Understanding the AgTech Ecosystem

Technology convergence is driving new investment opportunities throughout the agriculture value chain.
Agriculture isn’t what it used to be.

Centuries-old horse-drawn analog processes that supported how crops and livestock are grown, transported, processed, and distributed “from farm to market” are rapidly being redesigned as wave after wave of technological innovation—much of it repurposed from other industries—is quickly finding its way into the fields, onto ranches, and throughout the entire agriculture value chain. Growers and ranchers are largely ready to adapt technologies to their operations and are looking to their current suppliers, as well as new technology providers, to help them pragmatically enable these innovations. PwC sees technology as one of the main vectors driving the shift from simple to complex agribusiness systems.

The digital transformation of agribusinesses

We see a portfolio of mainstream technologies—mobile apps, digital mapping, field sensors, big data, cloud-based business systems, smart farming equipment, autonomous aerial and field vehicles—being used to create an interconnected digital ecosystem that tracks commodities from the farm to the market, while simultaneously tracking origination of the market product back to the farm. As this portfolio of technologies concentrates—often with a cloud-enabled solution as the central hub, we see the convergence of an expanding ecosystem that we will call AgTech. This expanding field focuses on the disruptive rethinking and reinvention of agribusiness operations and interfaces, bringing software; process transformation; and yield, productivity, and sustainability analytics together to make breakthrough productivity and higher return on investment (ROI) possible across this commodity driven value chain.

With proven technology capabilities including data analytics tools, machine learning, and mapping technologies, farm managers can begin to behave

In the past two years, the advancement of wireless technology and telematic solutions have simplified the transmission of data between agricultural machinery allowing data to be stored online and in a location easily accessed by growers and producers.

As it evolves, AgTech will expand into a coherent ecosystem across the agribusiness value chain. New investments will directly impact yield, productivity, and sustainability improvements across farms, fields, factories, and eventually at local food retail locations.
like chief operating officers (COOs), managing more fields/animals/resources than ever before and achieving new levels of productivity by implementing their own ag-specific enterprise resource planning (ERP) systems. Many of these ERP systems use cloud-based functionality to connect data and have allowed discrete process manufacturing efficiencies to better manage resources and increase both yields and ROI to enterprise growers. The ERP becomes the hub of the grower’s master data and allows them to efficiently interface directly with suppliers, processors, traders, and third party reporting. The ERP standards and solutions are currently emerging and PwC forecasts these solutions will likely become the cornerstone to the AgTech ecosystem whereby other technology providers—precision ag, smart equipment, field sensors, etc.—will need to include standard interfaces to these ERP solutions to differentiate their AgTech capabilities.

**Why are agribusinesses investing in AgTech?**
All along the agribusiness value chain producers, processors, distributors, and consumer packaged goods (CPG) brands are adapting and transforming in response to the megatrends of population growth, urbanization, resource constraints, and technology convergence. Agribusinesses today have the opportunity to gain unprecedented yields from fewer resources. With digitization, we potentially sit at the beginning of a Moore’s Law-like revolution in the agribusiness space.

According to Agfunder, the AgTech sector raised $4.6 billion investment dollars across 526 deals in 2015, far surpassing initial expectations and nearly doubling 2014 figures ($2.36 billion). Companies located in the US received just over half of all global investment ($2.4 billion) during 2015. By number of deals, this was 58% of the year’s activity, much lower than the 90% share in 2014. AgFunder attributes this not only to increased investment in international deals, but also increased reporting by international companies and the continued globalizatioon of private capital markets.

In fact, the opportunities are so compelling that traditional agricultural giants that have historically focused their research on the life sciences to improve seeds and fertilizers are now working side by side with private and venture capital-backed technology companies. They are making multi-billion-dollar investments in businesses with capabilities in software, sensors, smart equipment, cloud software as service, predictive analytics and algorithms, and robotics and drones.

Their goal is to collect, analyze, and take action on data relating to everything that impacts the broader agribusiness value chain, from climate to consumer preferences.

Today, agribusiness firms are actually seeing better ROI from such AgTech investments than from their traditional ag sciences investments. For example, Monsanto recently purchased The Climate Company for $900M and IBM bought The Weather Company’s digital assets. Monsanto and IBM are harbingers of what PwC expects to see over the coming decades: major investments by large tech and agriculture firms in the AgTech space.

Where a business sits in the agribusiness value chain determines how it will best take advantage of AgTech advances and convergence to serve your customers and your customers’ consumers while creating new value. Industries such as biotech, nanotechnology, biochemicals, fertilizers, machinery, animal feed, and animal health are all positioned “before the gate,” providing the inputs that form the basis of agribusiness. “Inside the gate” are the farming livestock, forestry, fishery, aquaculture, and hydroponics industries, while “after the gate” are the producers of animal protein, crops, biofuels, tobacco, and even wine. Wherever a business stands in the value chain, it can leverage technology, data, and capability-driven strategies to improve its productivity and efficiently scale business.
The convergence of technologies and the parallels we’ve observed and adapted from the financial services industry can make AgTech a higher ROI investment than traditional agricultural life science investments.
Understanding the AgTech Ecosystem - PwC

AgTech investments echo the recent investment patterns in financial services technology

Think about how the financial services industry has been recently transformed by technology. The same kind of disruption is happening today in agribusiness as commodities markets collect and analyze more real-time data. This means making decisions based on both broader and more specific insights and giving value chain participants new opportunities to create value and mitigate risks. Agribusiness is estimated to be a global $2 trillion market with an estimated 3-4% annual growth and increasing importance as the global population climbs from 7 billion to nearly 9 billion by 2050.

Commodity markets run adjacent to financial markets. For this reason, PwC routinely deploys teams made of ag and financial services experts to deliver unique insight on such things as the creation of high-speed commodity trading systems, risk management, and treasury management solutions.

Focusing on yield, productivity, and sustainability

Meanwhile, the entire agribusiness value chain is also squarely focused on improving yield, productivity, and sustainability, even as fewer farmers farm more acres and seek to meet growing demand.

Three common imperatives are driving future investments across agribusiness markets

Farmers that deliver profitability across all three objectives will likely expand their acreage and become enterprise agribusiness leaders in their markets.

Initiatives:
- Precision Ag solutions
- Integrated equipment
- Data collection and data quality
- Image management
- Consultative support
- Access to season trends and facts

Initiatives:
- Enterprise Ag (ERP) for the farm
- Telematics
- Automatous equipment
- Drones
- Sensory networks
- Services enablement
- Predictive analytics

Initiatives:
- Land use mapping
- Managing water
- Energy management
- Waste tracking
- Input traceability
- Farm/field performance reporting
- Harvest tractability

Improving yields

Improving asset productivity

Improving sustainability
Again, technology is a key enabler, and it is attracting billions in new investments as new solutions become available to track and trace crops from the field all the way through their processing to the supermarket or restaurant—and overseas. New cloud-based solutions are emerging including ERP for managing the larger farms/ranches, smart equipment that “learns” about upcoming maintenance requirements, and breakthrough growing/animal management innovations coming out of schools, Silicon Valley, and from the agribusiness belt of the U.S. and Canada.

Technology is also opening the door to new kinds of factory-like farming solutions, from hydroponic rooftop basil farms in Brooklyn to massive fish and climate-controlled lettuce “factories” in Japan that can operate year round. The results are higher yields with lower environmental impacts and the generation of data that will help increase yields even further in the future.

All along the value chain, it is possible not only to improve yield and monitor productivity but also to manage sustainability by collecting and analyzing data on carbon impact, soil quality, water use, energy, transportation, and logistics. At PwC we assess every link in the value chain to seek out ways to improve sustainability, and we are not alone. The largest agricultural corporations are making huge investments toward the same goal, understanding that in agribusiness, data can improve both financial and environmental performance.

According to the professor of environmental health sciences Dickson Despommier in his article “The Vertical Farm: Reducing the Impact of Agriculture on Ecosystem Function and Services,” we should expect over the next 50 years for the human population to reach 8.6 billion, requiring an additional growing area “roughly the size of Brazil.”

We are just at the beginning stages of the AgTech investment cycle, and the ultimate mission is to be ready and able to feed 8.6 billion people by 2050.
PwC has the technology strategy, blueprint and execution capabilities to help teams develop their plays to win in the AgTech ecosystem.
Innovation enabled by unprecedented convergence

This unprecedented convergence of biology, agronomy, plant and animal science, and digitization is a real inflection point creating the foundation for the future of agriculture. This future will see even more production and agricultural innovation and investment as we continue to clarify and crystallize the macro trends of the global value chain. It is a complex journey from farm to market; it involves everyone from growers and ranchers to produce and protein processors, distributors, CPG brands, food service, restaurants and grocery chains, among others. They all want sustainable, precision agriculture driven by accurate supply/demand data and controlled by enterprise-class AgTech solutions, along with data privacy, financial controls and end to end data security.

Having observed the shift in how agribusinesses are using their capital to fuel growth by putting technology at the center of their spending, we know that the time to interlock technology with process is now. By seeking out new concepts of selling AgTech results rather than just equipment or seeds, agribusinesses should be able to maintain profitability in the face of whatever challenging macro or micro environments may lie ahead. PwC has the technology strategy blueprints and roadmaps to help the enterprise take advantage of the technology convergence and the higher ROI opportunities that are emerging in the AgTech ecosystem.

Feeding the world

As the AgTech ROI improves throughout the agriculture value chain and success stories spread, more existing enterprises and new entrants will adopt disruptive AgTech strategies to compete more profitably, improve their margins, and serve their customers and clients better. They will soon understand that just as Mother Nature acts in real time, so must they.

Even if we are just in the beginning stages of the AgTech investment cycle, it is clear that cutting-edge agribusiness technology and analysis is going to improve yields, productivity, and ultimately sustainability. And that’s important. Our planet will have to feed 8.6 billion people by 2050. This is how we’ll get it done.

Reach out a PwC contact or anyone listed on the final page for information on a Digital Readiness review as a first step in expanding a AgTech strategy.
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