6 Ways Pharmaceutical Companies are Using Data Analytics to Drive Innovation & Value

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Introduction:

Pharmaceutical companies have always relied on empirical data in order to identify patterns, test theories and understand the efficacy of treatments. Data analytics is just another evolution in a trend that has been continuing for hundreds of years: that of human beings having ever greater access to information and data. Arguably, the creation of human knowledge and data has been accelerating since the invention of the moveable type printing press in the 15th century. That single innovation allowed information to disseminate like never before – scientists could now easily share the results of research in one country with scientists around the world.

Information technology has only accelerated that process making it possible to share and tap into more sources of information than it would ever be possible for the solitary human mind to process. We have long been in an age where there is too much information for one single person to analyse. What the computer software industry is now calling "Big Data" – consisting of greater volumes, variety and velocity of data than ever before – is really just more data.

That the capability now exists to process and make sense of that data through analytic technology represents a great opportunity for scientists and pharmaceutical companies. Whether from accelerating drug discovery or better understanding patient trends and behaviour, Big Data holds great promise for those companies looking to tap its potential. Consultancy McKinsey estimates that effective big data strategies could generate up to $100 billion in value annually in the US healthcare system alone.

But to really garner the benefits requires a different way of looking at data. Here are 6 ways that pharmaceutical companies can use Data Analytics to generate business value and drive innovation.

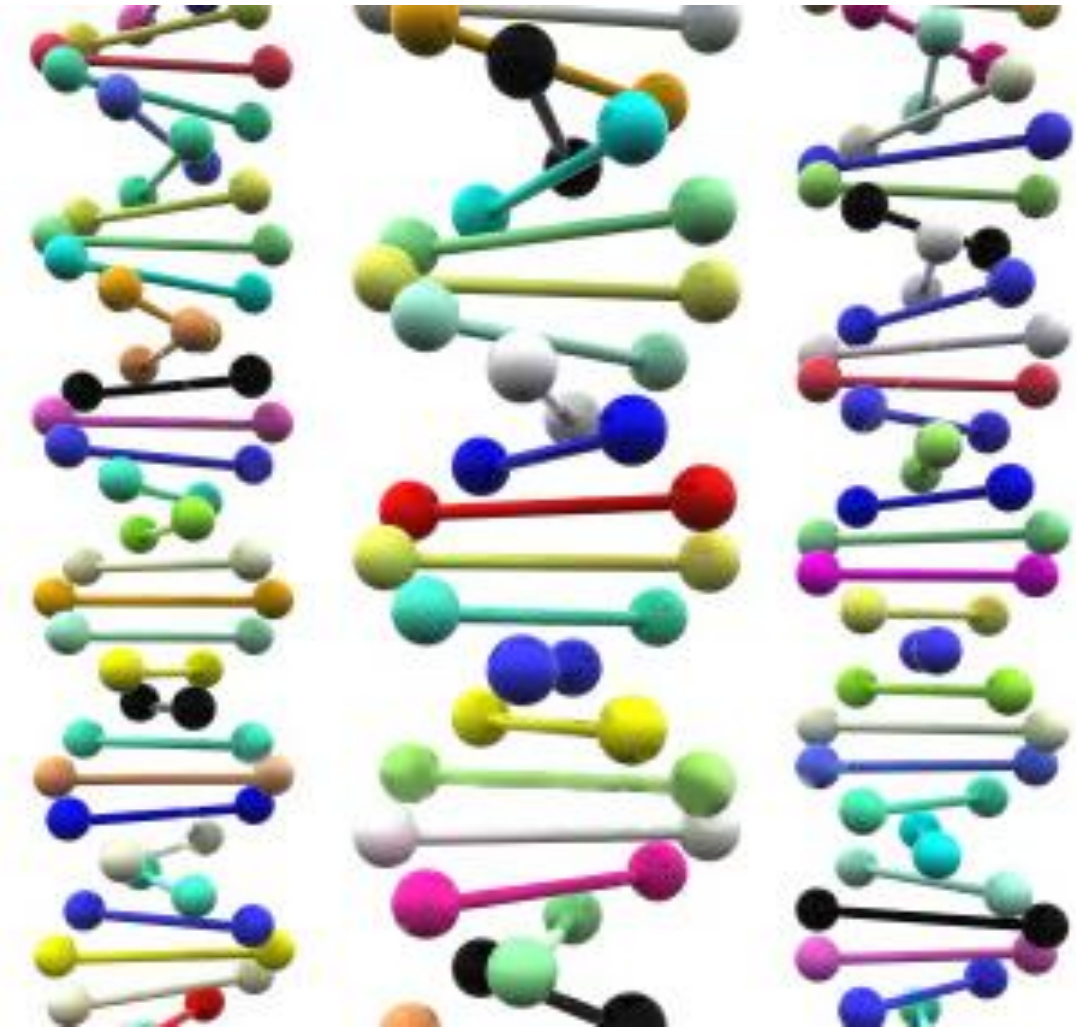
#1: Accelerate drug discovery and development

With a large number of patents for blockbuster drugs expired or near expiration and the cost of bringing a new drug to market pushing $5 billion, according to a 2013 Forbes analysis, there are huge benefits to be had by anything that is able to accelerate the process of drug discovery and development. Being able to intelligently search vast data sets of patents, scientific publications, and clinical trials data should, in theory, help accelerate the discovery of new drugs by enabling researchers to examine previous results of tests. Applying predictive analytics to the search parameters should help them hone in on the relevant information and also get insight into which avenues are likely to yield best results.

The industry is already starting to look at how it can get greater access to more data in order to help accelerate this process. For instance, a number of pharmaceutical companies – AstraZeneca, Bayer, Celgene, Janssen Research and Development, Memorial Sloan Kettering Cancer Center, and Sanofi – recently announcement a new data sharing initiative dubbed Project Data Sphere. The companies have agreed to share historical cancer research data to aid researchers in the fight against the disease today. The database will be available online globally, with the analytics technology being provided by software vendor SAS.

#2: Optimize and improve the efficacy of clinical trials

Clinical trials are costly and time consuming to run and pharmaceutical companies want to ensure that they have the right mix of patients for a given trial. Big Data can assist identifying the appropriate patients to participate in a trial (through analysis of demographic and historical data), remote patient monitoring, reviewing previous clinical trial events, and even helping to identify potential side effects before they become a reality. Global management consultancy McKinsey says that patients big data could also help pharmaceutical companies take into account more factors, such as genetic information, to help companies identify niche patient populations to help speed up and reduce costs of trials.



#3: Target specific patient populations more effectively

With information from genomic sequencing, medical sensor data (device that can, for instance, be worn and track physical changes in an individual during treatment) and electronic medical records more readily available than ever before, pharmaceutical companies are able to dig into the root causes of specific pathologies and realizing that one size truly does not fit all. Within any disease or condition different patients will respond differently to treatments – for a host of reasons. Combing through the data from these different sources can allow drug companies to spot trends and patterns that will allow them to come up with more targeted medications for patients that share common features.

For instance, Pfizer is combing data from electronic medical records, clinical trial and genomic data to spot opportunities for "drugs for specific patient populations". Using this approach the company was able to identify that a small subset of lung cancer patients had a specific genomic defect – a mutation in their ALK gene. Using this insight, Pfizer developed

Xalkori specifically for lung cancer patients with the ALK gene mutation, which was approved for use by the Food and Drug Administration in 2011.

“Had this compound been tested against a broad spectrum of lung cancer patients, it likely would not have been found to be effective," Pfizer CIO Jeff Keisling was quoted as saying in Information Week. "With this analytics-based approach, it was found to be very effective, but we had to be able to identify a subset of cancer patients with a specific gene mutation who previously did not have this treatment option."

Behind the scenes – the technology powering Pfizer’s Precision Medicine Analytics Ecosystem

Pfizer’s “analytics ecosystem”, which makes possible the development of new drugs like Xalkori is based on a 3 different platforms:

1. The genomics research repository - an open source data management system (built on tranSMART) initially developed in 2009 by scientists at Johnson & Johnson and Recombinant Data Corp. The platform combines genomic data sets from internal and external sources.

2. The life sciences hub – this was built to house data from Pfizer’s own clinical trials research along with research from its CRO partners. It is a cloud-based data repository (dubbed the “Clinical Cloud) that is hosted by Oracle and built into Oracle’s Life Sciences Hub.

3. The repository for Electronic Medical Records – this holds hundreds of million of anonymized records and is built on Teradata. The company uses Tableau Software and TIBCO Spotfire “for data analysis and visualisation.”

#4: Better insight into patient behaviour to improve drug delivery and effectiveness and healthcare outcomes

Greater amounts of data that companies can tap – including information from remote sensor devices - coupled with advanced analytic models, mean that pharmaceutical manufacturers can gain much greater insight into existing patient behaviour. The company can then use that information to design services targeted to different demographics or at risk patient groups in order to improve the efficacy of treatment.

For instance, one ontological drug manufacturer found that many patients were forgetting to take their medicine at the required time, according to the founder of MediSafe writing for Wired magazine. The manufacturer came up with a cloud-based mobile solution that would push messages directly to patients' mobile phones reminding them to take their medication, thus improving adherence to drug protocols.

Meanwhile, according to Medtronic's VP & GM Deep Brain Stimulation Lothar Krinke, his company has been working on designing technology that can "interpret certain electrophysiological parameters and management data." He cites how Medtronic's Neuromodulation business unit uses this technology to detect a spinal patient's posture, which can then help physicians determine the amount of stimulation the patient requires.

#5: Improve safety and risk management

Signals coming from a range of sources including social media, Google searches, etc. can act as an early warning signal for pharmaceutical companies about product safety issues and pharmaceutical companies have been thinking about how this type of unstructured data can be used more effectively.

"You can do what's called Internet "scrapes" of information, where you draw down lots of various hits or posts from the Internet, and then analyze that data. You can listen to the chat essentially, the public sentiment, in the virtual environment. With these approaches you can capture patient data of interest; but you can also capture additional data that may include safety-related information, which will need to be transmitted to the safety group," explains Dr. Ed Tucker, VP Janssen Research & Development, a Johnson & Johnson company in an interview with MIT Sloan Management Review.

#6: Gain improved insight into marketing and sales performance

With increasing competition from generics, Big Pharma is getting smarter about analysing and driving effectiveness in its sales and marketing operations. New, niche and underserved markets may be spotted by analysing information from social media, demographics, electronic medical records and other sources of data. Equally, analysing the effectiveness of sales efforts and capturing the feedback received by the sales force during client visits and using it effectively can help pharmaceutical companies get an edge on their competition.

For instance, Pfizer has been working with Ecuador-based vendor Noux, which works with SAP, to create a more centralized way of capturing information about sales, marketing and distribution data which had previously been managed in multiple excel sheets spread throughout the organisation. The solution aims at helping Pfizer better understand how often doctors are prescribing a given medication, track the effectiveness of sales pitches, track competition, understand the performance of individual sales representatives. In theory, that will allow them to make better informed decisions, faster than ever before.

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Subject Matter Experts

Dr. Peter Covitz
Life Science R&D and Informatics Leader
PFIZER

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Robin Smith
Chief Executive Officer
ORIG3N

"Attend my keynote and learn how to leverage the power of analytical data in healthcare; investigate your organizations analytic goals from beginning to end"

Mark Schreiber
Associate Director of Knowledge Engineering, **NOVARTIS**

"Join my session to discover proper integration of structured and unstructured data; how to assess available technologies for specific analytics"

Dr. Chris Waller
Director of Cheminformatics
MERCK

"Take part in my discussion on assembling translational data sets to support cross-domain predictive modeling activities across the pharma R&D continuum"

Justin Boyd, Ph.D.
Research Investigator
Department of Neurology
HARVARD MEDICAL SCHOOL

"Be sure to attend my session discussing the future of data in drug discovery and how to draw a road map for your organization"

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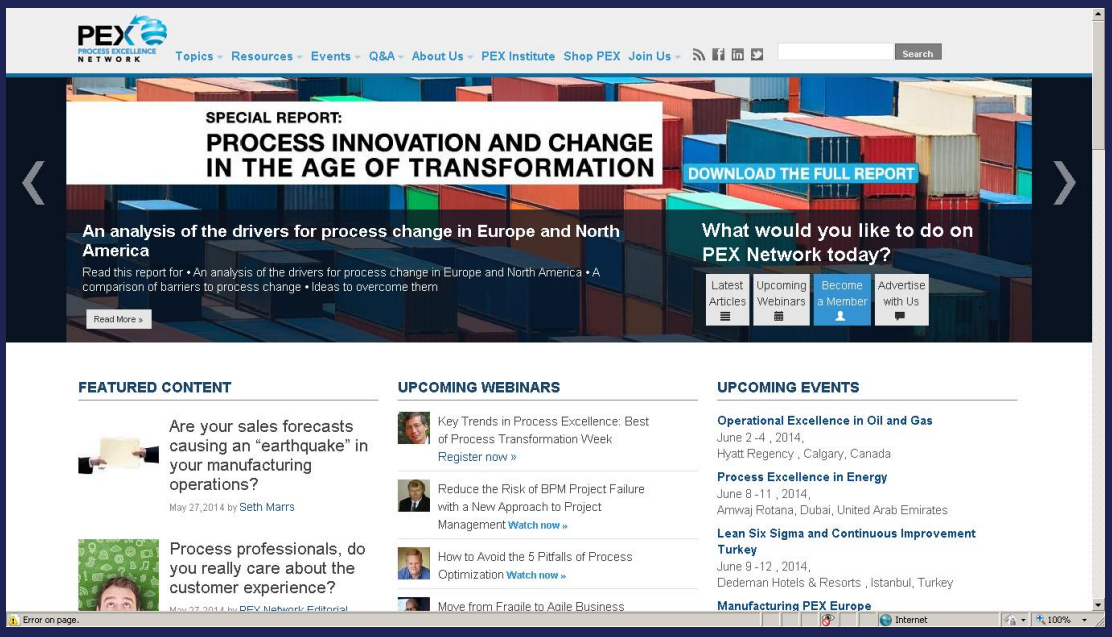

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