BIG DATA LEADERSHIP

BattaliaWinston

"THAT DARN DATA"

DATA! LET'S ADMIT IT, ITS PROMISE HASN'T COME TO FRUITION. WE KNOW THAT DRUG DEVELOPMENT PLANNING, STRATEGY AND EXECUTION REQUIRES EXECUTIVE LEADERSHIP, BUT THERE ARE LEADERSHIP ROLES WE ARE LEAVING OUT OF THE PHARMACEUTICAL INDUSTRY. IT IS BIG DATA, ARTIFICIAL INTELLIGENCE, MACHINE LEARNING - AND THE EXPERTISE TO SUPPORT IT - THAT CONTINUE TO HAVE HUGE UNTAPPED POTENTIAL. WE STARTED WITH IBM WATSON, WHICH I LIKE TO DESCRIBE AS A TECHNOLOGY PAPERWEIGHT. BIG PHARMA COULD NOT FIGURE OUT HOW TO USE WATSON AND OTHER BIG DATA, AT LEAST NOT IN DRUG DEVELOPMENT. IT IS TIME TO CHANGE THAT.

Referring to IBM Watson in "Chemical and Engineering News", Michael Elliott, CEO of the science informatics consulting firm Atrium Research, said "I'm surprised it lasted this long." Elliott noted that AI is limited by the quality and accessibility of data. "Data at pharma is often trapped in Excel or PowerPoint and lacks consistency in formats and quality across domains." (Mullin, 2019)

Mr. Elliott makes a good point when he discusses the limitation of AI. **No one can deny the enormous potential of accessing and using the current data that lies fragmented within the bowels of every research organization.** A McKinsey study estimated that big data had the potential to generate $300 billion of revenue a year in healthcare alone. Two-thirds of that is in the potential for healthcare savings, but the other one-third is to be found in the pharmaceutical industry in drug development. (James Manyika, 2011) The McKinsey study was done nearly ten years ago. Imagine what all the data in the last decade could mean. Surely it is now double or triple the $300 billion figure. One thing the study noted is that big data needs the right enablers - the right talent - to make big data effective. McKinsey said that we would face a shortage of, "people with deep analytical skills as well as 1.5 million managers and analysts with the know-how to use the analysis of big data to make effective decisions."

The shortage is here, as Derek Lowe notes in his blog, “Farewell to Watson for Drug Discovery”. The areas where big data and drug development “...worked the best so far are the ones with well-defined outcome sets based on large and very well-curated data collections, and where people have not been expecting the software to start spitting out golden insights and breakthrough proposals. It’ll get better – with a lot of work.” The question is: What does a lot of work mean?

There are Two Significant Problems in Big Data, AI, and Machine Learning

One is the divide between machine learning research and drug discovery research.
While IBM Watson is leaning out of this divide, pharma is leaning in, collaborating with MIT on the Machine Learning for Pharmaceutical Discovery and Synthesis Consortium (MLPDS). IBM Watson announced a year ago that Watson would focus its efforts on the clinical trial space. MLPDS, founded in 2018, has the express goal of drug discovery and development using machine learning, big data, and AI. MLPDS is partnered with the largest pharmaceutical companies including Lilly, AstraZeneca, Amgen, and Pfizer. Early in the efforts of the consortium one of its founders, Klavs Jensen said, “Machine learning can help plan chemical synthesis pathways and help identify which chemical parts within a molecule contribute to particular properties. Also, this may ultimately lead us to explore new chemical spaces, increase chemical diversity, and give us a larger opportunity to identify suitable compounds that will have specific biological functions.” (Koperniak, 2018)

The second problem is a lack of senior leadership - skilled individuals with a seat at the table. Leadership can get the data into formats useable by machines. This big data leader is new to pharma. According to GEP, the supply chain consulting firm, “Predictive analytics uses many techniques - data mining, statistics, modeling, machine learning, and artificial intelligence. In pharmaceuticals, predictive modeling can help identify new potential drugs with a higher probability of being successfully developed and approved.” (Importance of Analytics in the Pharmaceutical Industry, 2017) Pharmaceutical and biotech companies are at the earliest stages of building the right analytical teams. Eric Gibson notes that there is an unrecognized need for statisticians as collaborators to work across disciplines on the best design or best decision “based on the available data.” The leadership of statisticians is critical here. These individuals must be seasoned and skilled in order to fully understand the complex scientific concepts and how to significantly influence and prioritize the importance of the problems. (Gibson, 2017)

The most important leadership that statisticians can bring to drug development is the ability to interpret safety signals (particularly those that are unexpected), drive the portfolio from a data-driven position, and use models to manage dose selection. Statisticians can take the data that the analytics team generates and collaborate with a multi-disciplinary team to minimize "bias, false discovery, and generalizability of results." (Gibson, 2017)

We know that we don't have enough leaders in statistics or predictive analytics. Pharmaceutical and biotech companies need to acknowledge sooner rather than later the value of these skills in moving machine learning forward to maximize drug development. According to Milind Kamkolkar, Chief Data Officer at Sanofi, "In post-clinical trials. . . we have a treasure trove of information already. We don't need to buy, necessarily, additional data, if you will. If we just mined what we already had in a more sophisticated way using algorithms to go faster, we might already uncover new mechanisms of action, new therapeutic conditions . . .will it be faster? Yes." (Kamkolkar, 2017)

Pharmaceutical and biotech companies will compete for technology leadership with every other industry. Current estimates are that only 25% of Chief Data Officers in pharma come from the drug development industry. "Pharma sits on a ton of data. Its infrastructure doesn't quite keep up." said Roberto Torres. (Torres, 2019) Partnering with life sciences talent experts who have nearly unlimited access to big data, AI, and machine learning executives in other industries will be critical in bringing senior leadership to these roles.

Recruiting and developing management talent in AI, statistical, and predictive analytics leadership is critical to better and faster decisions with data. Finding the executive who can liberate your information and design both infrastructure and algorithms to make that information useful is key to leveraging big data successfully in the drug development process. One of Battalia Winston's strengths is our ability to work with one another across industries and functions when clients are recruiting outside of a single area of expertise. Our industry specialties include advanced technology, retail, manufacturing, and financial services. These are industries ahead of the curve in big data. By working across industries, we align knowledge and skills to match leadership to pharma and biotech clients. We look forward to partnering with you to fulfill the promise big data has to offer.

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