

## What is Artificial Intelligence and Why Does it Matter?

(Source: Edited excerpts from a White Paper "Man Vs. Machine: How Artificial Intelligence (AI) Makes Specialty Parcel Management More Predictable, Scalable, and Efficient" by ParcelShield)

*Editor's note: Because Artificial Intelligence (AI) is exponentially being integrated into the way we live and work, we will bring to the FOCUS readership a series of articles on how AI is being deployed to create efficiency in the healthcare industry and how it can assist in addressing complex issues such as drug abuse, product authentication, blockchain management, with the list being endless.*

AI isn't a one-size-fits-all concept. Pharmacies today use it to automate their specialty medication package management using customized business rules and workflows (how they ship, when they ship, and what to do when delivery conditions go wrong). And because AI learns on its own, it can evolve to keep pharmacies optimized and efficient as their business needs change.

Every day, AI works alongside specialty pharmacies and their very human staff to achieve the 'humanly impossible.' Together, man plus machine converge to manage specialty medication delivery processes with more cost efficiencies and fewer problems than ever before, freeing up pharmacies to tackle other business challenges critical to long-term growth.

AI is already changing the world. It seems that every day, there's chatter about a new cutting-edge AI development. From Amazon Echo to self-driving cars, brilliant minds are working constantly to develop smart technologies that solve everyday issues on a micro and global scale. But to those of us without special interest or knowledge, the concept of AI might just conjure up images of the dystopian and slightly horrifying futures we see in movies. Even for those who are familiar with AI, things can get confusing quickly. For example, what's the difference between AI and machine learning? What about terms like "deep learning" and "neural networks?"

There are many ways to define AI and all its subfields, components, and capabilities. Any source you turn to will probably have a slightly different version. For perspective, let's review basic definitions: According to the English Oxford Living Dictionary, AI is defined as: "The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision making, and translation between languages." In very general terms AI can be described as the process of training computers to "think" like humans do. But for each use case, the end goal may not be for the computer to behave exactly as a human does. In most applications, human reasoning skills and patterns are just used as a model on which to build the system.

How important is AI: "AI is one of the most important things humanity is working on. It is more profound than ... electricity or fire." —Sundar Pichai, CEO, Google

(continued on page 2)

## In Brief...

- ◆ **Walgreens Boots Alliance (WBA)** posted US\$33.8 billion in sales for the first quarter of its fiscal year 2019, a 9.9% increase year-over-year, with net earnings up 36.8% to US\$1.1 billion. Internationally, WBA's sales from retail pharmacy operations decreased 5.9% to US\$2.9 billion, reflecting a 2.3% adverse currency impact. The company attributed its 3.6% sales decrease on a constant currency basis in part to negative impacts of divesting Boots Contract Manufacturing the year before and a loyalty accounting change. The company noted that increased market share for Boots UK was offset by a weak retail environment. WBA also announced a new cost-management program aimed at bringing annual cost savings of more than US\$1 billion by the end of its third year. instituting initiatives aimed at optimizing divisions, global smart spending, global smart organizing and enterprise digitization to transform long-term capabilities.

- ◆ **Pharma manufacturers GlaxoSmithKline (U.K.) and Pfizer (US)** plan to enter into a joint venture that will combine their consumer health businesses into a single entity. The combined sales for both totaled US\$12.7 billion in 2017. The all-equity transaction (of which GSK will control a 68% equity interest and Pfizer will control 32%) will have a global market share of 7.3%, leading the market in key areas such as the U.S. and China.

- ◆ **Cardinal Health's** board of directors has elected *J. Michael Losh* to the position of independent director, effective December 5, 2018. Losh is a former interim CFO for Cardinal and will serve on the board's audit committee. He has also served in several other capacities, including health director from 1996-2009 and presiding director at CareFusion (following its spin-off from Cardinal) until it was acquired by BD in 2015.

- ◆ **China** will cut tariffs on a range of imported raw materials used in medicines, according to industry analysts, signaling the government's efforts to reduce high drug prices and improve healthcare, as well as opening up the Chinese economy. Import and export duties will be removed on 706 items beginning in 2019 as part of a tariff adjustment package, with duties on some raw materials removed altogether.

- ◆ **U.S. pharmaceutical manufacturer Eli Lilly & Co.** will acquire **Loxo Oncology Inc.** for approximately US\$8 billion in an all cash deal, making it the second multi-billion-dollar deal of 2019 by a U.S. pharma company. Lilly is paying a premium for Loxo's stock, 68% above Loxo's closing price on January 4th.

- ◆ **The government of Japan** will trim drug prices by 2.4% on an NHI price basis in ad-hoc repricing associated with the October 2019 consumption tax hike. The NHI price-based figures were reported by the Central Social Insurance Medical Council, also known as Chuikyo, on December 19th, two days after health and finance ministers agreed to conduct upward and downward price adjustments.

(Sources: China Daily, Company Press Releases, Drug Store News, Pharma Japan and Yahoo Finance)

## Artificial Intelligence (cont.)...

There are many different components associated with AI. This is why it seems complicated and overwhelming. Here's a handful of terms that often make an appearance in the discussion:

- **MACHINE LEARNING (ML):** An application of AI that gives computer systems the ability to "learn" on their own without explicit programming to perform certain tasks. Machine learning (ML) focuses on building systems that can access various forms of data, analyze and interpret that data, then use those findings to make increasingly better decisions, with little or no outside guidance from developers.

- **DEEP LEARNING (DL):** One of the processes that makes ML possible. AI is so good at learning on its own because it's designed to model the human brain's "neural network." AI's artificial neural network (ANN) is broken down into many layers, each with its own purpose. This mimics the way in which a human brain has layers of individual neurons that work together to make our bodies run.

- **PREDICTIVE ANALYTICS:** The use of historical and current data to make predictions about the future. While this concept has been around for decades, AI brings a heightened level of speed, scale, accuracy, and diversity in applications. AI systems can access and analyze an incredible amount of data in the blink of an eye, allowing it to run laps around yesterday's prediction tech and processes.

- **INTERNET OF THINGS (IoT):** All the tools and devices woven into our daily lives (aka "things") that connect to the internet and exchange information. These things include anything "smart" — our phones, cars, watches, and pretty much anything you can imagine. These devices constantly transmit massive amounts of data, which can then be harvested and fed into AI systems.

It's not an exaggeration to say that AI is virtually everywhere. The fundamentals of AI and machine learning are at play even with the simplest exchanges, like:

- Talk-to-text functionality on your phone
- Asking Google, Siri, or Alexa a question
- Spam filters in your email inbox
- Fraud prevention services from your bank or credit card company
- Traffic reports in apps like Google Maps
- Facebook's suggestion to tag specific friends in your photos
- Movie, song, or purchase recommendations from Netflix, Spotify, or Amazon.

During these and (many, many) other everyday interactions with AI, technology has essentially been trained to cater to each of our unique needs and desires. This plays into the greater goal of using these capabilities to make life more streamlined, convenient, and overall better for people around the globe. In Human + Machine, Accenture researchers refer to the "third wave of business transformation." Where the assembly line standardized processes and the advent of computers automated processes, AI can adapt processes. It can learn. You can understand why AI has so much appeal and significance in the healthcare arena, where we can harness this power to supercharge population health and transform businesses.

An example provided by ParcelShield: Using millions of data points from carrier networks, airlines and weather services, supported by machine learning algorithms, AI identifies potential medication delivery problems, predicts problem severity (if a delivery will be delayed or prevented), estimates geographical risk factors, and determines the probability of successful or delayed

medications. Further, AI enables pharmacies to validate carrier service probability (the likelihood of an on-time delivery), identify package routes and alternate routes, and spot and respond to route conditions and risks in real-time. AI works with pharmacy staff to drive more on-time medication deliveries and solve expensive medication losses and recoveries, often before they happen.

## BMS/Celgene Merger at US\$74 Billion

*(Sources: an article prepared by Joseph Haas and published by Scrip; The Pink Sheet; Strategic Transactions)*

The proposed US\$74 billion merger of Bristol-Myers Squibb Co. (BMS) and Celgene Corp. would be the third-largest biopharmaceutical M&A deal if it goes through at the terms announced 3 January. Slated to be final during the third quarter of 2019, the deal would combine two active deal-makers, and in Celgene, a company that is seen as a partner of choice by smaller firms seeking a supportive collaborator. It also represents the latest marriage between a large pharma company and a big biotech - prior deals of this type, such as the AstraZeneca PLC/MedImmune LLC, Roche/Genentech Inc. and Sanofi/Genzyme Corp. mergers, have proven successful.

Smaller than most of the large pharma companies, BMS has often been mentioned as an acquisition target, particularly for deep-pocketed companies that might want to increase their standing in immuno-oncology (IO). A Pfizer Inc/BMS combination frequently has been cited as a logical mega-merger.

With the BMS/Celgene merger not slated to close for months and general sentiment that the combination makes greater sense for Celgene shareholders than for their BMS counterparts, several analysts speculated that other companies could make bids for either firm before the deal is finalized.

The Celgene deal marks a strategic departure for BMS, which previously focused on smaller, bolt-on type deals. It earned praise for its "string of pearls" strategy, which included a number of moderately priced acquisitions, such as its US\$2.4 billion acquisition of Medarex Inc. in 2009, which netted the company its two signature IO therapies, the checkpoint inhibitors Opdivo and Yervoy.

While the Medarex acquisition certainly transformed BMS into an IO leader, the last large-scale M&A for BMS was the acquisition of DuPont Pharmaceuticals Co. for US\$7.8 billion in 2001, which brought in the Sustiva HIV franchise.

A key question at the periphery of large mergers is how entities affiliated with the merging companies will be affected, if at all. Shortly after the deal was announced, William Blair & Co. analyst speculated that Celgene being absorbed by BMS could jeopardize the existing, multi-faceted partnership between Celgene and the emerging Chinese company, BeiGene Ltd., a potential competitor of BMS.

The ten largest biopharmaceutical mergers to date are: Pfizer/Warner-Lambert (2000) for US\$84.1 billion; Glaxo Wellcome/SmithKline Beecham (2000) for US\$78 billion; Bristol-Myers Squibb/Celgene (2019) for US\$74 billion; Pfizer/Wyeth (2009) for US\$66.7 billion; Actavis/Allergan (2014) for US\$65 billion; Takeda/Shire (2018) for US\$64.3 billion; Sanofi-Synthelabo/Aventis (2004) for US\$62 billion; Pfizer/Pharmacia (2002) for US\$59 billion; Roche/Genentech (2009) for US\$43.7 billion; and Merck/Schering-Plough (2009) for US\$42 billion.