NOVARTIS

On being and becoming a data science company

A conversation with Novartis Chief Digital Officer Bertrand Bodson

By Elizabeth Dougherty | Oct 24, 2018

Bertrand Bodson leads digital strategy for Novartis. Photo courtesy Novartis.

When Bertrand Bodson decided to join Novartis, his friends were surprised. You like a fast pace, they said, and pharma is slow. You like to be on the leading edge of digital and pharma is...not.

But Bodson was convinced that Novartis was different. What grabbed him first was that Novartis invests about USD 9 billion a year in research and development. Few ventures in the world make such an enormous investment in ideas.

He was impressed that the company consistently makes this investment despite the fact that the probability of success is low. Researchers pore over thousands of experimental compounds for every one that makes it to market, and the process of shepherding that one medicine through discovery and development and finally to patients can take about 10 years and cost about USD 2.5 billion[1].

He also saw the potential for data science to make a difference at a company that is primed for change. Novartis has collected a treasure trove of information and has the talent to learn from it in ways that could help the company shrink those drug development timelines and improve the lives of more patients.

“This is where data science comes in,” says Bodson. “We already rely on data, but how can we unlock its power to drive more of our decisions so that we can get better drugs to patients faster?”

Novartis digital R&D history

Bertrand, in what ways is Novartis already a data science company?

We have collected a ton of information. In terms of clinical trials, over the past two decades we’ve collected 2 million patient-years of data. Very few pharmaceutical companies have that. Some of the largest, most

respected and most innovative digital technology companies are knocking at our door asking for access to that dataset.

In addition, the Novartis Institutes for BioMedical Research (NIBR) has approximately 15 petabytes of data. This collection includes scans, images, videos, chemical information and other research findings alongside a library of 1.5 million compounds. We want to use that data to systematically find hits – leads on compounds that have an influence on a disease-causing biological process – without having to do the time-consuming set of laboratory tests usually required to get them.

Our plan is to collaborate – there are many incredibly smart people out there – but we also plan to mine it ourselves. We have a lot of talent in this company. NIBR alone has thousands of scientists, of which 250 are data scientists.

In 10 years, I think this number will grow because research will increasingly be driven by data science. We're seeing a confluence of digital technology and data science with chemistry, biology and clinical research. It's an exciting time to be working in this space.

In what ways is this data useful?

Today, the data from a single clinical trial is mined with the sole purpose of getting that one drug to market. This is standard procedure, but it's just the tip of the iceberg. Now, instead of only looking at one trial, we're looking at the data from decades of clinical trials and asking, "What if we were to mine all of it together?"

We hope to make connections that would be impossible with a smaller dataset. For instance, could one of our drugs help treat a disease we didn't suspect? Could the data point to better ways to stratify patients so that we can be better at getting our medicines to the patients who will benefit most?

What are the barriers to using the data to make new discoveries?

Our data scientists probably spend 80% of their time right now on data wrangling to get the data in good shape, which is really a pain. We're making a substantial investment in building a platform to organize the data in a way that will make it much more self-serve. So a data scientist will be able to focus on the goal of finding a new marker of disease or a surprising connection rather than having to spend time preparing the information for analysis.

To help shape this effort and define the future of data and digital at Novartis, we've appointed Raj Patil, Head of Data Strategy, and Shahram Ebadollahi, Head of Data Science and Advanced Analytics.

Are there other spaces where digital technologies are changing the way we think about medicine?

Digital therapeutics is an exciting new space that Novartis has entered into. We're rethinking what treatment looks like and looking for digital interventions that could deliver better patient experiences. For example, our commercial team is working with Pear Therapeutics to develop apps for multiple sclerosis and dissociative disorders and to commercialize an app for substance abuse disorder.

We're also rethinking the way we interact with health-care providers. Our 20 000 sales representatives make 100 000 visits to doctors every single day. Reaching the right doctors with the right information at the right time is an enormous challenge. So we're working toward equipping our sales representatives with AI-powered tools that could help them make their interactions with doctors more personalized and more meaningful.

Does an investment in data science change the way Novartis thinks about patients?

I was in retail before, having worked at Amazon, and by default, you live or die depending on the experiences you create for customers. You have to be able to read the signs every single day of what your customers are experiencing.

In pharma, there are cases with close to 50% non-adherence, meaning half the patients are not taking their drugs. Patient health is way more important than retail, so a focus on the experiences created for customers totally applies to pharma, but is underplayed.

We want to know how to make it easier for patients. This is what tech startups do really well. They start from a pain point and make it better. We're making progress, too. For example, we are working on using modern technology, sensors, telemedicine and more to improve the patient experience.

Is it important for Novartis to be on the leading edge of digital technology?

Digital is where the world is going. You see it in every industry. The pharma space in particular is ripe for disruption. Looking forward, data science will drive more of our decisions and more of our programs – including our medicines – will be digital.

Novartis Chief Digital Officer talks #datascience and more in new interview.

Reimagine medicine with Novartis

The Novartis Institutes for BioMedical Research (NIBR) is the innovation engine of Novartis.

Learn More

1. DiMasi JA, Grabowski HG, Hansen RA. Innovation in the pharmaceutical industry: new estimates of R&D costs. Journal of Health Economics 2016;47:20-33.
