

Chapter 15



SELF AWARE DATA



What's the Non-Obvious Trend?

Rather than relying on human analysis, the combination of artificial intelligence and better sensors is allowing data to predictively organize itself, identify insights and often create its own actionable conclusions with little or no human intervention.

The fact that Dennis Abo Sørensen can tell a piece of wood from a mandarin orange when holding them is more significant than it seems.

In 2014, the 36-year-old man from Denmark who lost his left hand in a fireworks accident became the first amputee in history to receive a bionic hand that was capable of feeling the texture and shape of objects in his grasp. This is the sort of medical miracle that we often see feel good stories about in global news media and it is interesting for a brief moment, but hardly seems all that significant for our lives.

Consider for a moment, though, the technology that had to be built into the bionic arm in order to allow its user to sense the difference between two objects in its grasp. The sensors in the fingertips generated

electrical signals which were then translated by the arm into a series of electrical spikes which mimicked the language of the patient's nervous system.

In this way, the arm “talks” to the patient and the patient simply receives the information provided. This is the power of *Self-Aware Data* and it describes much more than bionic arms.

Data has traditionally been described by humans as a source of input to analyze for insights – but the analysis was something typically done by a person. As new innovations in the sophistication of algorithms and artificial intelligence continue to make more real-time analysis possible, we are entering a world where data has the ability to move from input to insight to action all on its own.

The result is that industries from farming to banking are becoming more reliant on this *Self-Aware Data* being delivered along with insights to be used immediately rather than analyzed in a raw format to be quantified later. To illustrate, let's start with taking a deeper look at how this is happening in the financial industry.

Robo-Advisors and Financial Transactions

Last year one of the hottest topics in the Financial Services industry was the rise of “Robo-Advisors” – fully automated money managers that could take an investor's portfolio and manage it according to some pre-selected criteria.

On paper, Robo-Advisors seemed to be the better solution because they can instantly make more unbiased decisions without being influenced in the short term by stock plunges or incentive structures that favor some trades over others.

According to one recent audit study, “the most accessible sorts of advisers (including advisers who work at banks or retail brokerage firms) often steer their clients toward products that are in their own best financial interest, not that of their clients. A human adviser might charge that investor an annual fee of 1% to 2% of assets versus a robo-adviser fee of 0.25% to 0.50%—a difference that can amount to tens of thousands of dollars in lost wealth.” I discuss this issue in my book *Likeonomics* in

relation to what it really takes to be a trusted advisor

The other fact that is routinely found in investment audits is that actively managed funds tend to *underperform* passively managed ones. So the numbers point to a paradox: the more human your advisor happens to be, and the more actively he or she manages your portfolio – the less money you would likely make on average.

Robo-Advisors are so useful, in fact, that they are already used by a significant number of financial advisors to maintain portfolios already.

This is the non-obvious *Self-Aware Data* trend at work, where potential financial transactions are analyzed, quantified, made and reported entirely by data while humans take the complimentary role of explaining those moves to investors and managing the emotional side of investment conversations.

This new model is one that is particularly favored by young people. According to J. D. Power's investor satisfaction survey conducted in Canada in 2016, "two-thirds (66%) of Canadians born between 1982 and 1994 indicate that they would be interested in robo-advice if their financial services provider were to offer it, compared to 54% of all investors."

Sarah Kocianski, a senior research analyst for Business Insider Intelligence, published a detailed report on robo-advising which found that "consumers across all asset classes are receptive to robo-advisors — including the wealthy ... the majority of assets managed by robo-advisors will come from people who already have some investments."

A recent study from Scottrade found that more than nine in ten Registered Investment Advisors (RIAs) believe robo-advisors will become more prevalent in the financial industry over the next two years.

Charles Schwab, BlackRock, Fidelity and Bank of America are taking this approach and have all launched their own initiatives in robo-advisory services as a component of their overall services.

How Self-Aware Data Is Changing Farming

In the past year nearly 100 commercial Earth observation satellites were placed into orbit, a tenfold increase from just three years earlier according to research firm Tauri Group. It is estimated that these "nanosatellites"

(mostly small enough to fit in a shoebox) will cumulatively have the ability to take a picture of every inch of land on Earth, every day.

For some, this sort of “man in the sky” surveillance may seem like a scary prospect – but for New Mexico-based Descartes Labs, these satellite images provide exactly the kind of big data needed to transform one of the biggest industries in the world: farming.

Descartes, which has just 20 employees, says it can predict crop yields partway through the year with 99% accuracy. In contrast to the process used by the USDA, which has traditionally sent real people to survey thousands of farms a month ahead of the October corn harvest, Descartes simply uses its algorithms.

“What’s great about our techniques is that traditionally you have to talk to tons of farmers in the US to get a USDA-style number,” Descartes founder Mark Johnson says. “With machine learning techniques, ... we look at tons of pixels from satellites, and that tells us what’s growing.”

Descartes already has plans to take this same approach and develop even better algorithms to track more than just corn in the US – expanding to other regions such as Brazil, Argentina, China and the EU.

In farming, *Self-Aware Data* is being fueled by companies like Descartes and other larger enterprises who are automating the process of understanding what satellite data is saying, and then providing it back to those in the industry who are putting it to immediate use.

If you think farming is still a traditional business where rural folk access the Internet via dialup and reject technology, you’d be wrong. Digital farming and the use of technology for everything from real time weather updates to forecasting crop yields is now commonplace.

For example, Delta Drone is a French maker of Unmanned Aerial Vehicles (UAVs) and one of the pioneers in developing drone technology that could be used by farms (and many other industries including mining, architecture, transportation and retail). Yet drones, by definition, are meant to be controlled remotely – usually by humans. What if a drone could make decisions on the fly based on data collected? What if a drone could use *Self-Aware Data*?

Increasingly, it can – thanks to a partnership between Delta Drone and technology consulting firm Wipro which has allowed for the vast quantities

of data generated each day (usually over 15,000 images) to be processed and analyzed in real time so optimization decisions can be made just as quickly.

In addition, the most forward thinking farmers are even sharing their data with one another to make predictions that can help all of their businesses. The Farmers Business Network, for example, is a US based system that includes more than 2,500 farmers and 8 million acres sharing information on everything from the pricing for seeds and chemicals (to avoid being price gouged by big seed vendors like Monsanto) to crop yield data.

This data is getting integrated into the devices used on the farm as well. Tractors can be guided by satellite imagery and the harvesting history of a particular plot of land can be analyzed to increase yields and lower cost. Weather forecasts, soil reading and other tests are measured by various software solutions and all of this data is being seamlessly put to use in real-time – sometimes by the machinery of the farm itself (like in the case of the connected tractor or weather drones increasingly used both to track weather and also to spray pesticides).

Sensing the shift, some of the biggest players in the agriculture business are using this trend and making big investments in so called “AgTech” solutions. Monsanto has invested in several startups that do everything from digitally monitoring water usage to providing farm management software. DuPont, which is merging with Dow Chemical, is also expanding its Encirca farm management software offering.

What all this investment in technology illustrates is that we’re already in a world where the complex operations decisions around everything from treating plants to harvesting crops are increasingly left to be made by *Self-Aware Data* while the farmer spends more time overseeing the work from a central location. A similar level of automation is happening in the manufacturing sector – where it is often described with an interestingly futuristic term of its own.

Industry 4.0

The idea of “Industry 4.0” first took shape in Germany as a way to describe a growing shift in the approach to manufacturing used by some

of the most prominent brands in the country, including BASF, Bosch, Daimler, Deutsche Telekom, Klöckner & Co., and Trumpf.

Industry 1.0 was powered by water and steam, Industry 2.0 by electricity (which brought the assembly line and mass production with it). Industry 3.0 was driven by computers and the start of automation – where robots and machines started to replace human workers.

The current definition and vision for “Industry 4.0” is one in which computers come together with automation to use machine learning and algorithms to run factories with very little input from humans. Sometimes referred to as a “smart factory” – the potential for this shift is one that is transforming the manufacturing sector, and it is based in large part on the use of *Self-Aware Data*.

For a factory or system to be considered Industry 4.0, it usually must meet a series of requirements. Most notably, it has to use “decentralized decision making.” In other words, the factory must use *Self-Aware Data* so that cyber-physical systems can make simple decisions on their own and become as autonomous as possible. This is a huge priority across the global manufacturing industry.

In 2015, consulting firm PWC surveyed more than 2,000 companies from 26 countries in more than a dozen industrial production sectors including aerospace, automotive, and electronics. In this global Industry 4.0 survey, one-third of the respondents said their company had already achieved advanced levels of integration and digitization, and 72 percent expected to reach that point by 2020.

In the same study, the most commonly cited difficulty in building an analytical capability was the “lack of people with the expertise to conduct the analysis.” Industry 4.0 creates vast amounts of data, but it needs to be filtered into actionable insights. In the most advanced cases, the factory is doing that on its own – fulfilling the promise of Industry 4.0 through *Self-Aware Data* that suggests how to prevent shortfalls, speed up processes, eliminate down time, and identify material wastage.

The approach is so promising, it is being embraced by every one of the world’s leading manufacturing countries, including China, Japan, the United States and the Nordic countries. GE Chairman Jeff Immelt and Siemens CEO Joe Kaeser have both done interviews in the past year

declaring this a priority for their future success and in a bid to help the industry understand the impact of Industry 4.0, Cincinnati Mayor John Cranley even signed a proclamation to state “Cincinnati to be the Industry 4.0 Demonstration City.”

Beyond proclamations, Swiss company ABB is already using these techniques in an Australian cement kiln. A computer-based system mimics the actions of an “ideal” operator, using real-time metrics to adjust kiln feed, fuel flow, and fan-damper position. The early results of this initiative were up by 5 percent, which in ABB’s business could mean tens of millions of dollars to the bottom line.

Why It Matters:

As the amount of data available to be collected and processed explodes, the expectations from both consumers and business about the value of that data and how quickly it should be analyzed and put to use are rising. When I first wrote about data as a trend several years ago, I remember writing about the 3 underappreciated types of data: Big Data (that companies collect about you), Open Data (that government collect and share openly) and Small Data (that consumers collect about themselves). At the time, I argued that unlocking the power of *Small Data* was key because it could get you closest to your customers.

When it comes to *Self-Aware Data*, it includes data in all three categories – and the opportunity is to build the right analytics tools and non-obvious management capabilities to be able to derive meaning from the data instantly and without the need for human intervention. As this trend continues to evolve, we are seeing more initiatives globally to add this layer on top of data to make it more meaningful, self-analyzing and actionable in real-time, and without diminishing the customer experience.

How To Use This Trend:

- ✓ **Test automated data** – As more data gets analyzed in real time and moves toward the ideal of *Self-Aware Data*, there

may also be some challenges in how this data should be analyzed and what conclusions can be drawn. And where in human involvement absolutely necessary either morally, financially or to manage risk.

- ✓ **Watch for new popular products** – Tracking what products are starting to take off and gain widespread adoption is important. For instance, as more people put a smart thermostat like Nest in their homes, it may open more opportunities to speak with them about energy conservation. If your business is in this space, the adoption of this type of product can open new doors. Similarly, there may be new cutting edge products already affecting your industry, so be sure you have the right process to prepare for them.