globally to improve health outcomes, reduce costs and increase access to available treatments.

Optimizing the performance of medical care through better understanding of disease causes, treatment consequences and measures to improve quality and cost of healthcare delivered to patients.

Understanding the future global role for biopharmaceuticals, the dynamics that shape the market and implications for manufacturers, public and private payers, providers, patients, pharmacists and distributors.

Researching the role of innovation in health system products, processes and delivery systems, and the business and policy systems that drive innovation.

Informing and advancing the healthcare agendas in developing nations through information and analysis.

Guiding Principles

The Institute operates from a set of Guiding Principles:

The advancement of healthcare globally is a vital, continuous process.

Timely, high-quality and relevant information is critical to sound healthcare decision making.

Insights gained from information and analysis should be made widely available to healthcare stakeholders.

Effective use of information is often complex, requiring unique knowledge and expertise.

The ongoing innovation and reform in all aspects of healthcare require a dynamic approach to understanding the entire healthcare system.

Personal health information is confidential and patient privacy must be protected.

The private sector has a valuable role to play in collaborating with the public sector related to the use of healthcare data.

IMS Institute for Healthcare Informatics
100 IMS Drive, Parsippany, NJ 07054, USA
info@theimsinstitute.org
www.theimsinstitute.org

We invite you to download
IMS Institute reports in iTunes

Egon Zehnder
350 Park Avenue
8th Floor
New York, NY 10022
www.egonzehnder.com