

5. COLD CHAIN LOGISTICS AND TECHNOLOGY



5. Cold chain logistics and technology

As we said in the previous chapter, innovation in logistics and technology will enable growers, suppliers and retailers to build faster and more flexible, precise and transparent supply chains. But how will they achieve this and, what do these players have to do to take advantage of this opportunity? This deep dive looks at potential approaches these actors in the supply chain could take to achieve their four objectives.

Faster supply chains

In increasing the speed of the supply chain, the objective is to enhance the freshness of the produce in order to deliver quality in line with growing consumer expectations.

When it comes to this transformation, the trailblazer can be found elsewhere in retail. Amazon, arguably the most advanced online retailer, is increasingly moving away from the traditional concept of retail as a category and assortment split towards an aspiration to achieve 'speed retailing' across all of its categories. This can be seen currently in its Amazon Prime, Prime Now and AmazonFresh services. In each of these cases, speed is king.

If other players are to meet the challenge this presents, they will need to get better at managing the supply chain. This means taking actions to optimise the chain and eliminate inefficiencies, developing an end-to-end view along its entire length. The challenge is to target and eliminate duplication of work, ensure well-orchestrated schedules from order to delivery, and reduce any lack of clarity in responsibilities, particularly where there are shared workflows. This is no easy task. The steps taken can be pragmatic in nature and should be carried out in dialogue with all parties along the supply chain. Such measures will increasingly be

underpinned by the use of supporting systems and tools. Achieving these goals is likely to prove challenging, but they are essential if producers, growers and retailers are to thrive in the new environment.

As part of their efforts to speed up the chain, players will also need to consider moving towards more collaborative working arrangements. To this end, they might do well to focus on the creation of strategic partnerships (between partners that share critical business volumes). This would have several benefits, including enabling them to move away from time-consuming negotiations, while at the same time superseding the isolated optimisation efforts of the past. Collaboration would make it possible for the different players jointly to perfect all of the links in the chain, as seen in the following case study.

CASE STUDY: FRESH PRODUCE SUPPLIER AND RETAILER COLLABORATION

What is new?

In the past, the relationship between retailers and fresh produce suppliers has often been confrontational, shaped by regular and tough negotiations. Taking the opportunity to place one such relationship on a different footing, two businesses – a retailer and a supplier – jointly developed a strategic partnership with the objective of producing mutual benefits. Their hope was that this new, collaborative effort would create additional value all along the supply chain, with both partners benefiting.

Once the retailer and supplier had set aside their long tradition of negotiation, they were able to start the process of building a relationship based on trust. They set out on this journey by first ensuring full, end-to-end visibility across both partners' businesses when it came to all of their supply chain activities. This enabled them to work together to detect where the existing inefficiencies were located, and then to systematically correct the root causes.

As a result, the retailer has reduced idle times in the ordering process by transmitting orders marginally earlier, so they can be factored into the supplier's earlier pick-and-pack iteration. Volume forecasts are now being shared early in the process to bring forward certain process steps. Regular formal and informal exchanges between both partners have driven the alignment and information sharing to save time, as inefficiencies have been eliminated.

These efforts have reduced the order lead time from 48 hours down to 24, resulting in improved freshness, increased customer satisfaction, and a 25 per cent reduction in shrink. The value created by these benefits was shared equally between the retailer and the supplier.

What is in it for the fruit and vegetable business?

A lot, especially when it comes to products with very short shelf-life, such as berries, certain mushrooms or salads, which will profit significantly even from a slight reduction in turnover times. If collaborative approaches to better managing the fruit and vegetable supply chain are to work, several key steps need to be taken. Firstly, each partner needs to ensure the relevant capabilities are in place in terms of organisation, processes and information technology. Secondly, it is essential to prioritise the right collaboration partners, as it means they can focus their efforts wherever they will have the greatest impact. Thirdly, both partners must establish a world-class collaboration setup, ranging from the partnership's clear objectives to insightful data-sharing mechanisms.

A second approach to speeding up the supply chain is to reduce standing times: every moment that produce spends not moving towards the end consumer, it loses freshness. Reducing downtime during transportation by truck, rail or air would improve quality and freshness at point of sale.

There are a number of challenges that stand in the way of achieving this ambition, however. This is the case, for example, with regard to the main transport routes out of several major producing countries, such as those in Iberia. While a reduction in the standing time could in theory be realised by using autonomous transport, at present no viable solution appears set to achieve this goal in the near term. These problems arise due to the hurdles currently presented by legislation, the lack of standardisation across borders, and the low degree of interconnectedness between competing companies.

More flexible supply chains

Increasing the flexibility of the supply chain is aimed at ensuring continuity and fulfilment in supply. There are many reasons why the fresh produce chain can be interrupted – for example, the impact of unexpected weather patterns or pest infestations – while customers' demands are also evolving, as already discussed. To stay in touch with demand therefore requires agility, particularly if cost targets are to be met.

The battle for consumers is becoming tougher and tougher, particularly in well-developed markets. In future, weather-related stock shortages will no longer be acceptable. Customers will opt for suppliers that can offer produce whenever and wherever required, while at the same time balancing consumer demands for sustainability and authenticity.

Companies all along the chain are already well aware of the stresses such demands can place on supply. Tomorrow's demands, however, will be of a different order. Meeting them fully will require the adoption of dynamic capacity planning, in combination with dynamic control

This situation is likely to change, however. In future, autonomous vehicles will present opportunities to speed up the chain. In the short to medium term, we expect to see more in-plant autonomous transportation. As a second step, we are likely to see short-distance haulage within national boundaries. And we are already in the midst of this development process: vehicles with some level of autonomous capability or artificial intelligence – known as advanced driver assistance systems – could jump from a little more than 10 per cent in 2015 to close to 40 per cent of all vehicles by 2025.

As well as the aforementioned measures, which aim to speed up the supply chain and thus increase product freshness for consumers in store, we also expect to see a wave of new ways to boost shelf-life. These will range from breeding more robust varieties of fruit and vegetables, to improved packaging, and ensuring the greater availability of uninterrupted cold chains.

of product flows. Operations will need to have advanced systems analytics in place to predict demand and variations in supply. This information will provide decision makers with the lead times necessary to take corrective action well in advance of a problem affecting supply, enabling those involved to find alternative sources or re-route supplies. This will inevitably make the supply chain much less 'linear' than at present.

Many of the innovations will be driven in part by the need to respond to demand for increasingly frequent deliveries and, consequently, the need for transportation of smaller unit sizes. These responses are likely to include the pooling of volumes through the introduction of cross-chain platforms and multi-purpose networks, including sharing cold-chain capabilities across sectors, for example between retail and pharmaceuticals. Innovations such as these will play an increasingly important role in facilitating the efficient usage of spare capacity, even extending to the use of crowd-sourced delivery options.

CASE STUDY: WALMART AND JD.COM

What is new?

Walmart and JD.com's strategic alliance is aimed at improving their operations and customer service in China, as well as enhancing their online capabilities. The two companies started this pioneering partnership a year ago, when Walmart first made its products available to Chinese customers through the JD.com online platform. Today, the companies are expanding their cooperation and integrating their platforms, supply chains and customer resources in China.

Walmart and JD.com are planning to deploy a jointly developed supply chain and back-end system that integrates inventory management. When an order is made through JD.com, the system will analyse the data from both companies' stocks to define the nearest sourcing warehouse that can fulfil the order. They expect the system will improve delivery efficiency for customers, optimise transportation, and increase inventory turnover rates.

The companies are also taking steps to ensure in-store and platform integration. Recently, the first JD Home bricks-and-mortar electronics store was set up inside a Walmart store to sell products that complement the US firm's offer. In addition, JD.com has placed pick-up stations for its digital customers inside Walmart stores.

What is in it for the fruit and vegetable business?

The potential areas for supply chain alliances can include capability sharing, the sharing of physical resources (such as warehouses and delivery networks) or systems and intelligence (such as forecasting and route planning). As well as enhancing customer service levels, the flexibility that results from such alliances can provide significant leverage for improving operational efficiency. The potential benefits include more efficient use of capacity and greater efficiency in such areas as the cold chain, due to higher rates of utilisation. These improvements will result in better quality and freshness for the consumer.

More precise supply chains

Another objective is to attain increased accuracy and reliability in supply chain processes. This will become all the more important as the fresh fruit and vegetable supply chain develops in ways that makes it increasingly heterogeneous, and thus subject to increased volatility. A key approach to achieving superior precision in supply chain operations is through the use of better demand and supply forecasting, as well as increased automation.

Predictive analytics

This is the home turf of the pure online players. Predictive analytics will become increasingly

important right along the fruit and vegetable supply chain, and all companies will need to make use of more advanced systems and tools to address forecasting, such as machine-learning and artificial intelligence (AI) that can improve automatic stock replenishment. However, to be make full and effective use of such technologies, every link in the fresh fruit and vegetable supply chain – including growers, platform owners and retailers – will first need to get the basics right. That means ensuring you have fully reliable product master data and can feed systems with the metrics necessary to understand everything that is driving demand, as well as developing approaches to synchronise forecasts from players all along the chain.

Even though in future the accuracy of forecasting will be far superior to that seen today, it will never be perfect. This shortcoming will give rise to new and better ways of matching supply and demand, such as the creation of online marketplaces for fruit and vegetables (similar to a modern stock exchange). Such a platform could help reduce oversupply and help people better anticipate such situations. It would also aid decision-making across all businesses in the chain, whereas today such decisions usually centre around a single business operation.

Image recognition

This technology will surely continue to change the game on the producer side, with more and more fruit and vegetables checked for quality using vision technology (as is already the case

for hard fruit such as apples and pears). A big question remains over how quickly sorters will catch up in applying automated decision-making systems guided by image recognition. The technology's overall impact will extend well beyond sorting: vision robotics will enable increasingly sophisticated interactions in retail warehouses, for example in picking and packing.

Process automation

This will help make supply more reliable. Warehouse automation will boost service level consistency and conformity, satisfying demand for greater professionalisation – such as strict adherence to industry standards, particularly in areas like pallet and carton quality. As with predictive analytics, this entails ensuring that the master product data is of high quality.

CASE STUDY: ANALYTICS CAPABILITIES

What is new?

Retailers and consumer packaged goods (CPG) companies are already moving in the direction of data and analytics excellence – either on their own or with help of technologically advanced companies. For example, many of them are making more frequent use of Google Cloud, Google Analytics or Amazon Web Services, which enable better analytics, fact-based decision-making, and greater automation.

The first step for companies aiming to use such services is to learn to deal with large data, streamlining the data-related processes and the decision-making based on this data. For example, Unilever recently went through just this sort of transformation with the help of Amazon Web Services. In this process, it re-designed its digital marketing IT infrastructure, allowing it to improve business agility and operational efficiency, and leading to easier, faster and better decisions by employees.

Some companies want to go even further, not only streamlining their existing processes but also bringing their analytical capabilities and knowledge about their customers to the next

level. Ocado, for instance, with the help of big data processing and machine learning powered by the Google Cloud platform, has achieved immense improvements in its operational efficiency and costs in various operational areas, ranging from communication with its customers to reduction in the cost of its IT overhead.

What is in it for the fruit and vegetable business?

Given that data management in the fruit and vegetable business is even more challenging than in other categories – even for large retailers and suppliers – it is essential that all players in the supply chain start working on data quality immediately. The first step is to make use of data already available, before then ensuring that all the fundamentals are in place: cleaning up master data, defining standards for weighed products, tracking products' paths throughout the supply chain, and standardising communication with suppliers, as well as continuing to use such data for better forecasting and planning. In a few years' time, we expect the fruit and vegetables business to have started catching up with other categories in the use of data to understand developments along its supply chain.

More transparency and better control

In our experience, the most critical challenge for the fresh fruit and vegetable supply chain is its inherent lack of transparency.

This has many causes. Despite years of effort and often significant investment, there is still insufficient data availability. Even the data that is available is often of inadequate quality. Combined with a lack of interoperability, and with only limited information on product lifecycles and transportation history, this results in a high level of manual intervention and paperwork.

Even though we do not expect the fruit and vegetable business to catch up fully with other sectors that are already highly sophisticated and data driven, we do expect significant moves towards greater transparency in the sector. In one significant development, we expect to see blockchain play a major role in countering the present inefficiencies and creating new value.

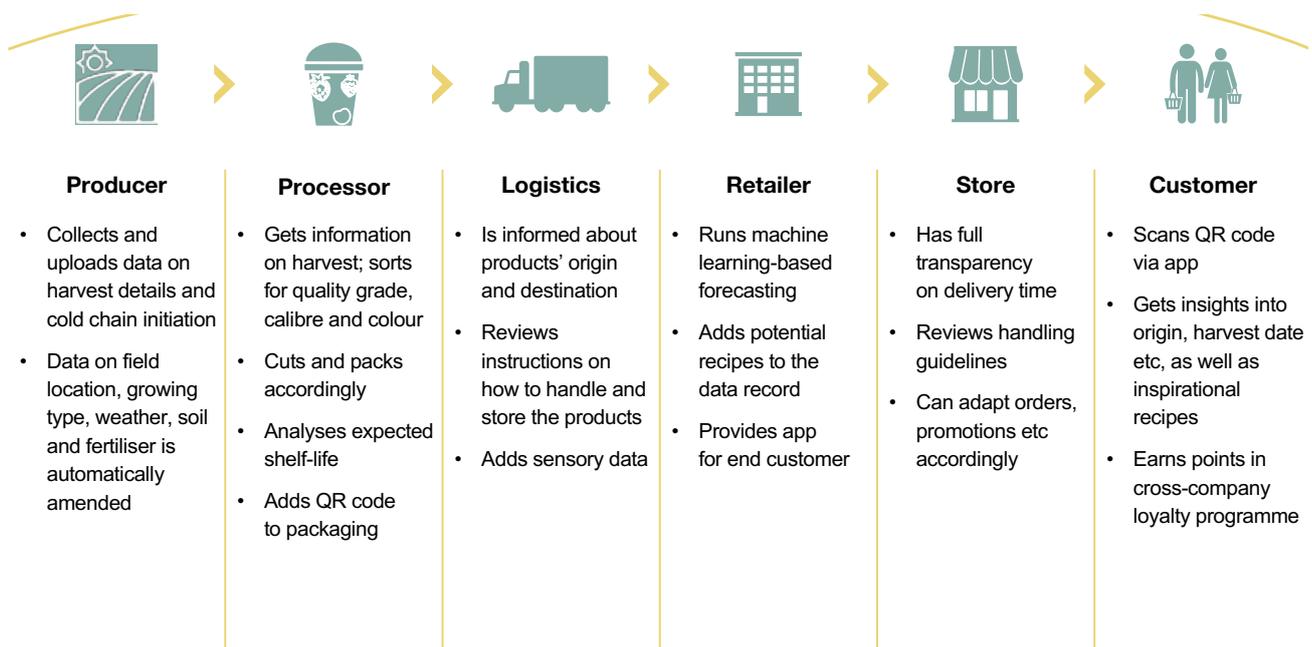
Blockchain is an inherently secure and highly decentralised data system. It is the basis for now familiar concepts like bitcoin. The data in each block carries a timestamp and is encrypted individually. As data blocks pass from one user to the next, they are automatically linked into a chain in such a way that, once the data is set in an individual block, it cannot be changed without altering all the other blocks in that chain. However, all data accumulated can be read by any user. This makes it ideal for ensuring data integrity and auditability.

A number of global players, including Walmart and Carrefour, intend to use blockchain technology to increase the data transparency of their supply chains by taking advantage of its decentralised nature and its location on a cloud database. This, they hope, will enable the data to be shared with any number of participants in the fresh produce chain and enable them to add extra value at every step of the chain.

FIGURE 6.

END-TO-END BLOCKCHAIN-ENABLED SUPPLY CHAIN EXOTIC FRUIT SALAD EXAMPLE

Source: Oliver Wyman



CASE STUDY: BT9

What is new?

A number of startups are seeking to win customers by responding to their increasing need for greater freshness and product quality. One such startup is BT9, which has developed wireless technology-based RF sensors to collect real-time cold chain information. The technology monitors the temperature and relative humidity conditions of products as well as their location. This has potentially wide application across all fresh categories, such as fruits and vegetables, ice cream, seafood, etc.

The technology provides visibility for all cold-chain stakeholders when it comes to the condition of any number of perishable products – whether they are being stored or transported – from producer to the store shelf. In addition to data collection and monitoring, the system also promotes decision-making, for example, by providing real-time alerts in an easy ‘click-and-go’ activation. Once a disposable tag is placed in the centre of a product package, it continuously gathers data from inside that package, transmitting online alerts and information to the cloud-based data platform via a connection centre, a device which can be installed almost anywhere – in fields, cold rooms, delivery docks or trucks.

What is in it for the fruit and vegetable business?

This technology may not yet be at a mature stage – in part because of the operational complexity involved, but also because of a lack of agreement between suppliers and retailers – but we believe in the potential of such approaches. Together with blockchain, it presents an opportunity to improve the supply chain by providing an end-to-end understanding of how it works in practice. The insights gathered can be used for tracking, analysis, cooperation with partners, identification of gaps and optimising internal processes.

The potential application of blockchain in the fruit and vegetable sector are many and various (as are the various pilots and initiatives currently experimenting with it). Here, we provide one example of how blockchain technology can support and conquer transparency while creating value for the consumer.

Blockchain will enable end-to-end data transparency for fresh products (see *Figure 6* for our ‘exotic fruit salad’ example). This will allow all players in the chain to respond to customers’ increasing demand for quality, in terms of both place of origin and production methods (for example, whether or not the products are grown organically). Retailers will even be able to share data relating to individual produce items with their own customers. For instance, the customer could scan a simple QR-code on their smartphone, then use an app to scrutinise every step taken along the supply chain by the product they have purchased, matching its journey against their expectations. This can include any kind of historical and real-time data linked to the product – be it related to timing (time of harvest, time in transport), location (its origin and the history of its journey from farm to fork) or other information (such as meal recipes). This data will be continuously available in a single, consistent version on the blockchain database.

Blockchain technology also provides a number of distinct advantages over today’s conventional supply chain IT infrastructure and analytics – for example, in comparison with today’s pure electronic data interchange (EDI). In contrast with EDI, blockchain is almost infinitely scalable. This can enable any number of players to be integrated seamlessly into the blockchain data at any point in the supply chain, without losing data consistency. These advantages are underpinned by the fact that blockchain technology is totally independent of adjacent and legacy systems. This makes its implementation both quick and cost effective.

It is also important to note, however, that several questions currently hang over the future of this technology, including issues regarding data protection, standardisation of data exchange, certification, and so forth. These questions need to be answered before blockchain’s full potential is allowed to unfold.

As well as increasing the level of transparency along the fruit and vegetables supply chain, we can also expect to see retailers attempting to gain a higher degree of control over each component area of activity. There has already been a wave of investment by retail chains aimed at increasing vertical integration. This has been done for various reasons, such as making purchase prices more stable, differentiation, and commodity hedging.

We expect to see further integration by retailers as they move into areas such as production, logistics, data and direct sourcing. This search for integration will probably not follow one particular pattern, but instead will likely take many forms, ranging from fairly loose arrangements for co-operation all the way to direct acquisition.

How to build a better supply chain

The key challenge for growers, suppliers and retailers in terms of integration will be to find ways of integrating the full range of new and increasingly important enablers that we have already discussed – and to do so in a manner that suits their own priorities and strategic course. This will require them to build several capabilities:

Systems and analytics

These are likely to become more important as the things that fruit and vegetable companies have to offer become increasingly data driven. However, costly investment in the latest software will not always be the right solution. Cleverly interconnected systems that support business-specific processes can also get things moving.

Talent

Ensuring growers and suppliers have the right people with the right skills will be central. Like many other sectors, the fruit and vegetable business faces severe challenges in finding the right personnel, particularly when filling low-wage positions in production and logistics. It is a problem not just in developed markets but increasingly also elsewhere in the world. While greater automation of processes and decision-making can offer solutions, automation creates its own challenges, demanding fresh talent with new job profiles. Data analysts, in particular, will assume much greater importance along the chain, even for producers. Process engineers will also be in much demand.

Organisation and change

An industry that is evolving rapidly also requires agile organisations. Even the most traditional businesses will need to adapt to new challenges laid down by the evolving supply chain – challenges that are likely to become increasingly hard to anticipate or foresee. All players in the chain will need to ensure that new technology is deployed quickly, and process changes and updates implemented promptly, as they become necessary. This requires agile teams that can carry out different functions. Plus, these demands need to be reflected in the organisation itself: for instance, by empowering mid-level cross-functional teams and reducing the fear of failure.