MANAGING APPLICATION DEVELOPMENT:

The healthcare perspective

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About this report

Managing application development: The healthcare perspective is an Economist Intelligence Unit report sponsored by Google Cloud. The findings do not necessarily reflect the views of the sponsor.

The report draws on two main sources for its research and findings:

● A survey that includes responses from more than 160 senior executives and application developers in the healthcare sector globally. This study is part of a larger survey that received more than 1,000 responses globally.

● An interview with Bill Gillis, chief information officer, Beth Israel Deaconess Care Organization (BIDCO).

We would like to thank the interviewee and survey respondents for their time and insights. The report was written by Peter Krass and edited by Becca Lipman.

Executive summary and key findings

Healthcare has gone high tech. Bulky paper records are quickly giving way to efficient digital records. Clipboards are being replaced by tablets and other mobile devices. And a range of entirely new time-saving and life-saving applications are being explored with technologies that use artificial intelligence (AI), blockchain, cognitive computing, big data analytics, robotic process automation and augmented/virtual reality.[1] As part of this technical evolution, The Economist Intelligence Unit's survey finds healthcare organisations have embraced the cloud and adopted advanced methodologies for developing new software applications.

An in-depth review of the healthcare industry's survey results uncovered the following

- More than three-quarters (77%) of healthcare organisations encourage their employees to leverage cloud services. Two-thirds (66%) have already adopted some degree of cloud technology and (30%) plan to use the cloud sometime soon.

- Nearly all healthcare organisations (92%) consider application development important to meeting their strategic goals.

- Among healthcare organisations, DevOps is used by a third (36%), as is Agile (36%). And continuous integration is used by nearly a third (30%). This adoption rate is similar to other industries.

- To measure the success of applications, healthcare organisations most commonly use metrics of customer/stakeholder satisfaction (70%), application quality (56%), and on-time/on-budget execution delivery (46%).

- Healthcare organisations organise their application developers much like other industries do. Namely, by department (46%), function (33%), products and services (26%), business unit (26%), and operating system (26%).

- Security is the number one challenge for healthcare organisations (and all industries) when it comes to better application development (40%) and cloud adoption (47%). Given the highly confidential nature of patient information, these issues are understandably top of mind.

Footnotes:

1. Deloitte, "2019 Global health care outlook: Shaping the future": https://www2.deloitte.com/global/en/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.html

CHAPTER 1:
Health-tech catches on

Healthcare is undergoing a massive evolution, thanks in large part to two interrelated technologies: electronic medical records (EMRs) and mobile technology. EMRs empower hospitals and other healthcare providers to create a single digital file for each patient. The benefits are hard to understate. They include better monitoring of potential drug interactions, more accurate billing and reimbursements, and improved patient outcomes.

Similarly, mobile devices let healthcare providers easily view patients' EMRs before, during and after treatments. And they empower patients to make medical appointments, check medical test results, and interact with insurers, all from their personal smartphones and tablets.

Both EMRs and mobile technology rely heavily on the cloud, so it's no surprise that most healthcare organisations either use the cloud now or plan to do so soon. Our survey of business executives, IT leaders and application developers finds that two-thirds (66%) of healthcare respondents have already adopted some degree of the cloud, and most of the remainder (30%) plan to use cloud technology in the near future. That puts healthcare organisations solidly in line with the all-industry average, where the percentages of cloud adopters and cloud planners are 67% and 29%, respectively.

However, cloud adoption in healthcare varies by region. In Europe, the Middle East and Africa (EMEA), more than three-quarters (76%) of organisations have adopted the cloud, more than either the Americas (63%) or Asia-Pacific (53%). In fact, cloud adoption by healthcare organisations in EMEA is even higher than the all-industry average (68%) for that region.

Similarly, the use of cloud services are encouraged by more than three-quarters (77%) of healthcare organisations. Among C-suite executives in healthcare, the rate of encouragement is even greater, expressed by nearly nine in ten (88%) of leaders.

EMRs empower hospitals and other healthcare providers to create a single digital file for each patient.

Figure 1

All in for the cloud

"To what extent has your organisation adopted cloud technologies?"

(% of respondents)

Source: Economist Intelligence Unit "Managing Application Development" survey, 2017

Yet it cannot be ignored that security ranks as healthcare's top barrier to adopting cloud technology. Privacy concerns loom large in healthcare, given the highly confidential nature of patient information, and the danger of medical records falling into the hands of hackers, cyber thieves or hostile nation states.

CHAPTER 2:
Build or buy? The great debate

The healthcare industry is marching ahead with technology for improved patient care, faster and more accurate insurance payments, and greater regulatory compliance. All of which will depend on specialised applications developed with niche skill, speed and smarts, which many larger organisations do not have in-house.

This poses them with the question of whether to build or buy application development. It is a question as old as the process itself.

While some industries that were surveyed indicate a preference—for example, a majority of financial services respondents prefer to develop internally with their own developers, and a slight majority of manufacturers lean towards external contractors and agencies—the healthcare organisations are divided.

Nearly half (48%) perform the majority of their application development internally. A third (36%) does the majority of their development externally. And the remainder (16%) say it's an even split between internal and external development.

Beth Israel Deaconess Care Organization (BIDCO), a value-based, physician/hospital network and accountable-care organisation based in Massachusetts, US, is an organisation firmly on the side of external development. BIDCO works with more than 2,700 physicians, eight hospitals and 40 EMR platforms, and is responsible for more than 10.5m patient encounters a year. It does this without a single application developer on staff, or any IT hardware on premises.

"We don't really do any in-house development," says Bill Gillis, BIDCO's chief information officer (CIO). "And we don't have any hardware here. We're not managing or operating any equipment in our environment."

Security concerns also tie back to BIDCO's decision to outsource all application development. Healthcare is among the world's most heavily regulated industries, due in part to concerns over patient privacy, creating new challenges.

"To develop an application and do all the work to not only get it certified, but also keep it certified—that doesn't make a lot of sense when there are companies out there that can do it for us," Mr Gillis explains.

Instead, Mr Gillis and his team at BIDCO work with a handful of essential contractors that provide them with technology and services, including a population health platform, off-site IT hardware, EMR system support, and repository of clinical data. These contractors also helped BIDCO create a private cloud EMR SaaS—said to be the first built by any healthcare organisation—for some 200 private physicians in its network.

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>
> *Bill Gillis, chief information officer, BIDCO*

"It wasn't until after we actually built it that folks came to us and said, 'you've built the first private cloud EMR in healthcare'," Mr Gillis recounts. "We didn't think of it that way. We just looked for a solution, and that happened to be virtualisation and cloud technology.

Of those organisations that are developing internally, the survey finds that many are doing so with advanced application-development methodologies, but not as often as other industries (see figure 3). About a third (36%) say they have adopted Agile, while the same percentage have adopted DevOps and prototyping. (Multiple responses were permitted.)

Notably, there are variations among regions. For example, Agile adoption in Asia-Pacific (46%) is much higher than in either EMEA (38%) or the Americas (31%). Similarly, DevOps adoption is higher in the Americas (40%) than in either EMEA (34%) or Asia-Pacific (32%).

Figure 2

Advanced approaches catch on

"Which development models and methodologies are used by your organisation's application developers?"
(% of respondents)

- Healthcare
- All industries

Methodology	Healthcare	All industries
Agile	36%	45%
DevOps	36%	39%
Prototyping	36%	30%
Continuous integration	26%	31%

Note: Multiple responses were permitted

Source: Economist Intelligence Unit "Managing Application Development" survey, 2017.

CHAPTER 3:
The voice of authority

Nearly all healthcare organisations (93%) consider application development important to implementing their growth strategies. And because applications are crucial to business goals, it is important to better understand which executives have authority over key application development decisions.

The survey finds application strategies are most often proposed by the head of IT (49%) or an IT manager (39%). Development is most commonly managed by either the head of IT (48%) or an IT manager (48%). Final authority for application development goes to a CIO, chief technology officer (CTO) or head of IT in more than three-quarters (82%) of organisations. Only the allocation of resources has a serious business component, with CEOs having that responsibility in about a third (32%) of instances.

In the case of BIDCO, the CIO manages application development. One project being overseen by Mr Gillis and his team involves analytics software for risk calculation. "That will allow us to segregate our patients into risk categories, understanding who's at high risk, and who needs care-management teams assigned to them," Mr Gillis explains. "We want to keep people healthy and out of high-risk pools."

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Bill Gillis, chief information officer, BIDCO

Figure 3

Deciders-in-chief

"Who in your organisation typically has final authority on deciding which applications to develop?"
(% of respondents)

CIO/CTO	33%
CEO	33%
IT manager	25%
Business-unit head	19%
Other C-level executive	19%

Note: Multiple responses were permitted
Source: Economist Intelligence Unit "Managing Application Development" survey, 2017.

CHAPTER 4:
A matter of strategy

But what does the healthcare industry's growth strategies entail? About half (51%) of healthcare organisations want to acquire new customers. Nearly as many (45%) seek increased revenue from their existing customers. And a third (33%) want to enter new markets.

Another common growth strategy among healthcare organisations is mergers and acquisitions. Last year the industry reported a record-breaking 56 M&As, of which 13 had disclosed price tags that totalled US$7.6bn.[2]

M&A is very much on the mind of BIDCO's CIO, Mr Gillis. On March 1st, the Beth Israel Deaconess system, Lahey Health, New England Baptist Hospital, Anna Jaques Hospital, and Mount Auburn Hospital finalized a merger that officially created a new 13-hospital health care system called Beth Israel Lahey Health (BILH)."That's really going to be our push for the next year," Mr. Gillis says. "Not only getting all of that data and getting it into a central unified system, but also leveraging the programs each organization has built locally and pushing those out across the newly formed network."

The survey also uncovered that to judge whether an application is a success against growth targets, healthcare's most commonly used metrics are customer/stakeholder satisfaction (70%), application quality (56%) and on-time/on-budget execution delivery (46%).

Footnotes:

2. MobileHealthNews, "56 digital health mergers and acqusitions in 2018," December 2018: https://www.mobihealthnews.com/content/56-digital-health-mergers-and-acquisitions-2018

The way ahead

It's clear that the technological transformation of healthcare is only beginning. The coming years should witness bold and dramatic changes as practitioners, insurers, suppliers and patients alike more broadly adopt such new technologies as wearable devices, healthcare-tracking software, AI and robotics. These advances should help physicians provide better care, suppliers develop more effective drugs and treatments, and patients take greater control of their own health. All these advances will be based on powerful and innovative combinations of hardware devices and software applications.

Looking ahead, it seems healthcare professionals will want to focus on the following key areas to improve application development:

Cost control: healthcare is expensive, and industry members are looking for ways to cut or at least control costs. Ageing populations and the move toward universal healthcare will only make the cost challenge more intense. While technology alone cannot solve the problem, it can help through cloud computing, Agile development, system modernisation and consolidation. For each of these moves, new applications will be required, too.

Shifting healthcare to the people: in order to reduce demand on healthcare systems, stakeholders will support patients to self-care through telehealth services, teleconferencing, virtual health systems, mobile apps and other digital applications. Outpatient clinics will also allow hospitals to offer healthcare in lower-cost settings that are also more convenient for patients.

Back-office efficiency: behind the scenes, healthcare organisations typically run massive data centres to process their core systems and processes. Some are adopting machine learning and robotic process automation, cloud-based software-as-a-service offerings, and predictive tools to improve the revenue cycle and supply chain.

Cyber-security: digitising health records can improve treatment, but it can also make patient data far more vulnerable to hackers, thieves and other criminals. Healthcare organisations will be required to provide innovative protections. These include using machine learning to detect network anomalies that could indicate a breach. Healthcare organisations must also stay current with the latest announcements from vendors, stay current with patching, and use technology to automate repetitive processes.