

Applying AI to Traditional Industries

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When people think of artificial intelligence (AI) and machine learning, images of autonomous driving, virtual reality, and other high-tech, start-up-dominated fields that didn't exist a decade ago typically come to mind.

However, in our continuous search for durable growth drivers, we are finding that AI has open-ended potential across many areas, including those that currently depend on labor- and time-intensive research and development processes. Companies with technology platforms that can solve for challenges across multiple applications are interesting in any industry. One such company is Codexis, a leader in protein engineering.

At the recent William Blair CONNECTIVITY conference, John Nicols, president and CEO of Codexis, described how companies are using technology to tackle previously insurmountable research and development (R&D) challenges in the food and pharmaceuticals industries.

Faster, Cheaper, Sweeter

Stevia, a sweetener extracted from the leaves of a plant native to South America, has gained some popularity as a sugar-alternative because it's non-caloric and natural. But many consumers experience a bitter aftertaste—which limited its historical market acceptance.

Codexis collaborated with a U.K.-based food ingredient company to engineer an enzyme process that eliminates the bitter aftertaste by extracting 95% pure Reb M glycoside, as opposed to the bitter but higher-yielding Reb A.

Researchers have known what part of the plant they needed for years, but until recently, the time and labor

required to develop the extraction process had not been economically viable.

New machine-learning platforms allow for this by processing information faster than we could previously imagine. Projects that once took about 20 scientists and up to two years of labor to complete now can take a few scientists a matter of months.

Bending the Healthcare Cost Curve Downward

The healthcare sector faces many risks and uncertainties, including pressure to reduce drug pricing. As a healthcare analyst, I'm especially interested in companies that can maintain healthy margins and robust R&D pipelines in the face of lower prices.

We believe that AI is already ushering in a new era of innovation in the healthcare industry. By dramatically streamlining the drug development and testing process, AI tools have the potential to yield tremendous benefits for society, both in terms of reducing costs and unlocking better ways to treat diseases and patients. For example, thanks to next-generation sequencing, blood samples can be used instead of tissue biopsies in some cancer diagnostics, improving the speed, accuracy, and ease of detection and treatment.

A mega-cap pharmaceutical company uses a machine learning derived enzyme to manufacture one of its most-prescribed drugs, which treats diabetes. The production process provides a better yield to meet the growing global demand, which allowed it to gain higher production efficiencies and avoid additional capital investments. It has also allowed the pharmaceutical company to move to a more environmentally friendly production process.

When evaluating a research-driven company's ability to create sustainable value for investors, partnerships can be very important. Companies that are able to understand the R&D challenges facing their clients and do the front-end work to create innovative solutions to those roadblocks should have a growing and highly defensible position in the value chain—regardless of industry.

Innovating for Profitability—and Sustainability

One of the biggest challenges facing manufacturers across industries is determining how to create a product with the same or higher quality at the same or lower cost—and with a smaller impact on the environment. This trend is being driven not just by regulators, but by consumers who are increasingly conscious of the environmental impact of their purchase decisions.

AI is playing a leading role in solving this engineering challenge. For example, by streamlining the drug development and manufacturing process or by increasing the yield from plants, AI is lessening the need for energy, water, chemicals, and other resources throughout the supply chain.

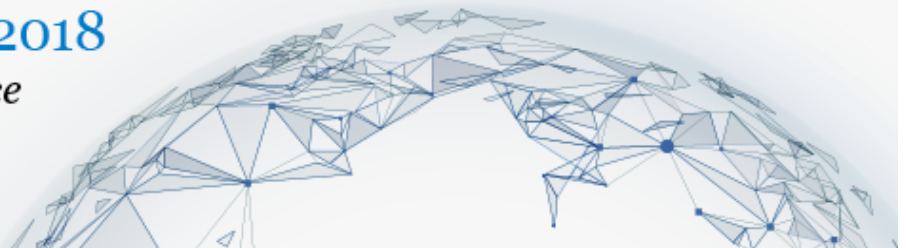
Across industries, companies that recognize the quickly evolving regulatory, competitive, and consumer demand environments and enlist innovative solutions to enhance the speed, quality, and sustainability of their R&D efforts will likely be among the longer-term winners.

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CONNECTIVITY 2018

Exploring the White Space

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