Prophet

the road to automation

The future of technology in fresh produce

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Introduction

The global fresh produce supply chain is in a state of flux. New commercial models, technological disruption and environmental challenges are causing the food industry to consider how to secure its future and protect margins.

Consumer change is being driven by the realisation that food production accounts for the majority of global water consumption, a large percentage of global land use, and the bulk of human-generated greenhouse gases.

Mindful consumers are demanding far greater insight into the provenance of the food they eat. To meet changing consumer needs, food growers are seeking to consistently deliver produce to the customer in a transparent and trusted way.

New retail models and consumer trends have already caused considerable disruption in the market. The drive for lower costs, improved efficiency, and supply chain transparency has driven consolidation of retailers and growers across the industry.

The fresh produce market has always been subject to substantial risks and complexity. Fresh produce has a fragmented grower base, and has to deliver a highly sensitive product through a multi-stage long distance supply chain.

Against this backdrop of continual change and inherent risks, data exchange and modern technology can play an important role in meeting the challenges the fresh produce industry faces.

The internet, the cloud, blockchain, automation, artificial intelligence: every year seems to bring more technological promises and threats. A fresh produce principal will be asking what these new technologies offer and whether they will cause continued and major disruption to their business and to the fresh produce supply chain.

The benefits of these new technologies will be realised by fresh produce companies that integrate software that is capable of intelligently managing their processes and tasks, and can manage the full range of risks and complexities inherent in the fresh produce supply chain.

MINDFUL CONSUMERS
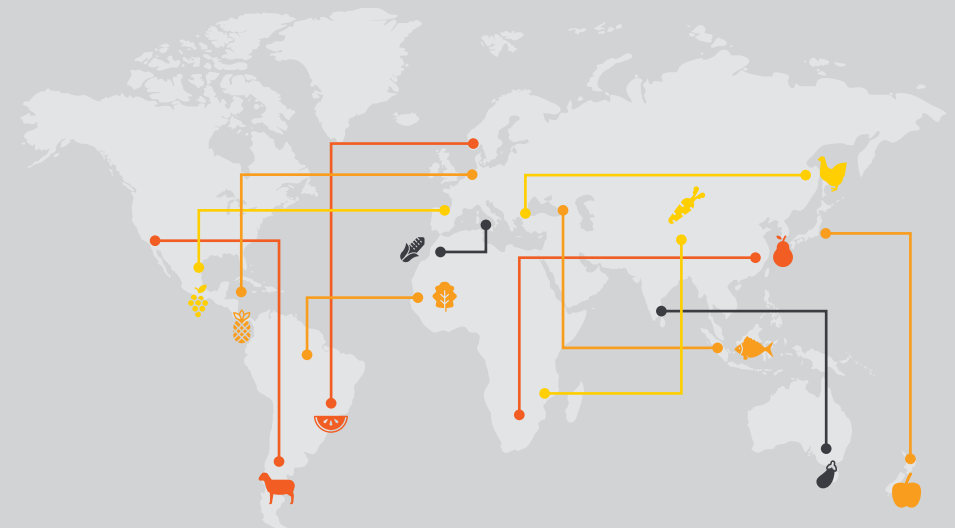
ENVIRONMENTAL CONCERNS

DISCOUNTERS

AMAZON

state of play

The threats and opportunities in the market right now

US MARKET

Discounters   US market   Amazon   Mindful consumers   Environment

Discounters

Discounter fresh produce retailers have ravaged European rivals with a no-frills, low-price strategy and continue to build market-share throughout the world.

Aldi and Lidl were not taken particularly seriously when they started opening stores outside of their traditional German base. In 1999, nine years after opening the first UK store, the Financial Times noted that Aldi had made "little impact in Britain".

Sainsbury's and Tesco enjoyed profit margins of approximately 7% during the 1990's and did not seem bothered about the arrival of the discounter competition.

"We welcome the advent of Aldi and others to come," said David Malpas, Tesco's managing director for most of the 1990's. "We can live quite happily in our part of the market and they can live in theirs".

But by 2017, Aldi had overtaken the Co-op to become the UK's fifth largest retailer; today it has a 7.5% market share, closing in on fourth-place Morrisons who has 10.6%. Lidl has 5.3% of the market, more than Waitrose. The two discounters are growing quickly – opening an average of one new store every week.

The former Aldi UK CEO Paul Foley was transparent about the effect of Aldi; "[we are] sucking the profitability out of the industry".

> SEE LINKED CONTENT: Structural shifts in the market

It's absolutely brutal...

there's an 'it will never happen to us' mentality. Lots of European supermarkets assumed [Aldi and Lidl] stores were for low-income shoppers... but they've lost 10% of their market share to them.

Bryan Roberts / Director / TCC Global Retailer

US market

In the United States, the food retail industry is expected to be worth approximately $1.3 trillion in 2020.
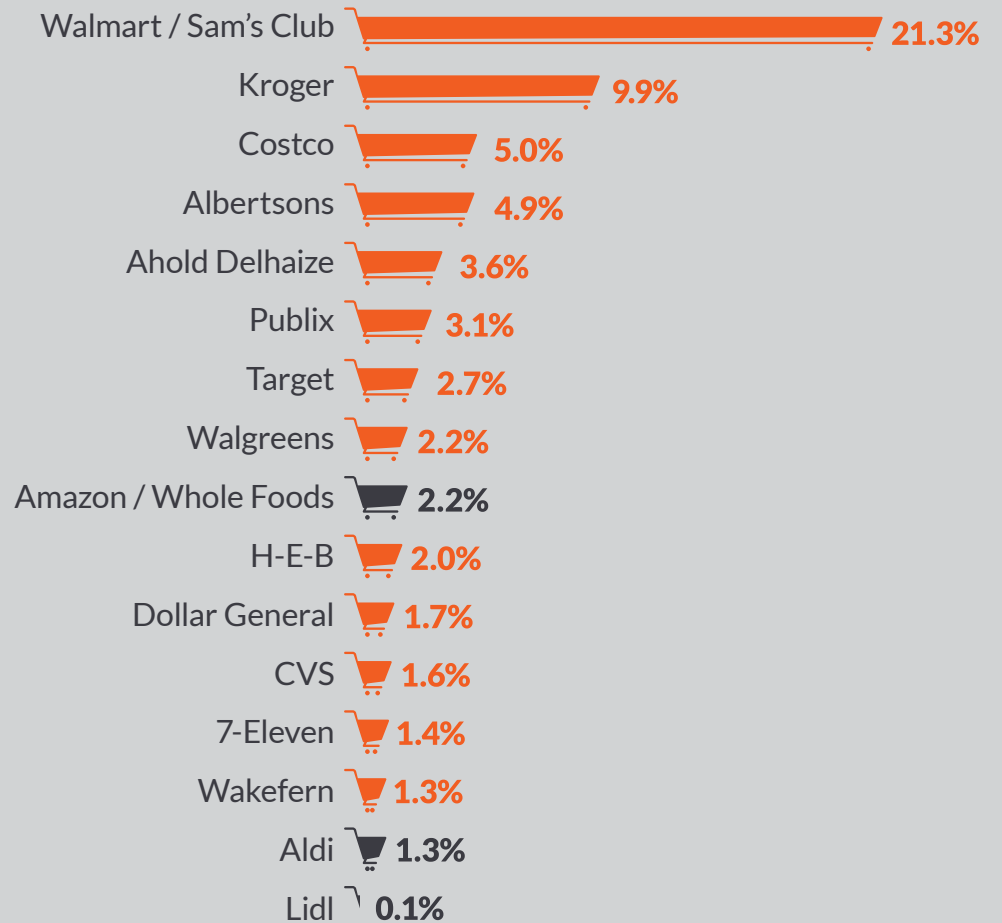
Business Insider notes that individually, Walmart's US market share, including that of its warehouse chain, Sam's Club, totalled 21.3% last year. Kroger ranked second with a share of 9.9% and Costco ranked third with a share of 5%. Amazon and Whole Foods, by comparison, accounted for 2.2% of the US grocery market in 2019, which is up from a 1.6% market share in 2017.

Despite the minor market share taken by the discounters to date in the US market, they have already had a profound impact.

John Ross, President and Chief Executive of Independent Grocers Alliance said "our country has been invaded by the German retailers, and they have disrupted the ecosystem quite severely".

Discounters are taking a bigger share of US grocery bills and pressuring retailers in the US to respond. Grocers in the US are decreasing prices on staples like eggs and milk, and stocking more products that discounters aren't known for, such as fresh produce.

US GROCERY MARKET SHARE 2020

Walmart / Sam's Club	21.3%
Kroger	9.9%
Costco	5.0%
Albertsons	4.9%
Ahold Delhaize	3.6%
Publix	3.1%
Target	2.7%
Walgreens	2.2%
Amazon / Whole Foods	2.2%
H-E-B	2.0%
Dollar General	1.7%
CVS	1.6%
7-Eleven	1.4%
Wakefern	1.3%
Aldi	1.3%
Lidl	0.1%

Source: UBS

The Amazon effect

In June 2017, Amazon announced its arrival into the grocery business by buying Whole Foods for $13.4 billion. Share prices of traditional food retailers fell on fears that they would not be able to respond to the investment and innovation that Amazon would bring.

Within months of purchasing Whole Foods, Amazon offered deliveries to a few American cities within two hours of online purchase. By the end of 2019, that same offer was available across 90 cities – and delivery time was being brought down to an hour.

In January 2018, Amazon launched Amazon Go in the US. Amazon Go allows shoppers to scan their phone on entry, and a series of cameras and sensors ensure the customer is correctly billed as they walk out of the store. As of March 2020, there are 27 Amazon Go stores in the US and there is a launch planned for the UK.

➤ SEE LINKED CONTENT: The new demands on food growers

" People really need to understand – Whole Foods is the beginning [of the change], it's not the end.

Brittain Ladd / Ex-Amazon employee and Founder + CEO / Six-Page Consulting

Amazon's technology driven-strategy is not unique. The tie up between Ocado (a UK online grocery retailer) and Kroger, has provided the US retailer with access to automated warehouses and distribution centres. Walmart is benefitting from an increasingly sophisticated data platform and analytics centre, and this is now being combined with automated grocery picking systems like Alphabot.

Major US retailers have recognised the threat to their margins presented by discounters and the technology behemoth Amazon.

" **These are people out there that attack us... you've got drug stores, you've got traditional supermarkets, you've obviously got Amazon, you got hard discounters, you've got other discount stores.**

Greg Foran / CEO / Walmart

Discounters ✛ US market ✛ Amazon ✛ Mindful consumers ✛ Environment

Mindful consumers

It has become more obvious over the last decade that consumers want greater convenience plus a better understanding of how their food has been produced.

Consumers increasingly care about the total environmental footprint of their purchase. Market trends show a preference toward 'mindful eating' – as consumers choose brands and foods that come from sustainable sources.

Millennial consumers are adopting digital solutions that provide instant access to products and services (e.g. Deliveroo and Uber Eats) without being confined to physically nearby choices.

According to recent McKinsey research, the purchasing decisions of those under the age of 35 can make mass brands and traditional channels ill-suited to them. There is a pronounced preference for new brands, especially in food products; the rising popularity of Beyond Meat and Impossible Burger is one example.

The Financial Times reported that the full extent of the COVID-19 crisis on consumer habits and use of digital channels is yet to be fully understood. The need to purchase digitally during the COVID-19 crisis may have a lasting impact on retailers need and ability to reach consumers through online channels.

Millennials are almost

4X

more likely than **baby boomers** to **avoid buying products from multinational food companies**

Source: McKinsey

Environmental concerns

The United Nations estimates that each year, approximately 1.3 billion tonnes of food are lost or wasted—about one-third of all the food produced in the world.

A recent UBS report highlighted some telling statistics around environmental impact of the fresh produce industry.
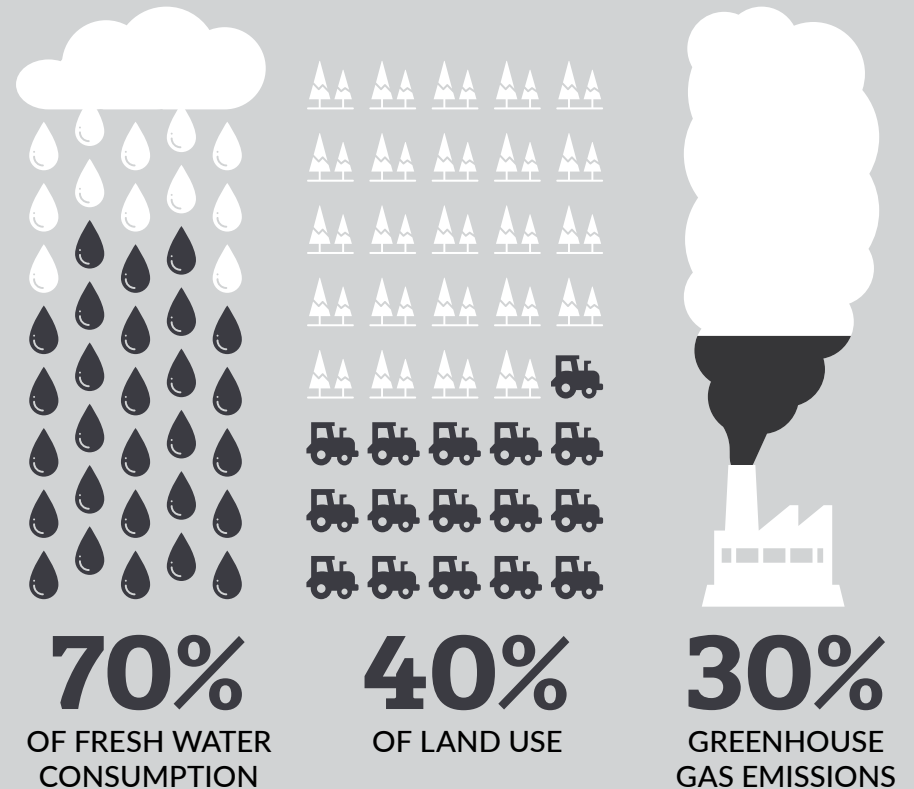
Farmers will need to produce at least 50% more food by 2050 because populations are growing and incomes are rising.

The changing climate will increasingly impact on food production. The most important agricultural regions worldwide are those most likely to experience difficulties in agricultural output due to drought and excessive heat.

Water use has tripled since the 1950s and demand continues to soar. Demand for water is predicted to exceed supply by 40% in 2030.

The UN's Food and Agriculture Organization (FAO) estimate that one-quarter of global farmland is highly degraded and another 44% is moderately or slightly degraded.

THE GLOBAL ENVIRONMENTAL IMPACT OF FOOD PRODUCTION

70%
OF FRESH WATER CONSUMPTION

40%
OF LAND USE

30%
GREENHOUSE GAS EMISSIONS

Source: United Nations

SUPPLY CHAIN 4.0

ROBOTICS

the tech challenge

How can technology provide a fresh produce opportunity?

DATA EXCHANGE

ARTIFICIAL INTELLIGENCE

Fresh produce is an unusual and challenging mass market product. It can spoil, decay or become unsafe to consume if not kept refrigerated at 40 F° (4.4 °C) or below, or frozen at 0 F° (-17.8 °C). Maintaining the "just harvested" state of fresh produce presents enormous challenges.

Inspections, border-crossings, varied modes of transport – all these add to the uncertainty of when produce will arrive. There are a huge range of risks in matching supply to demand. Supply chains can stretch from two days to many weeks. On any single day – the market – with its challenges of quality, timing and non-supply, struggles to fill retail shelves at acceptable customer prices.

The fresh supply chain is highly complex and fragmented – each actor in that chain deciding for themselves (with whatever market intelligence can be gathered, and based on its own judgment of what people want) what to grow and when. Budgeting and forecasting based on uncertain demand and supply is immensely difficult.

The challenges of fresh produce and the need to manage its passage through a complex supply chain has encouraged the food industry to embrace the opportunities of technology.

A WRAP report states that "The characteristics of the food system, such as complexity, huge geographical range, and diversity of operators make it particularly suitable for exploiting data-enabled technologies".

In order to adapt and respond to this considerable change, there is significant expectation that technology will allow the fresh produce industry to prosper.

> **There are numerous new technologies that can be applied to raising agricultural productivity, safeguarding environmental health, and satisfying evolving consumer preferences.**
>
> UBS
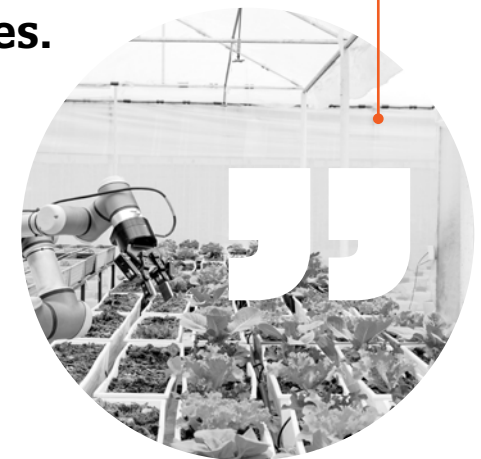
Lessons learned from technology

Technology relevant to the fresh produce industry has been harnessed with varying success to improve food traceability and safety, identify supplier poor performance, increase revenue, and meet retailer and consumer expectations.

The way in which the market has adopted these technologies teaches us a lot about the best way forward.

> ## The real question is, do we direct technology, or do we let ourselves be directed by it and those who have mastered it?
>
> **Douglas Rushkoff**

BARCODE TECHNOLOGY

Barcode technology became established throughout the retail industry in the 1980s. Barcodes removed paper from the warehouses, as systems were developed to allow the movement of goods through warehouses to be integrated with scanning barcodes for inventory specific references (pallets/lots etc). This saved time and labour costs.

It is estimated that barcodes delivered 20% efficiency gains overall – and perhaps, just as importantly, added much increased accuracy of stock management and traceability of usage. Many companies share the same barcode labels through the supply chain, further reducing the cost of handling.

RADIO FREQUENCY IDENTIFICATION

The next breakthrough had appeared to be Radio Frequency Identification (RFID). RFID removed the need to have someone scan a product, and could be read throughout the supply chain and read by sensors – but it failed in most markets. To provide the benefit, the warehouse had to be fitted with expensive sensors that could work throughout the warehouse or at entry and exit points, and had to work when faced with any warehouse and product conditions. The RFID technology required the entire supply chain to invest heavily to deliver its benefits.

VOICE RECOGNITION

Voice recognition was also meant to provide substantial gains when used in warehouses. This technology has been in place and has provided some benefits for more than a decade. The voice-directed system can be implemented to improve picking accuracy and the speed of the pick performed by the warehouse staff.

The voice picking system allows warehouse staff to concentrate on the picking process without looking at paperwork and having both hands free to perform the pick.

It has been calculated that this technology offers approximately a 5% gain over scanning but the benefits are only realised in high volume environments that are very labour intensive.

> **Only when digital solutions prove to be more practical, efficient, and affordable than anything else on the market will agriculture enjoy its smartphone moment.**

UBS

LESSONS LEARNT

Technology has delivered incremental gains to the fresh produce industry over the last few decades. There have been promises of revolutions, but the reality has been that technology has delivered regular evolution and improvements of business processes.

The benefits of increased automation have not been fully realised across the supply chain and considerable opportunities still exist to improve processes, mitigate risks, and protect margins.

Whenever there has been a need for more than just a commercial relationship (shared cross supply chain coordination) – progress has normally been slow. Benefits are more likely to be realised by those companies that work through the details of processes on a day-to-day basis inside and take an evolutionary approach to delivering those benefits when applying new technology.

Technological implementations in previous decades have also highlighted the human challenge – there is natural desire to wait and see, to respond when competitors respond, or to hope that the change is fleeting and the status quo will be resumed. There is a substantial risk that inertia prevents fresh produce companies from fully exploring the opportunities enabled by new technology.

Technology next steps

ANTICIPATED TECHNOLOGY ADVANCEMENTS

14%
Block chain

25%
AI and Cognitive Computing

53%
Advanced Analytics
(incl. predictive analytics)

20%
Robotic Desktop Automation

40%
Robotic Process Automation

18%
Machine Learning

25%
Intelligent Automation

51%
Data Management

13%
Chatbots
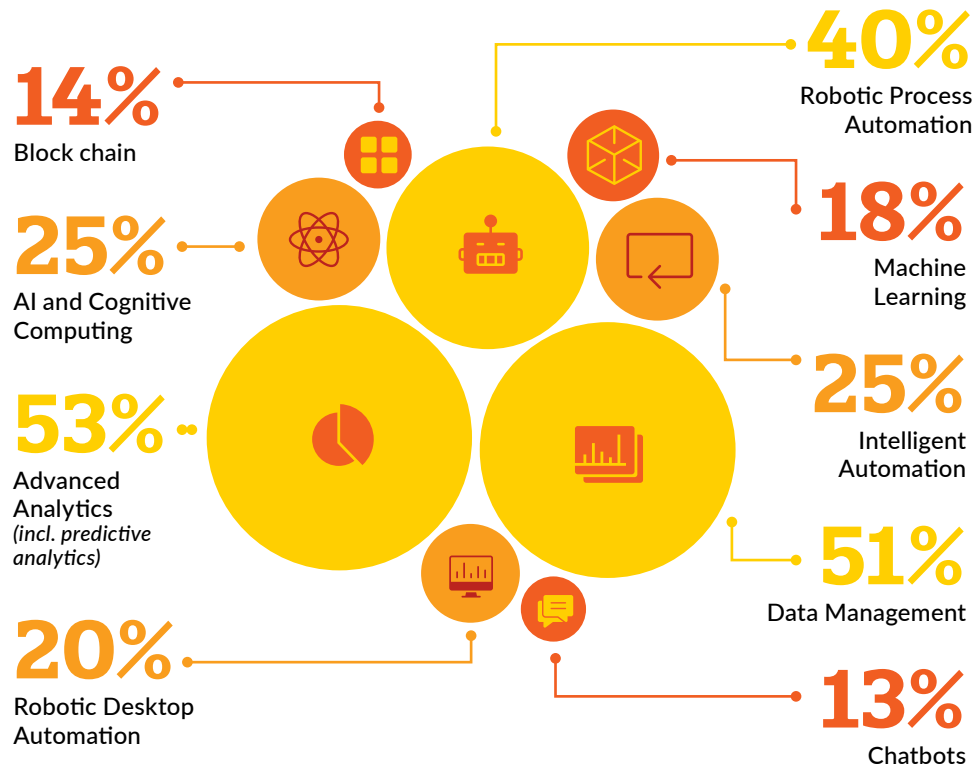
Source: Make Success Automatic: Best Practices in Robotic Process Automation, APQC 2018

THE INTERNET AND DATA EXCHANGE

We are in the fourth decade of the commercial internet and its effect is everywhere – there are new opportunities to interact, to share information, to find and retain customers, to change, automate and improve business processes. These changes impact almost every aspect of our lives.

Data is exchanged faster and more accurately – far less data is rekeyed. This makes it easier to programme the connection between systems. There are substantial opportunities for richer, more accurate and faster data exchange between systems through the supply chain.

Cloud infrastructure has provided on demand data storage and computing power for a fraction of the previous costs, and allows companies to scale more quickly without building their own expensive computing systems and storage centres.

Internet era technologies offer the potential for what McKinsey have referred to as the digitisation of the supply chain. "The digitisation of the supply chain enables companies to address the new requirements of the customers, the challenges on the supply side as well as the remaining expectations in efficiency improvement".

BLOCKCHAIN

Blockchain is the disruptive kid on the block. Blockchain is a form of Distributed Ledger Technology (DLT) – a chain of blocks that trace transactions and assets. The blocks are encrypted, carved, and timestamped by "miners" (a distributed group of "trustworthy" people who validate each transaction) and once incorporated in the chain, these transactions cannot be changed or removed.

Blockchain has the potential to enable supply chain participants to see all of the transactions relating to fresh produce, and allow consumers to understand exactly where their food has come from. For supply chain companies, this could provide "objective" stories of the life of any consignment and give much greater credibility and trust throughout the supply chain.

While blockchain does offer substantial opportunities for disruption, this technology and its effects are in their infancy.

❯ **SEE LINKED CONTENT: Pathway to blockchain and artificial intelligence**

Despite considerable interest, there is no detailed consideration of how DLT can be applied in the food industry and key challenges to its application.

Simon Pearson

AUTOMATION AND SMART SOFTWARE

Automation removes the need for humans to decide which buttons to push and when. Automation can drive significant change in the fresh produce industry by:

» Reducing the time required by human operators to process data through the use of smart algorithm software.

» Delivering improved data exchange technology in order to support human processing of tasks or replace the need for humans to interact with the equipment or rekey data between systems.

Eliminating tasks through automation requires:

» Software that can do what the human interaction does.

» An ability to automate a complex series of processes and tasks.

» An ability to search and collect the right data, to calculate and return the correct result/action on the database for that task to be completed.

The primary task is in knowing precisely what is happening and what the cost value and sale value is, as soon as possible, and as accurately as possible. There is a strong need for granular, pallet by pallet, consignment by consignment, inventory control for all aspects of data processing and reporting. All of the data necessary for any task has to be recorded and integrated: not in someone's head or in an external document.

INTERNET OF THINGS AND 5G

The Internet of Things (IoT) is defined as a network of physical objects or "things" embedded with software, sensors and network connectivity. These enable the IoT devices to collect and exchange data remotely across a network infrastructure.

IoT can have a significant impact on the fresh produce supply chain, especially in terms of food safety and traceability. By placing an autonomous IoT sensor in each pallet, food producers can automatically collect data about that pallet every minute. Sensor devices can help build an overall traceability picture of goods and products during their supply chain journey. Data from IoT devices provides a stream of high quality data that can be fed into smart software.

Current wireless infrastructure does not have the capacity to accommodate this number of devices and ensure exchange of information without minor lags. 5G connectivity will make it possible for sophisticated IoT tracking ecosystems that could transform logistics operations. High speeds and low latency will make it possible to gather real-time data, and to accumulate a more varied range of data across the entirety of the supply chain.

ROBOTIC PROCESS AUTOMATION

Robotic process automation (RPA) is a form of automation technology, sometimes referred to as software robotics.

Most automation tools require the use of Application Programming Interfaces (API) to script a series of mechanised processes; RPA systems watch the user perform tasks in the application's graphical user interface and then perform the automation by repeating those tasks.

RPA has the ability to rapidly automate processes without the time and cost of developing more complex technical infrastructure; RPA is particularly well suited to working across multiple back-end systems. RPA is especially useful when the interactions are with older, legacy applications.

"Technologies like RPA are terrific tools for breathing new life into legacy systems and creating digital process flows, where before there was only spaghetti code, manual workarounds and swamps of data polluting the corporate underbelly". Phil Fersht, CEO and Chief Analyst, HFS Research.

RPA is increasingly being used for more sophisticated purposes as bots become capable of smart decision-making based on pre-set logic.

A recent Forbes article stated that RPA is "a gateway drug to artificial intelligence". The premise is that sophisticated RPA systems are capable of digitising business processes that had resisted automation up until this point, allowing a base layer of structured data that can be exploited for machine learning.

However, the simplicity of RPA's approach means that it is unsuitable for dynamic environments with a large number of variables. RPA works best when application interfaces are static, processes don't change, and data formats also remain stable – a combination that is increasingly rare in today's dynamic, digital environments.

RPA does have a place in a corporate technology strategy when looking to rapidly move away from legacy systems and begin a journey towards a more automated supply chain. But without a robust data architecture that is able to incorporate new technologies, it should not be relied upon as a complete solution.

> **You should consider using RPA if you have a large legacy application as part of a process that functionally works, has no bugs, doesn't need new features, [and] doesn't require developing additional applications to support the process.**

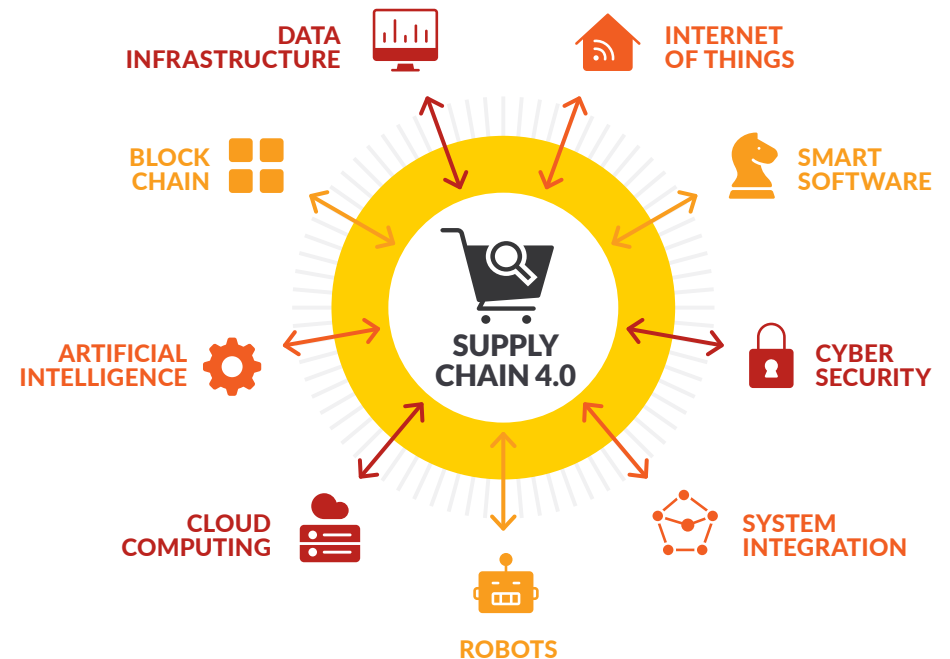**Keith L Murphy / Solution Architect / OutSystems**

SUPPLY CHAIN 4.0

As defined by McKinsey, "Supply Chain 4.0' is the application of the Internet of Things, the use of advanced robotics, and the application of advanced analytics of big data in supply chain management: place sensors in everything, create networks everywhere, automate anything, and analyse everything to significantly improve performance and customer satisfaction".

Supply Chain 4.0 represents the complete digitisation of the supply chain and the collective application of many of the technologies that have been discussed. Supply Chain 4.0 is the culmination of a successful cloud-first, data-first, smart connectivity (Internet of Things) strategy that is able to capture, manage and iterate every process within the supply chain.

The benefits of the digitised supply chain relies upon a continuous process of improved planning and execution, as real-time data allows plans and processes to be improved through a multitude of feedback loops that drive improved performance.

INTEGRATION OF TECHNOLOGIES IN FRESH PRODUCE SUPPLY CHAIN

DATA INFRASTRUCTURE

INTERNET OF THINGS

BLOCK CHAIN

SMART SOFTWARE

ARTIFICIAL INTELLIGENCE

SUPPLY CHAIN 4.0

CYBER SECURITY

CLOUD COMPUTING

SYSTEM INTEGRATION

ROBOTS

> ## "Planning becomes a continuous process that is able to react dynamically to changing requirements or constraints (e.g. real-time production capacity feedback from machines).
>
> — **McKinsey**

McKinsey portrays Supply Chain 4.0 as "the highest digital maturity level, leveraging all data available for improved, faster, and more granular support of decision making. Advanced algorithms are leveraged and a broad team of data scientists works within the organisation, following a clear development path towards digital mastery."

ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI), deep learning, and machine learning are often used interchangeably to describe the "science of getting computers to learn and act like humans do, and improve their learning over time in autonomous fashion, by feeding them data and information in the form of observations and real-world interactions".

In the last decade, implementations of AI have become more widespread due to concurrent advances in computing power and the availability of large amounts of higher quality structured data. AI techniques seek to support the automation of repetitive tasks and an enhanced decision-making process.

Successful implementations of AI require deep implementations of data exchange and processing. Deep implementations of data processing are able to capture, in near real-time, every task that is required for the whole process flow of data through a single database. For fresh produce, this must be at the right level i.e. the level of the inventory reference which is the specific pallet within the specific consignment.

AI has the potential to improve supply chain management, including the quality and speed of planning insights. AI can optimise the reduction of waste associated with overstocking and understocking, improve delivered freshness of the product and streamline inventory management.

responses needed

What does a fresh produce principal need to be thinking about?

HOLISTIC APPROACH

COMMITMENT TO AUTOMATION

PEOPLE FIRST

DEEP IMPLEMENTATION

+ Long tail
+ Lessons of the past
+ A holistic approach
+ Focusing on people
+ Data quality
+ Commitment to automation

The long tail opportunity

Chris Anderson's famous Wired article from 2004 introduced the concept of long tail of niche sales marketing. A long tail strategy allows companies to realise significant profits by selling low volumes of difficult to find items to many customers, instead of only selling large volumes of a reduced number of popular items.

In 2011, technology analysts at Forrester Research made a similar observation for automation requirements within large service organisations. They argued that high-volume repeat tasks like payroll, accounting, finance, order management and human resources have largely been automated. But there remains a long tail where task patterns become less frequent. This aspect of business delivery requires extensive manual work and temporary staffing to address bursts of activity. Forrester Research suggested that 50% of all automation opportunities are being missed.

The long tail opportunity for the fresh produce industry is to successfully embed data exchange and smart software across the supply chain, thereby allowing people to focus on value-add tasks and innovation, rather than their time being consumed by bureaucratic tasks.

SEE LINKED CONTENT: Automation opportunities

50%
OF ALL AUTOMATION OPPORTUNITIES ARE BEING MISSED

Source: Forrester Research

Long tail + Lessons of the past + A holistic approach + Focusing on people + Data quality + Commitment to automation
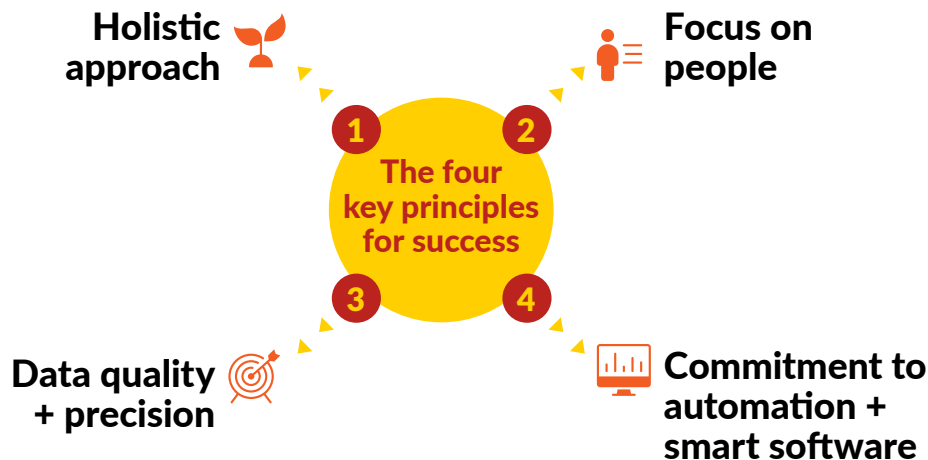
The ability of the fresh produce industry to embrace the long tail challenge, and exploit the opportunities of modern technology, requires an understanding of the lessons of the past.

Companies are most likely to embrace new opportunities where a material gain can be achieved without the need for wholesale reinvestment by all supply chain players at once. Business systems have to be capable of evolution, otherwise people will return to standalone spreadsheets or manual processes.

Lessons of the past show that productivity gain is delivered through a strong understanding of the fundamentals of the fresh produce supply chain; there is a need to have a holistic approach, a need to invest in people and skills, and an investment in robust data infrastructure and smart software.

Holistic approach

Focus on people

1

2

The four key principles for success

3

4

Data quality + precision

Commitment to automation + smart software

1. HOLISTIC APPROACH

The execution of the fresh produce supply chain has so many sources of uncertainty and change. This uncertainty is the "noise" that can prevent businesses from taking a comprehensive holistic approach to understand the fresh produce ecosystem, evaluate and solve problems, and meet the expectations of customers.

The need for a broad understanding of the provenance of fresh produce encourages the exchange of more data about the growing, harvesting and condition of the product as it flows through the chain – improving the prediction of what the product will be like at each stage and what to expect from handling and settlement. This will ensure less disappointment and a reduction in the waste experienced – as products are not sent to the wrong place or at the wrong time.

> **Adding technology, by itself, is not enough. Retailers must also rethink their operating models across stores, distribution centers, and headquarters.**
>
> **McKinsey**

2. FOCUS ON PEOPLE

The delivery of incremental supply chain improvements requires an investment in the data and digital skills of a workforce; digital literacy needs to be embedded throughout an organisation.

A recent WRAP report stated: "The delivery of the potential benefits from these technologies is by no means inevitable: there is a need to actively promote the adoption of these approaches and invest in skills and capacity".

The ability to use technology to meet the long tail challenge and incrementally improve supply chain effectiveness starts with a clear statement of what the problem is, and what a good outcome looks like. Without a clear understanding of each task, each process and each problem to be solved, the benefits are likely to remain elusive.

Leading computer scientist and physicist Stephen Wolfram reflected on this when explaining how to reap the rewards of AI.

> **What will AI allow us to automate? We'll be able to automate everything that we can describe. The problem is: It's not clear what we can describe.**
>
> — **Stephen Wolfram**

> **Automation creates organisations with far fewer layers – each employee is responsible for a more diverse set of responsibilities. Real-time data and analytics will empower faster decision making.**
>
> — McKinsey

The challenge of making the most of technology is a human-centred problem; there is a need to work within your organisational limits, to articulate the problems that are known, and find the right solution before taking the next incremental step to improve the next business process.

⊙ SEE LINKED CONTENT: Talent and technology
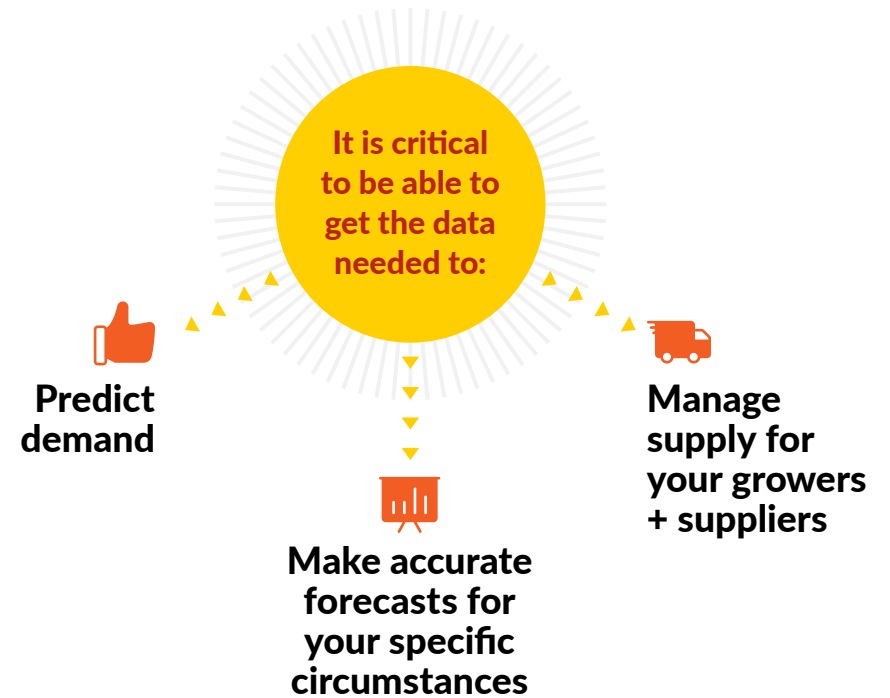
3. DATA QUALITY + PRECISION

In high-volume fast changing businesses, agile practices and fast decision making are critical. The primary task is in knowing precisely what is happening, and what the cost value and sale value is, as soon as possible, and as accurately as possible.

To deliver these changes, there is a need for very precise real-time inventory control and speed of information and actions. Whether in planning or in executing, the level of data has to be granular, down to the consignment and its pallets.

The ability to process big data on weather, growing conditions, transport and logistical factors is already delivering substantial benefits. The fundamental challenge is the sharing of this data so that it impacts throughout the supply chain.

The tasks that need to be performed have to be part of an integrated set of applications that can operate on the same database in near real-time without locking up data or introducing any lags into updating or retrieving data.

> SEE LINKED CONTENT: Working across the supply chain

It is critical to be able to get the data needed to:

Predict demand

Make accurate forecasts for your specific circumstances

Manage supply for your growers + suppliers

4. COMMITMENT TO AUTOMATION + SMART SOFTWARE

The path to automation and artificial intelligence starts with data and smart software. A completely digitised and intelligent supply chain requires fresh produce businesses to make a long standing commitment to high quality data and to enable automation throughout all business processes and tasks. These changes will enable fresh produce companies to implement software that is capable of intelligently managing their processes and tasks, and managing the risks and complexities inherent in the fresh produce supply chain.

> **The granularisation of the supply chain into hundreds of individual supply chain segments based on customer requirements and own capabilities designed in a dynamic, big data approach allows to mass-customise supply chain offerings. Tailored products provide optimal value for the customer and help minimise costs and inventory in the supply chain.**
>
> **McKinsey**

Fresh produce companies need to embrace the following changes:

Deep implementation
It is important to get all of the tasks and data and rules in a system in digital form as a deep implementation. Automation is then a layered evolution of removing the need for humans to decide when and what button to push.

Integration
Integrate openly with other systems (inside and outside the enterprise) so that no rekeying is required and data availability is maximised. For any software solution to deliver the right scope of automation, it has to have an open approach to integration and to sharing of data.

Experimentation
Experiment across a great many opportunities to work out (sometimes by trial and error) what works. There needs to be a close and long standing relationship between a technology provider and a fresh produce organisation. Strong, ongoing collaboration is required in order to correctly identify problems and achieve incremental improvements over time.

> SEE LINKED CONTENT: Key features of Prophet

enterprise resource planning

The importance of the right ERP software

An Enterprise Resource Planning (ERP) solution used to be about just that – planning. But the term ERP has become the general description for a "business system" – software that is used to operate a business.

Businesses are about processing transactions – for fresh produce – orders for fruits and vegetables and the services associated with handling those goods.

The normal core process functions covered by a fresh produce ERP are:

» Demand and supply forecasting
» Material Requirements Planning (MRP)
» Production capacity planning
   (APS – Advanced Production Scheduling)
» Sales and purchase orders
» Inventory management
» Transportation and works orders (manufacturing)
» Warehouse management
» Contract management
» Product specifications auditing
» Supplier auditing
» Receivables and payables
» General ledger

Good ERP software

Good ERP software providers invest the time to understand specific industries, and sometimes the specific sectors of that industry.

No software will provide a great solution for the fresh produce business without decades of dedication to understanding the specific and shifting needs of fresh produce.

Strong ongoing collaboration between the ERP software provider and the fresh produce organisation is needed in order to iterate the design, improve the business processes, and to incrementally solve more problems and deliver enhanced benefits.

" **The advantage of the incremental approach is that the company can get feedback on the implementation and how it is received and possibly fine tune the implementation strategy.**

Alexis Leon, Author of *ERP Demystified*

A good ERP should...

1 Make available the data needed to perform the actions of the business

2 Record the data of any process as it happens

3 Carry out any calculations, during or after that task is completed

4 Allow the system to trigger and coordinate the next actions by making that data available to others

5 Once transactions are complete, that data should feed accounting processes to cause the payments to be made

6 Integrate all the data and all the processes at the consignment level because every consignment is unique

7 Operate a real-time database

8 Coordinate and drive all the processes

9 Be used to both perform and capture processes for any core business transaction

10 Learn from feedback – iterate and improve

Core ERP functions

Good ERP software

ERPs to avoid

ERPs to avoid

SUPERFICIAL IMPLEMENTATIONS

The integration of these systems have been known to overrun by many years and only include basic functionality. The business will still need to maintain spreadsheets or external poorly-integrated stand-alone software.

REVERSED IMPLEMENTATIONS

Sometimes companies fail with their attempts to move from older "green screen" systems which use basic computer technology. These companies struggle on, hindered by an ERP that lacks the sophistication and processing power to cope with the complexities of the fresh produce supply chain.

USE OF A GENERAL LEDGER MECHANISM

General ledger mechanisms focus on average cost of stock, and possess poor information systems for the fresh produce environment. They often fail to deliver customer and product profitability.

BIG BRANDED ERPS

These do not have a core file structure, i.e. consignment-based, and they do not focus on activity-based costing and accurate, rapid consignment, and sales order profitability.

Core ERP functions + Good ERP software + ERPs to avoid

the way forward

An introduction to Prophet and fresh produce

INVENTORY MANAGEMENT

COLLABORATIVE RELATIONSHIPS

TRANSPARENT PRICING

USER-CENTRED DEVELOPMENT

SUPERIOR FILE STRUCTURE

CORE PLANNING TOOLS

ERP has to deal with what is different and unique about managing fresh produce – the need for granular, pallet by pallet, consignment by consignment, inventory control for all aspects of data processing and reporting.
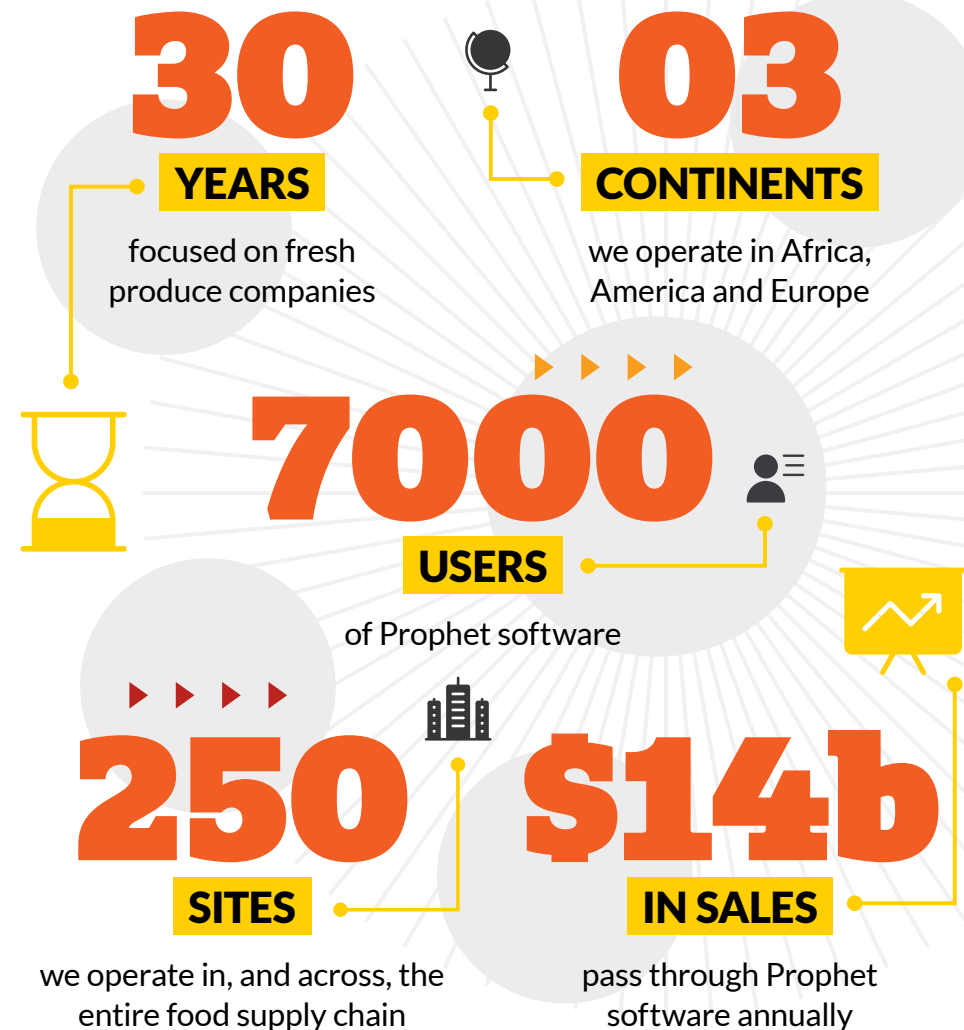
Achieving the required level of data exchange is a key foundation for taking advantage of other artificial intelligence and automation opportunities.

Prophet is one fresh produce focused ERP that has the technology, software design, and the right business model, to provide a successful ERP strategy. Prophet's extensive user base and long experience throughout the fresh produce supply chain make it an industry leading ERP. It has a robust foundation for – and already provides – a platform for automation and smart software that can provide real competitive advantage to fresh produce companies.

Prophet enables businesses to remain competitive to survive and prosper in the face of future disruption, and is also the right partner in the journey towards automation.

Other dedicated fresh produce ERPs – who have provided workable systems for fresh produce – do not have the foundation for true deep implementations, and the automation and artificial intelligence opportunities that this can bring.

A QUICK GLANCE AT PROPHET

30 YEARS
focused on fresh produce companies

03 CONTINENTS
we operate in Africa, America and Europe

7000 USERS
of Prophet software

250 SITES
we operate in, and across, the entire food supply chain

$14b IN SALES
pass through Prophet software annually

Key features of Prophet

INVENTORY MANAGEMENT

Inventory management centred on the specifics down to pallet/bin level – in all aspects of reporting availability through to Material Requirements Planning (MRP).

INVENTORY-BASED ACCOUNTING

The ability to apportion expected and actual financial postings to the lowest level of activity in order to provide accurate profitability reporting at these levels – sales orders, purchase orders, works orders. This has been the culmination of years of work and learning many lessons from trial and error, as well as intelligent design.

INVENTORY-INTEGRATED PLANNING TOOLS

Planning as a seamless on-demand extension of the live inventory management – just as quick and just as granular – because the current calculation of availability affects the important future time periods. In Prophet, material and capacity requirements planning is a unique near live inventory and capacity calculation engine – the culmination of years of work.

SUPERIOR DATA STRUCTURE

A file structure able to deliver reliable accurate customer sales order profitability by deriving an accurate cost of service as soon as the goods leave the business. Prophet can operate all application features for large multi-user enterprises over one integrated multi-user database – where a multi-legal entity enterprise acts as one unified operation.

A GENERAL RULES ENGINE

Configurable rules for all aspects of how data is automatically associated with orders, and inventory to be able to manage the variety of possibilities and apply them.

ACTIVITY-BASED COSTING RULES ENGINE

With configurable rules that generate accurate expected costs to match with payables or capture overheads accurately, and apply the correct contract to sales values for goods and services.

A CONFIGURABLE USER INTERFACE

The software can be used by everyone, everywhere, for all tasks. Configurable workflow processes that work in all circumstances ensure the right steps get fulfilled without management oversight. Together, these allow for the foundation for deep implementations – where the software is used by everyone in all their work all of the time.

CONFIGURABLE ELECTRONIC DATA INTERCHANGE

A comprehensive services-based message interface for electronic data interchange of all stages of all transactions. Prophet also provides equipment integration so that real-time data extends to the wider supply chain collaborators and to equipment and other software outside of the Prophet software.

TRANSPARENT PRICING

Regular and incremental system development is provided by way of an annual subscription license. This annual subscription license allows fresh produce companies to avoid major upfront license fees making initial ownership affordable – and allowing the shared development of a standard configurable system to deliver highly cost-effective ownership over many years. Prophet provides an annual subscription license business model, with no charges for add-ons or software modifications. There are also no large upfront license fees for new customers or extra support fees for software modifications.

LONG-STANDING CUSTOMER RELATIONSHIPS

Prophet works with its customers to share insights and ensure a strong collective understanding of the fresh produce industry and to continually evolve our approach and software in line with that insight. The Prophet customer-base affords breadth and depth within the fresh produce supply chain. Prophet gains experience from all interactions – including retailers, retail distributors, growers, packers and graders and conditioning stations, manufacturers, port handlers, food service distributors, terminal market wholesalers.

USER-CENTRED DEVELOPMENT

Prophet provides software that is adaptable – and adapted constantly – both by Prophet and by its users. Prophet makes use of open message integration to allow integration with emergent data exchange and technologies, and integrates open data for easy access, and use in the latest data analysis and BI tools.

ONGOING DEVELOPMENT OF THE SYSTEM

Regular and incremental system development is underpinned by an annual subscription license. All development work for all companies is carried out to ensure that a standard set of software solutions are available and used by all companies who take the upgraded software on a regular basis to use and gain form the change – and feedback into the virtuous circle to affect future change.

Working across the entire supply chain

Growers

Packers / Processors

Shippers

Importers / Exporters

Wholesalers

Marketing Agents / Brokers

3rd Party Warehouse Service Providers

Food Service / Retail Distributors

Large Corporate Food Companies

Large and Medium Sized Retailers

A quick glance + Key features + Prophet across the supply chain + Testimonials

What our customers say

James Judge
IT Manager
Berry Gardens

Prophet delivers us everything we need – it's trusted, gives us robust data and confidence and it is transparent.

Berry Gardens

Prophet understands our business and so they grow with us continually and they can adapt to our needs.

Fruitways Marketing

Stephan Viljoen
Supply Chain Manager
Fruitways Marketing

It's reliable, flexible, scalable.

Monaghan mushrooms

Prophet stands out as the best-in-class – the system has allowed us to streamline processes... saving us time and resources.

Worldwide Fruit

Prophet is a solution-based company... we've had a long lasting relationship for 15 years.

Strong Roots

Prophet provides an all in one solution. It does everything our business needs.

Angus Soft Fruits

A quick glance   Key features   Prophet across the supply chain   Testimonials

getting it right

How laying the foundation for deep implementation of smart software will reap rewards

GRANULAR CONTROL

ENTERPRISE RESOURCE PLANNING

REAL-TIME MULTI-USER DATABASE

TRUST-BASED RELATIONSHIPS

CAPTURE EVERY TASK

The opportunities for automation and an effective long tail strategy cannot be realised without deep implementations.

Deep implementations means:
» real-time data capture for every task
» real-time data processing to drive coordinated behaviour as new tasks are completed
» real-time data exchange with the "Internet of Things" – from processing machinery, robots, smart vehicles, data collection devices etc
» real-time data exchange for all types of transactions and other richer information needed throughout a fully digitised supply chain so everyone can act as things change

Deep implementations capture, in near real-time, every task that is required for the whole process flow of data through a single database. For fresh produce, this must be within the specific consignment.

The majority of fresh produce companies do not have an ERP that delivers deep implementation focused on inventory control. The software needs to be sufficiently smart to be capable of deep implementation – focused on controlling and reporting all tasks in the fresh produce business process through an integrated set of applications in one real-time multi-user database.

All companies will need to make use of more advanced systems and tools to address forecasting, such as machine-learning and AI ...[but] to make full and effective use of such technologies...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.

Oliver Wyman Report

While the use of ERP smart software has not been a key focus for many decades when margins were more generous – the increasing pressure on margins makes this a core requirement. Implementing the right ERP for fresh produce in the right way provides the greatest opportunity for automation with the fresh produce supply chain.

Any meaningful exploitation of artificial intelligence and blockchain technology in the next decade, within the fresh produce supply chain, will depend upon managing the more complex transactions per consignment through all of the processes. This includes consignment mixing, such as packing and processing, and accounting for the quantity, weight and value, through these transactions accurately.

Prophet works closely with its customers to iterate the software design based on customers feedback and the knowledge of their commercial needs. This is another key foundation for deep implementations – allowing adaptations to evolve with the next set of technologies and disruption.

Prophet's software environment is a highly configurable toolkit that allows users to build, adapt, and iterate their system and processes. The flexibilities of the Prophet approach, allows its users to incrementally improve supply chain efficiency and discover the remaining 50% of automation opportunities not being captured.

> **One of the things that stood out from day one about Prophet's approach to its software was the notion that the software was going to keep moving forward. Every time we have asked more of the system, it has been able to do what we wanted.**

The Class Produce Company
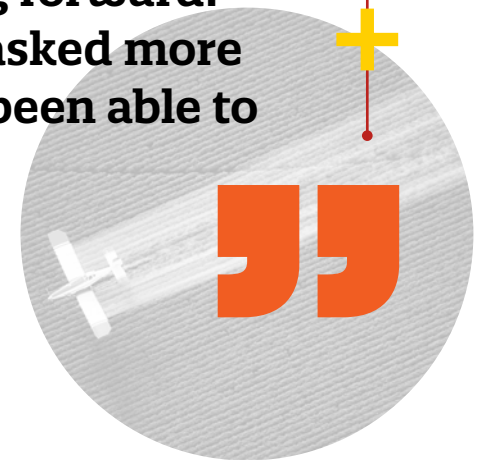
the future

The importance of building the right infrastructure

TECHNOLOGICAL DISRUPTION

ENVIRONMENTAL CHALLENGES

CORE TECHNOLOGY INFRASTRUCTURE

STRUCTURAL SHIFTS

COVID-19 · Structural shifts · The new data necessity · Talent & tech

New commercial models, technological disruption, and environmental challenges, are causing the food industry to consider how to secure its future and protect margins.

The response to COVID-19 will change people's spending habits, use of digital channels, and have wide ranging impacts on the fresh produce supply chain. Existing trends towards mindful eating, internet shopping, and the digitisation of the supply chain, may continue but at an even greater pace.

> **" If the two most recent recessions are valid indicators, structural changes will once again accelerate, not slow down, during the next economic downturn.**
>
> **Deloitte**

Automation, smart software and artificial intelligence offer substantial opportunities for fresh produce businesses. The benefits of new technologies will be captured by those businesses that are capable of a successful deep implementation of good technology underpinned by high quality data.

A successful ERP strategy is the robust foundation for automation and smart software that can provide real competitive advantage and allow businesses to survive and respond to future disruption.

A recent report on disruption in fruit and vegetable distribution said "This changing world of fresh fruit and vegetables presents both an opportunity and a threat. For those that are successful in responding to new technology, engaging with it so their business enters new channels and new niches, the upside is strong. But this opportunity also comes hand-in-hand with a challenge: these changes are accompanied by ever increasing customer demands, requiring producers and suppliers to respond ever more quickly".

The fresh produce market has radically changed over the last decade and it seems reasonable to expect that disruption and structural changes will continue to be felt throughout the supply chain. The impact of discounter chains, new entrants to the market such as Amazon, and changing consumer habits, will continue to put pressure on fresh produce margins.

There are signs of structural shifts in the fresh produce market. As of May 2020, Ocado's technology licensing deals with major UK and US grocers had catapulted its value to £15 billion – which is equivalent of the value of Sainsbury's, Morrisons and Marks & Spencer combined.

The Guardian was quick to spot the dramatic shift this might represent; "The big money in the food retail business, it turns out, lies not in selling groceries to shoppers, but in selling robots and clever delivery technology to grocers".

Changing investment behaviour may also sit alongside the changing requirements placed upon food growers. Investment decisions may increasingly be made based on how successfully fresh produce organisations have deeply integrated data processing, data exchange and smart software.

The food retail buyers of the future may demand real-time data on the quality and timeliness of fresh produce as an essential requirement before making investment decisions. The inability to accurately provide pallet level data may be a barrier to securing orders and meeting enhanced consumer demands.

A recent Oliver Wyman report is adamant that this change is already upon us and the expectations of fresh produce companies are only going to increase: "What will change, though, are the requirements it places on growers and suppliers as new best practices emerge...while maintaining clean product master data may today be sufficient for growers and suppliers to qualify as potential suppliers (from a data integrity perspective), tomorrow the requirement may shift to the real-time exchange of a broad range of transaction data, including attributes that allow for full traceability".

Fresh produce companies need to invest to meet the demands of the future; there is a need for a solid foundation of quality data, smart software, and a strong holistic understanding of all the risks and uncertainties present in the supply chain. Companies that invest in their people and their core technology infrastructure will have the right skills, insights and agile approach that is needed to prosper.

> **To the extent you can start that journey now, there can be more effective levers to pull when times are more challenging. Align human capital with advancing digital capabilities; co-investing in talent and technology can be a powerful partnership.**

Deloitte

Appendix

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Fresh Produce ERP that works.

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