Accelerate Biotech Innovation: Impacts of a Modern R&D Platform





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### Introduction

"The biggest innovations of the 21st century will be at the intersection of biology and technology."

**Steve Jobs** 

Over the previous decade, the foundation has been laid for scientists to leverage the power of technology to advance their research. This has also coincided with the creation of large, publicly available data sets, like genetic sequences on NCBI or proteins on UniProt. At the same time, we are also seeing a rapid increase in the pace of biotech innovation: mRNA vaccines for COVID-19 developed in record time, new gene therapies approved by the FDA, high performance materials sustainably produced from mushrooms, and alternatives to animal products like milk and meat produced in a lab. These advances would not be possible without modern technology that facilitates global collaboration, reduces busywork, and drives insights. Not surprisingly, in its 2022 Technology Trends<sup>1</sup> report McKinsey noted an increase in interest and innovation in technology areas such as cloud computing, applied AI, and machine learning across industries, with particular relevance for biopharma organizations.

Scientists have just begun to leverage next-gen digital technology by exploring applications of artificial intelligence (AI) and machine learning (ML) to strengthen their predictions and better define their experimental approaches. In addition to effectively processing large amounts of data, AI/ML offers time-saving benefits by removing hands-on time collecting and analyzing data. This translates to better data-driven conclusions that result in faster time to milestone.

Thus, it's crucial for the modern biotech company to review their tech stack and replace legacy systems that prevent them from taking advantage of emerging technologies which are essential to accelerate innovation.

"The biggest shift affecting AI's broad adoption is tied to more mature tooling and the emergence of a canonical tech stack that is drastically simplifying how AI solutions are engineered and integrated with other digital applications. AI is quickly becoming more consumable, and solutions that use AI are accessible even to organizations with few to no AI engineers of their own."

Jacomo Corbo Partner, McKinsey While biotech and pharmaceutical companies have made a huge push to move off paper notebooks over the past decade, many organizations are still encumbered by the "new" digital tools they adopted, rather than empowered. Legacy ELNs (Electronic Lab Notebook) and LIMS (Laboratory Information Management Systems) are difficult to update, silo data and limit collaboration, slowing progress and hindering an organization's ability to leverage insights, automation, and AI/ML. While many of these platforms claim to be modern and integrated, their product and user experience often falls short. The lack of an adaptable and modern underlying platform, not built with the complexity of biologics in mind, means that they fail to deliver on many of these promises.

Benchling takes a fundamentally different approach to set up our customers for success so they can focus on developing cutting-edge products and therapeutics for the greater good. By establishing a central source of truth for your data, Benchling's R&D Cloud brings together teams across research, development, and informatics. We've enabled more than 200,000 scientists across Fortune 500 companies, startups, and renowned academic institutions to accelerate their R&D programs.

Here's how:

# Eliminate data silos with a scientifically-aware, adaptable data model built on a truly integrated platform

Data silos exist when results live in Excel spreadsheets, experimental parameters live in an ELN or protocol management system, and sample metadata is scattered across a LIMS, ELN, or even paper notebooks. This creates inefficiency and inaccuracy in data entry, but also makes the data difficult to search for and use, requiring the tedious task of collecting data from the various sources and standardizing before getting the chance to visualize or consider them in aggregate.

While many legacy software providers have attempted to resolve these data silos by bringing historically disparate tools into what they call a "single" platform, this is often a cosmetic upgrade, growing their functionality through acquisition or slotting a new tool under the same login info. Truly breaking down data silos goes beyond sharing a single login. It means that regardless of the tool or application, if you enter the data in, it only needs to be entered once and is automatically propagated across the platform according to a defined, yet adaptable data model. On Benchling, if a scientist adds results to a sample in the Notebook application, their colleague can reference the experiment from the sample page in the Registry, and another colleague can identify all of the experiments the sample was mentioned in aggregate.

With a truly comprehensive global search and data that is readily available and accessible, scientists can ask and answer questions more quickly, gaining new insights and progressing towards key milestones. Thus, they can make quicker (and more informed) decisions with critical data at their fingertips.

### 71%

After switching from a legacy system, Benchling customers report a 71% reduction in time spent searching for data related to a specific sample 68%

and a 68% reduction in time spent compiling data on a specific set of samples for analysis and reporting purposes\*

Individual pieces of data without context don't give you a whole lot of information. The real breakthroughs come when scientists can view their data in aggregate with complete experimental context. Benchling's data visualization tool, Insights, makes it easier to compare and aggregate data to identify trends in real-time.

### 92%

of Benchling users indicate that having a unified solution rather than a disparate point solution benefitted their ability to find and maintain experimental and sample data.\*

Legacy system users often waste time asking where data is located. Jumping between systems to enter data and searching multiple databases to find it is frustrating and time-consuming.

With a unified, searchable platform like Benchling, scientists can spend less time on software and focus on what they were meant to—the science. They don't have to think about what goes where, where to find data, or how to track down colleagues for help. "For Jounce, the benefits were immediate. All the little things add up to the whole system being more intuitive, more efficient, and ultimately gives scientists more time to think about their experiments instead of thinking about the tools they have to work with."



Todd Rowe Associate Director of Research Informatics



## Improve collaboration and handoffs across teams

During the first wave of research *digitisation*, organizations simply converted traditionally paper-based systems to digital formats, like Excel spreadsheets and ELNs (sometimes referred to as "paper-on-glass"). While this conveyed some initial benefits, we have seen organizations like <u>uniQure</u> and <u>Gilead</u> truly accelerate their research by making data accessible across teams and ensuring seamless data transfer.

Many legacy systems claim that by moving to the cloud they have solved collaboration challenges, but beyond just a platform hosted on a cloud server, a truly collaborative platform should allow users across teams to access data of past experiments, view the full experimental context of a sample, and how each piece fits into the larger workflow. Handoffs between teams should be instantaneous and not be slowed down by requiring multiple steps to collate and format data.

With a modern R&D platform that streamlines collaboration, scientists are able to work in an integrated platform that centralizes all of their data. It allows for access to real-time data capture, surfacing results that colleagues can access as soon as they are generated, without waiting for a handoff. Data is available across the organization so upstream and downstream teams have easy access to the complete experimental context on samples from discovery to development.

#### Customer spotlight

Gilead partnered with Benchling to improve large molecule bioprocess development. Previously, they relied on a multitude of systems and databases managed through a mixture of e-mail, Excel, and an on-premise ELN resulting in data silos within and across teams. This resulted in time consuming manual handoffs between teams. By bringing teams onto a cloud-based, modern R&D platform they realized a:

2x

improvement in ease of data sharing within and across teams 63%

reduction in time spent on data capture, search, and collection >2x

improvement in ease
of study review and
forecast approval

GILEAD

## Trusted, open platform to uncover insights and power scale

To truly accelerate innovation, organizations must be able to leverage complex data sources, connect to cutting-edge analytical tools, and identify trends and bottlenecks to extract more value from their data. Legacy systems have limited, archaic APIs that are difficult to use. This makes connecting R&D data and processes to other data sets, instruments, and analytical tools difficult and manual.

Extracting data from previous programs can be critical to current and future success, although the difficulty and effort required to do this with legacy systems means this step is often skipped or under-resourced. Biotech organizations that have switched from legacy systems to Benchling cite connectivity to other tools and data accessibility as key driving factors.

Biotech organizations should be able to quickly surface insights from their R&D platform to capitalize on their success and learn from their data. Furthermore, a modern platform should enable organizations to take advantage of emerging technologies and alleviate the time consuming data cleaning step.

#### Customer spotlight

<u>Enveda</u> is leveraging high volumes of plant characterization data to identify new therapeutics through machine learning models. They are using Benchling to templatize data entry, ensuring that data for all samples gets collected in a standardized fashion, saving scientists from tedious, timeconsuming data cleaning. The assay results are automatically linked to specific plant samples, without any post-assay reconciliation needed. When manual input is required, templated data entry forces standardized data entry, removing the need for time-consuming data cleaning.

#### Enveda BIOSCIENCES

### 66%

of scientists said they had a more comprehensive view of experimental progress 1.3x

increase in data integrity

2x

reported average increase in speed to discovery

As Enveda continues to grow, Benchling's solution is designed to scale, which means Enveda won't have to worry about outgrowing their data foundation. And as Enveda's R&D pipeline grows in complexity, Benchling can augment its toolbox of capabilities, including lab automation, barcode inputs, workflows, and more. As we continue to develop the Benchling platform with new features and applications, connecting our customers to cutting-edge technology and enabling greater levels of automation remains a top priority. Benchling customers often integrate their Benchling instance with liquid handlers, QMS, internal data lakes, and Jupyter notebooks to leverage their own proprietary algorithms. Benchling is also exploring ways to make cutting-edge technology, like machine learning, accessible to scientists and biotech organizations that may not have the capacity to invest in their own, standalone initiatives.

"At the core of our innovation is R&D, and Benchling is our R&D foundation. Benchling helps us accelerate our innovation so we can deliver high quality biomaterials to vendors and customers faster."

**David Breslauer** Co-Founder & Chief Science Officer at Bolt Threads

## Conclusion

Unlike legacy platforms, Benchling is connected, intuitive, and adaptable, enabling customers to extract the full value from their R&D data by eliminating data silos, enhancing collaboration, enabling insights, and positioning customers to take advantage of emerging technologies to accelerate the development of therapeutics and other products. Progress demands speed, and siloed legacy systems are slowing biotech down. Benchling's modern approach keeps pace with the complexity of modern R&D workflows, facilitating collaboration, insights, and progress.

Join over 200,000 scientists using Benchling to power their biotech R&D.

Request a Demo