In the past few years, information technology companies have rapidly entered the health space in a new convergence that presents both an opportunity and a potential threat for biopharma firms. (See figure 1.)

From mobile devices such as the Fitbit biosensor to R&D data analytics tools such as IBM Watson Health, infotechs are playing a key role for consumers and researchers:

- In R&D, digital tools can optimize development of targeted therapies, speed up clinical trial enrollment and streamline data analytics.
- At the commercial end, these tools may allow deep integration of the customer voice, from product co-creation to post-launch communications, and they can help collect real-world evidence to prove value.

Infotechs are entering health care with different strategies that reflect core strengths. For example:

**Apple: building a consumer ecosystem**

Apple retains in health care its core strategy: focus on a limited number of products, target the high end of the market and keep building brand equity. Following its HealthKit partnership with the Mayo Clinic, Apple's ResearchKit helps gather continuous patient data, from diabetes to dermatology, and the Apple Watch apps aim to track medication adherence and side effects for several conditions. Together, these tools create a continuous learning environment linking individual data to health systems to optimize prevention as well as outcomes.

**IBM: from hardware to cloud services**

IBM has evolved from a horizontal technology company to one delivering vertical solutions, supported by extensive acquisitions, including Explorys, Phytel, Merge Healthcare and Truven, and partnerships, such as an alliance with Medtronic in diabetes. Watson Health may provide B to B to C solutions, aggregating clinical, claim and journal data for researchers and combining them with individual genomic data to support precision medicine. For instance:

- At the point of care, it may facilitate evidence-based medicine for providers.
- For consumers, it may enhance physical activity and adherence by directly connecting electronic health records (EHRs) and R&D centers via cloud-based services.
Alphabet, meanwhile, has built a large life sciences portfolio, expanding its Google search capabilities with Verily and Calico Life Sciences. It has partnered with the Mayo Clinic to provide curated health information via its search business. While Calico is focused on longevity, Verily has several diabetes alliances, including one with Novartis/Alcon to develop a contact lens tracking glucose levels in tears, and others with Sanofi (new diabetes management tools), the Joslin Diabetes Center and Dexcom.

In addition to longevity and diabetes, Alphabet investments span many areas. Google Ventures has invested in Flatiron Health (oncology analytics), Editas Medicine (genome editing), Alector and Denali (neurodegenerative disease), and Google Capital’s investments include Oscar Health Insurance.

The scale and scope of these investments do not obscure the fact that infotechs are unlikely to become direct health care players, with the exception of certain of Alphabet’s efforts, such as Calico.

Digital siloes

Silicon Valley business models differ profoundly from those of biopharmas; for instance, there is a greater tolerance for risk, and a culture that emphasizes rapid cycle times and product iterations. The role of infotechs in health care is still unclear. Will they enable life sciences research and communications? Or will they disrupt these activities by creating digital interventions that are more effective than some drug therapies?

Another issue is the evolution of digital health. Since the launch of the first wearables, digital solutions have remained siloed, from fitness apps to hybrid medical devices and data analytics tools. (See figure 2.)

The ultimate objective of digital technology – providing seamless care to patients from research to the clinic – remains elusive. Apart from clinical trials, there is no interoperability in the real world between consumer apps, physician offices and EHRs. Key barriers persist:

- For consumers, most apps still have limited functionality; as medical uses are developed, privacy and security concerns will be more salient.
- For physicians, reimbursement, the lack of infrastructure to handle massive patient data flows and liability remain barriers.
- At the EHR level, the different systems largely do not communicate.

Biopharmas have an opportunity to connect patients to providers and researchers, capturing value from real-world evidence linking medications to outcomes, and adding services beyond the pill, including internet navigation, behavior management and data interpretation. So far, however, it is infotechs that are leading collaborations with health systems.

Despite these uncertainties, the new convergence is already transforming biopharma business models in profound ways. This may evolve into an enabling scenario (optimized research and clinical trials), but it could also be a disruptive one (disintermediation by infotechs of pharma/provider/patient communications).

For biopharma firms, the scale of digital investments across the value chain remains daunting and limits current initiatives to pilot projects. They may therefore need to view digital health not as an investment with rapid financial return, but as a long-term hedging of the risk that infotech leaders gain a dominant position in the health sector.

Figure 2: Mobile Health evolution: from siloed solutions to seamless care

| Smartphone and smartwatch diffusion / health and fitness apps (iPhone, Apple watch) | Wearable adoption / consumer monitoring of biomarkers (Fitbit, Jawbone) | Medical approval and prescribed devices and apps (BlueStar, AliveCor) | Integration of consumer data with physician offices and EHRs (ResearchKit) |

Source: Francoise Simon

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