

# Artificial Intelligence in Retail

AI is more than just a buzz word and it should be able to deliver considerable value to the data rich Retail environment

**In the past couple of years AI has become something people seem to get excited and confused about in equal measure. We are going to try and cut through the hype to help you understand what AI is, why it could be an important part of how you run your business and how to get started on the journey**

## What is AI?

AI is difficult to define because it has a lot of different uses and the underlying technology can be very different.

We define it as a machine which can make “intelligent” decisions based on inputs. However this leaves open the challenge that computer programmes / algorithms have been doing this for years and it is said that as soon as technology is working it is no longer AI.

The current distinction with AI is that it:

- Learns based on its experience and historical data
- Can make micro decisions with multiple variables, the significance of which would have to have been pre-determined (by a human) previously

To simplify things we believe it is worthwhile focusing on the high level uses of AI and we believe there are 3 fundamentally different use cases which will have a big impact on Retail:

- Cognitive / decision making AI – analysing data to identify trends, reviewing all the variables in real time to make decisions which optimise the performance of the system (fundamental to all the use cases)
- Customer interaction – interacting with the customer in store or online to support them through their customer journey
- Logistics and movement – movement of product through the supply chain and to the customer in a convenient and cost efficient way

## Why is it important?

The promise of AI is a paradigm shift in the way that any Retail business operates and delivers value to its customer.

Firstly it could enable the automation of a number of different decision making processes within a Retail business – i.e. how much stock should be sent to a particular store on a particular day to ensure availability or how should I set my product price to optimise sales and profit.

Secondly it offers the potential for these decisions to be made without the bias often ingrained in human decision making.

Thirdly it can consider more parameters at once than its human counterparts – i.e. predicting sales and replenishment levels when there is good weather, local events and promotional activity on substitute lines.

Finally AI should be able to identify new patterns and challenge the way we approach problems.

## What impact could this have on Retail?

AI will increase the speed at which the Retail industry can transform to meet customer demand. It will enable change to happen at scale but without the disruption associated with an ERP. AI solutions in the next 10 years will have a narrow focus but they will be able to do the clever work with your data to generate the right decisions to feedback into core systems. Projects in this area should quickly deliver a clearer and more focused payback.

Fundamentally we are also describing a world where people spend less time moving data around and setting parameters and more time doing a value adding role. This may lead to fewer employees but could also lead to a greater emphasis on human to human interaction where it counts.

The expectation is AI will improve the digital experience in the first instance due to the rich data currently available with digital channels. However AI will ultimately help the physical Retail environment catch up through capturing data about customer journeys – maybe even being able to capture their reactions to product, merchandising and service.

## What isn't AI?

The excitement around AI means that a lot of businesses are waving the flag but it isn't always clear whether they are using AI or not. Below we try to break down our view of what isn't AI (these elements are often necessary but not sufficient):

- Having a big and new data set is not AI – although AI can be used to structure and make decisions from the data
- Having clever algorithms is not AI – AI needs to be learning and making independent decisions on how to set the parameters of algorithms
- Having teams of analysts / data scientists is not AI – they need to be focussed on taking a human decision making step out of current processes

## Retail use cases

**Automation** – Sainsbury’s are trialling delivery robots in certain areas of the country. The machines can navigate their way around the streets a 30 minute walk from their store and provide a quick and efficient fulfilment option for up to 3 bags worth of shopping.

It’s the ultimate convenience for the quick top up shop requiring only the electricity to power the robot. With this and driverless vehicles it is not too hard to imagine a fully automated distribution network from warehouse to home.

**Human interaction** – Northface hosts a product recommendation chatbot which asks questions to understand your preferences and ultimately makes product suggestions.

With a greater understanding of the customer - chat bots can become ever more insightful tailoring offers, promotions and approach to specific customers. Over time this will provide a much more personalised shopping experience to customers in store and online which will enhance the customer journey as well as increase basket size. We have recently written a short paper on the impact Voice AI may have in Retail ([patelmiller.com/insights-and-blogs](http://patelmiller.com/insights-and-blogs)).

**Cognitive / decision making AI** – a more in depth case study is shared below but this is the area where AI will deliver the biggest benefits in the next 5 years.

If the key to operational decision making is reviewing what the data is telling you and reacting accordingly then AI will be able to review the data quicker, consider more variables and continually be determining a best fit decision. (See the BlueYonder Case study below).

The real step change will then come when it also starts to identify its own patterns in the data which could lead to AI making genuinely innovative decisions. As far fetched as that may appear AI has already

proven it can devise novel, elegant and ultimately winning strategies in complex games like Chess & Go!

## Risks of Artificial Intelligence

There is one overriding risk to AI and it is a lack of control / accountability. Half of the challenge within business is building the trust to make decisions and we will need to trust a machine which can make the decisions but won’t be able to explain why.

Initially of course checks and balances will need to be in place to ensure that the AI is making sensible decisions. This can be partially mitigated by a team working alongside the AI to dig into its decisions and help justify them.

We have seen how it can move quickly from, on average, equivalent decisions as human counterparts to making consistently smarter decisions.

Ultimately AI will need to be trusted to deliver results.

Furthermore customer data is crucial for the customer facing applications of AI – and those using customer data have not consistently done a good job of winning trust. If this continues certain AI applications will be drastically hindered by what data can be captured and used.

There is also a legislative risk – the economic and social impact of AI is a source of speculation and it is not unforeseeable that policies are adopted which hinder AI progress.

## How AI helped Morrisons deliver on its promise to customers and transform store replenishment

BlueYonder



When David Potts, Morrisons CEO joined the grocer in 2015 one of the biggest customer satisfaction barriers identified was product availability. Up until that point, the supermarket chain had relied on traditional systems to replenish its stores – mostly through manual orders made by in-store teams. This proved time consuming, created inconsistencies between stores, and was not always accurate.

To improve availability, Morrisons needed a solution that could solve its two biggest challenges: under-stocking and overstocking, and in solving those challenges the solution needed to fulfil an exacting list of requirements including:

- Quick delivery, demonstrating rapid time to value
- Be capital light, to integrate with existing IT system infrastructure whilst facilitating removal of legacy systems
- Have a high level of automation to reduce manual intervention and free up Morrisons colleagues’ time to focus on serving customers
- Be highly accurate at an individual store/ product/day basis to increase product availability and reduce lost sales
- To utilize self-learning technology to ‘leapfrog’ Morrisons against the rest of the market, future proofing its replenishment capabilities

To solve these challenges, Morrisons invested in Blue Yonder’s Demand Forecast & Replenishment solution, which uses AI to improve demand planning and reinvigorate replenishment based on customer behaviour in every store.

In just 12 months, Blue Yonder optimized ambient and long-life replenishment among 26,000 SKUs across 130 categories, in all of Morrisons’ 491 stores. The result? Up to 30% reduction in shelf gaps, sales growth, and many more happy customers – demonstrated by the fact that like-for-like sales rose 1.7% in the final quarter of 2016, including Morrisons’ strongest Christmas trading period in seven years.

### Results



This summary extract is taken from the full case study “How AI Transformed Store Replenishment at Morrisons”, with permission by Blue Yonder.

To read the full case study please visit: [www.blue-yonder.com/en/morrisons-demand-forecast-and-replenishment](http://www.blue-yonder.com/en/morrisons-demand-forecast-and-replenishment)

## What does it take to get started?

Having spoken to a number of senior Retail executives about AI they have either begun the journey, applying AI in their business to projects they are passionate about, or they are unclear about how to get started.

The first hurdle is of general understanding "What can it do" hopefully we have already answered that.

The next hurdle is around the availability and robustness of data. However in our experience having the perfect data is rarely the case and you only ever get the right data by putting it in place. This will require some effort but is not insurmountable.

What you really need to get going is a simple and impactful application of the technology that can be quickly delivered to prove the case for AI. There are a number of examples which spring to mind and where you can quickly make a big impact:

- Improved forecasting and ordering
- Price optimisation
- Enhanced image search

Alongside the application you will need to develop a clear view of the KPIs you want the solution to optimise – part of the value of AI is that it can optimise a decision across a number of different variables, for example finding an optimal trade off between waste / markdown and availability.

Finally you may want to consider working with a partner to quickly help you identify and deliver value. It is often a trade off between the control of developing a solution in house and the speed and reduced complexity of seeking the help of an external provider.

## What could AI look like in your business?

The real power of AI is that it allows Retailers to transform far more quickly and flexibly than ever before. By using machines trained to rapidly adapt to changing patterns, it is possible to automate many areas of your business – and do it at your pace.

In the longer term this will mean continuous improvement will be baked into your organisation as the algorithms continually learn and develop.

As a simple example lets consider how AI might work in merchandising. Today a merchandiser might need to remember to check what levels of stock they have of each product both across stores and in the warehouse. They would need to understand the current sales rate to predict when optimally to land the product etc.

With an AI merchandiser all SKUs across all categories could be reconsidered every day, understanding store level movements and then aggregating that up to company level orders. Buyers and logistics team member would provide inputs to and receive outputs from the AI.

## The history of AI

### 1940s

Research in neurology had shown that the brain was an electrical network of neurons that fired in all-or-nothing pulses. The idea that any kind of computation could be described digitally left open the possibility of creating an electronic brain.

### 1950s

These ideas rapidly progressed into reality, with Marvin Lee Minsky creating the first neural network – a computing systems vaguely inspired by the biological neural networks that constitute animal brains - the SNARC (Stochastic Neural Analog Reinforcement Calculator).

The field of "Artificial Intelligence" began in 1957 with a convergence of Academics across the fields of mathematics, psychology, engineering, economics and political science with the assertion that assertion: "every aspect of learning or any other feature of intelligence can be so precisely described that a machine can be made to simulate it".

### 1970s

The initial years of AI focused on solving algebra word problems, proving theorems in geometry and learning to speak English, and saw rapid progress. ELIZA, the first Chatbot, was regularly convincing humans that computers could converse fluently in English by following the principles of semantic nets – a conceptual link between words represented as nodes.

### 1980s – 2000s

AI went through a series of boom and busts during the 1980s and 1990s, as faster computers allowed some of the early dreams of AI to be realised, and researchers began to focus on specific problems. In 1997, IBMs Deep Blue beat a reigning world chess champion, Garry Kasparov.

### Today

Applied AI has become a reality, driven by access to large amounts of data ("big data"), faster computers and advanced machine learning techniques. Recently DeepMind has developed an AI which has self learnt chess to be better than any human player.



### Google personal assistant making calls on your behalf:

Not the most cutting edge application of AI but quite exciting all the same. There is a great video of Google assistant in action booking an appointment at a salon and a dinner reservation ([https://youtu.be/JvbHu\\_bVa\\_g](https://youtu.be/JvbHu_bVa_g)).

Google assistant is able to understand the nuances of conversation and make an effective booking whilst in some instances coming across as more coherent than the human on the other end of the phone.

Imagine how much more convenient this could make your life? Particularly if it could help you prioritise, schedule and book meetings!



### Syte fashion image recognition

One of the things which really makes the human brain stand apart from machine is that we are currently much more effective at understanding and making inferences from visual inputs whereas they can store images but struggle to understand them.

However AI isn't too far behind and the Syte AI solution can essentially scan images and assign attributes to them basically making every image a potential link to a precise product or similar products.

Ultimately AI could even attribute more intangible aspects of products whilst also reviewing a customers favourite clothes to automatically identify personalised matches. BooHoo is already using this technology to help shoppers recreate looks they see on Instagram.

**AI will help transform the Retail value chain – some areas will be targeted first**

	Planning and strategy	Product design & sourcing	Space, range & display	Marketing & CRM	Forecasting, order and allocation	Supply chain & logistics	Trade and exit product
Current focus for AI solution	Low	Low	Low	High	High	High	Mid
AI potential (5-10 years)	Low	Mid	High	High	High	High	High

There are further opportunities to enhance the Retail value chain with AI but these are less likely to be the focus of the next 5-10 years

The obvious initial use cases will be impacted heavily by AI in the next 5 years

**AI and Retail future**

People discussing the future of AI in any context either outline a doomsday scenario or a utopia where no-one ever has to work again. Although this makes for compelling dinner conversation it will not help you determine the strategic direction you should take with AI.

We believe that AI will increasingly play a dominant role in Retail in the next 5 years and you should make sure you have started on the journey now to ensure that you aren't left behind. In the 10+ year time scale we believe the Retail landscape will be dominated by a series of AI point solutions taking on a lot of the operational decisions making within Retail businesses.

Humans will still play a key role making strategic and creative decisions whilst also providing that human touch to customer interactions.

Projecting a further 20 years ahead it is possible that a general super AI could have been created – which could be making all decisions in a Retail environment leaving just the AI and shareholders...but that is too far into the realms of science fiction.

**Conclusion**

AI is hard to define and takes a number of different guises but it is a technological development which will have the largest impact on Retail since the computer. The speed at which it lands will depend on the market uptake but we are expecting it to have a big impact in the next 5 years whilst being transformational in 5-10 years.

Given the complexity and the cultural change required to truly embed AI solutions we believe that first adopters will be best poised to unlock the value of AI as the technology moves on.

If you don't have at least one AI driven programme then you should elevate its position on your business agenda and start thinking of the simple use case where it could be applied to show the value it can deliver.

**About PatelMiller**

PatelMiller is a business consultancy that works closely with its clients to develop their strategies and deliver their full benefit. Our team have gained their skills from working for leading consulting firms as well as some of the world's best consumer facing businesses. We combine the tools, methods and analytics of a strategy consultancy in a pragmatic, engaging way, to make sure potential benefits become real benefits, quickly.

**Our service offering includes:**

- Strategy & analytics
- Lean operations
- Programmes & change

Our people have worked with businesses including Argos, BT, Dunelm, feelunique.com, John Lewis, M&S, Monsoon Accessorize, Morrisons, Nisa, Thomas Cook and White Stuff.

**Find out more:**

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Jonathan is co-founder of PatelMiller and previously worked for Asda-Walmart, Dixons and Tesco. He has extensive experience of analytics and how it can shape the way businesses make decisions and operate.



**Robert Nagle**  
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As well as an AI enthusiast & fearmonger Robert has 10 years of experience identifying and delivering analytically driven change into Retail businesses. He is hoping to train a machine to do his job one day.