The Evolution of AgTech

As multiple complimentary technologies hit critical mass, is this the new dawn for AgTech?

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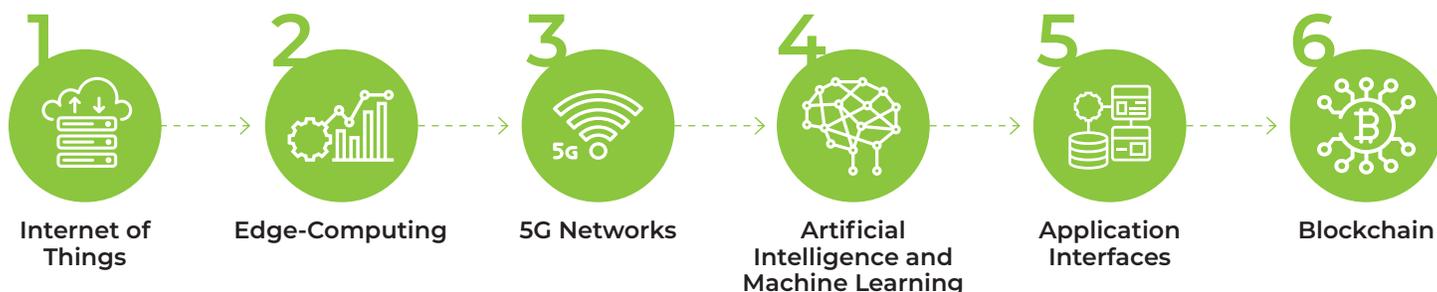## A technology platform for the future is evolving

If you follow AgTech news, not a single day goes by without yet another announcement from a startup or large tech company highlighting their groundbreaking innovative product that targets a key piece of the agricultural supply chain. All this investment activity and technical innovation has even attracted the eyes of the big tech firms—such as Google (Farmers Business Network) and Amazon (Plenty)—who have set up their own investment vehicles to capitalize on it. All of this technology investment going into agriculture has to be a good thing, right?

Throughout 2019, a number of technology trends moved from being mostly hype to wider adoption and practical usage. Together, these technologies complement and enable each other to create a viable platform that forms the foundations upon which potentially game changing solutions can be built. If any one of these components were not available, the true potential could not be realized.

The six key components making up this emerging platform for 2020 and beyond include:

- IoT (Internet of Things) sensors to gather vast amounts of ever-increasing raw data at the source
- Edge-computing to enable local processing of the data volumes, minimizing network latency
- 5G networks to provide high speed, reliable, and widespread network capability, connecting the Edge to the Cloud
- AI (Artificial Intelligence) and ML (Machine Learning) to make sense of the massive amount of data and automatically deal with the mundane, freeing up humans to deal with the exceptions
- A growing number of APIs (Application Interfaces) into ERP transactional systems closes the loop, enabling the AI and ML to automatically process transactions
- Blockchain to reliably and securely store the data in a scalable way without the risk of exposing critical information via unauthorized access

At Cultura Technologies, we are actively tracking developments across these technologies, analyzing their current and potential impact, and working with our clients and other technology partners to deliver and support solutions that will enable our clients to compete on an even playing field with their competitors.

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Internet of Things	Edge-Computing	5G Networks	Artificial Intelligence and Machine Learning	Application Interfaces	Blockchain

But not everything in the garden is rosy!

All technologies need to evolve and mature. Along the way there will be many casualties before an established set of technologies and technology partners emerge to establish some sort of stability. As we start 2020, some of the platform components are still at the "wait and see" stage where the adoption of a specific technology solution is at a high risk of not being the one that wins out.

For clients who are prepared to take the risk and accept the possibility of failure, there is great opportunity available to get ahead of the competition. Every business in every marketplace needs to develop and evolve their digital transformation strategy. This is not just to avoid falling behind the competition, but also to stand any chance of competing against a digitally native and disruptive organization that suddenly enters their sector and cleans up (like Amazon entering the bookstore market). Implementing the six components of the evolving technology platform should be key components of any digital transformation strategy, especially in the ag supply sector that is traditionally seen as slow to adopt new technologies.

#1 Internet of Things (IoT) - Creating an explosive increase in data volumes

The majority of high-profile investment going into on-farm technology is practical IoT. Much of this is focused on monitoring and automation such as using drones with image analysis to monitor crop health, sensors in the ground to monitor soil conditions, and robots to tend and harvest the crops.

The result of all these sensors is creating vast amounts of useful and potentially valuable data. The problem is, this data is fragmented into silos across multiple technologies from different competing vendors. It needs to be consolidated to get real value beyond the specific use case it was originally intended to solve.

This consolidation, cleansing, and aggregation is a great opportunity for the ag supply industry serviced by Cultura companies to amalgamate the disjointed data sources so meaningful insights can be derived. Data value increases exponentially when combined, so pooling the data into holistic ecosystems can achieve outcomes that benefit both the pooling organization and the contributing participants (farmers) to see how their data compares to other, for example.

#2 Edge Computing – Processing the data close to its source

Edge Computing is essentially moving the processing power back out to the Edge again. The power of the Cloud is great for processing vast amounts of data, but with millions of IoT and other devices generating massive quantities of remote data, getting all of that data into the Cloud and back in real-time is becoming the limiting factor.

IoT devices are getting more sophisticated, driving increased time-critical response requirements. Being able to process the data locally to provide time-critical operations and deal with unreliable data connections is driving the move to Edge. This is particularly relevant in our agriculture market where communication problems are common due to the geographically distributed remote locations we need to service.

#3 5G rollout – Connecting the Edge to the Cloud

The ongoing rollout of the high-speed 5G network is a key enabler for linking the IoT and Edge to the Cloud. This is particularly relevant for many of our clients with locations where physical legacy communication infrastructure is either non-existent or not capable of running modern high-speed networks without a massive investment. When complete, the wider range and increased bandwidth of 5G will provide better coverage in remote locations where our clients are typically situated, potentially removing the need for fixed communication lines altogether.

#4 Artificial Intelligence (AI) and Machine Learning (ML) – Empowering people to make better decisions

AI and ML solutions have started to hit mainstream and are already being used effectively for several well-defined but narrow scenarios. The adoption rates will increase dramatically as the tools improve and mature. A great application of AI/ML in the ag supply sector is to provide support systems for individuals who now need to cope with massive increases in data. This is done by filtering out and dealing with the routine and mundane, and only highlighting the exceptions and priorities people need to focus on. AI/ML should be seen as complementing humans, not replacing them.

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Currently, there is a critical shortage of the required skills to support AL/ML. This is slowing down adoption and causing technology vendors to gradually evolve their tools to make it easier for less highly qualified people to use them and get results. AL/ML is a skillset required by all businesses going forward, so everyone should be actively hiring and training new talent to remain competitive.

Today, the biggest problem with AI/ML is the quality of data. This is especially true if data is being pulled from several diverse sources where accurate data cleansing, de-duping, and code translation becomes critical. Insights based on "dirty" data can lead to fake/false/inaccurate outcomes—rubbish in, rubbish out! Again, this is an area where Cultura's family of companies has the skills, knowledge, and experience to work with our clients and partners to find solutions that address data quality concerns.

#5 Application Interfaces (APIs) – Closing the loop

For AI/ML to be effective, it cannot just be passive and limited to simply processing existing data to provide insights, it must also be able to initiate an action or response automatically. To enable this, effective APIs that back into the ERP commerce systems are required to provide real-time lookups and process live transactions.

At Cultura, we recognize this and have ongoing initiatives to further augment our products by enabling enhanced interfaces to support any future and ongoing AI/ML initiatives. Other software providers are racing to do the same because APIs are increasingly becoming a key differentiator for ERP systems, but this is a race we intend to win.

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#6 Blockchain – Scalable secure storage for openness, trust, and transparency

Blockchain technologies are still smoldering away behind the scenes, but widespread adoption is unlikely to occur in 2020. There are many competing Blockchain technologies from major tool vendors who continue their quest for dominance, causing lots of change and uncertainty over who will be the winners and losers.

The technology is still leading edge and only being considered by companies with big wallets who can afford to fail. Major institutions (some in agriculture) are starting to use Blockchain for internal systems to help prevent large scale information leakage and internet fraud. These are private/permissioned Blockchains because it is simply not realistic today to run complex enterprise use cases at scale on public blockchains. The technology doesn't currently have the maturity, sophistication, and interoperability required.

Traceability across the ag supply chain is an ideal utilization for Blockchain where a shared ledger that provides openness, security, and trust are critical requirements. The key problem that needs to be overcome for Blockchain to deliver on the promise is the need for multilateral agreement from all the participants regarding the choice of technology and metadata. Without this, there will be many disconnected links in the traceability chain.

Blockchain will eventually become pervasive and standardized, but this could take decades to achieve.

> **At Cultura, we recognize that we have a critical part to play in the ongoing digital transformation of our industry.**

AgTech for now and the future

It is an exciting time to be involved in AgTech. Several complementary technologies are all maturing at the same time and causing a paradigm shift across the agricultural supply industry. This is driven by the increased access to vast amounts of time-sensitive data and the availability of new tools to improve business speed and efficiency.

At Cultura, we recognize that we have a critical part to play in the ongoing digital transformation of our industry. Alongside our clients and partners, we are actively investigating all opportunities to take full advantage of the emerging technology platform.

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