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Facility Operations Optimized for Distribution

by **C3**

FROM HERE — **GETTING IT RIGHT** — **TO HERE**

Five Key Elements Needed to Run your Food and Grocery Operation

In this white paper, we discuss the five key elements that are causing drastic shifts within the food and grocery industry. This white paper is a collection of our five, heavily researched articles that discuss the following topics in great detail:

1. Omnichannel Grocery

Making Omnichannel Grocery Seamlessly Smooth

We begin by discussing the new frontier in e-commerce: grocery shopping. When Amazon bought Whole Foods in June 2017, grocery retailers took notice, and the race to omnichannel grocery fulfillment was on. As more and more people look to online ordering to meet their grocery needs, a number of factors are creating a serious competitive challenge for grocery retailers.

2. Out-of-Stocks

How out-of-stocks hurt your business and how to overcome the issue

One of those factors is the major issue of out-of-stock, which is covered in the next section of this white paper. If you are in the business of selling physical products to customers, not being able to fulfill demand means your business is failing. It's a stark reality and one that is particularly frightening in today's omnichannel e-commerce environment.

3. Sustainability

A recipe for an efficient, responsive and sustainable food supply chain

Food waste has quickly gone from being an isolated issue to a global catastrophe. We're not talking about throwing out that half-eaten sandwich - think bigger. In the third section of this white paper, we address the major problem with food waste at the distribution level. Nearly 900 million people around the world are malnourished. Yet every year we waste 1.6 billion tons of food – fully a third of all the food produced globally. And if that's not scary enough, food waste is deemed responsible for eight percent of global greenhouse gases – the ones that cause global warming. It turns out that the common basic ingredient is supply chain efficiency.

4. Automation & Digitization

How to keep up with distribution center automation and digitization

In today's world, efficiency (especially within the supply chain) very rarely comes without automation and digitization. Warehouses and distribution centers are at the forefront in adopting these new technologies; in the fourth section of this white paper, we'll look at some of the ways warehouse and DC operations are evolving and how to ensure that all your systems are in sync to make the most of new strategies and technologies.

5. Blockchain

The growing need for blockchain in the grocery supply chain

In the final section of this white paper, we discuss arguably the hottest new term within the supply chain is Blockchain. Not at all a new concept, Blockchain is taking its first fore into the supply chain world promising to help with the issue of traceability; and is getting a lot of attention thanks to new mandates by Walmart and others - including big players like Unilever, Nestle, Tyson and Dole - to require blockchain tracking of food from source to store.

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The Icing on the Cake

**Making Omnichannel Grocery
Seamlessly Smooth**

Grocery shopping is the new frontier in e-commerce. When Amazon bought Whole Foods in June 2017, grocery retailers took notice, and the race to omnichannel grocery fulfillment was on. As more and more people look to online ordering to meet their grocery needs, a number of factors are creating a serious competitive challenge for grocery retailers.

First, food is trendy, and home cooking has become both recreation and a status symbol for many. And with more options for online grocery shopping available, consumers are becoming extremely selective about the quality of products and timeliness of delivery. That adds pressure on the assortment of products offered and the speed at which new items are introduced. Second, the overall trend towards e-commerce has spread to grocery retail, making it a necessity to be in the game. Third, last-mile delivery options are expanding, but also the click-and-collect option has proved viable, opening up new channels for order fulfillment.

Grocers need to be at the top of their game to compete in online sales, and for many, it requires a big shift in the way they do business.

Traditional grocery involves a single point of contact with the customer – in the store. Now grocers are being challenged to offer online ordering, in-store pick-up, and home delivery, as well as the retail baseline of an efficient, clean, well-stocked and appealing in-person shopping environment.

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The shape and size of the challenge

Online grocery has experienced a huge growth spurt in the past year. Here's a snapshot of the trend, from various research reports:

1 The number of people buying groceries online doubled from 2017 to 2018, with 49 percent of U.S. consumers buying consumer packaged goods (CPG) online. In 2016 only 23 percent reported having done so [1]

2 More than 20 percent of consumers already buy groceries online every month [2]

3 Shoppers buying at online-only food stores increased from 16 percent in 2015 to 28 percent in 2018 [3]

4 Millennials (age 18-38) drive the trend, with more than 40 percent doing their grocery shopping online. However, close to 30 percent of Gen-Xers (39-52 years old) also shop online, while less than 15 percent of Boomers (53-71) do, and those over 71 years old actually participate more than the Boomers, at about 15 percent [4]

5 Forecasts suggest that by 2022 up to 70 percent of U.S. shoppers might be shopping online for groceries [5]

These consumers expect a seamless integration between the brick-and-mortar and online grocery shopping experience, treating the two as one entity.

The challenge for grocers is to bridge the gap and deliver what grocery buyers want.

Retailers' reaction

These expectations, the volume, and constant growth are adding complexity to the business model, and creating the need for more sophisticated supply chain management. With the traditional bricks- and-mortar retail model, grocers simply move product from a distribution center to the stores. The biggest challenge in designing a successful business model with omnichannel grocery retailing is the high cost and complexity of fulfillment. [6]

Here's where the costs and complexity layer onto the existing supply chain:

The need for greater speed to fulfillment
⌄
Providing additional fulfillment modes
⌄
The requirements for increased visibility
⌄
Revisiting the network design and/or distribution model

These new challenges require innovative strategies and adaptation across the supply chain that retailers are struggling with. They know that they need to make changes to stay in the game, with recent research showing that 39 percent believe legacy systems are holding them back. [7]

It's a difficult process to map your whole operation with the aim of deciding how to do omnichannel fulfillment. Let's look at a couple of the big choices retailers need to make when building an omnichannel operation.

Fulfillment options

To fulfill customer online orders, grocers need to be able to pick individual items. A traditional distribution center is not set up for item picking, instead usually shipping case lots and handling pallets of goods that are shipped in trailers to retail stores. For omnichannel operations, inventory needs to be selected on an item basis and sorted into small shipping containers that will be delivered directly to the customer whether by local delivery or parcel post. That's the operational difference between distribution centers and fulfillment centers. [8]

In grocery omnichannel, many retailers use their stores as the fulfillment center (FC). This strategy makes sense because the full assortment of product is readily available to be picked. Staff can move up and down the aisles as they would inside a regular fulfillment center, picking items into a basket, which can then be delivered or picked up by the customer. Doing fulfillment this way means no investment in logistics technology is required, and the buildings are already there, so no new infrastructure is required.

However, choosing this route can be slower than in a purpose-built facility – shoppers can get in the way, space limits the volume that can be fulfilled, and there is no way to

customers are picking from the same stock. This uncertainty requires keeping higher safety stocks and increases the cost of demand planning. It also forces the retailer to create a decision tree to determine which stores will fulfill orders depending on geographic regions and the types of items in the basket. [9]

The alternative is to go the fulfillment center way. While the upfront costs may be higher, **the advantages are better:** FCs provide more integrated inventory control; more accurate, streamlined and faster-picking processes; and typically a single shipping method – instead of having orders picked up or shipped out, the FC only ships orders out for last-mile delivery. Using a fulfillment center also allows for a greater product assortment than in-store fulfillment. [10]

Many retailers are opting for this solution. In fact, Sam's Club (Walmart's club store subsidiary) is scrambling to turn some of the 63 stores it closed in 2017 into FCs. Kroger is planning to open 24 facilities to fulfill online orders. And, although it's not grocery specific, Amazon operates more than 300 fulfillment centers, with more opening all the time. [11]

How we can help

Whichever option is used for fulfilling online orders, the requirements are the same: speed, accuracy, and seamless communication.

You've got the facility set up, customer-facing online ordering is organized, fulfillment methodology established. But you're still running into bottlenecks. What is going on? Stock is stuck in the yard, but staff is standing around waiting for trailers to unload. Phone lines are burning up as departments try to talk to each other, and everybody is drowning in drifts of paperwork. And, as a result, orders are not getting filled.

Here's where we can help. Before you take the plunge, **consider for a moment the little details that can make or break your omnichannel fulfillment:**

⭐ Does your strategy account for the flow of inbound trucks and trailers to your facility?

⭐ Does it take into account the number of trailers that need to be managed on a day-to-day basis?

⭐ Do you have paperless operations established?

⭐ Do you have advance notice that trucks are inbound?

A C3 Solutions cloud-based **dock scheduling** and **yard management** system can help you eliminate these costly backlogs. Automatically schedule appointments at the dock door for inbound trailers so they aren't left waiting. Improve your advance notice so you can better plan inventory flow. Eliminate the paper trail by making documents electronic.

Managing trailers in the yard with a **best-of-breed YMS** means you'll know exactly what's where and your yard staff will be able to find and move trailers to the docks without wasting precious time. Likewise, your inside workers will not be left to loiter while the yard staff play hide and seek with hundreds or thousands of trailers.

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Managing the last mile

Once the orders are picked, there's a new challenge – getting them into the customers' hands. The last mile is one of the most significant hurdles left in e-commerce, and it's especially tricky for grocery because of the mix of perishables and dry goods being shipped. Orders have to be handled quickly, and cannot usually be dropped at a customer's door if there's nobody at home. This is why click-and-collect is so popular with retailers and customers alike.

But home delivery cannot be ignored. And if grocers are going to offer it, they need to be able to provide end-to-end visibility into the process because that's what consumers say they want. [12] **It only makes sense to want assurance that your dairy has stayed cold, your eggs haven't been smashed or your bananas turned black because of a problem somewhere along the delivery chain.**

There are technical solutions for tracking orders from the fulfillment center to the door, including blockchain (more on this in a later article), and **Internet of Things (IoT)** sensors that record temperature, shock, humidity, and light. [13] Using local micro-fulfillment centers is another option that helps maintain control of the quality of products during delivery – shortening the distance traveled increases the likelihood of maintaining quality.

How we can help

One of the best ways to ensure quality and timely delivery is to make the back-end operation as efficient as possible. You take the pressure off the last-mile process by ensuring that the products going into each order have been in the fulfillment center for the minimum possible time. The shorter the stay in the FC, the fresher the produce, milk, meat and other items will be.

1
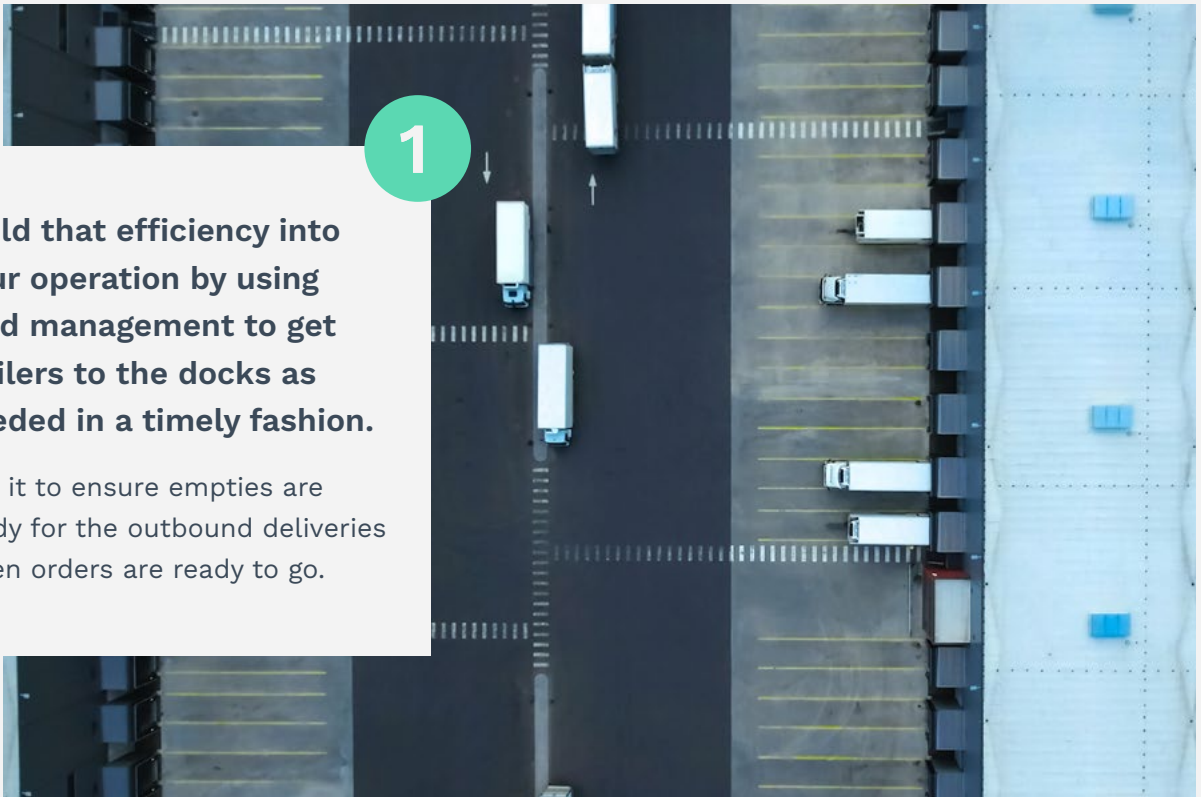
Build that efficiency into your operation by using yard management to get trailers to the docks as needed in a timely fashion.

Use it to ensure empties are ready for the outbound deliveries when orders are ready to go.

2
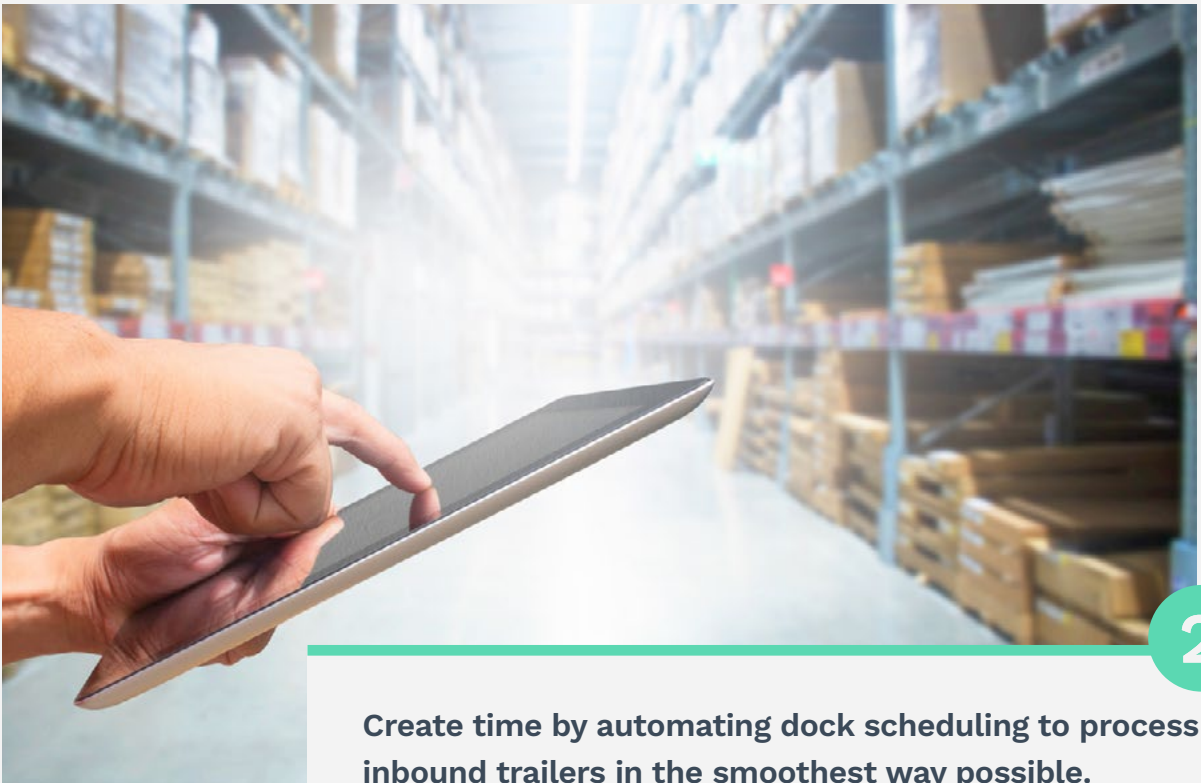
Create time by automating dock scheduling to process inbound trailers in the smoothest way possible.

Increase the productivity of the assets you have – human and infrastructure – by employing paperless, instant communication that creates real-time visibility into all the inbound and outbound activities under your management.

Making omnichannel grocery a sweet success

If you are going to make the investment in facilities and systems to make omnichannel grocery retail your business model, then it will pay in reduced costs, shorter **ROI** and better customer satisfaction to also ensure you've also got the right systems to make it all work smoothly.

Powerful and flexible dock scheduling and yard management systems can provide you with the edge that will power your e-commerce to be best-in-class.

The food e-commerce marketplace is a blur of motion right now. Not only are sales booming as more and more consumers opt to buy their groceries online, but the technologies and options for rising to the challenge are constantly evolving. Many retailers are struggling to keep up as they adapt their operations to the new landscape. But even as they go through these tremendously disruptive changes it is possible to take advantage of technology that makes operations run smoother.

Opting to employ solutions like our dock scheduling and yard management systems really can make the difference between success and a costly mistake.

Let's indulge in a little food analogy as the dessert to this piece:

Think of C3 as the icing on the omnichannel e-commerce cake. How you build your e-commerce infrastructure – multiple FCs, in-store fulfillment, or omnichannel DC – is the layers of the cake. They are the foundation of the enterprise.

To top it off we provide the substance that makes it all hold together seamlessly. C3 solutions systems – like the frosting – smooth out the rough edges, render it seamless and make the whole process that much sweeter for the retailer and the customer.

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References

[1] "Online grocery set to boom in 2018", Deborah Weinswig, Forbes, March 1, 2018.

[2] "The grocery store of tomorrow", Amy Wunderlin, Food Logistics, July 16, 2018.

[3] "E-commerce impacts the grocery shopping experience", Food Marketing Institute, 2018.

[4] "E-commerce impacts the grocery shopping experience", Food Marketing Institute, 2018.

[5] "Online grocery set to boom in 2018", Deborah Weinswig, Forbes, March 1, 2018.

[6] *Last mile fulfillment and distribution in omni-channel grocery retailing: A strategic planning framework,* Alexander Hübner, Heinrich Kuhn and Johannes Wollenburg, Catholic University Eichstätt-Ingolstadt, November 2014.

[7] *The current and future state of the omnichannel supply chain,* Veridian.

[8] "Omnichannel multiplies the challenges for distribution-centric supply chains", Paul Myerson, Industry Week, June 1, 2018. "

[9] *Last mile fulfillment and distribution in omni-channel grocery retailing: A strategic planning framework*, Alexander Hübner, Heinrich Kuhn and Johannes Wollenburg, Catholic University Eichstätt-Ingolstadt, November 2014.

[10] "What is an omnichannel warehouse", Jason Rosing, Cerasis, September 28, 2018.

[11] "Brick-and-mortar retailers rush to open more fulfillment centers as they strive to keep pace in a changing landscape", Rob Smith, CoStar, July 13, 2018.

[12] "Solving for the grocery last mile is harder than you think", Kate Patrick, Supply Chain Dive, April 26, 2018.

[13] "Solving for the grocery last mile is harder than you think", Kate Patrick, Supply Chain Dive, April 26, 2018.

Chapter 2

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The Nightmare on Inventory Street

**How Out-of-Stocks Hurt your Business, and
How to Overcome the Issue**

If you are in the business of selling physical products to customers, not being able to fulfill demand means your business is failing. It's a stark reality and one that is particularly frightening in today's omnichannel e-commerce environment.

For companies in the grocery and food sectors, an out-of-stock (OOS) situation means customers will go elsewhere to shop; and 'elsewhere' means the competition gets the sale. With the thin margins that grocery operates on, every customer counts. It's hard to quantify the annoyance customers feel when their regular grocer fails to provide items they normally buy every week, but it frequently means they will leave to shop elsewhere.[1]

And when they are shopping online it's even easier for the consumer to jump ship. A couple of clicks and they've moved on to the next website or mobile app, placing the order with the competitor who has the items the customer wanted.

If any of this sounds like an issue your business is facing, read on to learn some of the real-world effects of out-of-stocks for grocers and some of the ways you can reduce risk and keep those shelves full.

Why you should be afraid

Shoppers place product availability in their top three factors for deciding where to shop.[2]

But with the consumer goods out-of-stock rate now averaging around eight percent, and promotional out-of-stocks at closer to 10 percent[3] retailers are not hitting this target very well.

And when a customer can't find what they're looking for stores typically get three chances – the first time the customer will pick a substitute product, the second time they are equally likely to pick a substitute, make no purchase, or go to another store, and the third time it happens 70 percent of shoppers will buy the item elsewhere.[4]

A 2012 study showed that these OOS situations can cost a supermarket five percent in sales.[5]

Add e-commerce into the mix, and suddenly you are dealing with a new layer of consumer expectation and complexity. Expectations are being driven by Amazon (and its Whole Foods subsidiary), which is setting an impossibly high bar of convenience for consumers, with actually be on the shelf when a picker comes through the store to fill a click-and-collect order.

Shopping cart abandonment is a statistic online retailers watch carefully. According to first quarter 2018 data, almost 76 percent of online retail carts are abandoned by shoppers before checkout.[6] And almost a third (31 percent) of carts are left behind because the item sought is unavailable.[7]

For online-only stores, the OOS rate is 15 percent, and out-of-stocks have an estimated annual cost to the consumer goods industry of about US$22 billion.[8]
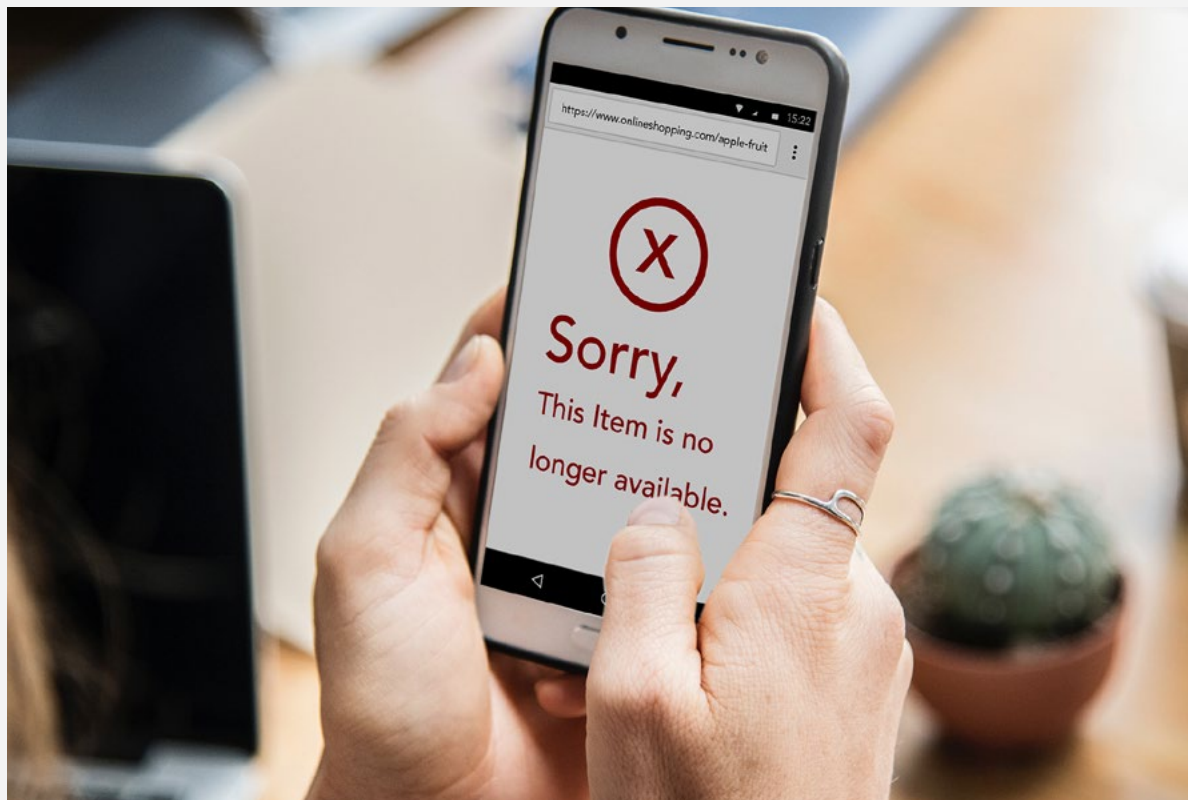
Doing it wrong

Canada's largest supermarket chain, Loblaw, learned the hard way what happens when out-of-stocks get out of control. In 2006 the grocer had a serious customer service problem: their store shelves were empty. Would-be shoppers could wander the aisles and find shelf after shelf labeled with a yellow no-inventory tag.

It was as though the company's supply chain had simply stopped. Loblaw lost customers, sales and profits. Suppliers were not being paid, and order-management was in disarray. One supplier reported waiting three or four months to deliver an order because a warehouse was so backed up, while at the same time store shelves sat empty.[9]

This mess cost the company tens of millions of dollars and set it back at least a year. Stock prices jettisoned 18 percent in a matter of 12 months.[10]

As a result, both the president and the chair of the board stepped down.[11]

Avoiding grocery gore

While the Loblaw case was severe, the company has since recovered and dramatically improved its supply chain operations as well as restoring its brand image as a retailer that shoppers rely on. Part of the reason for its success has been the careful implementation of numerous information technology tools that manage inventory and improve visibility, as well as controlling the transportation link of the supply chain.

According to the FMI/GMA Trading Alliance, five root causes are to blame for out-of-stocks, ranging from poor in-store execution, ordering and fulfillment, forecasting, manufacturing and category management and merchandising.[12] For Loblaw, fragmentation of the network, legacy systems that didn't talk to one another, and warehousing that was focused on storage rather than flow were all swapped out for systems that are integrated and communicate to **eliminate silos and provide visibility** into inventory location.[13]

Many grocers are pursuing similar strategies today in order to manage their omnichannel operations in response to the **Amazon effect**.

Simply put, retailers need to have product available where and when customers want it. And that means using tools to predict demand, manage order flow and ensure that inventory is in place in stores and in fulfillment centers when it's needed.

The horror of empty shelves

For this article we are going to look at the rise of an old technique–vendor-managed inventory – that is gaining new life in the omnichannel space as "order-to-shelf".[14]

Modeled on the famed Toyota Production System (TPS) and also known as Just-in-Time in the manufacturing world, retailers are using it to manage faster turns and omnichannel demand by bypassing the distribution center and having suppliers deliver smaller quantities right to the retail location.

The objective is for the retailer to pass on costs of handling and storing product to the supplier, all the while keeping shelves stocked. But it doesn't always work as planned. Notably, even Amazon's Whole Foods experienced out-of-stocks across its network shortly after implementing an order-to-shelf system.[15]
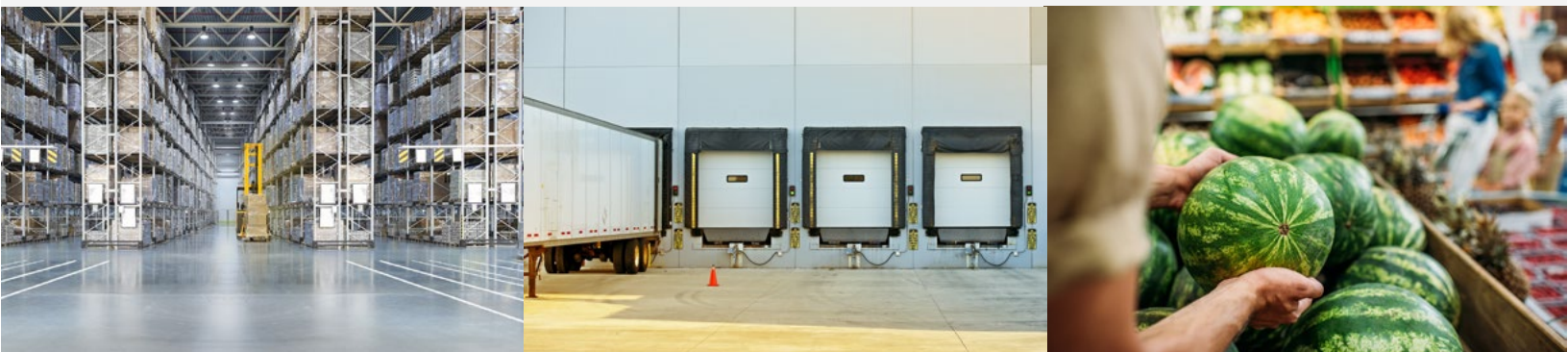
Handing off inventory control to a supplier is inherently risky for the retailer, with stock-outs being the primary ill effect. However, suppliers also run the risk of reputational damage when retailers are short of their brand name products. Both parties have a lot at stake in getting it right.

So how do grocers and their suppliers make this work? To properly execute order-to-shelf strategies, communication and transparency between the retailer and supplier are critical. Deliveries are now being made at a store level, in smaller quantities, and with greater frequency. The data that is shared between the partners must be transmitted cleanly, clearly and in a timely fashion.

Wake up from the nightmare

Along with sophisticated demand prediction tools that use algorithms to make predictions based on the reams of data now available across the retail supply chain, successful retailers are also looking at the places where they can apply practical real-world tools to ensure seamless inventory control.

You don't want to end up with a nightmare situation where a supplier can't deliver an order because the DC is too backed up. It comes down to fundamentals like managing the flow of goods through your facilities, by implementing smart systems to control activity in your yard and at your dock doors.

Dock scheduling systems are the glue that holds the entire operation together. Using our cloud-based technology, you can manage the arrival and departure of vendors' shipments at all of your retail locations.

Retail locations don't typically have the luxury of multiple dock doors to receive the numerous smaller orders that an order-to-shelf system requires. This increases the degree of complexity and the importance of making and keeping an appointment schedule for inbound trucks.

It's a big job for the retail store management to keep track of inbound orders, have the dock free and staff on hand to unload the trucks at the right time. Asking them to do this manually is just asking for trouble. Papers get lost, people make little errors and spreadsheets get messed up inadvertently all the time. As soon as one truck gets delayed waiting to unload, it starts a cascade and then the out-of-stocks start to happen.

It's a big job for the retail store management to keep track of inbound orders, have the dock free and staff on hand to unload the trucks at the right time. Asking them to do this manually is just asking for trouble. Papers get lost, people make little errors and spreadsheets get messed up inadvertently all the time. As soon as one truck gets delayed waiting to unload, it starts a cascade and then the out-of-stocks start to happen.

But with a scheduling system in place, vendors can make their own dock reservations automatically. Your staff will spend their time on more productive tasks than taking calls and trying to juggle appointments manually. Labor on the receiving docks will be better utilized. Orders will be tracked from door to door, enabling better visibility and planning.

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Sweet dreams are made of this

As we have seen, out-of-stocks mean immediate lost revenues as customers are forced to either substitute, not buy or go to a competitor. That five percent loss will hurt your bottom line. And when they find stock-outs are a regular occurrence you'll lose even the most loyal customer.

We know it's not easy to forecast demand, especially when you are trying to predict orders coming in from e-commerce alongside in-store walk-in traffic. There is a huge premium on getting it right in the era of omnichannel e-commerce. Customers are unforgiving and very demanding. You don't get a lot of chances to get it right these days.
But when you do, the rewards are huge.

★ Does your strategy account for the flow of inbound trucks vvand trailers to your facility?

★ Does it take into account the number of trailers that need to be managed on a day-to-day basis?

★ Do you have paperless operations established?

★ Do you have advance notice that trucks are inbound?

Scheduling is not a detail, it's a key operational advantage in today's fast-moving, on-demand market. Having control over the movement and timing of loads into your retail stores means you can manage the out-of-stock risk and keep store shelves stocked.

At C3 Solutions we think it's worth being proactive and providing yourself with tools that will give you a leg up over the competition. Being the retailer that's known for being organized at the docks, keeping commitments and being easy to work with is no pipe dream. It's a sweet, achievable dream, and one that will keep the Nightmare on Inventory Street at bay.

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References

[1] "Inventory Management: Out of Time for Out-of-Stocks", Natalie Taylor, Winsight Grocery Business, July 9, 2018.

[2] *Solving the out-of-stock problem*, FMI/GMA Trading Alliance, 2015.

[3] "Food Industry Taskforce Identifies Specific Action to Improve On-Shelf Availability", Food Marketing Institute, February 20, 2015.

[4] *Solving the out-of-stock problem*, FMI/GMA Trading Alliance, 2015.

[5] Getting Availability Right – Bringing out-of-stocks under control, Oliver Wyman, 2012.

[6] "Online shopping cart abandonment rate in selected industries as of 1st quarter 2018", Statista, May 2018.

[7] "Online retailers have an inventory problem", Daniel B. Kline, The Motley Fool, July 27, 2018.

[8] "Online retailers have an inventory problem", Daniel B. Kline, The Motley Fool, July 27, 2018.

[9] "Loblaw's supply chain reaction", Marina Strauss, Report on Business, February 25, 2006.

[10] "Loblaw's supply chain reaction", Marina Strauss, Report on Business, February 25, 2006.

[11] *Loblaw Canada System Design Case Study*, Ryan McWhorter, Isabelle Cantin, March 1, 2017.

[12] *Best practices solutions to address on shelf availability*, FMI/GMA Trading Partner Alliance Report, 2016.

[13] *Helping Loblaw achieve high performance through supply chain transformation*, Accenture, 2013.

[14] "Why more retailers are using and order-to-shelf system to manage inventory", Gloria Dawson, Supermarket News, January 23, 2018.

[15] "Why more retailers are using and order-to-shelf system to manage inventory", Gloria Dawson, Supermarket News, January 23, 2018.

Chapter 3

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Making Sure Everybody Eats

A recipe for an efficient, responsive and sustainable food supply chain

Nearly 900 million people around the world are malnourished.
Yet every year we waste 1.6 billion tons of food – fully a third of all the food produced globally. It's estimated to be worth US$1.2 trillion now and may grow to $1.5 trillion by 2030 if nothing is done to stop it. And if that's not scary enough, food waste is deemed responsible for eight percent of global greenhouse gases – the ones that cause global warming.[1]

Now, if we tell you that this waste is largely avoidable, and as a supply chain operations manager in the food industry you can have a significant impact, would you be interested to learn how? We thought you would.

In this paper we'll discuss the scope of the food waste problem, where it's happening, and how you can help solve the problem; while at the same time maximizing your operations to take advantage of current food industry trends[2] like:

★ The growing drive for food safety

★ Hyper-local sourcing

★ The booming desire for convenience reflected in meal kit sales and the rise of 'grocerants' (hybrid grocery store/restaurants)

★ Increasing e-commerce and its effects on inventory control and last-mile delivery

★ Sustainability concerns

★ Demographic shifts

It turns out that the common basic ingredient is supply chain efficiency. Read on to learn how to bake it into your supply chain operations.

An expanding waste-line

Nobody wants to see food wasted. It's pretty distressing, in fact, to know that while piles of produce rot in one place, people go hungry somewhere else. But redistribution is not as simple as seeing a hungry child and handing her an apple.

Before we tackle how to fix the problem, let's look at some of its roots. Food waste is not the same across the globe.

Research has shown that in developed countries the lion's share of spoilage takes place in the retail and consumer environment.

Most of what is destroyed before being eaten is fruits and vegetables and meat products. In less-developed places most waste occurs at the production level, with fruits and veggies the primary victims of spoilage.[3]

Boston Consulting Group has identified five key drivers behind the waste problem, and three of them are supply chain related. These are:

1 Supply chain infrastructure > **2** Supply chain efficiency > **3** Supply chain collaboration

1

On the infrastructure side, the application of cold-chain and temperature-controlled technology could prevent many of the losses experienced at the beginning of the food supply chain.

In fact, BCG estimates that using these technologies, especially in developing countries, could cut the waste by $150 billion a year.

2

To improve efficiency, digital supply chain tools can make transactions seamless, track losses and prevent waste.

This area of improvement could net a $120 billion reduction in waste annually [**For more information, read our recent white paper on Supply Chain Visibility**].

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Finally, better collaboration, among producers, suppliers and processors, through using digital tools could further reduce the waste problem by $60 billion.[4]

What's amazing is the variety of tools available to help solve these problems. From simple insulated totes that are being used in remote, developing markets to facilitate cool chain transport, to the most sophisticated tracking technologies that employ sensors and satellites, and including software-as-a-service offerings like **Yard and Dock Management** – such as the ones C3 Solutions offers – there are technologies at every price point and level of sophistication that can be leveraged to improve food chain efficiency.

Going on the digital diet

Just as digital tools can be such a major piece of solving the food waste problem, they can also play a vital part in helping your food supply chain keep up with the trends that are driving the business forward. Let's look at them in turn.

The growing drive for food safety

Food safety has become a huge operational concern for producers, processors and retailers alike. Recent headlines about the persistent e-coli breakouts in lettuce this past summer, as just one example of many, have highlighted the need for traceability throughout the food supply chain.

Internet of Things (IoT) technology **[Read our IoT whitepaper here]** has in the past few years become a sophisticated and powerful tool enabling tracking at many levels to ensure the safety of food supplies. From cutting edge work being done now to apply edible barcodes to individual cuts of meat[5], to sensors that are placed in shipping containers to continuously monitor and report on the temperature, humidity, shock and light conditions that food products undergo during climate-controlled transport[6], IoT is rapidly becoming a standby for food supply chain operations.

What makes it work is the visibility it lends to the provenance, location and condition of product as it moves through the chain of custody. The ability to accurately schedule and see your transport assets in real time, and ensure that they are processed in and out of customers' distribution centres or retail locations adds another level of efficiency to the temperature-controlled food chain.

By implementing yard management, you can be sure that the trailers on your property are where they're meant to be and processed in the correct order to ensure product quality. Likewise, adding a dock scheduling system to your operation further supports the food safety promise you make to your customers. Trailers full of perishables will move through from pick up to drop off on time and without costly delays like getting hung up waiting in the hot sun or freezing cold.

C3's YMS and Dock Scheduling software complement the comprehensive tracking of assets and cargo, ensuring that no leg of the supply chain goes unmonitored. That will result in faster deliveries, less food waste and better quality product for the end user.

Hyper-local sourcing

Consumer preferences are driving a push towards the sale of more locally produced food in supermarkets.[7] While the traditional model of large-scale buying has facilitated the rise of large, mass-market grocers, this new trend is creating its own supply chain challenges.

For the grocer, it will mean more, smaller deliveries managed on a store or regional basis. It will also mean cultivating closer relationships with food producers and collaborating with a view to ensuring that the right foods are made available to customers as they are ready for consumption.

When it comes to managing these small-business relationships, things don't get simpler. Smaller business partners means needing to work with more of them, and the proximity to markets means there is less need for cold-chain management. But at the same time you need even more accurate scheduling of order drop offs to ensure products are properly handled and arrive on store shelves in a condition that matches how customers envision 'farm-fresh'.

Because farmers have to deal with shifting harvest timelines thanks to weather and labour availability, a **self-serve scheduling software** makes it easier for the small supplier to manage transportation planning. Even if it's just getting a dock time for a pick-up truck of tomatoes, for the farmer, being able to rearrange on the fly might make or break a week's worth of profits.

The desire for convenience

Convenience is driving the food business. As with most enterprise that's selling retail, the Amazon effect is exerting tremendous pressure on the food business to deliver more variety, faster and with more options.

This is seen in trends like the rise in meal kit home delivery and the shift from grocery store to 'grocerant' – food retail locations that double as a source for ingredients for home cooking and a place to eat out or pick up a takeaway meal. Likewise, grocery retail is

shifting to an omnichannel model with e-commerce and in-store orders being processed side by side **[For more details read our paper on Omnichannel in the food business]**. And the rise of in-home digital assistants facilitates the automation of basics resupply, so basics like toilet paper and detergent show up on the doorstep without requiring action, leaving the more interesting food items for brick-and-mortar retailers to supply.[8]

At the same time that these trends to speed and convenience are being driven by the millennial and younger generations, food sellers must also cater for the needs of the Boomer and Gen X populations, who have plenty of cash, need to eat, and do things differently. Older consumers are looking for healthy options and tend to do more cooking at home. They look for their grocer to have plenty of high-quality fresh foods – meat, dairy and fruits and vegetables – always available.[9]

Not only are grocers being pulled in multiple directions, but it's all changing so quickly and radically that it's hard to keep up with the latest trend. And digital technology is fuelling the whole game.

What do these consumer-driven trends mean for supply chain operations? They are forcing the grocery business to become agile, lean, fast and responsive like never before. To succeed in this environment food retailers need to be switched on, using every technological advantage to stay ahead of the competition.

Practically, this means **leveraging digital tools** to ensure that there are no gaps or roadblocks in your operations. Once you've mastered complex demand planning and omnichannel distribution, you need to keep the balls in the air by adding visibility and communications tools where they count – at the distribution interface.

Leveraging a dock scheduling system helps take human error and vagaries like traffic and weather out of the equation. By allowing carriers and customers to schedule and modify their own reservations you'll ensure a smoother flow at your docks. Knowing when trailers will arrive means less labour cost, and frees up the people who would otherwise have to manage the schedules.

Likewise, when you have multiple trailers queued up in your yard, using a yard management system provides the visibility into where they are and lets you manage them to ensure no product spoils or gets wasted. You gain control, visibility and efficiency, which saves time and operating costs and prevents product losses. It helps you and it helps to alleviate the global food waste crisis.

Feeding the digital native

There's a hidden bonus in the digital drive for the food supply chain. It's the workforce of the future.

As the food industry brings together the trends we've seen here, from progress towards making the food business more sustainable and at the same time wasting less and helping to alleviate hunger around the world, to figuring out how to satiate the desire for convenience, instant gratification and the quest for globally sourced products, the need to apply digital solutions has never been more obvious.

Fortunately, the generation of digital natives who are in their working years, along with those who are just entering the workforce, are attracted to the business. The 'foodie' craze, which blossomed in the early 2000s is not fading and grocery is a trending place to work.[10]

Alongside that popularity, it turns out that supply chain jobs are suddenly desirable. Unlike the previous cohort who most often claimed they 'fell into' supply chain work, millennials are seeking out careers in the field. And planning roles are the most popular.

C3 Solutions

Almost 70 percent of millennials working in supply chain say it's important to be able to work with the latest technologies.

And half say they want to work for organizations that have strong environmental ethics.[11]

Put this together with the rising need for the food business to keep up with technology, and it's a pairing made in heaven. The industry needs digital expertise, and those who have it want to work there. The industry also needs to up its game in reducing food waste, and the new generation of workers are motivated by sustainability causes. For the new global food supply chain worker it's a perfect opportunity to feed the mind while nourishing the soul by being the lynchpin to the new technologies that will unleash meaningful operational efficiencies.

Perfecting the recipe

We started this paper by talking about a massive, tragic gap in global supply chain operations. Food waste has terrible human consequences, is bad for the environment, and creates billions of dollars in unnecessary costs for organizations around the world. It needs to be addressed.

At the same time, food is an obsession for many in wealthy countries, and our increasing reliance on digital technologies has created an ecosystem where instant gratification and constant change come together to fuel increasingly complex food and grocery supply chains.

The common ground for both these meta trends is the need for greater operational efficiency. According to the Boston Consulting Group report efficiency gains could save $120 billion in food waste per year. And they recognize that digital tools are the way to achieve this:

> Digital supply chain tools can allow better matching of supply and demand, make transactions in the supply chain more efficient and seamless, enable the tracking of loss and waste, and even allow for dynamic pricing, which can move products through the system before they expire." [12]

At C3 Solutions we recognize that getting all this right is a big challenge. It's not one that can be solved overnight, nor can it be rectified with one solution. What we do know is that by gaining efficiencies through getting parts of your supply chain to communicate better – such as the links at your dock doors and in your trailer yards – you can be part of the solution. **Efficiency gained by applying our digital tools is a vital part of the recipe for solving today's food supply chain challenges.**

References

[1] *Tackling the 1.6-million-ton food loss and waste crisis*, Esben Hegnsholt, Shalini Unnikrishnan, Matias Pollmann-Larsen, Bjorg Askelsdottir, and Marine Gerard, Boston Consulting Group, August 20, 2018.

[2] "What trends will shape grocery retail in 2018?", Katy Askew, FoodNavigator.com, December 18, 2017.

[3] *Tackling the 1.6-million-ton food loss and waste crisis*, Esben Hegnsholt, Shalini Unnikrishnan, Matias Pollmann-Larsen, Bjorg Askelsdottir, and Marine Gerard, Boston Consulting Group, August 20, 2018.

[4] BCG, ibid.

[5] "Trutag Technologies and PWC Australia for alliance on food trust initiative", TruTag, October 2, 2018.

[6] "Maersk Line launches Remote Container Management for customers", Maersk, June 26, 2017.

[7] "What trends will shape grocery retail in 2018?", Katy Askew, FoodNavigator.com, December 18, 2017.

[8] "10 Food Trends that will Shape 2018", Phil Lempert, Forbes, December 13, 2017.

[9] "The Grocery Store of Tomorrow", Amy Wunderlin, Food Logistics, July 16, 2018.

[10] "10 Food Trends that will Shape 2018", Phil Lempert, Forbes, December 13, 2017.

[11] *Millennials in Supply Chain*, Supply Chain Management Review, APICS & APQC, April 2017.

[12] *Tackling the 1.6-million-ton food loss and waste crisis*, Esben Hegnsholt, Shalini Unnikrishnan, Matias Pollmann-Larsen, Bjorg Askelsdottir, and Marine Gerard, Boston Consulting Group, August 20, 2018.

Chapter 4

FROM HERE

GETTING IT RIGHT

TO HERE

21st Century Warehouse

How to Keep Up with Distribution Center Automation and Digitization

Picture the typical retail warehouse of 15 years ago: Workers rode around on forktrucks and pallet jacks, picking and putting away product by the pallet load, loading trailers for single stores, or several at a time. It was pretty regular stuff – Store 14 got its load on Thursday – with occasional surges for seasonal or promotional product.

Fast forward to today's retail DC and you'll likely see significant differences fuelled by the **rise of e-commerce, omnichannel fulfillment and the growing trend towards buying fresh food online.** The imperative now is speed and accuracy in an extremely competitive retail environment.

Failure to meet rapidly rising customer expectations in this context will mean failure. Period.

Thus inside the DC – or fulfillment center as they are more accurately described in e-commerce – the focus has shifted from regular store-bound orders to individual customer orders. The workers are doing completely different work, and are often toiling alongside robots. Even the internal infrastructure is evolving from static racking to massive automated storage and retrieval systems (AS/RS), and goods-to-person setups that are fed by robots.

Automation is everywhere, and everything is moving at light speed. Get it right and you win omnichannel ecommerce. Make a mistake and it's a potential nightmare.

In this article we'll look at some of the ways warehouse and DC operations are evolving and how to ensure that all your systems are in sync to make the most of new strategies and technologies.

The evolution of retail warehousing

That old-school warehouse described above is no dinosaur. In fact, it's a distribution model that many retailers still use, and have implemented in recently commissioned facilities. But it's not a model that serves omnichannel commerce very well.

Retailers today are being stretched to respond to the demands of combining online orders with brick-and-mortar operations.

E-commerce orders are not palletized, or even case-picks, they are composed of eaches, individual items that must be 'shopped' from a DC or store, typically by a human being.

Trying to fulfill store replenishment orders from the same stock that e-commerce orders are picked from is a non-starter. **E-commerce** orders, in addition to individual item picks, need fast fulfillment, packaging for shipment through parcel post, and delivery to disparate locations. The order of complexity is high and the cost of all those touches can be staggering.

Retailers are exploring numerous potential solutions to these challenges, each of which is contributing to the rapid evolution of distribution and fulfillment models. Automation, hyper-local fulfillment, buy online, pickup in store (BOPIS), and various combinations of these solutions are proliferating, each with advantages and pitfalls to consider.

Enter automation

Warehouse robotics suppliers cannot keep up with demand for their product these days.[1] Why? A couple factors are playing into the new popularity of warehouse robotics.

1

First, human labour is problematic.

People are expensive, error-prone and hard to find. Low unemployment rates are making warehouse fulfillment jobs harder and harder to fill.[2]

2

Second, robotics move faster than humans.

They can operate 24-7, never unionize, and can be deployed and re-deployed flexibly. A system set up for goods-to–person fulfillment using automation plus humans, for example, would need to have an accurate forecast for 10 years out in order to pay off.[3] Robots can also work alongside humans, now, with co-bots (collaborative robots) demonstrating they are fully capable of safely picking from the same totes as a human partner;[4] as well as roaming the fulfillment center floor without running anyone over.

With the speed retail trends are moving, this flexibility is a key competitive advantage for omnichannel retailers.

On the other side of the automation coin are the gigantic, stationary AS/RS units. These have been around for a while, but now they are being constructed as the core of many DCs. The units are many stories tall with hundreds of thousands of storage cells inside, each accessed via a mobile robotic carrier that pulls inventory as its needed and feeds it down to packing stations.

This trend began in Europe where space is limited and labour expensive, and has seen recent uptake in North America, especially in the grocery marketplace, where temperature controlled storage is needed. These 'lights-out' buildings need no humans to operate, which is convenient because finding staff to work in cold storage is even harder than finding regular warehouse workers.

Complete integration

Robotics and automation at these levels of sophistication require a great deal of coordination. Making the best use of expensive assets like massive self-supporting AS/RS buildings or robotic fulfillment systems means that all the parts of the supply chain feeding into and flowing out of the DC must be carefully orchestrated. When you have a fully automated building, you don't leave the scheduling of inbound loads to a fallible human with a spreadsheet and telephone or email.

That's where you need a comprehensive, automated scheduling system - such as **C3 Reservations** - to make sure that trailers arrive at the docks when they need to be there. Likewise, with a large, automated warehouse, it's highly likely that there will be **trailers to manage in the yard**.

These systems take the guesswork and human error out of scheduling and yard management, integrating seamlessly with the automation that powers the DC. The systems talk to each other, which means your people don't have to spend their time fruitlessly tracking down truck drivers to find out when they plan to arrive, or searching through thousands of trailers in the yard to find the one that's needed now. That's how a relatively small investment in yard management and dock scheduling can help make the most of a big investment in DC technology.

Hyper-local

When you think 'distribution center', the image that comes to mind is typically a big box located on the outskirts of a major center, usually close to major transportation arteries. Once again, e-commerce and omnichannel requirements are skewing that picture.

Because of the pressure to offer faster and faster fulfillment times, whether it's to a pick-up point or a customer's doorstep, and the growing trend to ordering fresh food online, it makes sense to fulfill orders close to the ultimate consumer. Amazon's been doing this with all its goods; its fulfillment centers are springing up like mushrooms across the landscape so that no customer is more than 90 miles away.[5]

For grocery retailers, the idea is catching on. U.S. grocer Albertsons, for example, will be inserting multi-level AS/RS units into existing stores. **Powered by artificial intelligence, they will take an online order and deliver totes of produce and other goods to a human picker to fulfill customer orders.** The retailer says the system will fill orders faster and is scaled to work within the existing retail infrastructure.[6]

Numerous other retailers have unveiled similar strategies, some, like Sam's Club turning poorly performing stores into local DCs, or department stores like Macy's and Nordstrom opening multiple, smaller DCs.[7]

Hyperactive commerce

The objective of these strategies is to ensure that online orders will be filled as quickly as possible. But with multiplying locations, with smaller inventory holdings and ever-increasing speeds to manage, getting the product into the local DC has never been more important.

Hyperactive commerce

The objective of these strategies is to ensure that online orders will be filled as quickly as possible. But with multiplying locations, with smaller inventory holdings and ever-increasing speeds to manage, getting the product into the local DC has never been more important.

If product is not on the shelf when it's needed the sale, and the customer may be lost forever.

When you only have a limited amount of room for fast-moving items, you need to ensure that the trailer they are on gets to your dock door on time. C3 Solutions has the answer in our dock scheduling tools. They allow transportation partners to set their own appointments seamlessly, so you know when that critical item will be in stock.

In keeping with the fast pace, paperwork is minimized, phone calls all but eliminated, and nobody has to try to manually keep up with the constant barrage of inbound freight. Why trust a key link in this complex, constantly moving, highly digitized supply chain to antiquated methods?

You need seamless control when you have hyperactive commerce.

In-store pickup

While a hyper-local fulfillment strategy can be part of a retailer's BOPIS strategy, many are continuing to rely on in-store picking to fill e-commerce orders. It takes the pressure off old-school DCs, and turns the store into an order-fulfillment center.

Relying on suppliers to ensure that product is on the shelf is a recently resurgent tactic to ensure that inventory is managed to prevent stock outs. This return to vendor managed inventory (VMI), now called "order-to-shelf"[8] is both brilliant and risky.

It's brilliant because it downloads the day-to-day scheduling of product to the manufacturer or distributor. Now it's their job to ensure stock-outs don't happen. But it's risky because there are still a lot of variables that can get in the way of the vendors' best laid plans.

Dock-dock goof

Typical retail stores don't have a lot of docks to manage increasing volumes of inbound trailers. That means there may be scheduling challenges to accommodate greater numbers of truck arriving to unload smaller replenishment orders.
Every time a customer or picker finds an empty shelf in the store it's lost revenue and lost reputation. If that's happening because trailers are waiting to be unloaded, **you need a solution**.

A dock scheduling systems from C3 Solutions can help solve the problem, and ensure that shelves are never empty. By alleviating the pressure on store receiving staff to manage the arrival of numerous trailers, automated dock scheduling allows the inbound truck driver to set his or her own appointment.

Staff members will no longer have to track drivers down to find out when they're coming, or worse, divert them when there's no room.

The old, error-prone spreadsheet is retired and human goofs are eliminated.

With a dock scheduling system supporting your BOPIS omnichannel strategy store staff are freed up to do more important tasks like making sure the product gets from the truck to the shelf.
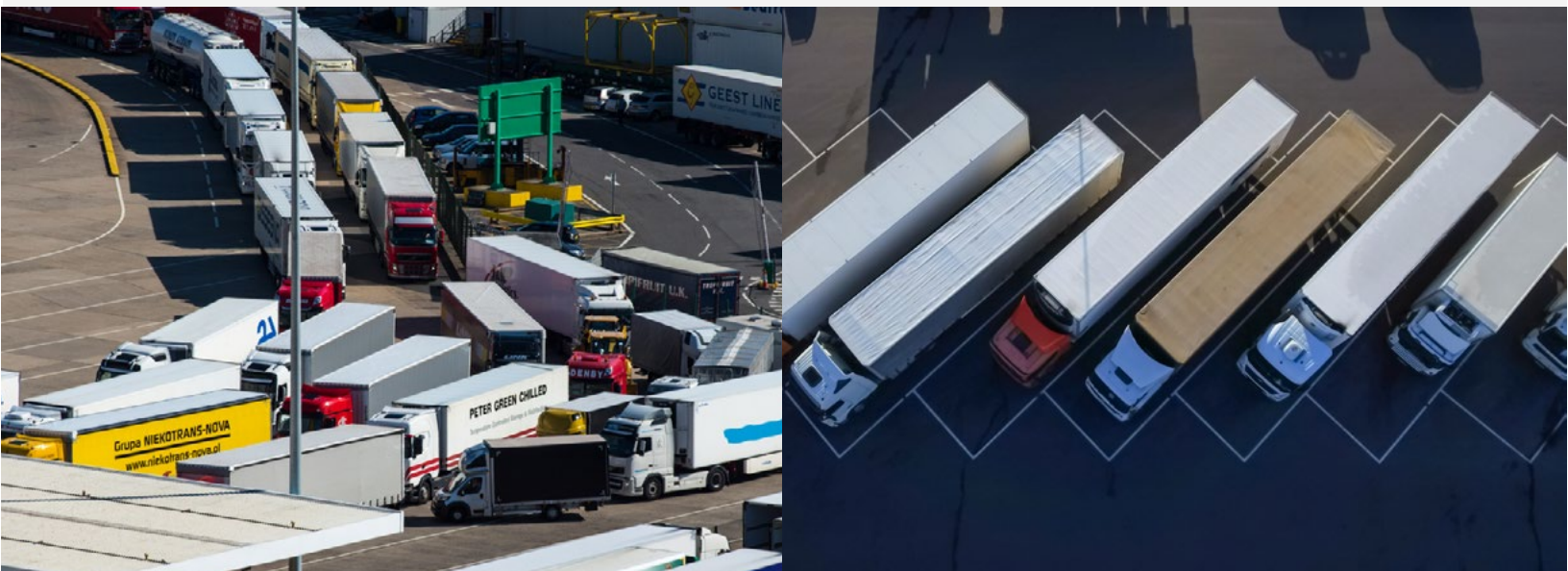
The digital advantage

Successful omnichannel supply chain operations rely on technology at an unprecedented level. Everything from the online customer interface for ordering product, to the systems that operate in-warehouse automation, and of course, the scheduling and yard management systems that C3 Solutions offers, leverage recent digital innovations.

Mobile technology is the backbone that holds it all together. Many of the spectacular advances in supply chain control in recent years have been made possible by the rise of technologies like the Internet of Things **[See white paper]** and cloud computing. With disparate and remote segments of the supply chain communicating and people relying on internet-connected devices to track and manage inventory, these technologies are crucial elements of success.

On the upside, **leveraging IoT**, sensor-based inventory control and cloud-based software such as C3 Yard management or dock scheduling to manage omnichannel operations gives you not only the immediate advantages that each system confers, but also the ability to keep up to date and remain relevant to the next wave of supply chain workers who thrive in this digital environment. Implementing a **bring your own device (BYOD)** program for warehouse workers, for example, allows for faster training, lower costs and a happier workforce.

But there's always a risk in such programs, and making sure systems stay secure is a huge concern for today's operations managers. Cyber threats are not limited to the potential theft of customers' credit card data. With hyper-connectivity, the whole supply chain could be brought down by a hacker with nefarious intentions.

You might be surprised to learn, however, that keeping your apps in the cloud can actually be a safer, less risky approach. As we explain in our blog, "**Insecure about SaaS security?**", cloud-based offerings are less likely to be in peril for several reasons.

First, because they are offered by specialist companies that do this as their core business, they take security very seriously. If something were to happen it's their whole business at stake. Second, because their systems are self-contained and not on your network, if there is a problem, it's their problem to fix, not yours. Third, in the event of a catastrophic event, a reputable company whose business is solely to provide software-as-a-service (SaaS) will have redundancy built in. If it's your own in-house system, how much redundancy can you realistically count on?

Keeping up

Distribution centers are displaying a lot of diversity as supply chain operations managers strive to find creative, cost-effective solutions to manage their omnichannel sales. However, from the tiny, hyper-local fulfillment center, right up to the giant lights-out automated DC, they all have a couple things in common.

First is the need for speed in e-commerce fulfillment. Second is the overwhelming digitization of operational control. These two features combined make the ideal condition to apply digital solutions that ensure connectivity where they will deliver instantly measurable results.

When speed of delivery is of the essence, being able to predict and control stock levels in your facility – be it huge or hyper-local – is a competitive advantage.

With the dock scheduling and yard management systems that C3 Solutions offers, you gain control over the inbound and outbound freight at your docks, you gain visibility into your operations and you can use the information to outmaneuver the competition. With the 21st century warehouse now a reality you cannot afford to be managing with 20th century tools.

References

[1] "Robot maker reaches production capacity on U.S. orders", Inside Logistics Online Staff, Inside Logistics, November 8, 2018.

[2] "Robots Are Taking Over the E-Commerce Warehouse", Robert J. Bowman, SupplyChainBrain, April 9, 2018.

[3] "Robots Are Taking Over the E-Commerce Warehouse", Robert J. Bowman, SupplyChainBrain, April 9, 2018.

[4] "Universal Robots makes its debut at Modex", Inside Logistics Online Staff, Inside Logistics, April 10, 2018.

[5] "The real cost of e-commerce logistics", Deborah Adams Kaplan, SupplyChainDive, June 6, 2017.

[6] "Albertsons is the First National Grocer to Implement AI-Driven Micro-Fulfillment eCommerce Solution", Albertsons Companies press release, October 30, 2018.

[7] "Brick-And-Mortar Retailers Rush to Open More Fulfillment Centers As They Strive to Keep Pace in a Changing Landscape", Rob Smith, CoStar.com, July 13, 2018.

[8] "Why more retailers are using an order-to-shelf system to manage inventory", Gloria Dawson, Supermarket News, January 23, 2018.

Chapter 5

FROM HERE

GETTING IT RIGHT

TO HERE

The New Kid on the Block

The Growing Need for Blockchain in the Grocery Supply Chain

Blockchain is the flavor of the month in the food business these days. It's getting a lot of attention thanks to new mandates by Walmart and others - including big players like Unilever, Nestle, Tyson and Dole - to require blockchain tracking of food from source to store.

The topic is also getting a boost from recent news stories about romaine lettuce recalls in North America. Produce contaminated with E. coli bacteria is believed to have sickened many, and at least one person died in both Canada and the U.S. late in 2017.[1] A new outbreak in the late fall of 2018 has just prompted grocers across both countries to remove all romaine from store coolers,[2] and health agencies in both countries have warned against eating it.

According to Health Canada, the most recent outbreak has seen 18 cases, with six hospitalizations in Ontario and Quebec. In the U.S. there have been 32 cases reported and 13 hospitalizations across 11 states.[3]

After a thorough investigation by health agencies in both countries the source of the infections was narrowed down to leafy greens (in the 2017 outbreak) and Romaine lettuce in the current one. Investigators also know that the same strain of E. coli as was seen in 2017 is causing illness in Canada and the U.S. This suggests there may be a reoccurring source of contamination. Investigators are using evidence collected in both outbreaks to help identify the possible cause of the contamination in these events.[4]

However, they have been unable to pinpoint the source of the contamination. Lettuce can become contaminated by E. coli at numerous points in the supply chain.

From contacting manure in the field, to unsanitary handling and transport, to cross-contamination at the grocery store or by coming into contact with bacteria from raw meat or poultry and seafood on countertops and cutting boards.[5] With so many potential sources of trouble, having a means to track lettuce would certainly help investigators.

Walmart to the rescue

At the moment very little is being done to track the provenance and handling of greens like romaine. Which is where the Walmart initiative comes in.

On September 24, 2018 the retailer sent a letter to its suppliers of leafy greens announcing its blockchain-enabled Walmart Food Traceability Initiative.

The letter said the initiative is intended to "increase transparency in the food system and create shared value for the entire leafy green farm to table continuum." It's a direct reaction to the lettuce contamination scare.[6]

Walmart's direct suppliers will be required to implement IBM's Food Trust blockchain network by January 31, 2019. Beyond that they will have until the end of September 2019 to get all of their own suppliers on board to provide complete end-to-end traceability. The benchmark, according to Walmart's open letter, is for leafy greens suppliers "to be able to trace their products back to farm(s) (by production lot) in seconds – not days."[7]

This is an important initiative. Food contamination, no matter what the source, has many negative consequences. Not only do people get sick and die, their illnesses cost the health care system, insurers and the ill individuals themselves in terms of lost time and unforeseen costs.

As well, many parties in the supply chain also suffer, from the farmers whose livelihood is compromised by the loss of reputation for their product, through the distributors who can't sell it, to the transportation partners who will lose the contract to move the produce and the retailers themselves who have to **throw out vast quantities of recalled food**.

Walmart is asking its suppliers to work with blockchain technology to address food traceability; noting that current methods are slow and clunky.

In a comparison test the company used traditional methods, and it took about a week to track a package of mangos back to its source. Using blockchain, the process took 2.2 seconds.[8]

If this could be implemented across food supply chains the potential losses associated with an outbreak could be quickly mitigated.

How it works

Blockchain was conceived in 2008 as a method of securely tracking crypto-currency transactions. Now it is finding increasing use in supply chain applications. It allows near-instant verification of details relating to transactions and hand-offs between supply chain partners.

Blockchain is what's known as distributed ledger technology. It's a digital ledger that's attached to each and every item being tracked. As the item moves through various points in the supply chain the ledger is updated with details such as date, time, parties to the transaction and so on. As it gets updated, identical copies of the ledger are available to all parties in the supply chain for sign off, and nobody can alter the data once it's entered without approval across the board.[9]

IBM's Nigel Gopie likens blockchain to writing records in pen:

> If you make an error with pen, you simply cross out the error and write the change next to it — the error and change is visible. Blockchain is like using a pen; if it was like a pencil, you could erase or change data without anyone knowing...In a blockchain, nothing is ever changed; it is updated, and every update is tracked. Everyone is shown what that update was. For that reason, you can trust all records on blockchain."[10]

Blockchain is poised to deliver great advances in supply chain management. It is the ultimate means of inventory control. At its core, it guarantees that every piece of inventory is completely unique and cannot be in the same place twice. "Move a product from finished goods to in-transit, and that transaction status will be updated for everyone, everywhere, within minutes, with full traceability back to the point of origin," asserts Paul Brody, a blockchain consultant with EY.[11]

Blockchain will thus improve the following aspects:

1 Reduction in
documentation errors

2 Tracking of products
and distribution assets

3 Allow for real-time sharing
of process improvement information

4 Create a permanent
audit trail to reduce fraud.[12]

Food Fight

The food business faces numerous challenges related to waste, illegal production, fraud, and as we've detailed here, foodborne illnesses.

As we explain in our paper on the **sustainable food supply chain**, about one third of all food produced every year is wasted. It's estimated that between 10 and 22 per cent of fish harvested around the world is not regulated, making illegal production another huge area of concern.[13]

Likewise, food fraud – the mislabeling, misrepresentation, tampering and substitution of one food for another – has become a serious worry. In Europe, for example, horse meat was found to have been standing in for beef in a widespread fraud.[14] A recent study found that half of the seafood sold in Canada is improperly labeled.[15]

Finally, foodborne illness has been found to affect one in six in the U.S. every year with a total cost of US$93 billion.[16]

Blockchain for the win

Blockchain can help resolve these problems. It can add transparency, increase efficiency and improve food safety. Together, those three benefits will also help to reduce the tragic waste of food around the globe.

By beginning the ledger the moment vegetables leave the ground, data from one end of the food chain to the other can be immutably captured. It can track lettuce from the farm it came from, along with growing conditions, through to any processing facility. It can include batch numbers, expiry dates, storage temperatures and conditions, and finally shipping data including atmospheric conditions in transit and during warehousing and final mile distribution.

The potential business benefits of using the technology are clear. **Increased efficiency cuts costs, while improved food safety reduces risk to both reputation and the bottom line.**

The blockchain ledger pens a direct line to bottom line-profitability on your own ledgers.

BLOCK CHAIN

The way forward

As promising as it is, it is important to remember that blockchain is still in its infancy for supply chain management.

For it to be successful there will need to be more research, more pilot programs and standards will need to be created and implemented. To that end, many significant supply chain organizations are joining the **Blockchain in Transport Alliance** (BiTA).

It is a standards and advocacy organization to help educate, advocate, and establish standards for blockchain applications in the transportation industry. It and other organizations like it will have to work diligently to create a trust network that will allow for widespread use of blockchain in supply chains.

Likewise, for blockchain to work it will need a common or interoperable operating platform, and early adopters are cautioned to ensure they are dealing with reputable suppliers and not to place too much stock in inflated promises about deliverables. As with the dotcom boom in the 1990s, there will likely be much hype and little in the way of substance in many offerings that come to market.[17]

A digital connection

Let's assume for a moment that blockchain really does reach its potential and becomes a widely accepted supply chain tracking and inventory management tool.

From the farm to a consumer's fork, every bit of produce, meat and fish can be followed, and everyone along the way assured of its provenance, location and proper handling.

But if you are going to have all this security built in to your operations, you need to ensure you've deployed complementary digital tools to make it worthwhile. Blockchain secures the chain of custody and verifies what has happened to a product as it moves from point to point through the supply chain. To make sure that these benefits are preserved you need to be sure that delays or mishandling are not happening on your watch. For more on this, we invite you to read our white paper focusing on **supply chain visibility.**

Can you ensure that product arriving at your facility will be received in a timely fashion? Can you guarantee that trucks arriving to pick up loads will be processed quickly enough to ensure continued viability of perishable products? If a trailer is dropped, will your staff be able to locate it in your yard when it's needed? Are you managing the comings and goings at your dock doors using old-fashioned methods? Will a spreadsheet and telephone system be able to keep up in a blockchain world?

1

If your operation is not managing this link between carriers and the distribution centre effectively, a couple bad things will happen in a blockchain-enabled supply chain.

First, product will be delayed, and delay in an omnichannel or even a simple e-commerce operation cannot be tolerated. Product will spoil, shelves will be empty, and customers will be lost.

You'll be contributing to food waste and your business will suffer.
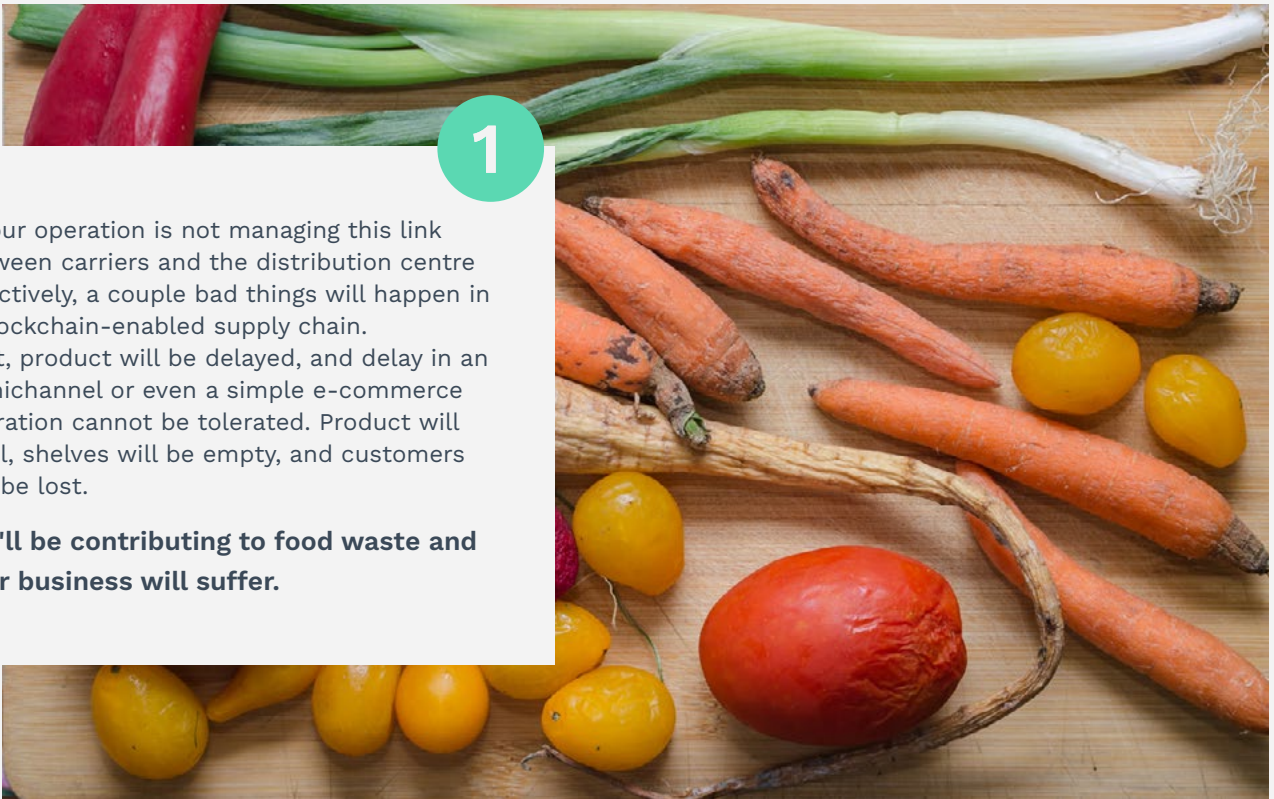
2

Second – and this is the new part – your deficiencies will be known to all parties along the chain. It will be forever recorded in the blockchain ledger that, for example, it was a holdup at your docks that delayed the shipment so long that the milk spoiled. Errors will not be blamed on some unspecified 'transport delay'.

Your operation will have to take responsibility.

Why not avoid this scenario altogether and employ tools that are designed for the digital age? Using cloud-based **yard management** and **dock appointment scheduling** systems like C3 Solutions' will enable accuracy, efficiency and productivity in your dock and yard operations that will let you keep up in the blockchain world.

Trucks need never be kept waiting for a time slot at the docks, drivers can make their own appointments and change them if needed. Trailers in the yard are located with pinpoint accuracy so you know which one arrived when and whether it's next in line for unloading. Likewise, your staff, indoors and out, will be kept productively busy with a well-scheduled dock operation. With warehouse staff being few and far between these days, maximizing the productivity of the ones you have means a more profitable enterprise.

Blockchain means supply chain operations will be held to a higher level of accountability.

With every move being recorded in perpetuity, you need to be able to ensure your part of the chain is as transparent and well documented as it can be. By implementing a cloud-based yard and dock management system, you'll eliminate the paper trail and the errors that come with paper documentation. Every move that takes place between carriers and your facility will be recorded in real time and in a consistent and reliable fashion. And because it's cloud-based it's secure, and available on demand.

These are powerful, effective solutions to a fast-paced, complex operational challenge. **And they are designed to be compatible with the next generation of 21st century digital technologies, like blockchain.**

So when those blockchain-enabled leafy greens start pouring into your warehouse, it's just going to get faster and more complicated. Be prepared – take advantage of the digital tools that will help your operation keep up and you'll be ahead of the competition. **They'll be in the weeds, and you'll be enjoying your salad days.**

References

[1] "**Multistate outbreak of Shiga toxin-producing Escherichia coli 0157:H7 infections linked to leafy greens (Final update)**", Centers for Disease Control and Prevention, January 25, 2018; & "**Public Health Notice – Outbreak of E. coli infections linked to romaine lettuce**", Public Health Agency of Canada, February 9, 2018.

[2] "**Sobeys removes romaine lettuce products from shelves**", Sobeys Inc., November 21, 2018.

[3] "**Food Safety Alert – Outbreak of E. coli infections linked to Romaine lettuce**", Centers for Disease Control and Prevention, November 20, 2018.

[4] "**Public Health Notice - Outbreak of E. coli infections linked to romaine lettuce**", Public Health Agency of Canada, November 20, 2018.

[5] "**Public Health Notice - Outbreak of E. coli infections linked to romaine lettuce**", Public Health Agency of Canada, November 20, 2018.

[6] "**Food Traceability Initiative, Fresh Leafy Greens**", Letter to Leafy Greens Suppliers, Walmart, September 24, 2018.

[7] "**Food Traceability Initiative, Fresh Leafy Greens**", Letter to Leafy Greens Suppliers, Walmart, September 24, 2018.

[8] "**Walmart mandates blockchain use for leafy greens suppliers**", Jeff Wells, FoodDive, September 25, 2018.

[9] "**Blockchain 101: Is it going to help you?**", Treena Hein, Inside Logistics, June 21, 2018.

[10] "**Two truths and a lie: The newest party game to explain blockchain**", Nigel Gopie, IBM Blockchain Blog, October 8, 2018.

[11] "**How blockchain revolutionizes supply chain management**", Paul Brody, Digitalist Magazine, August 23, 2017.

[12] "**Blockchain 101: Is it going to help you?**", Treena Hein, Inside Logistics, June 21, 2018.

[13] "Blockchains and food security in the supply chain", Lance Koone, Future Food-Tech New York, June 7-8, 2017.

[14] "Horsemeat scandal: the essential guide", Felicity Lawrence, The Guardian, February 15, 2013.

[15] "Nearly half of Canadian seafood improperly labeled: study", Aleksandra Sagan, The Globe and Mail, August 28, 2018.

[16] "Blockchains and food security in the supply chain", Lance Koone, Future Food-Tech New York, June 7-8, 2017.

[17] "The potential of blockchain technology in the food system", IFT.org, 2018.

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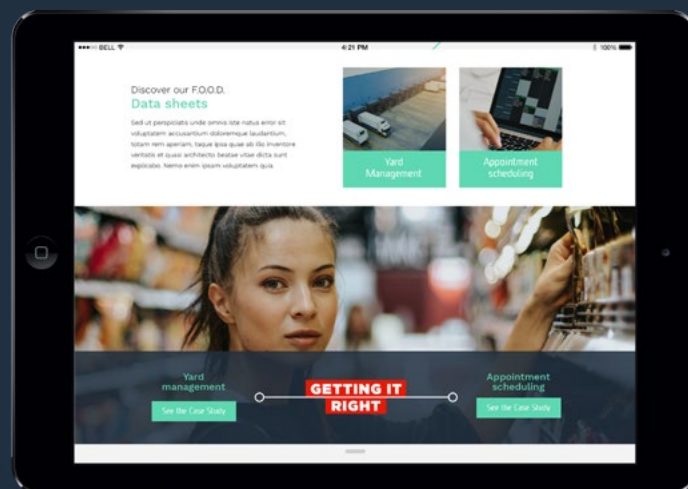
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