

Digital Transformation of Food Quality & Safety

How COVID-19 accelerates the adoption of digital technologies across the food supply chain



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Foreword



The European Union is today, in October 2020, a very different place from where it was in October 2017, when a call for proposals was launched that resulted in the funding of the TheFSM - The Food Safety Market project (among many others). We are now a Union that is planning its recovery from the most severe health emergency in our history, an emergency that has affected our economy very negatively.

And yet, the objectives of the TheFSM - The Food Safety Market project are all excellent examples of the potential of the 2020 European strategy for data, which is central to the digital plans that form the second pillar in the Union's growth strategy underpinning the recovery.

In its European strategy for data, the Commission has committed to promoting the development of common European data spaces in strategic economic sectors and domains of public interest. The goal is to make these sectors safer and more efficient by establishing rules and infrastructure that would allow for valuable insights to be extracted from data assets collected and shared by those who work in these sectors.

The objectives of TheFSM - The Food Safety Market are in line with this vision. The project is exploring how data management technologies can be used to integrate the processes of independent certification operators along the entire food chain, from production to processing. This will be done by harmonising data representation schemes (interoperability and standards are an important part of the European Union's data strategy) and by creating a platform for data assets, where demand and offer can meet and be managed in a secure way and at a very large scale. To the extent possible, the platform will also manage legal issues related to data ownership and usage rights by hosting digital versions of contracts.

This goes to show how important policy directions of the European Union are often preceded by years of work of our best scientists and technology developers. These identify both opportunities and technical challenges for the benefit of the technology adopters and policy makers who can then form better informed opinions on what is possible and what is necessary to bring the greatest collective benefits to the citizens they serve.

Gail Kent

Director Data, European Commission - DG CONNECT

Note from the editor



The COVID-19 pandemic has a tremendous effect on the food supply chain. The lockdowns brought along inevitable disruptions and shortages. But they are also shifting demand from traditional, brick-and-mortar channels to digital, e-commerce ones. This creates completely new forms of challenges to the people that try to ensure that safe and healthy food is delivered to consumers around the world.

It has also resulted to a radical digital transformation of the food supply chain. As part of our EU-funded innovation project "[TheFSM - The Food Safety Market](#)", we are exploring ways in which food safety and quality data exchanges may become more automated, straightforward and interoperable. The aftermath of the pandemic makes our work even more timely, even more relevant. As [Rob Leclerc from AgFunder](#) recently noted: "Five years of change in our food and ag system will happen in the next five months."

During the lockdown measures, thousands of food safety and quality professionals around the world have been mostly working from home. They have been trying to ensure that the food products of their businesses – food manufacturers, distributors and retailers – are healthy and safe. This led to a drastic change to the way that they do their very important job. They still need to perform their everyday hygiene and safety monitoring tasks.

They often can only rely on digital tools to monitor whether any food safety incidents have occurred in their supply chains. They need to perform fast and efficient supplier audits and facilities inspection using big data and digital software tools, from a distance. Significant data exchange needs to take place in a digital form, through secure and trusted software platforms.

We wanted to understand better which changes we should expect in the near future. We therefore reached out to the community, asking distinguished colleagues from a variety of supply chain stakeholders about their opinion: what is the effect that this pandemic has in terms of digital transformation? It started as a series of informal interviews for [my food and intelligence blog](#). It has evolved into a quite solid discussion about the future of food risk monitoring and prevention - especially in terms of digital technologies and tools.

I would like to thank all the contributors for their valuable opinion pieces. By this volume, I think that we only offer a glimpse at the wealth and variety of challenges ahead. It therefore intends to spark and continue the ongoing conversation on the topic. Hopefully giving us better insights to a future that is already here.

Nikos Manouselis
CEO, Agroknow & TheFSM Coordinator



Nataša Matyasova

Vice President, Head of Quality and Food Safety, Nestlé

Which changes do you see coming in your work after COVID-19?

Acceleration of digital. With millions of people in complete or partial lockdown, the pandemic has forced society and therefore companies to quickly and dramatically change how we work, communicate, socialize and consume products & services.

Increased need for transparency. Data analytics combined with artificial intelligence became a vital source of information from our consumers, customers, and suppliers and helped us improve our internal processes to ensure quality and food safety all the time. The acceleration of e-commerce and cross-border commerce has even further highlighted the need for transparency and data sharing among all the players in the value chain.

Remote ways of working. Social distancing created a new constraint that has led, and will continue to lead, to rapid development and adoption of remote diagnostic, management and collaboration solutions. This will result in the emergence of “virtual technical support teams” that is a team of specialists connected remotely in order to guide and support onsite factory personnel.

Which are the tasks that seem to be requiring the use of more digital tools and technologies?

Although Nestlé’s digital transformation started some time ago, the pandemic accelerated adoption of digital solutions as there was a need to keep the operation running and produce safe food while still respecting lockdown orders and travel bans.

Regarding the increased need for transparency, understanding the origin and flexibility of supply was paramount to ensure continuity of the business and deliver safe food to our consumers despite border closures and supply chain transport challenges.

Social distance is driving an entirely new way of working. Remote solutions for troubleshooting, site visits, improvement programs and verification activities were quickly developed and quickly adopted by our Operation teams across the entire value chain. The current infrastructure to manufacture food products requires people to be physically on-site. Operators run machines. Maintenance staff maintain and repair machines. External vendors and contractors need site access to provide services that support a significant portion of the operation.

What do you do to address this need? What kind of tools and technologies do you use more?

The economic and social downturn caused by COVID-19 will create a much deeper divide between manufacturers who have just started to digitize and those who are much further ahead on their digital journey. In the past decade, advances in Artificial Intelligence and Internet of Things technologies have enabled tremendous efficiencies in predictability, capacity, availability and flexibility of supply chain and manufacturing operations, mainly in the area of automotive, online retail, media and high tech. Per McKinsey, companies that were early adopters of these technologies early are already seeing a 7% revenue growth advantage over their peers.

Data ownership and management. In 2017, the Economist announced that data has become the world’s most valuable resource. The COVID-19 pandemic has highlighted the absolute necessity to have access to reliable and real-time data in order to coordinate the correct operational response. In the near future, we believe data will become an even more strategic resource across multiple facets of business and society. We need people with the capability to interpret big data and make risk-based decisions. In situations where there is more data than a single person can evaluate, there will be a greater reliance on Artificial Intelligence to guide, or in some cases, make decisions for us.

To achieve full traceability, a combination of solutions including but not limited to blockchain are needed to enable the various parts of the value chain to exchange information securely. The challenge with achieving full traceability really highlights the need for interoperability of the different blockchain solutions and requisite data standard alignment to really move the needle.

Connected Workers. For manufacturing @ Nestlé, greater connectivity will mean a significant acceleration of the deployment of Industrial IoT, including sensing, data visualization, remote collaboration tools and AI-based insights across our operation. Control-tower view of data and insights across the whole manufacturing & supply chain operation will likely become an important component of day to day operations. However, the real impact of COVID-19 has been on people. The best way we can equip people to deal with a constantly - and sometimes abruptly - changing environment is to develop a new learning mindset in our employees. The quick adoption of new, advanced technology will mean there is a greater need for reskilling and upskilling. It is also likely to lead to an acceleration in the creation of new roles. At Nestlé, through 'Connected Workers' our aim is to design solutions that support our frontline operators around the following three dimensions, which have a direct impact on Food Safety and Quality of our products:

- Informed decision making – “Making use of data and information to make evidence-based decisions”
- Fast execution – “A willingness to move quickly, often valuing speed over perfection”
- Connect with my community – “Rapid access to information to do the job”

Remote working. A time of fear and uncertainty has been compounded by a totally new routine – everyone who can, must work from home. Practically, we've gone from digitizing the relationship between the Company and customer to digitizing the relationship between employer and employee. We are building more adaptive teams that are more frequently in touch with each other. This period of uncertainty has required each of us to be more supportive of one another. Control has to some extent given way to trust being guided by common purpose to deliver safe and high-quality food to the communities.

Remote working presented various challenges and rapid solutions. We required simple and easy to use tools to virtually access all parts of our operation. We had to overcome poor connectivity and WIFI coverage at some of our manufacturing sites, increase internet bandwidth and introduce new streaming tools. We had to learn how to communicate efficiently across the globe despite the different time zones. New digital e-training modules were developed to replace face-to-face workshops and trainings. Virtual Reality became the “new” reality.

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Practically, we've gone from digitizing the relationship between the Company and customer to digitizing the relationship between employer and employee

Is there an area where digital technologies still fail to deliver? Where do you still see a need for more appropriate and efficient tools?

People. Technology will continue to evolve at an accelerated rate. Our challenge remains to ensure we develop the competency of our people at this pace. We must recruit for new skill sets and train current employees at the same time. This cannot be done by industry alone. We need governments and education support across all generations of employees. We need our leaders to adjust their styles to lead remote teams. We need flexibility and adaptability to accelerate change management while remaining focused on the key principles that guarantee food safety and quality.

Software and Tools. As we rely much more on data, interoperability and enforcement of clear data standards is a must. Support from regulators as well as the right incentives will be a key enabler. Data must be exchanged across value chains, across all geographies and industries. Big data needs to be analysed by proper tools and artificial intelligence to make fast and accurate decisions. Food Safety today cannot be ensured by only the expertise from yesterday. Predictive tools enabling real time risk-based decisions must be developed and deployed with great speed. Infrastructure. Access to highly efficient IT networks is a new norm. Without this, no digital technologies will work. Secure remote access will become key to enable remote way of working. Any failures in infrastructure may have a negative impact on Food Safety and Quality of our products as we will have less direct people involvement in processes and many verification activities will be performed remotely.



John Carter

Area Europe Quality Director, Ferrero

Which changes do you see coming in your work after COVID-19?

The production of food defines our world. The effects of agriculture on our daily lives are so omnipresent that they can be easy to overlook; landscapes and societies are profoundly influenced by the need to feed our growing population. But much has been taken for granted. Only occasionally are we forced to consider: “where does our food come from?”.

This has recently been accentuated by the COVID-19 crisis. The global pandemic forced populations into lockdown, and the social effects have been manifold; indeed much may not yet be apparent. The economic activity of our society shrank to its essentials. Healthcare professionals, of course, were deemed ‘frontline workers’... but the food industry too stepped up and delivered. Farms and factories around the world maintained operations and continued to fulfill obligations to their supply chains. Retailers adjusted their practices to minimise risk but ensure a safe, continuing food supply to their customers. Consumer behaviour changed, focusing initially on pantry loading with trusted staples and, later, on home food preparation (as the Horeca sector struggled).

In this context, technology has played an important role in enabling business continuity in a new reality. Some of the changes to the ways of working have been common to all industries; the switch to remote working was sudden and forced, but teams quickly adapted thanks to the ease of use of virtual meeting technology. The food industry, being so ‘traditional’ is often one of the slowest to adopt new trends, so this crisis in fact enabled a step change in practices and indeed culture. This embrace of the possibilities of remote working will have ramifications after the crisis.

So, we have updated both our technology and our attitudes to the possibilities of remote working. The tech part has been quite smooth; the cultural aspect has been interesting... this necessitated a new discipline of

communication and transparency which, coupled with a sense of solidarity against a common foe (the virus, not the auditors!) engendered a strong team spirit.

Which are the tasks that seem to be requiring the use of more digital tools and technologies?

The adoption of face-to-face video communications has enabled regular visibility between corporate central teams and factories. Decision making was necessarily swift during the crisis, and discipline coupled with a pragmatic will to make things happen allowed companies to do the right thing – quickly. This was formally enabled by the ability to use online signatures in derogation and non-conformance management (e.g. docusign). Days before the lockdown, we were still physically printing, signing and scanning such documents. Now the process is much quicker and indeed more disciplined and robust. Video communications as a technology was also transferred to the quality audit process. A total ban on non-essential travel required auditors and auditees to adjust to the new tech; and adjust they did. Again, goodwill and trust on both sides has allowed high quality audit reports to be prepared (on reading them, most people would be unable to distinguish between a remote or a physical audit). A physical audit will probably always be necessary in some form, at some frequency, but is fair to say that the virtual alternative is now a valid and realistic option. A few physical audits did take place, and to replace the traditional ‘shouting questions into the ear’ model of factory communication, many sites invested in headphones and radio sets to facilitate clearer discussions. Video communications are moving as well; initially, meetings were desk bound, transferring the conversations from the office desk to the home office. But the possibility of connecting via smartphone has added the possibility of mobility. And if you can

talk and move – well, you can move and work. As economies re-open, the positive habit of using smartphones while connected can be utilised to give real-time experiences and data – of factory and retail audits, of defect evaluations and of risk assessments.

What do you do to address this need? What kind of tools and technologies do you use more?

Prior to this crisis, many observers, myself included, have commented on the opportunities offered by Big Data, both in the ability to know more about our supply chains and products and as a guarantor of traceability and transparency with technologies such as Blockchain.

My observations of the initial impact of Covid are that the effects have predominantly cultural and human – yes we have seen a huge rise in the use of video comms, documentation management (simplification) and workflow tools, but the main outcome has been to bring people closer together in collaborative teams.

There is certainly a need for reliable rapid analytical methods, for example, to assist in rapid decision making. But, at least for me, there has been an obvious need for human, rather than artificial intelligence. The same argument applies with supply chain technology – robust traceability, market intelligence and forecasting models needed human interpretation in this ‘black swan’ event to react logically to the external shock.

In other words, the first technological reaction to the constraints imposed by the crisis was tactical; enabling current processes rather than catalysing a step change. In a world where the pressure was on an industry to simply keep producing (“Feed the world! Just make it happen!”) we did not take the time to run pilot projects with new technology.

But now? Several months into the crisis, there is clear evidence of the strategic change that can be built on these new experiences, on this new culture of collaboration and fast decision making, and we can surely expect some major technological steps capitalising on the new reality.

Is there an area where digital technologies still fail to deliver? Where do you still see a need for more appropriate and efficient tools?

I think the answer is that we don't yet know. There is a need for a review of what worked and what didn't, and I think it is too early for one commentator to judge. We have proved



Any crisis presents both challenges and opportunities, and the advent of the global COVID-19 crisis has confronted the planet and the human race with both. In 2020, we have been given a glimpse of the future thanks to technology, and we now have a window of opportunity to enable positive change

as societies and teams that we are robust and connected, that we can continue to deliver under extraordinary pressure, that we can collaborate swiftly and supportively to do the right thing. Will **Blockchain** speed up those decisions? Do we need increased **Cybersecurity** to protect our data? What role can **Artificial Intelligence** play in the future? And, indeed, what is the future of work?

Any crisis presents both challenges and opportunities, and the advent of the global COVID-19 crisis has confronted the planet and the human race with both. In 2020, we have been given a glimpse of the future thanks to technology, and we now have a window of opportunity to enable positive change. Perhaps, indeed, we in the food industry have an obligation to use the human learnings of the crisis to deliver that change, because, after all... the production of food defines our world.



Ellen de Brabander

Senior Vice President R&D, PepsiCo

Which changes do you see coming in your work after COVID-19?

Digital transformation is everywhere you look and will continue to accelerate quite some time. While PepsiCo started undergoing its own digital transformation a few years ago, the food & beverage sector in general has been late to adapt. While we have seen an impressive acceleration of adoption of digital technologies in the food and beverage sector, one area we still see limited use of digital technologies in the food sector is in the R&D space, including new product development.

If you look at what data and digital technologies can bring to R&D departments in the food & beverage industry, there are 4 main benefits:

1. Creating new valuable and actionable insights by connecting different data sets and using advanced analytics – this is a huge opportunity and will be an unlock for accelerated or breakthrough innovation processes.
2. Working remotely – it allows people to operate remotely rather than in person, like conducting audits or supplier and ingredients qualifications.
3. Automation of resource intense processes and recurring steps – e.g. artwork and product label review and approval.
4. Enabling rapid traceability by connecting data sets, which is very important in the food safety and quality space. For example, being able to digitally trace the identity and source of an ingredient that ends up in a product is critical should an issue arise regarding the product. This traceability enables companies to provide timely information to customers and consumers, should the need arise.

The need for customization is a big driver for accelerating digital transformation and moving away from a 'one size fits all' approach. This means that the cost to develop and produce a product must be lower and digital technologies provide a clear opportunity here. Leveraging digital technologies provides more than just speed

and cost benefits. It also provides a great opportunity to gain new insights by combining relevant data sets, e.g. connect consumer preferences and sensory profiles data sets with corresponding formula data.

Which are the tasks that seem to be requiring the use of more digital tools and technologies?

There are still a number of very intense manual processes happening in many organizations. For example, every product needs to have a label, and each label must have the right look and feel, the correct languages etc. This is a very resource intensive process. Therefore, if this process is automated, it will be a big unlock for our teams.

Another difficult task is managing suppliers and data regarding their ingredients. The Food Safety and Modernization Act in the U.S. requires manufacturers to manage risks related to certain ingredients and their inclusion in foods. Thus, it is very important to carefully manage quality assessments so potential issues can be rapidly addressed. Automating this process through digital technologies will reduce time-consuming and manual processes.

What do you do to address this need? What kind of tools and technologies do you use more?

We see this process split in 3 pillars that all require investment:

1. **The data pillar** – we need quality data in order to do advanced analytics that provide new insights. A data strategy should be in place to address how to acquire, store, manage, share and use data.

2. The technology pillar – in the food sector, we deal with amazing varieties of data sets, many of these stored in different ways within different systems. In order to unlock the new insights from connecting different systems. In order to unlock the new insights from connecting different data sets, data sets must become connectable in a scalable way. Point to point connection of data sets will no longer be a feasible approach and needs to be replaced by a platform-based data architecture.

3. The people pillar – investing in change management and education is a long-term journey, requiring a lot of resources. And this can be done only if there is complete alignment and support from the company's leadership.

Is there an area where digital technologies still fail to deliver? Where do you still see a need for more appropriate and efficient tools?

There are still a number of areas in the food sector where we don't have the technologies or the solutions in place, yet. For example, there is not currently a single system or solution in place to check compliance of a new formula (a new recipe) with the regulations of many international markets.

The ultimate digital opportunity in R&D will be 'virtual product development' for near-in product innovations. Most innovations in the food sector are near-in and still require a lot of time and resources to fine tune the recipe and ensure you're delighting consumers, as well as meeting food safety, quality and regulatory compliance. It's a long journey and while we've made great strides within PepsiCo to transform our global R&D organization with digital technologies, there is still work to be done – but once in place, these new technologies will unlock unlimited potential for growth.



The need for customization is a big driver for accelerating digital transformation and moving away from a 'one size fits all' approach. This means that the cost to develop and produce a product must be lower and digital technologies provide a clear opportunity here. Leveraging digital technologies provides more than just speed and cost benefits. It also provides a great opportunity to gain new insights by combining relevant data sets, e.g. connect consumer preferences and sensory profiles data sets with corresponding formula data.



Clare Menezes

Director of Global Food Integrity, McCormick & Company

Which changes do you see coming in your work after COVID-19?

The three main priorities for our business as we work through the COVID-19 era are:

- Ensuring the health and safety of all employees and the quality and integrity of our products
- Ensuring the continuity of McCormick's business, keeping our brands and our customer's brands in supply, and keeping our financial strength
- Emerging a stronger McCormick after the pandemic

Our current research centers around total digital transparency and post-COVID, this is absolutely still on course, and if anything, will likely become more significant as consumer demands for information about their food purchases become even more exacting.

In the post-COVID era, we can be clearer on the value of digital transparency and the fit in our business. Now, more than ever, the value of integrity, digital transformation, and the points of application are emerging – the fragility and global nature of the food supply chain have been exposed for the world to see.

Which are the tasks that seem to be requiring the use of more digital tools and technologies?

With pressure on support services key to maintaining food integrity, including labs, especially contract labs, we can see how important it is to have contingency plans, in the form of digital tools and technology.

We need agility and access to these new digital tools to be able to respond to such scenarios or any supply chain disruption, the COVID-19 pandemic has shown us that. So, expect to see many more digital decision support tools being adopted by industry in the near future.

What do you do to address this need? What kind of tools and technologies do you use more?

McCormick uses an initiative called T.A.S.C. – Technically Advantaged Supply Chain that deploys transformational, cross-functional teams to leverage state-of-the art science, technology, digitalization, with a culture of innovation. This will for sure see us deploying more sensor technology and decision support tools to deliver and insulate product integrity from any future supply chain disruption.

Is there an area where digital technologies still fail to deliver? Where do you still see a need for more appropriate and efficient tools?

There aren't any areas where digital tools "fail", but there is a need for tools that 'prove out' predictions around where the next integrity event will play out and how it could lead to quality or food safety failure. These tools are an obvious candidate for AI given the number of PESTLE factors that might come into play – we continue to closely monitor these tools to see how we can implement them.



Now, more than ever, the value of integrity, digital transformation, and the points of application are emerging – the fragility and global nature of the food supply chain have been exposed for the world to see.



Eric Timmermans

Director Corporate Quality Affairs, Friesland Campina

Which changes do you see coming in your work after COVID-19?

Indeed, COVID-19 has accelerated the digital transformation of the food supply chain and the way we are working. Previously, we were all in the routine of going to the office every morning and coming back home every afternoon. Now, everybody is working from home and the extent to which this will stay will differ from sector to sector. Within our company, around 40-60% of staff will be working from home from now on, depending on the individual's role and the position in the company. This means that we'll be using more and more digital tools in the future.

As with the rest of the world, the pandemic has dramatically changed shopping in the Netherlands. For example, it is difficult to socially distance in the supermarket so more and more people have moved to a different way of shopping. Since then, grocery shopping has gone online and exploded in popularity. This has changed the food supply chain from what we used to know since most retailers are now offering online services.

Which are the tasks that seem to be requiring the use of more digital tools and technologies?

In the past, we were doing all of our food safety audits onsite: suppliers audits, certification audits done by certification bodies etc. Due to COVID-19, we are looking at how to conduct remote audits using digital tools, such as by using Google glasses, and I think there will be more tools like this coming. I would love to use these kind of tools to have a virtual factory tour and talk to people into their own environment.

We are also in the process of reviewing our corporate auditing program, which were previously all conducted onsite, by changing it into self-assessments by the side (?) and then, for now, using a remote auditing tool like Microsoft Teams or Zoom. As I mentioned before, we are looking into virtual-reality tools to reduce the onsite audits.

These won't fully replace the current way of working, but I think that remote auditing and training via digital tools are very important. So, from a food safety point of view, those are the two most important areas where we'll be using more digital tools and I think that this will be a speedy transition.

What do you do to address this need? What kind of tools and technologies do you use more?

We are producing a lot of data with a lot of information which we are addressing internally. For instance, we have several databases for the raw materials we are processing and for all the processes. We are linking all of these databases together and even incorporating some of our suppliers' data to have a better understanding and analysis to identify certain trends.

As a dairy company, the cattle feed we use is prepared in silages and unlike before, we now monitor these by using a combination of 3 databases to predict the quality of the silage. So, we can decide early on whether or not to use it or where to use it, while in the past we were monitoring this in a different way.

One of the challenges is that the databases are not interconnected. Technically, this can be easily done but working within the scope of data privacy regulations is the biggest challenge, especially when we are linking databases with external partners. On the other hand, I am confident that linking the databases with 3rd party data will really help to improve the speed and efficiency of food safety and quality by preventing issues as well as predicting trends in the supply chain. That way, we can make sure that we can anticipate these trends instead of reacting to them.

Is there an area where digital technologies still fail to deliver? Where do you still see a need for more appropriate and efficient tools?

At the beginning of the pandemic, everybody was enthusiastic that things were going smoothly as we shifted to online meetings and trainings. On the other hand, we can see that people are not connecting with each other. I have some hesitation that digital tools can ever facilitate these connections between our people, colleagues and teams.

Another concern is regarding the quality of the information and insights you get from a digital tool. The information quality is based upon the quality and the speed of the data that comes in. When I want to make a decision on a certain issue, I want to have the latest data available, even real-time data, so the question here is how fast and how close can you get to real-time? I think that's the challenge!



Otso Tolonen

Team Leader, Assurance Data Services, GLOBAL G.A.P.

Which changes do you see coming in your work after COVID-19?

For GLOBALG.A.P., the digitalisation of the assurance process was an underlined topic well before the global pandemic started. As a company that is expected to deliver trust into the food supply chain, we have recognized various ways to gather data from primary agricultural production, and to utilise it so that we can deliver trust today. Before the pandemic hit the world, we had started our journey to bring added value from a data-driven certification process to all stakeholders.

While it is largely true that the global pandemic accelerated the demand for digital transformation, for GLOBALG.A.P., the pandemic has served as another indicator that the need and potential of digitalising the food safety certification processes is essential. As more farmers become tech-savvy, equipment on the farm connects to the internet, and data is captured from primary production, the possibilities to utilize this information carries a major potential to bring ease to the certification process and open new markets for producers. At the same time, the data can be used to further strengthen our certification standards and to deliver enhanced trust.

GLOBALG.A.P.'s certified producers have grown steadily in recent years. At the end of 2019, there were approximately 210,000 GLOBALG.A.P. certified producers around the globe. We expect this number to increase significantly. This also means that GLOBALG.A.P.'s certification bodies will see an increase in demand to carry out audits, and to manage GLOBALG.A.P. certified producers. To support the certification bodies with the increased demand, our position is also to investigate ways we can facilitate data exchange among all players – including certification bodies, producers, GLOBALG.A.P. and customers etc.

What do you hear from your clients/partners? Which needs are they high -

lighting during this period?

The global pandemic has certainly not reduced the need for safely produced food products, and this is a prominent concern for all clients and partners. The need for buyers to have trust in the certification system, and for products coming from a GLOBALG.A.P. certified process, remains the same. While the future has become more obscure for local and global industries, we have discovered that dedicated and industry recognised systems are more important than ever. In this sense, the primary role for GLOBALG.A.P. during the pandemic is unchanged. GLOBALG.A.P.'s clients and stakeholders are still expecting us to instil the trust that our standards deliver today for business transactions in our stakeholder network. In short, this means that our value is demanded by retailers and suppliers who source safely produced food products, by certification bodies who still need to verify the farm level situation, and by the producers who want to sell their produce.

GLOBALG.A.P. stakeholders are also interested in using the data that originates from food supply chains. Added transparency and traceability can play a major role for retailers and suppliers to respond to increasing consumer expectations. We have seen that the global pandemic has not stopped the need towards data supported decision making, or for our clients to understand how they can better integrate themselves into our systems. Moreover, we have recognised that our stakeholders have a specific focus on assurance that contributes to food safety and sustainability giving rise to data analysis-led practices.

How do you respond to these needs? What is your company/organization doing differently to serve your clients/partners better?

As discussed previously, the consistency of the GLOBALG.A.P. assurance processes play a major role

across the food supply chain. To maintain this consistency, even during a global pandemic, we have overcome challenges to maintain the appropriate level of assurance that customers are demanding. The global pandemic essentially stopped all business-related travel. This brought major challenges for certification bodies and their auditors, as food safety professionals were no longer able to travel to farms to carry out audits and to certify farmers. This challenge has accelerated the development of remote audit practices. Certification bodies can now carry out remote audits for producers who are located in areas that are majorly affected by the pandemic, regions where auditors do not travel. The need for remote audits was recognised at the early stages of the pandemic. GLOBALG.A.P. founded rules and regulations specifically for remote audits to ensure integrity of our standards. Furthermore, we have provided technical infrastructure to increase the integrity of the assurance, using our Audit Online tool to capture the audit data derived from remote audits. Oftentimes the hardest of challenges can also be the most educative. While the global pandemic accelerated the demand for remote audits, we will not treat them as a mere temporary solution, but seek to study how best practices from remote audits can contribute to a data-driven assurance process in the future. We expect that farm level data can be used to assess compliance criteria remotely, and thereby ease the certification process for all relevant parties while ensuring integrity.

What is the digital technology that will be more extensively adopted by the market during the next 12 months?

While in some parts of the world the situation with the pandemic is getting better, it is still hard to predict one year on and to estimate its impact. However, I believe that the global pandemic has opened eyes to the potential of digitalisation. From our standpoint, we see this resulting in a more connected assurance ecosystem where all stakeholders are interested in sharing relevant datapoints to contribute to the assurance process. This will not necessarily mean creating new user interfaces from scratch, or forcing agricultural producers to adopt new software, but enable secure ways to exchange data between existing systems and infrastructure. Connected systems and devices ease data and remove the duplication of data. The global pandemic has showed that these systems can be considered reliable and provide added value when adopted - even during normal times. The global pandemic has also proven that existing technol-



The need for transparency is perhaps often associated with the supply chain, where people in the downstream have visibility across actions carried out in the upstream. The need for upstream to have transparency on the way their data is used in the downstream is also relevant. While respecting such fundamentals as personal privacy and data security, we also need to be able to provide the right context for data.

ogies can be adapted swiftly to various practices. In the case of remote audits, video streaming and conference calls were extensively adopted. The pandemic created a necessity to use existing forms of communication technologies. Perhaps not necessarily in the next 12 months but in the future, we can look forward to extend these tools and methods combined with emerging technologies such as on site virtual reality and capturing essential information with drones.

The need for transparency is perhaps often associated with the supply chain, where people in the downstream have visibility across actions carried out in the upstream. The need for upstream to have transparency on the way their data is used in the downstream is also relevant. While respecting such fundamentals as personal privacy and data security, we also need to be able to provide the right context for data. We need to ensure data serves the purpose intended by its creator and its stakeholders in the ecosystem. Clearly this notion is not about new technology, but it is a necessary discussion point in parallel to widespread debate relating to the adoption of new technologies. This discussion, inevitably, will shape the adoption of new technologies in a more digital, data-driven supply chain.



Nikolaos Gkionis

Lead Auditor GFSI schemes & Management Systems,
TÜV AUSTRIA

Which changes do you see coming in your work after COVID-19?

In my opinion, the COVID-19 (coronavirus) pandemic has advanced the digital space by almost three to five years for pickup and home delivery. COVID-19 lockdowns across the world have not only restricted people's movement, but they have also narrowed their access to traditional sources of food. This has led to the strengthening of the search for alternatives, especially in urban centers, enabling the digitalization of retail sector with relative ease.

In the food certification sector, digital transformation is more difficult. Although we must take advantage of the tools that new technologies provide. The on-site audit is one prerequisite for all the food related standards (GFSI recognized standards like BRC, IFS, FSSC 22000, SQF etc or not GFSI recognized standard like ISO 22000). GFSI reaction was immediate after the pandemic crisis in order to continue to support food business. GFSI gives the possibility to use the food safety risk assessment for sites which were unable to coordinate an on-site audit and renew their current certification before its expiry. Each standard gives its guidelines to follow this approach

While the on-site audit is a prerequisite for certification, the documentation audit can be performed remotely (audit of records, systems and documentation). This could lead to reduce the time of physical presence (perhaps for a two day audit , one day will be on site and the other day performed from the office).

The BRC (13.07.2020) provides this opportunity with the BRCGS080: Blended Audits – Remote Auditing using ICT. The Blended Audit comprises of an offsite, remote assessment followed by an on-site audit. This option is only available for the announced audit programme. The remote audit takes place using ICT (Information & Communication

Technology). The Certification body has a documented process for undertaking blended audits ensures compliance to IAF MD4:2018 and the use of information and communication technology (ICT) for auditing/assessment purposes. This option is only applicable for re-certification audits and not for the first BRCGS audit at a site. That means it is not applicable for initial audits or for sites not holding a current BRCGS certificate. See below a schematic diagram from BRCGS080:

Audit of production facilities and good manufacturing practices	ONSITE	
Audit of records, systems, and documentation	REMOTE PERMITTED	
Requirements assessed in both		

On the other hand, digital transformation in relation to training was rapid. TÜV AUSTRIA HELLAS has performed a lot of training programs, taking advantage of new technologies and provisioning for webinar training programs for the next months.

What do you hear from your clients/partners? Which needs are they highlighting during this period?

Clients are very concerned about the evolution of the pandemic. They are worried first of all about business continuity, while being able to estimate appropriately for food safety and quality. They are very happy with digital transformation to the training sector. By training their personnel in this way they feel comfortable that they continue to produce a product at a higher level of safety and quality.

Regarding audits, the majority of our clients want to conduct remote audits. The reason being is that they have already used tools that our company has introduced in accordance with the guidelines of each audit standard.

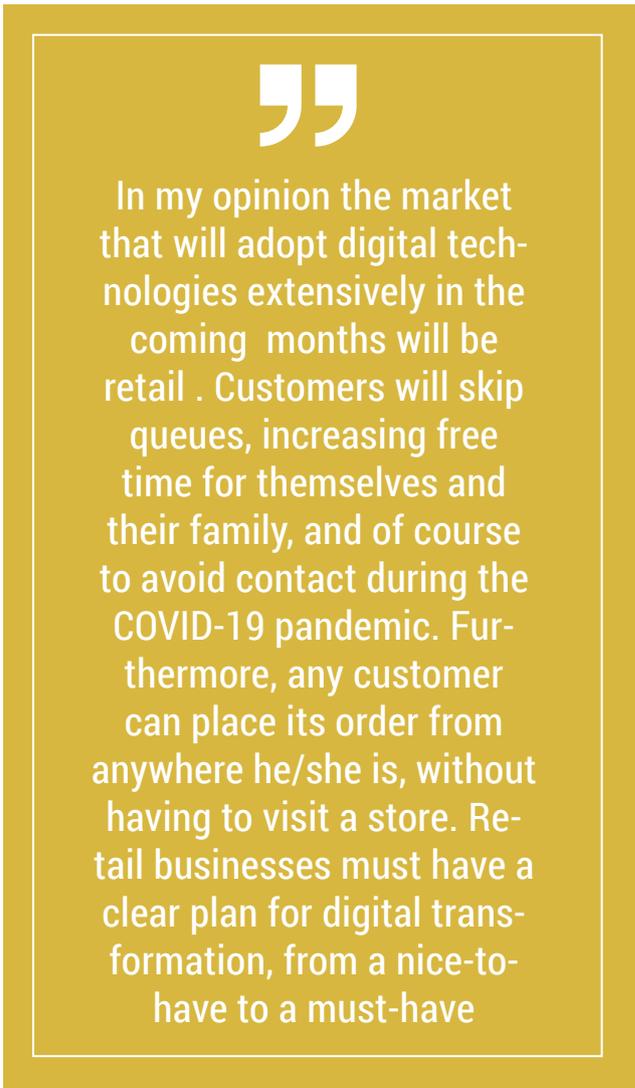
**How do you respond to these needs?
What is your company / organization
doing differently to serve your clients /
partners better?**

TÜV AUSTRIA HELLAS has developed procedures to face the COVID-19 pandemic. Risk Assessment tools for extension decision under COVID-19 outbreak (surveillance-recertification), have been developed by the Food Safety team of TÜV AUSTRIA HELLAS. Many clients have already used these tools for extending their certificates for 6 months.

Furthermore, The Private Certification Scheme “COVID-Shield” was developed by TÜV AUSTRIA Hellas with a focus on health, safety and business continuity. This is the first integrated certification scheme to increase the confidence of citizens and consumers to businesses, which apply and become certified with the Certification Scheme TÜV AUSTRIA COVID-Shield. The Private Certification Scheme “COVID-Shield” is addressed to all companies that - due to their activities - favour association, hospitality and generally have public meeting places. For example, hosting companies (hotels, accommodation), catering, food preparation, processing and / or disposal companies, transport and supply chain companies, retail (supermarkets, shopping centers), sports and gymnastics services, public services, educational facilities, schools, facility management companies etc.

The scheme sets out basic requirements and procedures that organisations must implement in order to receive a “COVID-Shield” certification, verifying that an appropriate resources and infrastructure are in place. The resources and infrastructure needs to be aligned with current epidemiological guidelines, to provision for the prevention of the inflow or spread of the coronavirus disease in the facilities of the organisation.

**What is the digital technology that will
be more extensively adopted by the mar-**



In my opinion the market that will adopt digital technologies extensively in the coming months will be retail . Customers will skip queues, increasing free time for themselves and their family, and of course to avoid contact during the COVID-19 pandemic. Furthermore, any customer can place its order from anywhere he/she is, without having to visit a store. Retail businesses must have a clear plan for digital transformation, from a nice-to-have to a must-have

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In my opinion the market that will adopt digital technologies extensively in the coming months will be retail . Customers will skip queues, increasing free time for themselves and their family, and of course to avoid contact during the COVID-19 pandemic. Furthermore, any customer can place its order from anywhere he/she is, without having to visit a store. Retail businesses must have a clear plan for digital transformation, from a nice-to-have to a must-have.

Furthermore, the extensions of the lockdown worldwide are accelerating the need for universities, academies and other institutions to switch exclusively to remote and online learning. Governments across the world should propose mechanisms of fiscal expansion, in a bid to provide funding for moving aspects of education online and promoting the adoption of the digital transformation.



Ruud (Rudolf) A. Overbeek

Sr. Vice-President Corporate Development & Strategic Relationships, FoodChain UK Ltd. and Decernis GmbH

Which changes do you see coming in your work after COVID-19?

Over the years, the world has been slowly but surely shifting to digital, and we can expect it now to shift even faster. There is no doubt that the current experience has accelerated a change in the way we, including the food industry, will work. Our workplace is no longer a physical space, an office, or a desk. A “digital” workplace has developed rapidly, transforming the way we work. And although it has already shifted dramatically over the last decade, it has shifted even more rapidly in the past half year.

Already during the onset of COVID-19, cloud-based infrastructure services spending hit record growth, increasing 34% according to recent research. This growth was driven by organizations around the world moving to remote work as the pandemic hit, and enterprises sought rapid access to such resources. This implies a shift in the way organizations are doing business, and business models that are customer- or consumer-faced will continue to invest in digital technology, as they did over past years, but at a more rapid pace. Despite this growth, companies are showing some caution in investments as they wait for the economic impact of COVID-19. Focus has been on supporting key parts of operations through proven technology solutions.

What do you hear from your clients / partners? Which needs are they highlighting during this period?

When it comes to food, (digital) technology is generally not the first thing that comes to mind. However, over the years technology has changed how the food industry works through software, robotics, geo data, and processing technology, which help manufacturers produce food more efficiently for a growing world population. At the core of this transformation is the mounting power to produce, transfer and analyze data. Combined with the increasing

capacity in fast data-processing and cloud-based computing, data can be stored, re-analyzed, and accumulated from multiple sources to provide new insights.

While technology also helps to improve food safety, the growing complexity of the supply chains has led to a further necessity for fundamental change, which was exacerbated during the pandemic. There are several factors that drive this increasing need:

- Global supply chains are more difficult to monitor and control.
- Risks related to fraud, safety, and social or environmental supply chain practices.
- Regulatory asymmetry between countries creating a more complex market.
- Import from countries with weaker food safety practices into countries with more stringent practices, in turn increasing the risk of food safety incidents.

How do you respond to these needs? What is your company / organization doing differently to serve your clients / partners better?

The aim is therefore to improve traceability and data management processes across a complex network of farmers, brokers, distributors, processors, producers, retailers, regulators, and finally consumers. For example, blockchain and blockchain-like technologies are considered to facilitate and fast-track investigations and trace outbreaks back to specific sources. While these digital technologies alone will never eliminate all food risks, they will be able to improve the speed of response, reducing costs and limited damage.

While today's technology can produce a wealth of information, information alone is insufficient for firms to be successful, because of:

1. Paralysis through Analysis – the easy option is simply to request more information.

2. Easy access to data makes us intellectually lazy – the bigger the dataset, the easier it is to find support for any hypothesis you choose to test.

3. Impulsive and Flighty Consumers of Information – the capacity to focus and concentrate on a specific activity is falling.

4. Learning can be dangerous – democratization of information creates an imbalance, with certain people incapable of interpreting and using information in a sensible way.

5. Generation of information will only increase – there was more information generated in 2018 than in the entirety of human history, resulting in a substantial reduction of the value and life of knowledge.

Therefore, despite rapid advances of technology, producing meaningful datasets is still difficult to accomplish. While we have access to more and more powerful data analysis tools, a lack of proper integration of these tools and processes leads to lesser ROI. Cloud based applications and enterprise solutions therefore need to integrate with company and supply chain processes, collecting valuable data to help them mitigate risk and ensure compliance at all stages of the food supply chain. To adapt to this shifting landscape, the industry should:

- Embrace technology to use resources more effectively.
- Focus on retaining, and not replacing knowledge. Nothing is ever irrelevant.
- Increase transparency.
- Focus on usability of tools. Powerful tools are wasted if ineffectively used.

What is the digital technology that will be more extensively adopted by the market during the next 12 months?

AI and machine learning will play an increasing role going forward in this shifting landscape. This rapidly developing technology already handles repetitive tasks allowing humans to focus on the most engaging parts of their jobs, allowing companies to leverage the workforce more effectively. As an example, AI-powered chatbots help companies with customer support, learning from real marketers, salespeople, and customer service reps, while answering questions accurately.

There should be no doubt that AI-powered technology will play such a role in food safety, not just for mundane tasks but also for transforming complex data into analytics.



There should be no doubt that AI-powered technology will play such a role in food safety, not just for mundane tasks but also for transforming complex data into analytics. Because we will increasingly generate massive amounts of data, this data is useless without transforming it into valuable insights.

Because we will increasingly generate massive amounts of data, this data is useless without transforming it into valuable insights. AI will increasingly help companies make use of their data by consolidating it from a variety of sources, making it available in a central searchable source, allowing customers to identify important changes and patterns, and even predict key business metrics.

More evolved AI algorithms identify trends, segment data, uncover anomalies, and create detailed reports. AI makes connections within millions of seemingly extraneous signals that humans would never be able to analyze otherwise. With companies and governments spending billions on AI annually, with technology giants leading the way, and with AI becoming a more prominent part of the curriculum for leading Universities, disruptive breakthroughs are bound to happen.

More powerful AI that could read and understand everything humanity has ever written, will allow AI to increasingly take over tasks that were once thought to be exclusively human. It can only be imagined how this can be useful to all.



Walter Stiers

Industry Architect, IBM Belgium

Which changes do you see coming in your work after COVID-19?

In the **pre-COVID-19 epoch**, there were already an accumulation of challenges in the food supply chain, ranging from how best to achieve operational excellence¹ – including food-safety, profit optimization, up to food waste-reduction – to global integration. The increasing awareness at a legislation level and the ‘buying powers’ of customers², were putting a focus on reducing the impact of climate-change, increasing the importance towards sustainability³ - from an ecological, social and economic point of view - and a need for increased clarity and transparency⁴ towards food provenance⁵ and nutrition.

During the **start of the pandemic**, different partners of the food supply chain encountered unparalleled challenges. Supply chains were being subjected to volatile conditions and they were being challenged, tested and stretched, often beyond their limits.

Social distancing, lockdown measures and the provisioning for a "new normal" have given rise to new ways of working, and the integration of virtual and physical activities at both a company-level, and more broadly across ecosystems and supply-chains. Supply chain operations are shifting to react to COVID-19, and a need for resilience in the face of adversity is required. The most urgent needs I encountered in the field were:

- A remote workforce that needs mission critical data and decisions to be reliably and securely transferred.
- The ability to capture critical care data and to integrate it for rapid response
- The effective management of critical inventory in times of disruption
- The mitigation of supply chain disruptions through end-to-end visibility

The different rates and paces of recovery and the ‘next waves’ around the globe, in the COVID-19 world, make the need for resilience even more urgent. As a result, this unprecedented crisis forces us to adapt to a new life cycle of engagement, that is far more digital in its nature: We need to integrate the virtual and the physical as one

What do you hear from your clients/partners? Which needs are they highlighting during this period?

Specific demands I found in the ecosystems of the food supply partners were as follows:

- A shift to home working or an extension in the “work-from-home” model that keeps the workforce engaged and productive. Meanwhile, how organisations balance their employee’s needs with affordable labour models was also firmly on the corporate agenda.
- How companies can establish new IT processes and procedures to manage operational continuity & resiliency, including the ability to detect and rapidly respond to new cybersecurity and privacy threats.
- Robust inventory forecasting and planning for a “second wave” outbreak.
- Investing in cashier-less technology to address consumer’s residual post COVID-19 sensitivities.
- The rise in online ordering and BOPUS (buy on-line pick-up in store).
- A move from in-store to on-line selling will modify basket size and the influence of cross-sell and up-sell opportunities.
- Decline in demand for products at hospitality events, travel, and hoteliers e.g. at stadiums, on airlines and in hotels.
- Ensuring the supply chain doesn’t break down so product can still be produced and delivered.
- Examining the strength of the supply chain and the management of cash flow to pay vendors on time
- Looking for alternative suppliers and/or sourcing options if the primary supplier is unavailable or inaccessible
- Increasing the diversity of suppliers and manufacturers in order to pivot the worst affected regions (including the rapid integration with new partner systems)

How do you respond to these needs? What is your company/organization doing differently to serve your clients/partners better?

During the early days of COVID-19, many food supply partners needed to adapt to the sudden change in demand with a collection of offerings⁸ to service retailers and consumers alike. Solutions were prioritised to overcome key challenge areas across business continuity, supply chain resiliency⁹, customer care and operational disruptions – all with financial pressures looming and the need to maintain mission critical parts of their business. Offerings included some of the following:

- Preparing for and ensuring a safe workplace: Worker insights for plants, distribution centres or possibly stores, monitoring social distancing, health, fever detection, personal protection and sanitisation.
- Increased agility by provisioning for new app instances, and the automated testing of new instances based on unexpected changes in customer requirements¹⁰.
- Outsourcing “Source to Pay” Operations to reduce business costs and meet the challenges of complex global enterprises through effective data-driven source-to-pay operations.
- Understanding the local impact of COVID-19 and planning more effectively.
- Location Intelligence:
 - > Demand Sensing: For critical products and regions that need urgent support, shipment forecasts can factor in the development of COVID-19 and the impact on consumer purchasing.
 - > Supply Decisioning: Visualising potential hot spots for the impact of COVID-19 and other disruptions.
- Community focused initiatives like:
 - > Free Tools Based on Trusted Data to Track COVID-19 Cases on Your Phone and Online
 - > Adding the coronavirus to the 2020 Call for Code Global Challenge

What is the digital technology that will be more extensively adopted by the market during the next 12 months?

Digital technologies that will be extensively adopted by the market during the next 12 months, are helping enterprises to become more resilient and agile in order to survive uncertainty and change. While no one can predict what's in store for tomorrow, we can work today on building a smarter global supply chain.

Supply chain operations and planning can leverage **artificial intelligence** and **blockchain**, and other emerging technologies - such as automation, IoT, 5G, and edge computing – to help predict the unexpected. Greater agility and the ability to rapidly recalculate business strategies will help reduce the impact of unanticipated events – from disease and food-borne illness to severe weather, geopolitical transformation,



Access to data allows the supply chain to act and react in an agile way, helping food supply partners to adapt to expanding needs by provisioning for sustainable solutions.

and international trade policy changes. Transforming supply chain processes into intelligent workflows using artificial intelligence (AI), enables an enterprise to reach new levels of responsiveness.

and international trade policy changes. Transforming supply chain processes into intelligent workflows using artificial intelligence (AI), enables an enterprise to reach new levels of responsiveness.

Intelligent workflows challenge siloed processes and ways of working, uncovering efficiencies across a network of partners. New supply chain intelligent workflows that are augmented by AI and related technologies - underpinned by business platforms and global visibility based on trusted data - can deliver exceptional outcomes at scale.

The ability to harness intelligent workflows across the supply chain, is driven by the cooperation of all parties to share their data openly. Blockchain solutions like “IBM Food Trust” enable multiple partners⁶ to share their data – with the appropriate permissions and transparency - across companies in a trustworthy and scalable way⁷.

Access to data allows the supply chain to act and react in an agile way, helping food supply partners to adapt to expanding needs by provisioning for sustainable solutions. By applying Intelligent workflows (AI) on top of Blockchain technology, future pandemics such as COVID-19 can be tackled in a resilient way, while lessening the impact of outbreaks.

The Food Trust blockchain technology can be catered to the specific needs of a business network or ecosystem such as the “IBM Blockchain Transparent Supply.” For more information about the Blockchain Transparent Supply: <https://www.ibm.com/blockchain/solutions/transparent-supply>. and global emergencies on food supply chain operations.



Cronan McNamara

CEO, Creme Global

Which changes do you see coming in your work after COVID-19?

I have seen COVID-19 accelerate digital transformation in a wide range of industries through our customers across the globe. People working in the area of digital transformation have told me that COVID has done more for digital transformation, than years of evangelism and planning on their part! I think digital transformation was starting to slowly happen in the food sector before the pandemic. Since the pandemic hit, working remotely, where possible, has become preferable. However, the food industry has been so focused on core production and keeping the supply chain moving in the midst of the economic uncertainty and the new COVID-based restrictions. They haven't really had time to think about digital transformation, beyond basic remote working. I believe the pandemic has highlighted the necessity of better digital technologies and data capture across the supply chain, to keep it safe and productive. Once things settle down, companies will turn their attention to this and we are seeing a number of companies starting to do that already.

What do you hear from your clients/partners? Which needs are they highlighting during this period?

Before the pandemic many of our clients were focused on consumer health and preferences and were working on reformulation and substitution activities, to make products healthier and safer. Despite the pressure of the pandemic, a number of these initiatives have continued during the period. With over 90% of our client projects being multi-discipline and collaborations with diverse teams outside of Ireland, we are used to working remotely on projects with our clients. One aspect that we are seeing is the need for organizations to organize and structure their scientific data into a central repository, so that all stakeholders in the group can read or edit it and work in a productive way. Operational data has long since been structured and organized in companies, but research, scientific, new product devel-

opment and product safety-related data has lagged behind. We are seeing a real appetite (no pun intended) in the food industry to tackling this issue now as it can improve efficiency and save money in the medium to long term.

How do you respond to these needs? What is your company / organization doing differently to serve your clients / partners better?

Creme Global has been involved in developing and delivering scientific models and predictive models for our clients since our foundation in 2005 – via our Expert Models platform. In recent times, we have realized that our clients need more support in gathering, structuring and organizing their scientific data in an accessible yet secure system. Often our clients want to collaborate with each other to share anonymized and confidential data and hence we have focused on developing a secure, yet user-friendly data management system called Data Foundry which integrates with our scientific and predictive models on Expert Models.

What is the digital technology that will be more extensively adopted by the market during the next 12 months?

That's a good question. We see Machine Learning systems that are deployed on top of well structured and automated data streams in the food supply chain as being an area ripe for innovation. Whether these will be extensively adopted in the next 12 months remains to be seen. I would hope so, but it takes time to plan for and invest in systems like these and management teams are busy keeping the lights on at the moment. Even if they don't get as far as Machine Learning, there are significant benefits to be gained by simply being able to view, search and visualize their own data in a clear and efficient manner.



Tomaz Levak

Founder and Managing Director, Trace Labs

Which changes do you see coming in your work after COVID-19?

Trace Labs team is a core developer of OriginTrail protocol, which is a foundation of the global OriginTrail ecosystem. Having such global exposure gave us an insight into the scale of the challenges that companies were facing with regards to the pandemic before it was as evident in our environment.

We were able to respond quickly, introducing the work-from-home ahead of the official recommendations and tried to make sure we minimise any unnecessary risk for our team. It allowed us to keep on track with all the projects and to tighten some of the internal processes even more, ultimately raising our productivity.

As with anything, it's not all ideal. Office space dynamics are important for several processes in designing and developing cutting-edge solutions. While the presence of work from home arrangement will be increasing and the office work see some changes, we are excitingly waiting for the time where we are able to collaborate with our colleagues face-to-face more often.

What do you hear from your clients/partners? Which needs are they highlighting during this period?

The initial response of all stakeholders was internal optimisations on costs, which included digitising the processes related collaboration tools that supported the shift towards working from home.

However, the more interesting shift from Trace Labs perspective came after the initial response when organisations started to look for solutions that can increase their resilience for future disruptions that might occur. This is where we also see the majority of digital transformation drivers to come from. It will be the move from pursuing organisational optimum towards pursuing network optimum that will create a pressure and motivation to introduce streamlined digital processes enabling interoperability, interconnectivity and integrity.

Resilience built through such digitalisation will be crucial for food systems as well as it will provide unprecedented levels of supply chain visibility, data-based accountability and real-time

response times to any disruptions.

How do you respond to these needs? What is your company/organization doing differently to serve your clients/partners better?

Trace Labs is developing an open-source OriginTrail protocol that was designed to enable secure and scalable data exchange across supply chain networks. Based on the public blockchain, it provides the highest levels of integrity and trust. Utilising global data standards, (e.g. GS1 EPCIS, Verifiable Credentials) it enables data interoperability, meaning companies can keep their legacy systems (anything from an Excel file to complex ERPs) in place without disrupting their processes.

Secured, structured and linked data then serves as a powerful base for a variety of business applications (e.g. Certificate validations, Compliance checks, Track & Trace systems)

In addition to the open-source OriginTrail, Trace Labs has released a proprietary software Network Operating System (nOS). nOS is the easy to use gateway between legacy IT and OriginTrail Decentralized Network; It's a hub for managing decentralized infrastructure, structuring data, and enabling business apps.

With OriginTrail and nOS together, we are able to help organisations synchronise their digital transformation efforts and help them get the most value out of their data.

What is the digital technology that will be more extensively adopted by the market during the next 12 months?

That's a good question. We see Machine Learning systems As the internal collaboration tools get implemented, cross-organisational focus will be key to ensure an edge on the market. It will also expand beyond the document collaboration towards aligning multitude of business processes to achieve better visibility and integrity of the entire supply chain operations.

We see cross-organisational trusted data exchanges at the core of such transition and OriginTrail Decentralised Network as a key enabler.



Nicola Colombo

CEO, C-LABS SA, Global Head of SGS DIGICOMPLY

Which changes do you see coming in your work after COVID-19?

From an organisational perspective, C-19 did not impact us at all, my team have been working remotely since the start of our SGS DIGICOMPLY program in 2016, I actually see an improvement in how we work with clients, we can have very effective meetings remotely while just a few months back the same meeting would have required hours of travelling, lots of energy for transportation, significant transportation costs. The culture changed and people learnt to make online meetings more effective, behave naturally and acquainted with technologies that support remote meetings. From a business perspective, I see that companies are very cautious about long term investments in new technologies, it is essential now more than ever to create micro solutions that address a specific challenge quickly, effectively and with low financial impact. Overall in the food industry, COVID-19 impacted supply chains. We have seen shortage of meat in USA, significant price changes in commodities that trigger more potential fraud risks, policies that gets adapted to give more freedom in ingredients changes are just a few of the effects of this wave. Moreover, the ongoing changes on retails have been accelerated, consumers don't want to queue any longer at the cashier with risk of being infected, so opting more for delivery, or even drive in pick-up is the new normal.

The second tsunami is the recession, we are entering into and the second wave of these days may further impact economies. In the USA, we are seeing the highest unemployment numbers, even more than during the great recession, Europe, foresee GDP at -11% in the eurozone for 2020, while China, who managed to fight C-19 very well is the only economy that started to see growth. Last tsunami, the climate change: supply chains are already affected and will be exponentially affected in the coming years, just looking at grains harvest being compromised, with temperatures going toward 50 Celsius in several countries there is no crop that can survive.

What do you hear from your clients/partners? Which needs are they highlighting during this period?

What I am hearing from clients the focus on adapting supply chains, from a model where sourcing comes from the best places which can give best value for money

, to a more decentralized sourcing, with locally produced trend picking up. We also see clients securing stocks of certain ingredients but also equipment, think about packaging machinery, are mostly sourced from Northern Italy, centralization that posed a big risk, if we look back during the first wave of C-19, that region suffered a severe look down that cause disruptions in this supply chain as it was the first region after China in the world being affected by COVID-19.

How do you respond to these needs? What is your company / organization doing differently to serve your clients / partners better?

We cannot stop innovate, we are continuously thinking about new ways to help our customers bringing safe food to their customer, finding new way to sell better online and offline, to bring this innovation to our customers, we need to listen even more, partnering with them to rapidly create solution and support this transition in the industry.

What is the digital technology that will be more extensively adopted by the market during the next 12 months?

For sure remote inspections, connected sensors and any communication solution that facilitate the new way of working are on the mainstream. Moreover, with changing supply chains, there is a higher demand to detect emerging food safety issues earlier in the life cycle, to do so, it is essential to gather better and more valuable data, in this context, Machine Learning is helping us significantly and with a fraction of the costs that were required just a couple of years back. There are promising AI researches on how AI been taught to unveil unknown risks and facts automatically by teaching machines to use common sense reasoning at scale. Discovering yet unknown risks requires to reason through cognitive links between facts and their potential adverse effects. In most cases this knowledge is disseminated across different sources and research papers. The issue is that thousands of relevant research and food incidents related documents are published everyday, human experts cannot cope with the sheer volume of information alone.



Quincy Lissaur

Managing Director, QLCI

Which changes do you see coming in your work after COVID-19?

Remote auditing is likely to become more prevalent, although it will take off quicker in some industry sectors than in others. This will be advantageous as it is advantageous (faster audits) and reduces cost (no travel costs).

I foresee that significantly more aspects of auditing will be done remotely in the near future through the use of email, video calls, etc. including, as a minimum, (i) Document Review and (ii) Interviews. Other remote auditing activities might possibly be undertaken as well, but this will depend on the industry sector and the standard that is being certified against. Nonetheless, certain certification activities will still need to be done on-site. For example, in the food industry a physical site/facility visit will need to be done to ensure that the PRP requirements are being adhered to. Although some of these requirements could potentially be checked remotely via the use of new technologies (e.g. glassware with cameras) not everything can be done remotely.

When thinking about potential changes in the area of business development and sales, I suspect very little will change. The trend towards tendering for certification services is likely to continue to grow, especially for larger corporations, but I believe that personal relationships and face-to-face contact will remain important to help build confidence and trust between companies and their CB providers.

In terms of the use of digital technologies, I would predict that we will see broader use and faster adoption of several technologies over the next 12-18 months such as:

- Video conferencing
- Secure document sharing
- Blockchain technologies (although not as much as some analysts predict)
- Traceability systems
- E-learning
- Automation of non-essential labor activities
- Investment in supply chain management technologies

As a non-profit organization SSAFE will continue to work with its intergovernmental, academic, NGO and industry partners to continue strengthening the safe supply and trade of food around the world. More than ever the Covid-19 pandemic has shown how vulnerably societies can be and how, as a food sector, we need to collaborate and work together to ensure every consumer has access to safe food no matter who or where they are.

”

Covid-19 has had a major impact on societies and economies around the world. As difficult as it has been for many people, we need to embrace this crisis by taking the learning and look at how we can do things better, more efficiently, while protecting our people and our assets.

Endnotes

- 1 [Carrefour says blockchain tracking boosting sales of some products](#): “The pomelo sold faster than the year before due to blockchain,” Delerm said. “We had a positive impact on the chicken versus the non-blockchain chicken.”
- 2 [Carrefour says blockchain tracking boosting sales of some products](#): “Millennials are buying less but buying better products for their health, for the planet,” Delerm said.
- 3 [J.M. Smucker Uses IBM Blockchain to Trace Coffee Beans for 1850 Brand](#): “By providing transparency of our supply chain, we are enabling the consumer to see the journey of their coffee from the region it was produced, to the mill, to exporters and importers.”
- 4 [Nestlé Expands Use Of IBM Food Trust Blockchain To Its Zoégas Coffee Brand](#): “For Nestlé, IFT is a ready to use solution that is great to convey and consolidate existing data sources that increase the traceability on our products, allowing us to be more transparent than ever with consumers,”
- 5 [From Sea to Table: Norway’s Seafood Industry Hooks Into IBM Blockchain](#): “It’s been said that up to 40 percent of fish in the world doesn’t come from where it’s labeled.” - “Blockchain lets us share the fish’s journey from the ocean to the dinner table.”
- 6 [Nestlé Expands Use Of IBM Food Trust Blockchain To Its Zoégas Coffee Brand](#): “In addition, the maturity of the solution and our experience with it means that we can be fast to deploy to new products and help our partners understand how to supply data. In 2019 we went live with consumers in France on two products, and in the Nordics with one. These were milestones, both from as the first tests with consumers and from an implementation perspective.”
- 7 [Dole Plans to Use Blockchain Food Tracing in All Divisions by 2025](#): “Produce that’s been logged via blockchain can be instantly tracked back through the supply chain, giving retailers and consumers confidence in the event of a recall.” [US Food Inspectors to Test IBM Blockchain for Export Certifications](#): “increased immutability and visibility of critical documentation traversing across the supply chain,”
- 8 [COVID-19 Action Guide](#): Beyond the Great Lockdown: The key to continuing a successful virtual-to-physical transformation, to taking advantage of new-found agility and innovation, lies in the cloud. ... what we call cloudified delivery.
- 9 [COVID-19 and shattered supply chains](#): Supply chain resiliency starts with organizations evaluating how they can proactively turn the unanticipated into the envisioned.
- 10 [COVID-19 Is Significantly Altering U.S. Consumer Behavior and Plans Post-Crisis: Personal Mobility, Retail Shopping, and Event Attendance Are Among the Areas Most Impacted](#): nearly 40 percent of consumers surveyed said they are likely to use contactless payment options - more than 75 percent of respondents indicate they are choosing to visit stores to buy essential goods

The Food Safety Market: An SME-powered industrial data platform to boost the competitiveness of European food certification

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