

How Modern Digital Tools Are Transforming The Biotech Industry

Major Technological changes can be seen impacting the biotech business sector, both now and in the future.

Today's leading companies are leveraging modern biotech tools to aid business productivity and growth.

Key aspects involved in transforming the biotech industry



Artificial intelligence (AI)



Machine learning (ML)



ERP



Cloud Computing

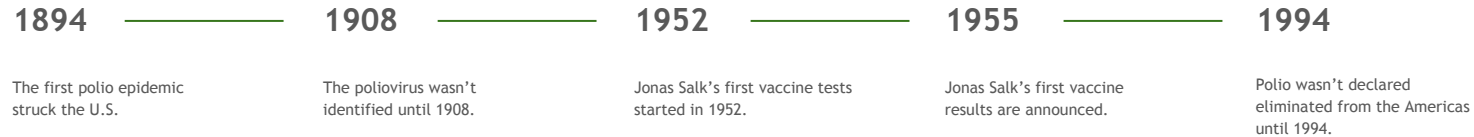
All residing on a unified platform.

The combination of these technologies reduces the time it takes to create and produce diagnostic procedures and medicines.

The impacts of these technologies pave the way to reduced failure rates and enabling the production of therapies tailored to specific patients.

A Brief Look at Vaccine Timelines: Now and Then

Even in recent times there were very few diseases that caused more fear than Polio.



With modern biotechnology, today's timelines look much different.



The previous record for vaccine development was four years from collecting viral samples to drug licensing for mumps.

BioSpace

Industrial Internet of Things (IIoT)

The advent of other digital tools such as Industrial Internet of Things (IIoT) means sensors on various biotech production devices are now measuring and adjusting the rate of chemical flows, temperatures and other variables previously monitored by people.

“Robot scientists using AI can test more compounds and do so **with improved accuracy and reproducibility** and exhaustive, searchable recordkeeping,”

Steve Oliver | Systems Biologist University of Cambridge



Using AI, scientists are able to create and analyze large quantities of outcome data, highlighting the differences between healthy cells and those damaged by diseases such as cancer.

The bottom line

AI and ML improves biotech profits by **dropping failure rates from the current 90 percent** and reducing the cost of developing new drugs.



“We are turning the drug-discovery paradigm upside down by using **patient-driven biology** and data to derive more-predictive hypotheses, rather than the traditional trial-and-error approach,”

Niven Narain, co-founder of Berg, a biotech firm near Boston.

Source: [Nature](#)

Cloud computing and virtual meetings

permit rapid sharing of information and making informed decisions. In terms of analyzing data, the physical location of a scientist, manager or worker is no longer a barrier to their contributions to a biotech effort.

The strength of a company surfaces when all applications work together through seamless integration with an ERP platform, without creating additional security threats or data integrity issues.



Online collaboration also allows smaller firms to share information and gather insights from academic organizations and government research organizations, permitting access to many more stakeholders

Source: [Northeastern](#)

Tech and Clinical Trials



“As clinical trials migrate to better service levels for all patients, clinical trials become more about converting data into actionable intelligence.”

Michael Kleppinger of Syneos Health

Source: [XTalks](#)

Modern Enterprise Resource Planning (ERP) systems combine data from departments such as purchasing, inventory and finance. This piece of software allows chief financial officers and other top executives to **make better decisions** by seeing a larger picture using multiple data streams

Non-traditional data sources broadening access to data types

Among the most recent products cited are internet-connectable **smart watches** including

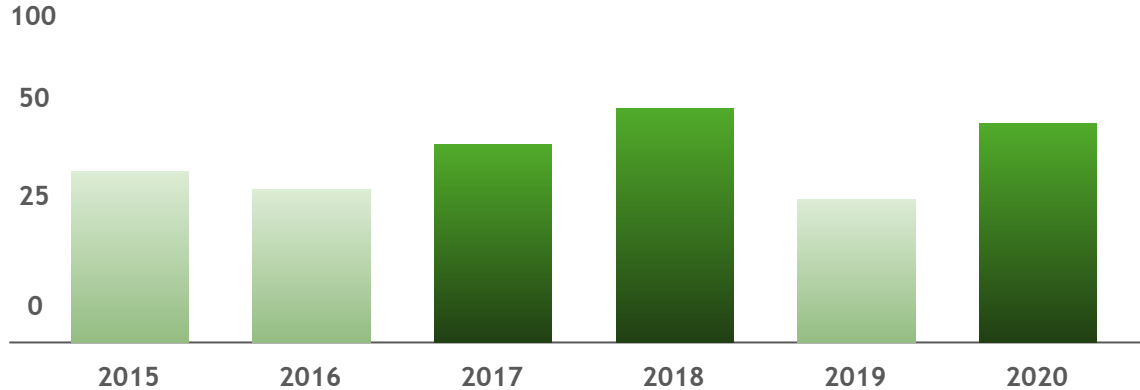
- **Apple iWatches™**
- **Fitbit™ exercise trackers**

These devices obtain and record physiological data.

Running the data through machine learning algorithms let's companies better **predict how well certain therapy molecules will work** and determine the molecules' toxicity and treatment effectiveness much faster and more economically than in the past.

Medicines and the FDA

Personalized medicines accounted for more than 30% of FDA approvals for 3 of the last 4 years.



When evaluating new molecular entities, PMC categorizes personalized medicines as therapeutic products for which the label includes reference to specific biological markers, often **identified by diagnostic tools that help guide decisions and procedures** for their use in individual patents.

Source: [PR Newswire](#)

Tech and Personalized Treatment



One area directly benefiting from computer advancements is the cost of personalized genetic testing to consumers.



These tests are now down to the range of \$100 - \$2,000 depending on the nature and complexity of the test.



For comparison, the 1990's Human Genome Project cost approximately \$2.7 billion.

Source: [MedlinePlus](#)

For biotechnology companies, this major price reduction means personalized treatment plans are now realistic options. Using drugs based on a specific patient's genetic and molecular makeup, the theory is these individualized medicines should be more effective at treating a patient more than a broad-spectrum drug.

Source: [XTalks](#)

Tech and Personalized Treatment

In 2020 alone, the Food and Drug Administration (FDA) approved:

19

Personalized
Therapies

1

Cell-based
Immunotherapy

8

Diagnostic
Applications

One of these was the **first chimeric antigen receptor (CAR) T-cell-based immunotherapy** for treating patients with refractory mantle cell lymphoma.

Source: Personalized Medicine at FDA: Scope and Significance of Progress in 2020

The FDA also released **seven guideline documents** related to the manufacturing and clinical development of gene and cell-based therapy products. Highlights of the 2020 reports includes the **approval of a pan-tumor liquid biopsy next-generation sequencing-based test** as a companion diagnostic device for multiple biomarkers in cell-free DNA isolated from plasma specimens, a method that permits testing without using more invasive methods.

Updated Biotech Boosting Food Production

Variations of the same **biotechnology derived gene-editing tools** used to develop therapies for treating humans can also be used to create more robust crops.

Among highlights cited in a 2020 Businesswire review of the “Agricultural Biotechnology: Emerging Technologies and Global Markets” report indicates **DNA sequencing, RNA interference, synthetic biology tools and gene editing** will all have a large impact on growing that market well beyond 2024.

The effect will result in the ability to **provide higher yields with equal nutritional value** for humans and livestock in smaller spaces. At the same time, improved biotech methods applied to agriculture will permit growing crops in harsher climates than those currently farmed.



The Bottom Line

Taking advantage of emerging and evolving computer technologies like **AI** and **ML**, is the **#1 way biotech companies are able to work faster and create new products in less time, and with significantly lower costs** than ever before.

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Our team is comprised of forward-thinking, experienced Subject Matter Experts (SMEs) and Technology Consultants with decades of business, industry, and regulatory experience.

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