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WHITE PAPER

5 Themes Driving Life Science IT Investment

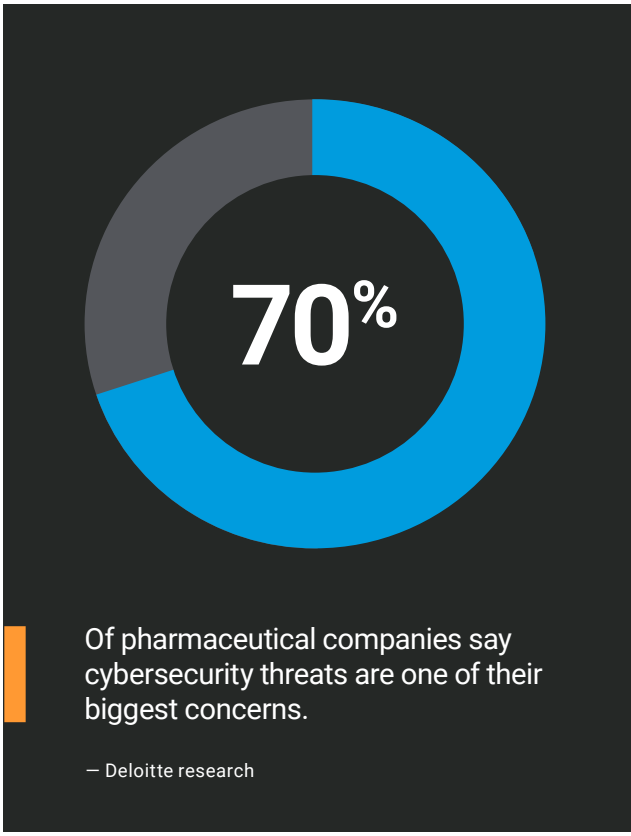
Innovation promises to accelerate testing, and research and development — but requires complementary focus on security and protection

Executive Summary

- There are five themes that are driving life science IT investment: cloud hosting, big data, and analytics; artificial intelligence and machine learning; virtual care; mergers and acquisitions (M&A)/consolidation; and blockchain.
- Life science companies are investing more in IT, with 70% saying that cybersecurity threats will have the greatest impact on their company in the next year — and yet, many companies are slow to adopt practices to prevent potential cyberthreats.
- Each of the five themes has its own cybersecurity requirements, including following certain regulations and best practices to ensure diligent protection.

IT investment within life sciences and the pharmaceuticals industry is climbing. These investments are driven by both trends and regulations, including precision medicine, and legislation that is lowering drug prices for the Medicare population. Although these factors are diverse, one pivotal priority unites them: the importance of investing in preventive cybersecurity measures. According to Deloitte research, 70% of pharmaceutical companies say cybersecurity threats are one of their biggest concerns.

However, despite this looming concern, cybersecurity needs are often overlooked or identified too late — resulting in potential risk and the need to increase budget initiatives because cybersecurity measures weren't initially prioritized.



The need to think about cybersecurity as a preventive measure, instead of treating it as an afterthought, is urgent: it was recently revealed that a market-leading pharmaceutical company had their credentials exposed on a code-sharing site for more than a year. That left sensitive data vulnerable to the entire internet for potential exploitation for more than 365 days.

Although a cybersecurity investment might not seem like an immediate concern, it can save organizations millions of dollars in cyber incident cleanup, downtime, and brand repair (Table 1).

Consequences of Cyberattacks	Economic Impact
Operational standstills	• Revenue loss
Data breaches	• Damaged brand reputation • Loss of patient trust
Ransomware	• Ransom cost • Operational downtime revenue lost • Subsequent rising costs for cyber insurance (industry-wide)
Defaced information	• Tainted or unreliable clinical trial data that causes incorrect care could delay FDA approval • Lost revenue from reduced patent protect pricing • Loss of provider and patient trust
Rebuilding systems after the attack	• Rebuilding costs and lost revenue due to operational standstill during rebuild

Table 1: The potential economic impacts of the consequences of cyberattacks

Prioritizing cybersecurity requirements alongside technical investment decisions is the best — and only — way to ensure you and your patient population are protected from cyberattacks

The five themes in HCIT investments

There are five themes driving IT investment within life sciences and pharmaceuticals. In the next section, we'll discuss each one and offer best practices for pharmaceutical companies to ensure protection against cybersecurity threats.

1. Cloud hosting, big data, and analytics

Cloud data and analytics involves the deployment of scalable cloud computing with powerful analytic software to identify patterns in data and extract new insights. It migrates core technology and infrastructure from on-premises to the cloud, and leverages advanced tools and algorithms to analyze big data and derive insights for a number of potential use cases.

The benefits of cloud hosting, big data, and analytics for life science companies include:

- Enhanced capabilities around expense analysis and scalability
- Shorter exploration cycles, leading to quicker discovery and distribution of new and more effective drugs
- Enhanced data management capabilities, especially when sharing data with third parties and collaborators
- The ability to develop and distribute personalized (precision) medicine (e.g., genomics)

2. Artificial intelligence and machine learning

Artificial intelligence is the general ability of computers to emulate human thought and perform tasks in real-world environments, while machine learning refers to the technologies and algorithms that enable systems to identify patterns, make decisions, and improve themselves through experience and data. These tools empower computers to develop intelligence to think and perform tasks like a human without human intervention.

The benefits of artificial intelligence and machine learning for pharmaceutical companies include:

- The ability to analyze large data sets to understand the implications, benefits, and success rates of new drugs before they are launched in the market, and to identify patient candidates for clinical trials
- Faster and more accurate processing of large datasets compared with human capacity, improving efficiency and quality of drug manufacturing
- The development of more effective design and marketing strategies

3. Virtual care

This theme includes decentralized clinical trials that are designed to be executed wherever the patients are physically located through a combination of remote patient monitoring and telehealth. It also includes wearables and remote patient-monitoring devices, which are tools worn by patients that collect and transmit key information.

The benefits of virtual care for pharmaceutical companies include:

- Reduced costs to recruit and retain patients for clinical trials, and a decrease in clinical trial delays due to recruitment issues
- More diverse trial population due to easier trial access
- Decreasing costs to execute clinical trials through telehealth
- Real-time communication and data collection from patients, reducing time to action, empowering patients to take control of their healthcare journey, and increasing potential medication efficacy

4. Consolidation/Mergers & Acquisitions

This theme affects organizations that are merging with or acquiring other organizations to expand their market reach, increase the scope of offerings, and/or achieve economies of scale. These organizations must consolidate and reconcile technologies, users, and processes to successfully integrate.

The benefits of M&A/Consolidation for pharmaceutical companies include:

- The ability to realign or expand portfolios in response to strategic shifts (including pipeline replenishment of drugs reaching patient cliffs)
- The ability to acquire innovative technologies that complement an existing product portfolio or core competency
- Access to new and/or different markets
- Cost reduction synergies, including expertise in digital solutions

5. Blockchain

A blockchain is a digitally distributed, decentralized, public ledger that exists across a business network. In healthcare, it is used to preserve and exchange patient data through various systems and stakeholders.

The benefits of blockchain for pharmaceutical companies include:

- Securing supply chains through increased transparency, reducing substandard, and/or outdated drugs
- Reducing counterfeit medicine through supply chain traceability
- Enhanced patient privacy and data protection during clinical trials

The need-to-know on cybersecurity for life sciences organizations

Each cybersecurity-related regulation affects pharmaceutical investment in different areas of concentration (Table 2).

Relevant Regulations	Area(s) of Concentration
Health Insurance Portability and Accountability Act (HIPAA) — Protects personally identifiable information and protected health information	• Cloud hosting, big data, and analytics • Artificial intelligence and machine learning • Virtual care • M&A/consolidation • Blockchain
21st Century Cures Act — Enables patients to have access to their own data	• Virtual care
Quality system regulations for medical devices and wearables	• Virtual care
Drug Quality and Security Act (DQSA), Title II (Drug Supply Chain Security Act) — Defines the requirements for the electronic tracing of specific prescription drugs at the package level that are distributed in the United States	• Blockchain

Table 2: The cybersecurity-related regulations that affect pharmaceutical investment

Table 3 shows the cybersecurity capabilities that are most important to protect pharmaceutical investment themes.

Relevant Regulations	Area(s) of Concentration
Secure your infrastructure • Harden the outside of your infrastructure with a DDoS mitigation tool • Harden the inside of your infrastructure with a microsegmentation solution	• Cloud hosting, big data, and analytics • M&A/consolidation

Secure your access
• Zero Trust Network Access
  • Multi-factor authentication to avoid account takeovers
  • Secure web gateway
	• Cloud hosting, big data, and analytics
	• Artificial intelligence and machine learning
	• Virtual care
	• M&A/consolidation
	• Blockchain

Secure your applications and APIs • Secure web applications and APIs to ensure data and analytics outcome integrity	• Cloud hosting, big data, and analytics • Artificial intelligence and machine learning • Virtual care
Have the resources and expertise to correctly set up and manage cybersecurity solutions	• Cloud hosting, big data, and analytics • Artificial intelligence and machine learning • Virtual care • M&A/consolidation • Blockchain

Table 3: The cybersecurity capabilities that are most important to protect pharmaceutical investment themes

Keep Yourself Protected

Although this is a dynamic and innovative time within the pharmaceutical industry, many challenges still must be addressed. Healthcare is a prime target for cyberattacks, with pharmaceutical companies being no exception because of the high value of supply chain information, protected health information, and intellectual property (such as patents) that they work with.

The best way to stay on top of risks as you invest in transformation is to work with a trusted leader in the healthcare cybersecurity space — from product, expertise, and resource perspectives — to ensure adequate protection against potential cyberthreats amid technology advancements.

Contact Akamai for a deeper dive into what solutions would benefit your organization the most.