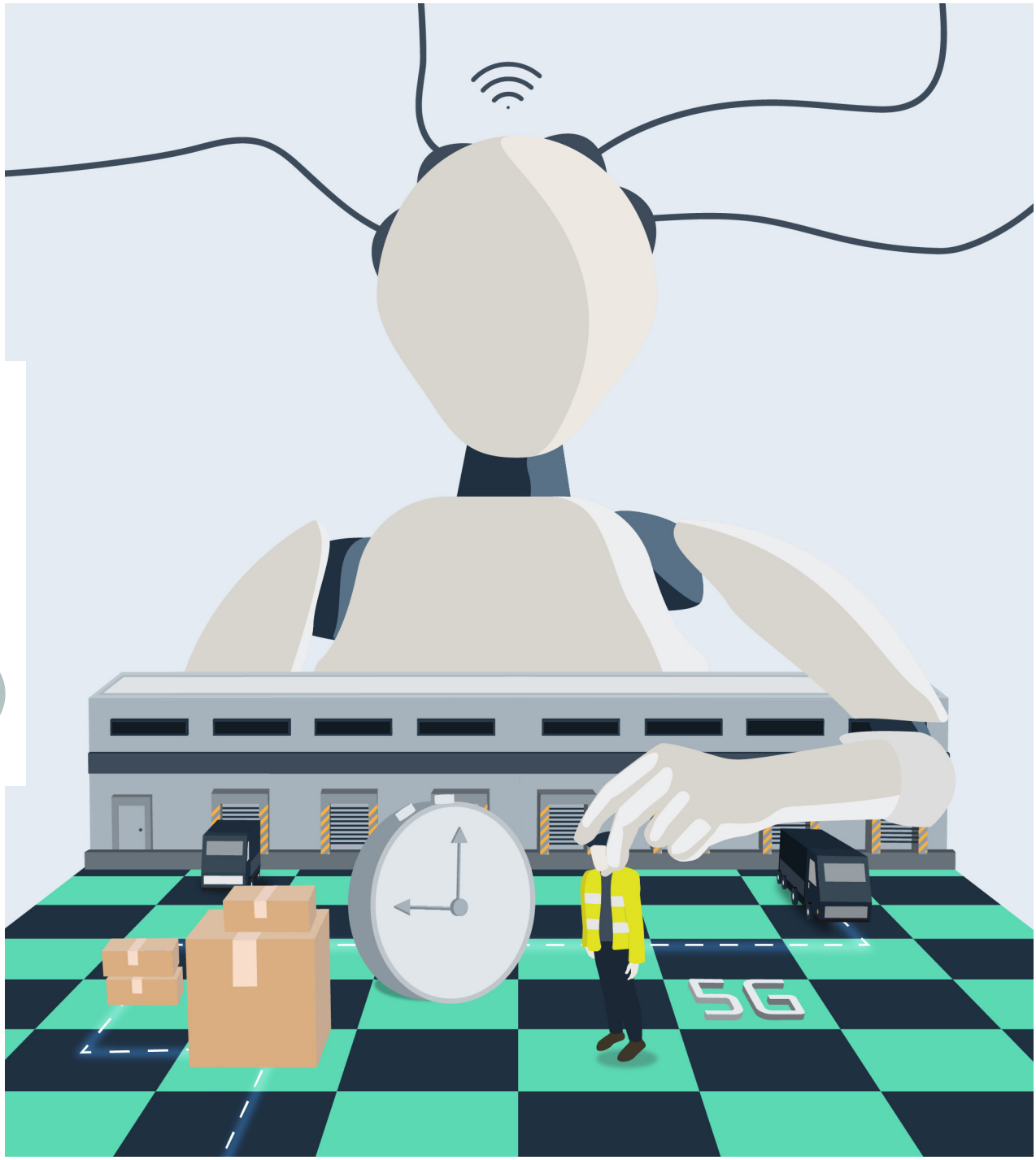
PLAN YOUR NEXT MOVE

BY C3

Artificial Intelligence

Making Machine Learning Analytics Work for Your Retail Operation



C3 Solutions

SOLVING FOR RETAIL

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> If you aren't thinking five moves ahead in today's high-stakes game of retail chess, you'll find your business outmaneuvered and backed into a corner. The key to winning this game is being able to decide on the right technologies to leverage in the fight.

Just as a chess master must choose whether to zig and zag like a knight or make a laser-straight run with a bishop to outsmart the opponent, selecting the right tool to optimize retail operations will depend on a lot of factors. In this paper, we will look at the various challenges facing retail today and then focus in on a technology that many are choosing as a solution.

This time we'll be considering artificial intelligence (AI) as a promising new tool to solve retail challenges and drive bottom-line results. Although it's been around for a while, AI is just now coming into its own as a supply chain tool. As you'll read below, it's got tremendous promise as a means to streamline operations by improving processes like routing and by making autonomous driving possible.

Once those technologies become the norm, you will be challenged to keep up without modernized practices. That's why we at C3 Solutions want to share what we've learned about AI and how it fits in the retail supply chain.

One of the ways we see future success is through the proper application of technology like automated yard and dock management. Once those automated trucks start rolling, being able to seamlessly manage operations at the dock doors will be an even more critical function than it is now.

We hope you find this exploration of AI interesting and helpful as you plan for the continued and future success of your retail operation.

Challenges

Did you know that delivering 25 parcels by road could offer **15 septillion** possible route options?[1]

Home deliveries seemed like a simple process – send the truck out, let the GPS guide the driver and a few hours later everything's delivered.

But with parcel deliveries topping 87 billion in 2018[2], and 2,760 shipped every second of every day, that's a lot of permutations and calculations being made around the world to get them to their final destinations. Even 15 years ago we did not have the computing power or capability to crunch numbers on this scale.

All this activity is being driven by e-commerce and customers' increasing demand for fast-as-possible deliveries. Known as the "**Amazon effect**", thanks to the e-commerce giant's ability to fulfill orders quickly and accurately and the resulting inflation of customer expectations, **it has fundamentally shifted the retail marketplace from one where price was a differentiator, to one where delivery speed makes the sale.**

Alongside Amazon's dominance, the technology in customers' hands also plays a huge role.

> On Cyber Monday in 2018,
>
> 54% of shoppers were using mobile devices
>
> 30% of actual purchases were completed by mobile
>
> **netting**
>
> US$ 7.9 billion
>
> **in revenue for online retailers.**[3]

The growing penetration of mobile into retail means customers are perpetually ready to shop, very well informed, and are able to make purchasing decisions on the fly. **Retailers are now challenged to keep up with that trend and make sure they can stay one step ahead of the always-on customer.**

On the operations side, the need for speed creates multiple challenges. It means traditional suppliers are being forced to step into the last-mile delivery game, turning themselves into retail omnichannel operations. It means a greater emphasis on flexibility and gaining the ability to adapt to changes in demand. It means having to implement stronger returns and reverse logistics practices. It means having a pinpoint-accurate inventory control system and demand planning in place to prevent **stockouts, which in the world of e-commerce almost always means a lost sale.**

Failure to meet these challenges has disastrous consequences, as the staggering number of retail bankruptcies and closures in the past few years demonstrates.

In 2019, the third week in September, 8,500 stores were closed in the United States alone, and a forecast suggested 12,000 might be the final tally by the end of the year.[4]

That represents those shuttered due to bankruptcies and downsizing.
But at the same time, the U.S. retail industry is expected to report growth in the range of 3.8 percent to 4.4 percent by the end of 2019, thanks largely to e-commerce.[5]

Clearly retailers need a new way to understand and execute business processes if they are going to survive and thrive.

What is AI ?

Staying alive in this environment requires fast thinking and a sound understanding of the technologies that can keep your business in the game. Artificial intelligence is one of the most interesting new game changers in the retail landscape. It's been described as **"the single biggest technology revolution the world has ever seen".**[6]

Actually, AI is larger than one single technology. It is a collection of systems that allow a computer to "sense, comprehend, act and learn".[7] Rather than relying on coding that anticipates binary decisions to make a process happen, AI allows the computer to figure out how to act by analyzing data instead.

The system is programmed with algorithms, a set of guidelines in the form of sophisticated code that allows the machine to adapt as it works, changing the output based on the data it's fed. Examples of AI that we take for granted now include the online recommendations that pop up in our social media feeds or in online shopping apps. It's also hard at work making stock market trades, operating your smart home assistant and flying planes.

Adoption of machine-learning technology – another term for AI – has the potential to resolve issues of time, resources and cost. Analytics is the branch of AI that will do the most in this area, as it represents the ability to crunch the numbers in vast quantities of data where humans can no longer keep up.

AI is set to make a dramatic impact on business around the world. **One estimate places its economic impact at US$15.7 trillion by 2030 – that's an uptick of 14 percent in global GDP.** Of that, about $6.6 trillion will come through productivity gains and the rest from consumption.[8]

Many are pinning their hopes for business success on it. **Numerous surveys have asked executives about their plans for AI adoption, and the number who say they plan to use it tracks as high as 75 percent.**[9] The retail and consumer goods segment of the global supply chain analytics market alone is expected to grow from US$1.2 billion in 2019 to $2.5 billion in 2024 – that's an annual growth of 16.2 percent.[10]

In general it's expected that AI will affect three areas:

1. Productivity gains through automation of processes (including automated vehicles and robots)
2. Productivity gains through application of AI to assist the existing labour force;
3. increased demand thanks to the ability to increase product personalization.[11]

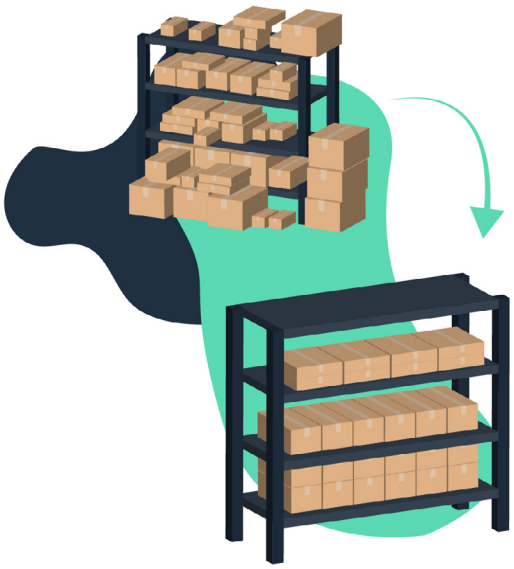
What can AI do for Retail Operations?

Retail operations stand to benefit from AI in many ways, and in ways that have yet to be envisioned or realized. However, for the moment AI is seen predominantly as a means to streamline inventory control and profit by improving processes.[12]

Crunching the vast amounts of data being generated from observing e-commerce shopping habits, **Internet of Things** connected objects, and sales information can yield reams of actionable insights.

> **But retail operations will also be influenced by the use of AI in the service sectors it relies on. AI in transportation and logistics, for example, will have a huge impact on how retail operations will need to function. AI applications that improve routing – as we noted above – as well as load matching, and in the not-too-distant future autonomous trucks, will all contribute to a faster, more efficient transportation system.**

In the meantime, here are some of the top AI applications that are proving to have a direct and beneficial impact on retail.



Inventory optimization

In the cutthroat retail world, inventory optimization is a key survival tool. One of the ways that AI can help is by providing accurate predictions of future sales. **Demand planning is now part of the analytics tools that AI can provide, and will allow retailers to reduce excess inventory** by only buying what these predictions indicate is needed. The other benefit is that the amount of space needed to store inventory may be vastly reduced if the quantities needed are foreseen accurately.

This does present a risk on the flip side, however, if demand exceeds predictions and the retailer is caught short. Overstocks cost retailers US$470 billion in 2015, while out-of-stocks caused a US$630 billion hit, globally, according to one study.[13] But with the increased accuracy, and continuous learning that AI affords, both types of inventory miscalculations may eventually be remembered as headaches of the past.

Delivery optimization

Going back to the route-planning problem noted above, **AI is already being employed to ensure packages get delivered with the maximum efficiency**. A major parcel delivery specialist has been using such a system since 2013, and now employs it on 10,000 routes. It uses fleet telematics and advanced algorithms to provide drivers with optimized routes. The technology figures out the most efficient way to deliver and pick up packages within a set of stops defined by start time, committed delivery time, pick-up windows and special customer needs. The system relies on customized online map data to calculate miles and travel time to plan the most cost-effective routes.

For the delivery company's retail partners this means e-commerce parcels will be delivered faster and for less cost. It also means that those same retailers will feel even more pressure to step up the speed and efficiency of their own operations.

DC process improvement

AI is being used by third-party logistics (3PLs) suppliers to predict when customers will need orders and then organize their distribution centres accordingly. If you know when a pallet will be needed it's possible to stage orders so that they can be most efficiently picked and loaded onto waiting trucks.[14] AI is taking old-school analysis of fast-moving SKUs versus slow moving product to a whole new level, based on order history and factors such as seasonal demand and even weather patterns, in the case of cold storage suppliers handing items like ice cream and frozen treats. And for the company in this example, it's paid off with a 20 percent improvement in efficiency.[15]

End-to-end supply chain planning

AI will be able to enable planning across the supply chain from raw materials right through to the end retail consumer. In the best case scenario, it will entail being able to better plan everything from how much of a sourced material will be required and the precise moment it needs to be delivered to the manufacturing plant, through to knowing when demand for that product will peak and then being able to suggest it to the right customer and have it delivered the same day.

This will reduce costs all along the supply chain by reducing delay, avoiding wastage in manufacturing, eliminating unwanted inventory and the extra touches and storage it requires, and minimizing the cost of lost sales due to stockouts. If done correctly, AI has the promise to deliver benefits all the way along the chain.

Avoid AI Pitfalls

While numerous large retail companies are making productive use of AI – Amazon being the prime example – it is still very much a technology, or suite of technologies in relatively early development. This means retail leaders taking a look at introducing AI to their operation need to proceed with caution. There's a lot of hype, inflated claims and hucksterism to be wary of as numerous developers seek to promote their – largely untried – solutions.

Here are some recommendations to help prevent an expensive AI misstep:

Use AI for the right reasons.

Using AI because someone in senior management has read about the competition using it is not a good reason. Instead, **leaders should ask what technology will drive the most value for the bottom line.**[16] For example, you might ask which areas of the business have lower profits than they should, or what tasks employees are doing that are unpleasant, or where the most errors are made.[17]

Adopting AI might be the answer to solving these challenges, but it just as easily might not. **As always, with new technologies, asking the right questions will hopefully reveal the realities of your needs and the areas where new solutions may be practical solutions.**

Ensure the right leadership

With IT capabilities so central to retail success, it comes as no surprise that for many organizations the ownership of IT projects has been fragmented across numerous departments. With IT budgets increasingly spread across the enterprise, AI implementations can become pet projects of a single department, without general oversight. This often leads to stalled progress or failure since important considerations like regulatory compliance, data management, security and more may be overlooked.[18]

It is therefore extremely important to keep oversight of AI projects within the purview of the company's chief information officer. AI is complex and requires careful integration of many functions and data from across the enterprise. It will require planning and input from across the enterprise, with guidance from IT and senior management. Preventing departments from going rogue with their own AI experiments will reduce the risk of wasted time and costs.

It's all about the data

Before AI will work, you have to have the data to feed it. If you are operating in an e-commerce or **omnichannel environment** already, you have access to reams of information. Information from your e-commerce sales, logistics processes, inventory control, marketing, and so on may all be valuable fodder for an AI system to interpret.

The key is identifying exactly which data will be useful for your AI project and making sure it is captured and stored in the right format.

The good news about AI is that it can tolerate data that's not completely "clean". Data with duplicate records or even outdated and incomplete information can still be used by AI systems thanks to their ability to learn and fill in gaps.[19]

Get the right people

Part of solving the data question will involve finding staff with the skills to implement and maintain AI systems. This is a serious challenge. In fact, lack of AI talent is seen as a major barrier to the technology's adoption by many enterprises.[20]

There is a huge shortage of data scientists – the people who will manage AI systems – around the globe. Their skills are so valuable that numerous acquisitions of AI startups have been fuelled by the need to gain the talent behind the technology, more than the tech itself. It's estimated that graduates in the discipline will increase by seven percent a year, but demand will outstrip supply, with a 12 percent annual growth rate.[21]

Retailers seeking to make an AI breakthrough need to consider the cost that hiring these skilled practitioners – whether directly or through outsourcing – will add to the cost of their project.

Real Intelligence

The amount of data created from digital sensors, virtual reality applications, and smart mobile devices doubles every three years, and while the ability to store it has expanded proportionately, the cost has dropped dramatically.[22]

AI allows the utilization of the vast quantities of data – also known as Big Data – made available by e-commerce. It also creates an opportunity for the retailer to be constantly connected to their customers, leveraging the data that online shopping creates, to stay top of mind and make tailored offers. In fact, for now marketing and sales applications are the most common uses of AI in the retail sector, with supply chain applications ranking in second place.[23]

However, as we have seen, AI for supply chain is really still in its infancy. And this creates an opportunity for retail businesses that want to take advantage of AI technologies in the near future. Because AI capabilities are still in their formative stages, now is the time to look at how the information and process improvements it can afford will affect other processes and systems that the business relies on.

For companies with retail distribution operations, this means ensuring you can keep up with the increased velocity of orders coming and going from your distribution and fulfillment centres, as well as being prepared to shift on the fly as you learn more about future demand.

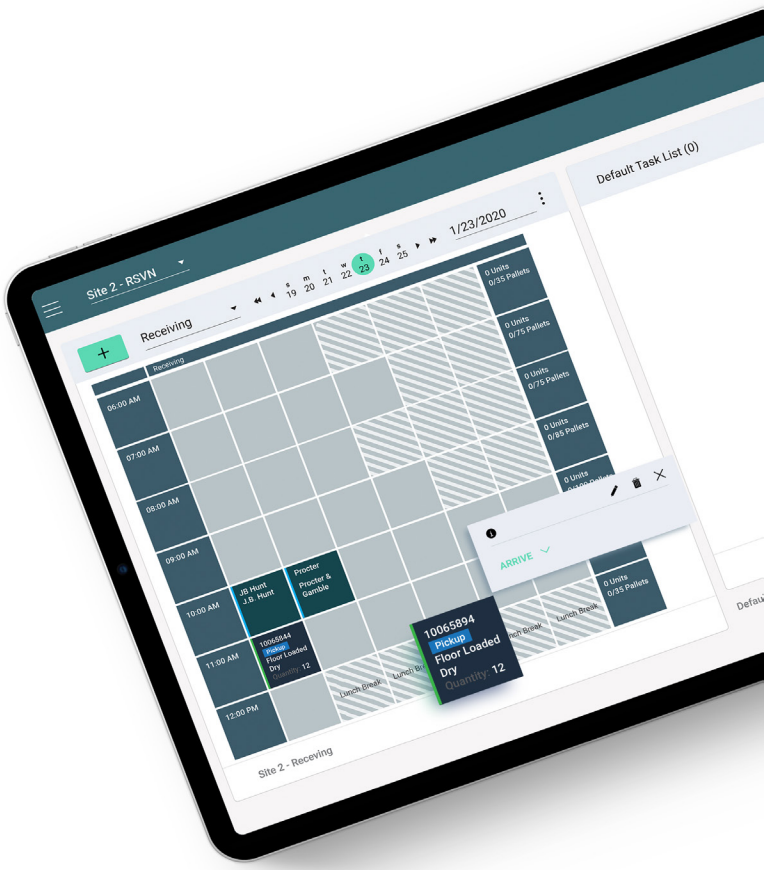
That's where C3 Solutions' best-of-breed scheduling system comes in. If you want to leverage the powers of artificial intelligence to speed up your operations you need to ensure that all areas will be able to keep up. **You cannot afford to have bottlenecks and congestion slowing down the arrival and departure of goods and orders at your dock doors.**

Implementing a dock scheduling system will allow for the smooth arrival and departure of trucks, and help ensure that your inventory is where it needs to be at the right time. It will be a key piece of the plan when it comes time for your operation to step up to the improved speed and accuracy that AI will bring.

Think about it this way: AI will mean pinpoint accuracy in the delivery of goods for replenishment. If your docks aren't ready at the moment that inventory needs to be delivered, then what's the point in having the precision of AI to know that those SKUs are needed? Likewise, on the outbound side, whether it's a parcel truck arriving for last-mile delivery pick-ups or a full-truckload going out to replenish a bricks-and-mortar location, **if they are forced to loiter in the yard waiting for the load**, then you are wasting the capabilities that you've paid for by implementing AI analytics.

But if you have a scheduling system in place, you'll be able to make sure that loads match up with time slots at the docks and you'll be leveraging your AI investment to its intended result.

By using the latest in C3 scheduling technology to coordinate your dock equipment and labour with the other fast-moving parts of your retail supply chain you will be able to maximize the ROI on your IT investment.



Dock Scheduling with

Reservations

A cautious gambit

Artificial Intelligence should be on your radar if you play on the retail chessboard. Just as AI can play the game of chess better than a human chess master, it will also be quickly learning how to master retail operations. That may be a little fanciful, since AI won't do anything without human creativity to do the initial programming, but once this technology evolves and matures to the point where it's commonly employed and no longer solely at the disposal of IT-native retailers or the very large, it will be a fundamental game changer.

Those that are not feeding the data they collect from their operations into the big computer brains will be at a serious disadvantage. They will be slower, less accurate, unable to predict with precision, and will lose sales.

Just as in chess, the game relies on being able to think many moves ahead, retail success will likely soon come down to the ability to leverage AI to its best advantage. Ignore it and you may find your operations in checkmate.

Ready to Plan Your Next Move?

PLAN YOUR NEXT MOVE

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Globally recognized as the masters of Dock Scheduling and Yard Management Software technologies; we've perfected the art of helping industry leaders move strategically through quickly changing landscapes so that operations continue to move smoothly.

At C3, we've dedicated ourselves to helping you plan your next move!

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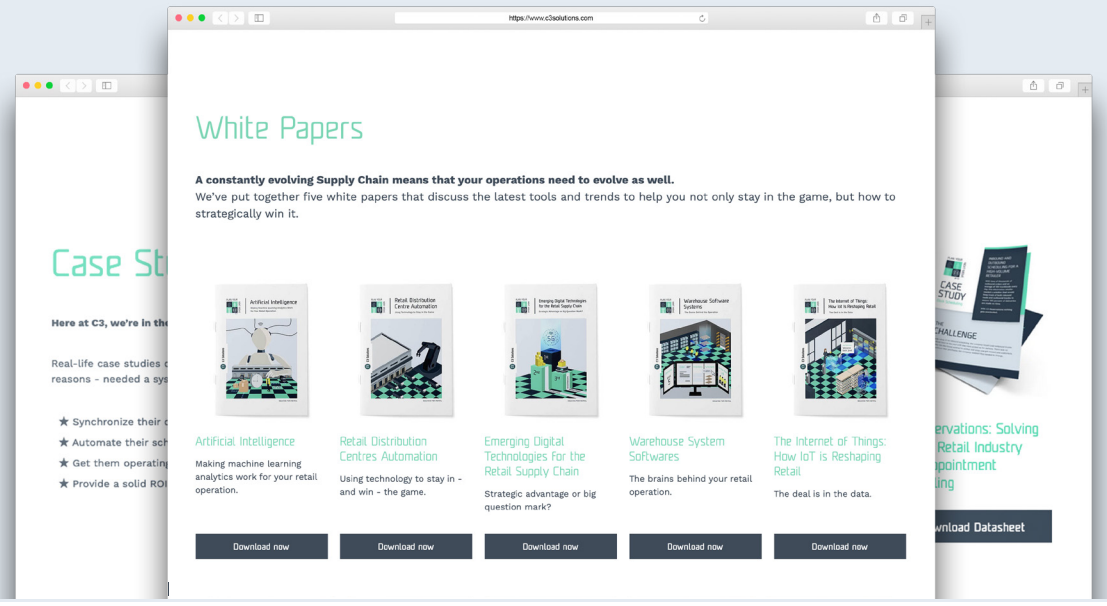

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