



Tectonic shifts

How to respond to technologies impacting your sector: logistics and agribusiness

Thriving on disruption series

The speed and scale of technological change threaten incumbents, large and small. Companies that don't have a process for engaging with the future place themselves at greater risk. With worked examples, we explore the potential effects of – and responses to – specific technologies in the logistics and agribusiness sectors.

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Seeing ahead

In the fourth industrial revolution, success awaits those that predict and lead disruption.

The tectonic plates of the global economy are truly on the move. The fourth industrial revolution (4IR or i4.0) may be on everyone's lips in the boardroom at a macro level, but if this is as far as the discussion goes, then your company could be in grave danger of becoming one of the disrupted. To explore the relevance of technologies to your business, you should be having practical discussions and brainstorming the finer details of technological disruption with financial, commercial and operational teams – not to mention establishing a process for capturing and implementing the resulting action points.

As we have argued in our previous publications *Decoding disruption* and *Becoming truly digital*¹, success in the digital age often demands radical business model transformation. Long-term predictions may be fallible, but given the urgent need for change, there is still value in setting out scenarios for the near future.

Understand the potential threats to your sector, taking into account your existing business and ambitions as well as your unique product and geographical exposure. With the right strategic framework, c-suites can paint a useful picture of the near future and capture innovation from across the organization.

About this paper

Building on earlier KPMG publications in the *Thriving on Disruption* and *Winning with Technology* series, this paper aims to present practical ways to begin examining challenges and strategies, focusing on two example sectors and on key technologies impacting these sectors:

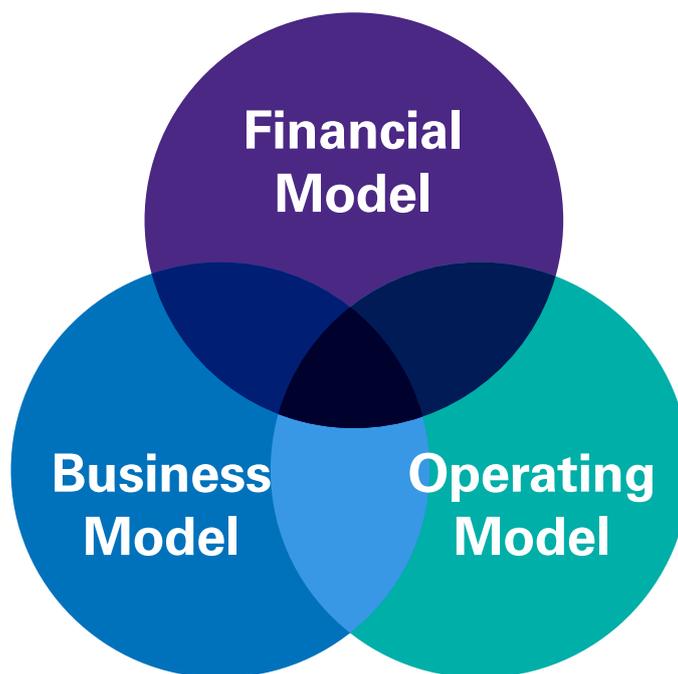
- Logistics and 3D printing
- Agribusiness and Internet of Things (IoT)/Robotics

We selected these sectors as both face substantial technological change and are likely to see huge business model innovation in the near future (although they are hardly unique in this regard). We took anonymized (composite) companies, large and small, in both sectors. KPMG professionals interviewed senior corporate leaders, academic industry specialists, start-up founders and KPMG strategists at length. Our aim is to show that a relatively simple approach can be used in any sector, and for any company size, to reduce the complexity of i4.0 to actionable insights – by debating interdependencies in your **financial, business** and **operating models**.

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Three lenses to structure our thinking – and the key considerations in each

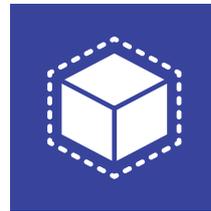


Consider:

- | | | |
|---|--|---|
|  Vision, mission |  Markets |  Core business processes |
|  Financial and non-financial outcomes |  Customers, channels |  Technology, operations infrastructure |
|  Ambition, constraints |  Propositions, brands |  Organizational structure, governance, risk controls |
|  Investment, capital allocation | |  People, culture |
| | |  Measures, incentives |

Logistics and 3D printing

- 3D printing may change the type and volume of goods transported, bring new customers and competitors, and blur lines between different players.
- Logistics players can integrate up and down the value chain.
- Companies may have to rethink their fleets, storage facilities and customers, with last-mile deliveries taking on greater importance.



3D printing is set to revolutionize the logistics sector

Logistics operators have a number of potentially high-impact technologies on their horizons, with 3D printing (also known as additive manufacturing) surely high on the list. As one observer puts it, 3D printing has the potential to be “the biggest single disruptive phenomenon to impact global industry since assembly lines were introduced in early twentieth century America.”² But what about the impact not on manufacturers per se, but on the logistics players that move goods from one factory to another, or from assembly line to your shop or front door?

Below is a detailed brainstorming process for two very different companies in the logistics sector, both facing the same technological developments but demanding different levels of response.

The two composite companies used:

1. An anonymized US\$50 million revenue composite of several smaller logistics players, with strong brand recognition within their home regions, direct arrangements with national retailers, and partnerships with some of their international peers.
2. An anonymized US\$2 billion revenue composite of typical larger, global logistics players with significant infrastructural investments, including in-house air freight.

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Logistics and 3D printing

Implications for the financial model

The possibilities unlocked by new technologies call for a significant rethink about what it is that logistics companies fundamentally provide – from ‘move X from A to B’ to giving a client what they need, where and when they need it.

Logistics players that ship 3D printing’s commodity inputs risk becoming increasingly irrelevant for certain high value products. This has immediate implications for large, long-term capital investments, and may start to really pinch industry margins in 5-10 years.

At the same time, investments that embrace and seek to become part of the disruption could well fail – with incumbents’ current momentum being a disadvantage when compared with start-ups building a new culture and infrastructure from scratch.

To get a sense of the right balance, we first need to brainstorm specific implications at the business and operating model level and apply these to the specific investment constraints of a company.

The potential for doing away with large amounts of upstream inventory is going to have a big impact on the logistics industry as a whole. I think there will be a lot less movement of intermediate parts within and from Asia, in particular.

– John Manners Bell, Chief Executive Officer,
Transport Intelligence Ltd.

Example responses

1. US\$50 million company in two markets

Our purpose is connecting our local communities – 3D printing should not be a threat but rather an opportunity for us.

The ambitious 5-year expansion plans for three new territories, underpinned by our traditional model, may need to be reconsidered.

If we are to remain relevant and leverage our limited investment capability and core strengths of local market relationships, we first need to understand the potential of this technology.

Then we should create a shortlist of ideas to pilot, and cost these out. We cannot afford to spread our investment thinly.

2. US\$2 billion company in 100 markets

We connect the world. While that global footprint is core to our identity, some expansions have come at the expense of quality and profitability. Our commitment to dividends is under pressure, while shareholders want a clear long-term direction.

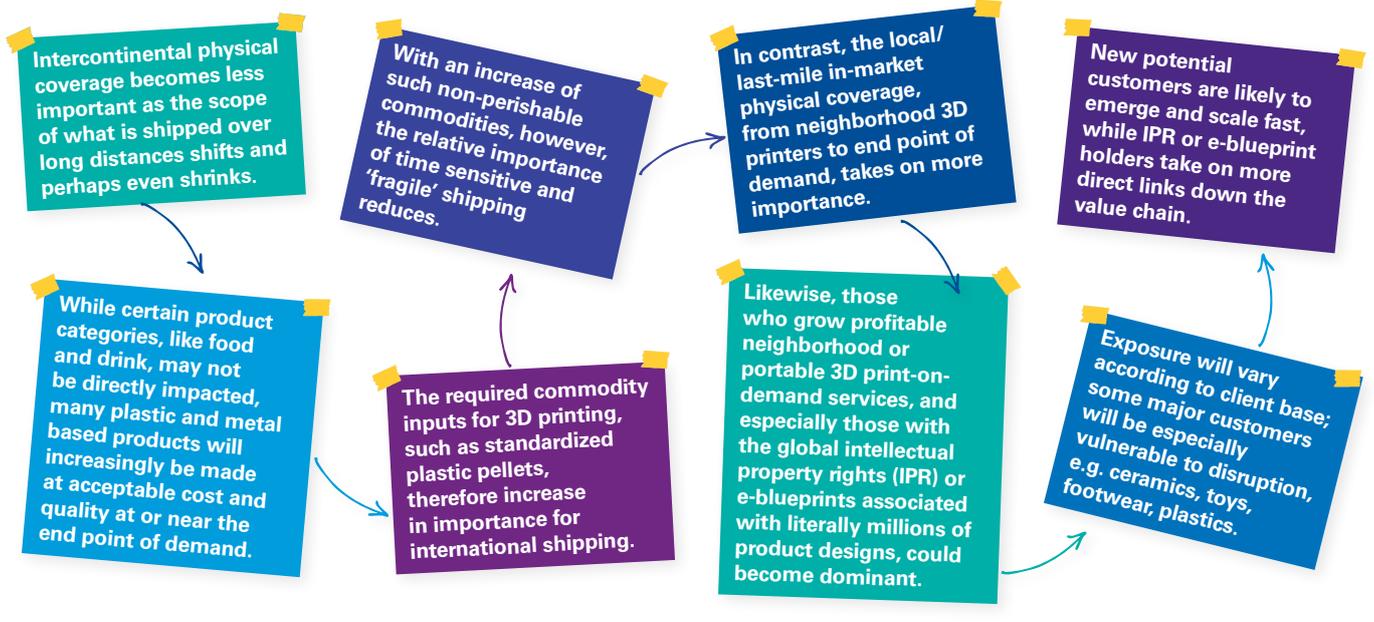
Under new leadership, we are not as constrained by previous investment decisions, and have been tactically considering our own-presence versus partnership options for some smaller territories.

3D printing’s potential to disrupt us fits well with this wider conversation about where we should be investing for the next 10+ years of profitable growth.

Logistics and 3D printing

Implications for the business model

Brainstorming



- Several existing propositions become threatened with volume decline, such as goods warehousing, forward stock storage, goods shipping, air freight, spare parts storage, and just-in-time delivery.
- Some existing propositions become more relevant, like last-mile delivery.
- Several new adjacent opportunities to leverage existing market footprint arise; for example, expanding into a 3D printing operation itself, or at least holding the value around product design libraries.
- Additional upsides include the opportunity to 'green' brands as efficiencies in transport density rise.
- Today's client relationship management may start to pre-empt client sectors most heavily impacted, prioritizing less affected sectors like food and drink.

The borders between industries are disappearing...a logistics company can do to a certain extent what some retailers do. At the same time, they can do what some manufacturers do...it wasn't 4IR which started this but it can accelerate it.

— Wolfgang Lehmacher,
Head of Supply Chain and Transport Industry,
World Economic Forum

One can't assume that logistics is going to be done by the traditional logistics providers.

— Jag Srai, Head of the Centre for International Manufacturing, Cambridge's Institute for Manufacturing

Example responses

1. US\$50 million company in two markets

We may only be in a handful of regions, but we are deeply embedded with strong brand awareness locally.

For those home regions, we want to become a primary intermediary in the value chain between product design and end consumer, be that at the expense of established manufacturers, if necessary.

We note the growth of on-demand localized 3D printing services such as 3D hubs and will consider whether to explore partnership opportunities or enter the space ourselves. We are also mindful of a number of pilots and new entrants seeking to dominate last-mile delivery (e.g. UberEATS in food, Zalando and Parcify in Belgium delivering online orders directly to shoppers' locations by bicycle³, and a handful of start-ups experimenting with street-level delivery robots).

We will now prioritize for piloting 1-2 of the following interrelated opportunities:

- short-distance express delivery from 3rd party scaled printer to consumer
- acquire or ally with local disruptive new entrants into last-mile sector
- print designs (we see a number of start-ups seeking to develop solutions in this area and, given our disadvantages compared to them, will consider whether a partnership would be more appropriate)
- local storage for printer raw materials
- integrated in-house printing and shipping services.

Meanwhile, we will invest in business development for less disruption-prone product categories and channels (e.g. coffee chains and hairdressers should be less disrupted than physical toy shops).

2. US\$2 billion company in 100 markets

We cannot focus on all 100 markets for this scale of sector disruption. This means we are now pausing on further international expansion, instead considering those core geographies where we have critical market share. Elsewhere we will form new alliances for global fulfilment obligations.

We will invest in a number of pilot programs, likely scaling 4-5 of these over time:

- specialized storage and transport for raw materials for 3D printers, to become a consolidator across manufacturers with industry-leading choice
- integrated printing and shipping services (perhaps replicate partnerships such as UPS and Fast Radius⁴)
- high street 3D print shops
- portable 3D machines and virtual warehousing of 3D print designs; given the popularity of pioneers like Thingiverse and Shapeways, we will consider specialization and differentiation relevant to our customer base
- short-distance, express delivery from scaled printer to consumer (highly-publicized trials by US tech giants and others use drones for this purpose, which might be appropriate).⁵

In parallel, we will set public affairs efforts towards understanding and influencing the latest developments in 3D printing-related regulatory and legal frameworks across our core geographies.

Logistics and 3D printing

Implications for the operating model

Brainstorming

Opportunity to integrate 3D printing with the fleet itself, in terms of on-demand, on-site bespoke supply-as-a-service (possibly with on-site tailoring/redesign).

Reduced part inventories needed for own fleet repair, replaced by mobile 3D printed parts on demand.

Specialist vehicles/facilities may be required for mass use of particular 3D printing materials.

- Cost savings may arise as the volume of standardized printer input rises, favoring bulk transport methods and/or improving pallet or container densities.
- Truck traffic patterns may shift toward smaller vehicles, with an emphasis on regional or local deliveries and fewer long-hauls.
- Reduced infrastructure requirements for goods storage and international goods transport.
- Growing importance of last-mile logistics and of disruptive new entrants (e.g. Uber) requires enhanced data collection and analysis capabilities.
- Uncertainty over legal responsibility for defective 3D printed products.
- Major investments in 3D printing technology may be required to facilitate new business models.
- New measures required to track and minimize product failure from print to handover, if taking on 3D printing in-house.
- Shift in skills required from man-hours on transport to man-hours on product redesign, consumer and design company relationships.

There are opportunities for logistics companies out there. What 3D printing is going to allow is postponed manufacturing, so intervention at a much later stage in the supply chain. Logistics providers have an opportunity because they are much further down the supply chain in terms of where their facilities are located, very much closer to the customer, so they are going to be able to undertake customization of products with high usefulness to end customers.

– John Manners Bell, Chief Executive Officer,
Transport Intelligence Ltd.

...you need good scouting, you need good relationships with start-ups; go there and see what is out there...you need networks of leading companies testing, experimenting with technologies, so that you say 'OK, we have identified this issue, we think this tech fits, does it really work?'

– Wolfgang Lehrmacher,
Head of Supply Chain and Transport Industry,
World Economic Forum

Example responses

1. US\$50 million company in two markets

Whichever business model pilot is prioritized, we are going to have significant operating model change. At this stage, we see the major challenges as:

- long-term reconfiguration of real estate portfolio (we see an opportunity in platforms like Flexe, the warehousing marketplace, which allow us to monetize excess warehouse capacity during this reconfiguration stage)⁶
- reconfiguration of fleet, emphasizing local delivery, smaller vehicles (but mindful of large outlay now with electric, autonomous vehicles and drones possibly commercially viable within 15 years)⁷
- building a new skill set (even a new culture) from scratch around lower volume, more complex, harder-to-replicate service categories.

2. US\$2 billion company in 100 markets

While exact operating model changes will reflect our decision on the pilots, we see large-scale transformation of our global operations as a necessity. This likely involves:

- embedding 3D printer networks within our existing network (e.g. 'end of runway' printing, used by UPS with its investment in 3D printing start-up Fast Radius; spare parts printing rather than warehousing – we are conscious of high profile moves in this area with, for instance, Daimler allowing 3D printing of spare parts for its trucks and Deutsche Bahn also commissioning printed spares)^{8,9}
- shift in exposure towards less time-sensitive bulk transport (e.g. pellets) and away from mail and small item warehousing
- early adoption of cost-efficient, last-mile technologies, like drones
- building or more likely buying the new skill sets required, and then finding the right balance between autonomy and integration.

Agribusiness and IoT/robotics

- IoT should bring greater supply chain transparency but collaboration may be necessary to invest in and share outputs of IoT.
- Agri producers and processors risk becoming commoditized as Artificial Intelligence (AI) know-how grows.
- Incumbents need new skill sets and they may need to partner with start-ups and revisit organizational structures.



Riding the agtech wave

The Irish Farmers Journal / KPMG in Ireland paper *Agri-business, Summer 2018*, highlights a 'global agrarian revolution'¹⁰, as the agricultural sector embraces the potential offered by a range of new technologies, including robotics, IoT sensors, AI and data analysis.

Together, i4.0 technologies could radically change efficiency and productivity. The business opportunity has not been lost on investors; according to Agfunder.com, investment in agricultural technology (agtech) increased from US\$100 million to US\$10 billion between 2005 and 2017. Agri players up and down the value chain will need as much visibility as possible of new technological use cases, opportunities, and threats.

The two composite companies used:

1. An independent, anonymized US\$5 million revenue producer of dairy and fruit.
2. A larger, anonymized US\$5 billion revenue composite of several dairy and meat processors.





The investment in IoT sensors and robotics is a relatively small part of the total technology investment in agribusiness to date. This is because it is hard to create solutions that can be easily replicated across products and growing environments. We have had this discussion with New Zealand companies that have designed a great solution for the local dairy system, for example, who want to go and take on the world, but – apart from somewhere like Ireland – the system is often not relevant in other markets without major retooling, limiting potential, as each installation has to be bespoke to its environment.

– Ian Proudfoot, Global Head of Agribusiness,
KPMG International

Agriculture has always changed but the pace of change is getting quicker. Because of the demands for increased productivity or lack of sufficient labor, robotics may be the farm machine of choice in the future. Farming has the potential to become far more resource-efficient and environmentally friendly on existing farmland, by using new technologies such as artificial intelligence, robotics and sensors that collect and analyze data. This would be the great benefit for the primary producer.

– Eoin Lowry, Agribusiness Editor, Irish Farmers Journal

Agriculture is still largely greenfield when it comes to digital adoption, although we are beginning to witness significant opportunity in the sector.

– Piers Hogarth-Scott, National IoT Practice Leader,
KPMG in Australia

The agri majors are aware of the disruption out there and are seeking to participate in it through venture investing, partnerships and licensing activities. But there are a lot of corporations that are not, that are moving quite slowly, and they are the ones that risk being disrupted by start-ups and other innovators.

– Michael Dean, co-founder, Agfunder

Make sure you've got a full understanding of the costs as well as the savings if you're buying into complex technological offerings; in some cases the net savings won't stack up when you factor in the new complications they bring.

– Ian Lahiffe, General Manager,
Allflex Livestock Intelligence, China

Agribusiness and IoT/robotics

Implications for the financial model

The implications below reveal the extent of disruption that may occur across the food and beverage value chain – not just for processors (who themselves have been disruptive forces in the past), but also at the farm level, where change has been more gradual for much of the past two centuries.

Major beneficiaries of this change should be new players that capture, aggregate and act on data. Where does this leave the ambitions of producers and processors? What if data, and the capital to enact on it, become bigger advantages than multi-generational farmer know-how? Will the intellectual property (IP) around IoT and robotics extract value at the expense of processor margins?

Similar to the earlier example, this implies a significant rethink on the purpose of processors and sole producers.

While some sole producers have flourished in recent decades, those with marginal profits, often with historic ties to their land, do not sell or exit in the same quantities seen in some other sectors. As fragmented suppliers, they have limited bargaining power with processors, and limited capital for investment in new technology. How can they maintain and grow margins?

For processors, how can i4.0 complement other factors, like provenance and branding, to provide an escape from the race to ever-greater scale? How will IoT and robotics investments be funded without impacting sales and marketing focus?

To get a sense of some of the trade-offs here, let's brainstorm implications to the business and operating models, and apply these to the specific investment constraints of two very different players in the value chain.

For us in Korea, agriculture is a labor-intensive business. In terms of technology for operational excellence, the big opportunity is labor reduction by robotics. Once a significant operational excellence is achieved, then the CEO starts to think about IoT, data analytics and other forms of optimization leveraging new digital technologies. Wherever human resources are an issue and a business or a process is largely dependent on manual tasks, robotics will work, leading CEOs to use more digital technologies.

– Mun-Gu Park, CoE of Digital Transformation for Management & Risk Consulting / Tax Technology, KPMG in Korea

Most people recognize that the future of industries will be ecosystem driven with significant sharing and partnering. Companies need to adapt because they have these initiatives, but many are failing to scale across the enterprise or link through to outside players.

– Michele Hendricks, Global Executive for Industrial Manufacturing and Executive Director for Global i4.0, KPMG International

Example responses

1. US\$5 million sole producer

We are proudly family-owned – providers of quality produce but also long-term custodians of our land.

Non-financial outcomes are as important to us as profit:

- We are wary of taking on large debt, but also realize that there is a risk in being left behind on pricing without the efficiency gains that new technology can bring
- We will need to explore smarter ways of gaining from new technology, avoiding financial stress and only giving companies our data in return for clear value
- Investing in new cutting-edge technology will be difficult for us, but we are aware of leasing solutions and machinery sharing platforms, such as FarmLink in the US, and of innovation in finance with banks and insurers designing credit and risk products for customers of IoT platforms. All of this opens doors for us to embrace innovative technology we might have thought unaffordable.¹¹

2. US\$5 billion processor

We are here to bring taste and nutrition to the globe, without compromising the sustainable farming practices of our suppliers.

- We play in a competitive international marketplace. Being smaller than our foreign competition, we lack economies of scale. We make up for this in our diversified approach to products, geographies and, increasingly, a realization that portfolio-style investment in new ideas will determine the group's trajectory
- We see major acquisitions in our sector, including DowDuPont's acquisition of Granular¹², a farm management software start-up, and John Deere's acquisition of Blue River Technology¹³, which produces smart farm machinery enabled with AI and computer vision. Cargill's recent investment in Irish visual recognition company Cainthus is another interesting hedge against disruption available to agtech majors¹⁴
- With substantial start-up activity and, in some cases, very rapid growth, we need to up our game on building links into the start-up community and identifying strategic targets
- We see the rapid emergence of new markets signaled by the growth of companies like the Dutch Protix Biosystems, French Ynsect (insect proteins) or Californian Impossible Foods (plant proteins).¹⁵ We will look for opportunities to expand our product portfolio into those markets with growth potential and brand complementarity.

Agribusiness and IoT/robotics

Implications for the business model

Brainstorming

Far greater transparency and information around product origin will be possible and will be demanded by consumers.

Beyond transparency for the consumer, transparency may also benefit players throughout the value chain, as well as regulatory actors. Consider the opportunity for distributed ledger (blockchain) to combine with IoT to enable constant conditions tracking through harvesting, shipping, processing and distribution.

Far greater standards of efficiency (over 1bn tons of spoiled food annually at present¹⁶) and environmental stewardship will be made possible by IoT and will consequently be demanded by multiple societal actors. This may become a branding and quality/taste differentiator both when selling into channels (e.g. retailers and foodservice) as well as the end consumer.

- Data transparency and a blockchain approach should enable the personalization of brand story and provenance down to individual farms, or at least specific regions (e.g. milk pools). For example, think of a consumer who scans a carton of fruit yogurt with their phone and sees information and images of a grass-fed dairy farm in the relevant milk pool, along with the specific fruit orchard.

If you're making investments in these platforms you should integrate a number of technologies, and 'swap out' and 'swap in' technologies as the ecosystem evolves. You need flexibility and agility.

— Piers Hogarth-Scott, National IoT Practice Leader, KPMG in Australia

I would try and go with established companies rather than start-ups. There's a lot of start-ups in the agtech space and frankly I think a lot of them won't work and aren't going to make it, as it is so hard to prove concepts and bring them to market in agriculture. You need to make sure there is appropriate support behind the product; try not to be a guinea pig and try to focus on solutions that are supported.

— Ian Lahiffe General Manager, Allflex Livestock Intelligence, China

The days of going to one solution provider for a comprehensive solution are probably over. The IoT is an ecosystem play like no other; there is no single vendor that can deliver an end-to-end solution. By definition it requires multiple technologies to come together to provide a holistic solution. And that's where interoperability is so fundamental.

— Piers Hogarth-Scott, National IoT Practice Leader, KPMG in Australia

Example responses

1. US\$5 million sole producer

We need to develop an awareness of, and take advantage of new product and brand opportunities:

- We see the interest in farm-to-fork and will look for new online market places to connect directly with consumers
- We do not have the scale to compete on price. Rather, we play to our strengths of local heritage, sustainable and high welfare standard techniques and quality produce
- We sell unprocessed produce into local retailers and sell into processors for value-added produce to international markets. We want to increase sales in both categories, as sustainable farm yield allows
- We will work out some budgets for a shortlist of specific technologies that have been suggested to us or that we have seen at recent agri fairs. We won't be able to afford everything at once, and we will be open to sharing related costs where possible
- We see Business Farmers Network in the US has become one of the world's best-funded tech start-ups and has won many fans to its online information sharing portal and marketplace, pooling data to give producers new efficiencies and productivity gains. We will examine the use case for us or the existence of similar offerings in our markets¹⁷
- We are aware of success stories like The Yield in Australia¹⁸, which is just one of a number of companies offering producers opportunities to radically enhance productivity and efficiency¹⁹; we will seek the highest ROI smart solutions for our own operation.

2. US\$5 billion processor

We see branding and efficiency opportunities in IoT and robotics, both in what we do and in our ability to influence what our suppliers do.

We also see the risk of becoming a commodity processor, where data sits with disruptive start-ups, while less price-sensitive customers want a direct, provenance-driven relationship with our suppliers.

We will therefore ring-fence an investment fund – sitting outside of our core business and not impeded by our way of doing things. It will invest in start-ups where we see a clear play for us or for our suppliers:

- We note large funding rounds for ambitious agtech companies (e.g. Ginkgo Bioworks securing US\$275 million Series D from the likes of Y Combinator and Bill Gates²⁰, and a US\$200 million Series B round for Californian indoor farming company, Plenty²¹)
- Many successful start-ups in our sector will aspire to build standalone businesses to compete with the majors, rather than seek acquisition. We will need to develop our own incubator and means of investing early in promising start-ups.

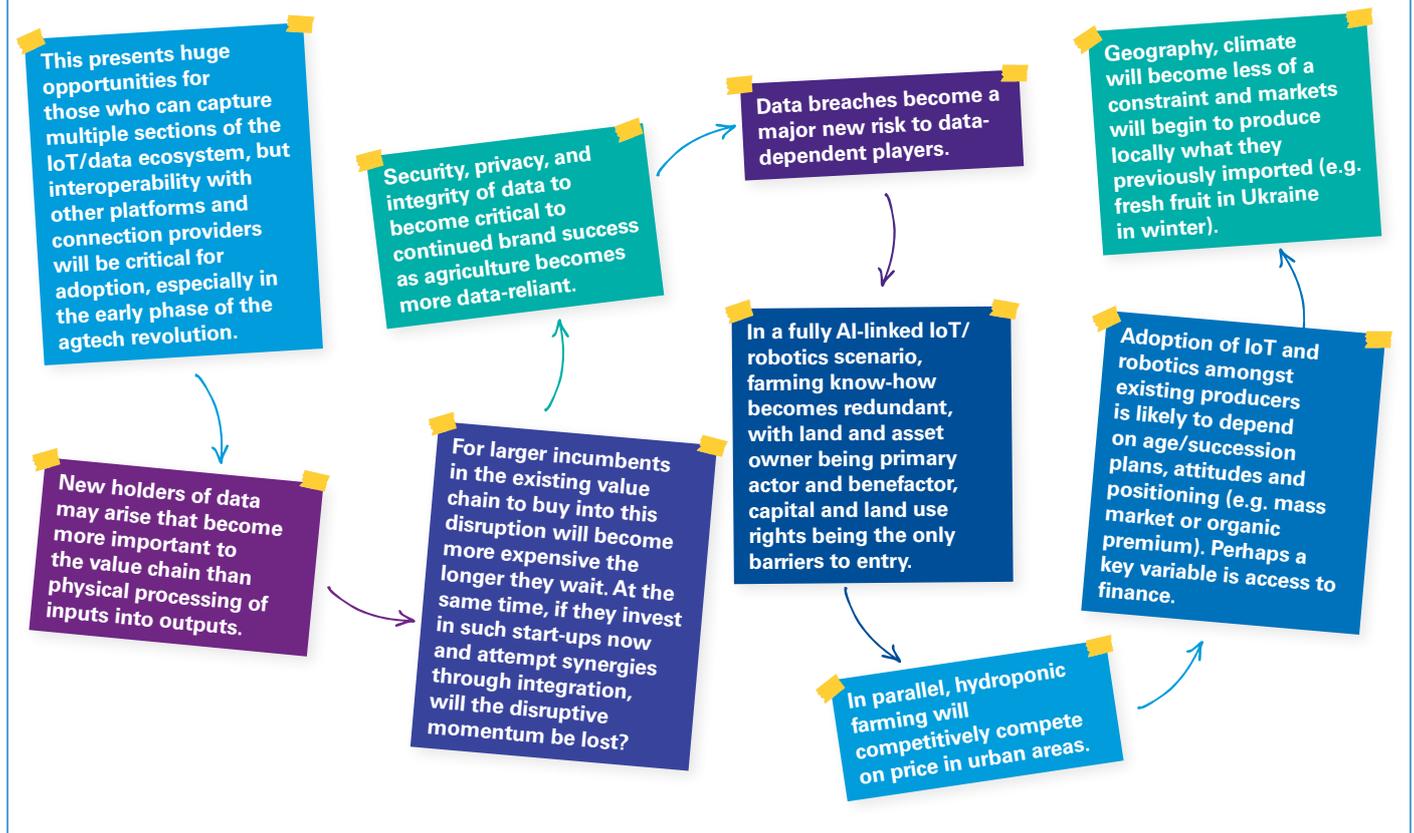
Where such investments are a success, we will gain revenue synergies. For example, we are currently looking at an IoT player which we could use to sell sensors into other processors, in turn, building a proprietary benchmarking database across a number of food processing categories.

As our supplier base is fragmented and has neither the funding nor need for 365-day coverage of some of these new technologies, we are also considering a financial services arm focused on leasing and farm robotics 'as a service'.

Agribusiness and IoT/robotics

Implications for the operating model

Brainstorming



- Labor requirements are likely to fall substantially for a range of producers.
- Experienced hires in data analysis, innovation and platform construction could become as important as direct experience of farming or processing.
- At the farm or producer level, a fragmented and often cash strapped cohort should seek greater innovation to finance access to these new tools.
- If anyone is able to farm a fully autonomous plot, and get more out of increasingly marginal land, then new geographies and producer profiles may enter the fray to increase competitive intensity and undercut on price.
- Most players at the producer level will likely build their IoT arsenal over time, while more aggressively funded new entrants may attempt to take market share through price and brand distinctiveness.
- Building alliances with other players in the IoT ecosystem should help to realize maximum value within the value chain.

Example responses

1. US\$5 million sole producer

We see a number of practical steps:

- We will consider reassigning acreage to products with greatest potential for yield increase as a result of IoT-enabled farming
- We will have to educate ourselves and our workers on IoT-related data use, including cyber security considerations
- We will look to swap input and yield information with other farmers in our region.

While data collection and sensor investment/installation across farm operation will be permanent, certain robotic investments only make sense on a pay-per-use model.

2. US\$5 billion processor

With diversification of our portfolio into data/IoT and financial services, we would need to reconsider our optimal group structure, including its governance, GDPR²² and other shared risk controls (e.g. how to confine the impact of a start-up's bankruptcy), not to mention an optimized group tax structure.

Our existing IT team has not been designed for this diversification. Realistically we will have to develop integrity standards/internal regulations, as well as strategic alliances with threat analysis providers, to enhance data protection. We will keep an eye on the emerging generation of Governance, Risk and Compliance solutions. We want to avoid being in a winner-takes-all battle for a single common data exchange or communication standard. Interoperability will be key.

- The requirements of an IoT system rolled out across suppliers are probably beyond that of the existing rural telecoms networks. We need to engage the telecoms sector, and potentially state bodies, early on
- We see data breaches in other industries and no wealth of cyber security activity in agtech; we will explore this opportunity with a view to cornering a share of what we think will be a major market.

While we can buy in the new skill sets required, retaining them, and striking the balance between a group culture, and start-up creativity, will be tough. We will need to revisit our organizational structures, career programs and pay-scales.

We will also need to rethink how we sell and how we engage with stakeholders. As our farm suppliers also become our customers, how can we best educate them and bring them along with our ambition? Our existing supplier relationship managers, for example, may not be best placed to sell pay-as-you-go data or robotic services, but their network role will need to be encouraged through cross-sale bonuses.

If you can put a man on the moon you can get a machine to pick a strawberry.

– Tom Coen, Founder of Octinion²³

The inherent vagaries of biological systems mean technology is likely to augment – rather than replace – the intuition of farmers. The algorithms needed are unlike those of other industries, they are often geographically specific, making it a costlier and more time intensive process.

– Ian Proudfoot, Global Head of Agribusiness, KPMG International



In terms of companies providing IoT solutions it's the Wild West right now. You have a rich ecosystem of emerging start-ups and established players.

– Piers Hogarth-Scott, National IoT Practice Leader,
KPMG in Australia

There are opportunities in areas like northern China and Ukraine where winter season is terribly cold, and therefore new digital technology packages will allow cost-efficient business models for producing fresh fruits and vegetables within nearest reach to markets. We see opportunities for Korean agribusiness to develop new markets by exporting these digital agtech packages.

– Mun-Gu Park, CoE of Digital Transformation for
Management & Risk Consulting / Tax Technology,
KPMG in Korea

If you're thinking narrowly about i4.0 in the tech space you're probably getting it wrong. To unleash greater value you have to think strategically about it. Companies should be asking: 'what performance are we trying to drive? How does my business model need to change to be more competitive?' And then look to the technology as the enabler or accelerator.

– Michele Hendricks, Global Executive for Industrial
Manufacturing and Executive Director for Global i4.0,
KPMG International

People want traceability and efficiency in the supply chain and of course at the high level those are advantages that come from data sharing, but for many producers you're giving away your advantage by offering up full data transparency. People need to be careful about who they share their data with; I've seen quite a lot of squeezing of suppliers going on.

– Ian Lahiffe, General Manager,
Allflex Livestock Intelligence, China

Both the risks and opportunities that come with these tech disruptions are on our Board's radar. We have active working groups assessing the cost and potential of greater use of technology, such as robotics and IoT.

– Frank Stephenson, CEO, ABP Food Group



Recap

The various examples in this paper, using a simplified version of the KPMG strategic framework across financial, business and operating models, show the initial thinking of sector incumbents. Of course, these thoughts are likely to only be as good as the business cases, budgets and implementation programs that follow them. Our intention is to show that your Board can derive value from moving beyond vague conversations on disruption. Instead, set aside time for targeted workshops to brainstorm possible responses to specific technologies or themes – and then hand over to the relevant teams to flesh such ideas out and report back.

Don't expect all ideas to be winners – even those that go to full pilot stage may well fail – but quick failure on what won't work may still be better than doing nothing.

If you want to be a leader in your space, you cannot take the 'wait and see' approach. There are always new emerging technologies that disrupt the market every year and could benefit your business. If you do not stay ahead of these emerging technologies and understand how they impact your business, you may not be a leader in your space for long.

– Greg Corlis, Managing Director,
Management Consulting | Technology Enablement,
KPMG in the US

This raises an important point, implicit in the sector examples discussed above: timing. As a growing body of literature testifies²⁴, it is easy to invest too early in disruptive technologies – not least when the wider ecosystem necessary to support a technology is not yet in place. A simple illustration of this from the above examples would be the limited value of blockchain in agribusiness, without first having a critical mass of IoT sensors (and supporting controls and processes) along the value chain to provide the necessary and reliable input data. But arguably, the IoT capability already exists²⁵ – the missing piece is the coordinated deployment across multiple companies in a value chain. In short, for both sector examples reviewed here, we believe significant disruption is now in the 5-10-year horizon.

Companies are stressed, they need quick results. But to do a proper i4.0 transformation you should really be thoughtful about it. What we've found with our clients is an abundance of pilots, often isolated to a single function or plant. They're missing the massive opportunity that comes with cross-functional – and broader value-chain – connectivity.

– Michele Hendricks, Global Executive for Industrial Manufacturing and Executive Director for Global i4.0,
KPMG International

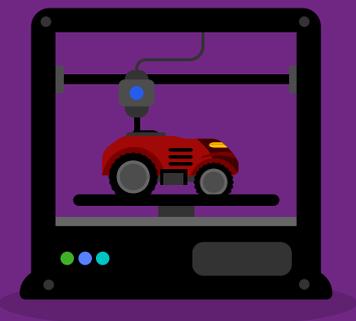
A practical call to action

The call to action is, in one sense, the same for all businesses: be vigilant and diligent in monitoring and assessing new technologies, and understanding what they mean for you.

Practical next steps:

- 1. Engage leaders:** If you do not already do so, build in formal Board and senior management time to discuss the technologies and disruptive forces in your ecosystem
- 2. Understand the environment:** Such sessions should be more productive if your strategic or markets team have already mapped the disruptive landscape and provided an initial threat assessment (not to mention if your management culture encourages and incentivizes those across the company hierarchy to raise new ideas)
- 3. Get the timing right:** Allow for a 'hype curve' with all new technologies. A 'watching brief' may be an adequate response for technologies that are further out – but especially for those that are already gaining traction, be proactive in charting out brainstormed financial, business and operating model implications, including the shortlisting of potential pilot responses – which may well include courting the start-up scene
- 4. Create a roadmap:** Task the relevant teams to collaborate, to determine how pilots or immediate strategic responses may look in practice – articulated in sufficient detail across financial, business and operating model levers to include realistic budgets, owners, timings and implementation plans.

Don't fall into the technology trap – investing in a technology without clarity on how it sits within and supports your overall strategy leads to expensive mistakes. Executed well, this process should provide any business with a specific call to action unique to its circumstances.



As an example, a possible action plan for a US\$5 billion multichannel processor:



Ring-fence an investment fund for strategic investment in agtech start-ups.



Finance and build a new financial services offering focused on smart farm tech.



Seek cutting-edge data protection/ cyber security tools and personnel.



Task the public affairs team with specific goals related to IP, data, and rural connectivity.



Task HR with developing a pool of expertise in, at a minimum, data science and innovation, and embedding a new level of technological familiarity across senior management and the Board.

As these initiatives evolve over the next 1-2 years, some may justifiably be dropped, others may be successfully developed in-house or bought in, while others again may open a door to new strategic alliances.²⁶

Whatever the eventual mix of innovation to results, the ground appears to be shifting beneath our feet; those who do not pre-empt change risk being marooned.

Sourcing & notes

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