

FROM DISCOVERY TO MARKET: USING TECH TO COMBAT THE ARDUOUS LIFECYCLE OF DRUG DEVELOPMENT

In the 1960s, Congress granted the FDA rights to approve drugs,¹ paving the way to the 'Drug Lag.' However, the FDA recently outlined the Innovation Initiative, which promotes modern and efficient regulatory processes to expedite product development programs.² In fact, the recently approved 21st Century Cures Act will provide \$5 billion in annual funding to the NIH.³ This means that pharmaceutical companies will have more flexibility to utilize agile development methods that help bring life-saving drugs to market quicker without compromising efficacy.



Many emerging technologies in the market are in line with this initiative, and predominantly focus on leveraging data and digital platforms to transform the entire drug development lifecycle. Here are some of the trends that could revolutionize each phase of the process:



DISCOVERY

MACHINE LEARNING; AUGMENTED AND VIRTUAL REALITY

When screening 30 million compounds for a candidate,⁴ your methods have to be extremely accurate. Machine learning can optimize complex predictor functions and provide a more manageable set of biomarkers.⁵ Also, 3D structures of any given protein available via augmented or virtual reality applications allow researchers to closely examine its effect on human physiology and target any potentially harmful reactions.



PRE-CLINICAL AUTOMATION

For decades, researchers have employed automation in their development processes, but it's becoming more ubiquitous as more technologies become available. Automation can reduce errors in the lab by 70 percent and even cut time collecting specimens by 10 percent.⁶ Now that demands for drug therapies are soaring, automation will be critical to increase accuracy.



PHASE I & II DATA MINING

Since 2003, the cost to develop a drug has jumped 145% (2014).⁷ Another way to address rising R&D costs and climbing attrition rates for drug failure in late-stage trials is to employ data mining. From identification to characterization to trial, data mining pre-established information could satiate the data-hungry process of drug development and eliminate several time-consuming steps.



PHASE III & IV ANALYTICS

As concern among patients grows regarding "the push to get more drugs approved, instead of effective drugs approved,"⁸ researchers working within later-stage trials could leverage data trends to better understand adverse effects rather than using a trial and error approach. Analyzing trends in data helps answer important questions and even predict future trends, further accelerating drug development.

POST-MARKET DIGITAL MARKETING

While some life sciences companies have dabbled in direct marketing strategies, many are slow to implement digital marketing for social media listening or eCommerce, even though revenues continue to increase in this space.⁹ As the ability to connect companies directly with patients increases, pharmaceutical companies will need to create a digital experience designed for a wide array of customers.



FROM DISCOVERY TO POST-MARKET AND EVERYTHING IN BETWEEN, PHARMA COMPANIES WILL FEEL THE IMPACT OF THESE CUTTING-EDGE TECHNOLOGIES. AS NO ONE IS IMPERVIOUS TO SUCH TRENDS, PHARMA MUST BE PROACTIVE AND EXECUTE A SOLID STRATEGY SOONER THAN LATER TO REAP THE BENEFITS.

¹ <http://www.econlib.org/library/Enc1/DrugLag.html>

² <http://www.fiercebitech.com/biotech/fda-outlines-innovation-initiative-cures-plans-to-speed-up-drug-development>

³ <https://www.pri.org/stories/2016-12-25/americas-new-21st-century-cures-act-will-speed-drug-approvals-good-thing>

⁴ <https://news.ncsu.edu/2017/05/fourches-hyper-predictive-model/>

⁵ <https://www.bioprocessonline.com/doc/big-data-analytics-the-next-evolution-in-drug-development-0001>

⁶ <https://www.shire.com/research-and-development/science-and-innovation/shaping-tomorrow/advances-in-automation-bringing-laboratories-to-the-next-level>

⁷ <http://cen.acs.org/articles/92/web/2014/11/Tufts-Study-Finds-Big-Rise.html>

⁸ <https://www.usatoday.com/story/news/nation/2017/02/09/new-cancer-drugs-do-little-improve-survival/97712858/>

⁹ <http://www.cms-connected.com/News-Archive/July-2016/eCommerce-Trends-and-Statistics>