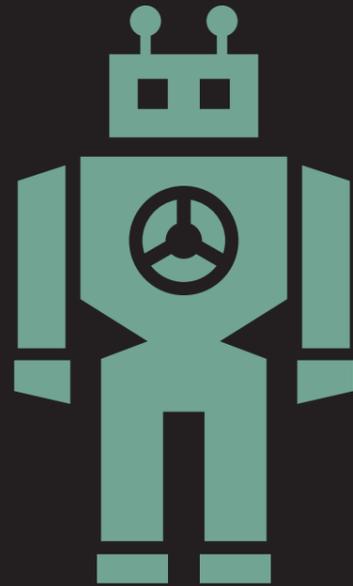


# **Robocalypse: Now?**

**What the 'Fourth  
Industrial  
Revolution'  
means for Retail.**

**“Don’t panic!”**

Douglas Adams,  
The Hitchhiker’s Guide to the Galaxy



With the likes of Professor Stephen Hawking, Bill Gates and Elon Musk talking about the potential of artificial intelligence to change the world for better or for worst, it’s big news at moment.

The fourth industrial revolution is coming and cognitive automation is its flag bearer. You may think that this is not relevant to Retail or certainly not for the next 10 years. Well think again! Technologies that can think, learn and adapt will increasingly be part of our lives and sooner rather than later.

This is forecast to have a massive impact across a range of industries and Retail is right up there. From robots in the aisle to customer service bots and simulation modelling across the supply chain, Robocalypse is coming.

So what does it all mean and what do I need to do about it? Well it’s not an all or nothing game.

In this paper we provide a pragmatic view of who’s doing what and how you can work out what will work best for your organisation.

**From robots in the aisle to customer service bots and simulation modelling across the supply chain, Robocalypse is coming.**

**Talk to  
Boxwood.**

# Introduction

**Picture the scene: armies of robots operating in industrial production lines, running day and night, performing the same repetitive tasks their programming dictates as their human masters look on. No, this isn’t science fiction, but the reality of the modern production line, and a scene we’re now very familiar with.**

But things are changing. Rather than sticking to purely physical tasks, smart systems are now beginning to take on more of the cognitive load. This means that many jobs that have historically been safe from the threat of automation may no longer be so.

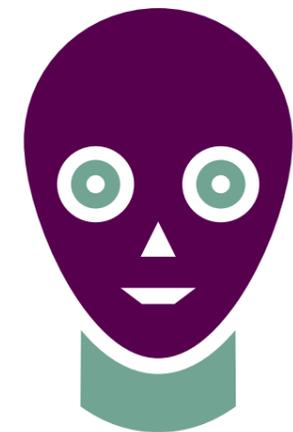
In fact, if the headlines are to be believed, hundreds of millions of jobs in the UK, the US and other major economies around the world are now at risk of automation by smart machines.

If you think that sounds a bit far-fetched then think again. ‘Intelligent’ technologies have been playing the humans at their own game for some time now. IBM’s supercomputer, Deep Blue, took down world chess champion Garry Kasparov back in 1997. In 2011 IBM’s robot super-brain, Watson, was able to defeat a 74-time winner of the US quiz show Jeopardy. And in 2016, Google’s Deep Mind system beat the world’s leading player of the fiendishly complex Chinese board game Go.

As computers become increasingly able to take on non-routine tasks, an evolution of the work place (and the world) is set to take place. The ‘Fourth Industrial Revolution’ is upon us. Predictions of the scale of the impact on employment vary, but they all point to a shift of seismic proportions. Research by the University of Oxford predicts that 47% of jobs in the US have a high risk of automation over the next 20 years. For Retail, there is a 92.3% chance of salesperson jobs being automated. Others estimate that the overall impact across the economy could be higher, with the Chief Economist at the Bank of England, Andy Haldane, suggesting that 15 million jobs (around half of the UK workforce) could be at risk.

As Retail leaders we’re accustomed to change. We deal with changing shopping habits, channel shifts, economic and political uncertainty and disruptive new competitors on a daily basis. But all this change is expensive, frankly unaffordable, unless a step change in productivity is achieved. For a business to survive and thrive in tomorrow’s market, a new Retail model, enabled by automation, is required. The future is coming fast and only the fit-for-purpose will survive.

In this paper we aim to bring some clarity to the practical application of both physical and cognitive automation in the Retail model. We look at the Retail value chain in some detail and provide examples of where these new technologies can be deployed. We provide some context on what is happening in other industries, debunk some myths and draw conclusions about what the technology can and can’t do. Our intent is to provide Retail leaders with a grounded, practical perspective on the opportunity that the Fourth Industrial Revolution presents, and the very real risks of ignoring it.



Source: <http://www.oxfordmartin.ox.ac.uk/downloads/academic/future-of-employment.pdf>  
<http://www.bankofengland.co.uk/publications/Pages/speeches/2015/864.aspx>

# Navigating the next industrial revolution

Revolution	Year	Information
1 	1784	Steam, water, mechanical production equipment
2 	1870	Division of labour, electricity, mass production
3 	1969	Electronics, IT, automated production
4 	?	Cyber-physical systems

Source: <https://www.weforum.org/agenda/2015/09/navigating-the-next-industrial-revolution2/>

## Definitions

Whether it's the automation of basic office processes, robotically enhancing your means of production or venturing into the exciting world of analytics, AI and augmented reality – every business will, at some stage, feel the impact of the technological revolution. The terms may sound complicated, but the process of integrating these new technologies into your business needn't be. The real challenge will be for executives to remain fully informed about where the advances in technology are heading and agreeing on how best they can be deployed to create commercial advantage in their own businesses.

On one end of the spectrum we have robotic process automation (RPA) – these are activities that are process-oriented and rules-based. On the other end of the spectrum are cognitive technologies where activities are characterised as judgment and skill oriented.

### Class 1 Basic Robotic Process Automation (RPA)

This is the automation of the rudimentary 'swivel-chair' processes found in almost all organisations – processes that are repetitive in nature, involve multiple systems and follow explicit steps, such as cutting information from one system and pasting it into another. These tools often sit on the desktop and log on to systems as a human would. Generally they're thought of as quick-hit technologies that allow for a very piecemeal approach to automation.

### Class 2 Enhanced Process Automation

This is the automation of processes not classified as rudimentary. Tools in this category have additional capabilities that allow them to solve problems and perform basic work activities (out-of-the-box knowledge). These additional capabilities include, the ability to understand natural language (Natural Language Processing) and therefore interpret unstructured data such as emails and social media content, and/or the ability to learn new knowledge by either watching a human solve problems or by consuming additional data. Tools in this category can utilise years of experience gained across multiple organisations, and have the ability to completely transform back-office processes.

### Class 3 Autonomic/ Cognitive Automation

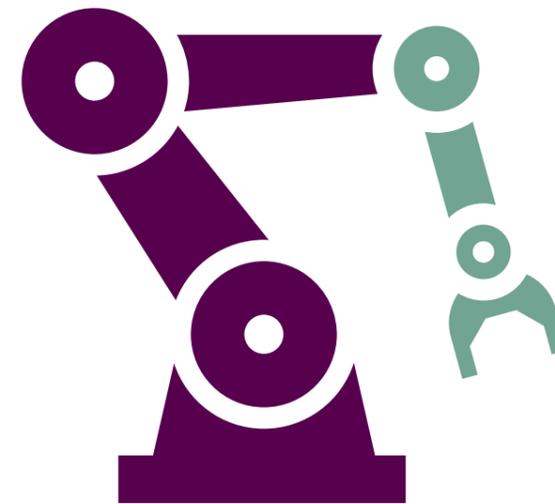
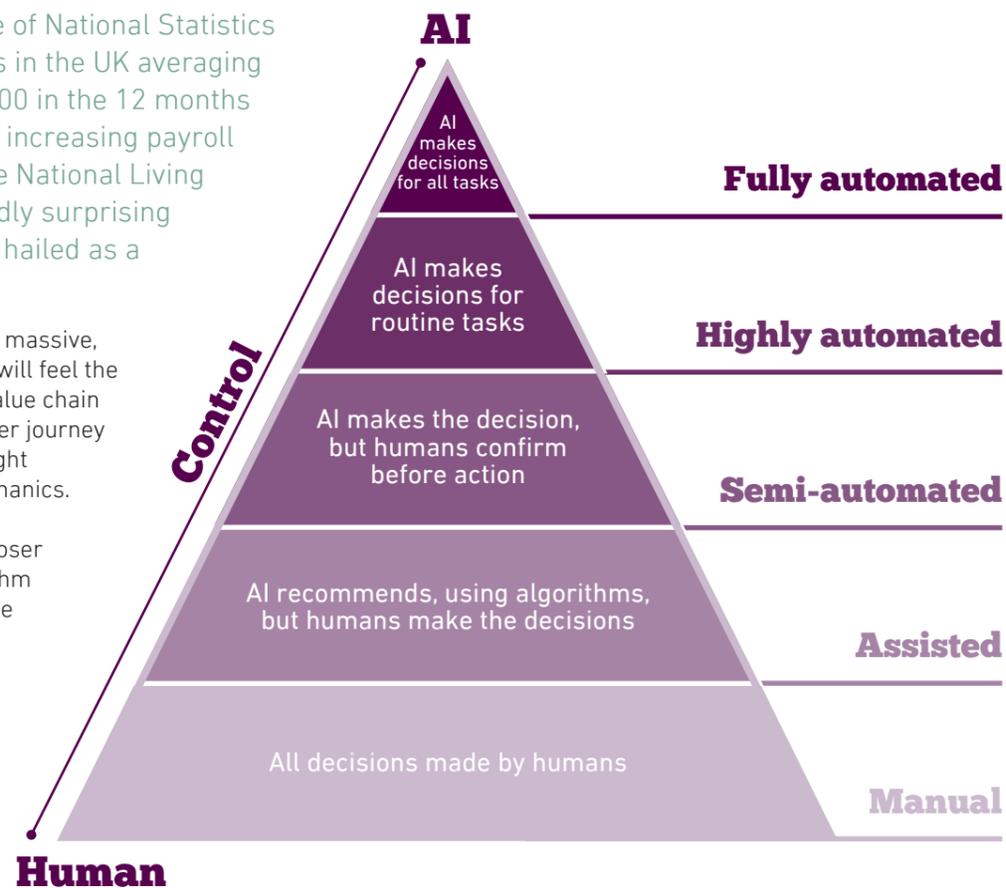
This is the category surrounded by the most hype. Cognitive automation refers to cognitive software that mimics human activity, such as perceiving, inferring, gathering evidence, hypothesising, and reasoning. And just like humans, cognitive software solutions are taught rather than programmed. In other words, while we program explicit steps into a traditional computer to solve a problem, in a cognitive solution, we would teach it the area of interest (the domain). Once the base domain knowledge is established, the cognitive solution continues to learn and solve problems within that domain – usually all on its own.

The real power of cognitive computing is the ability to ingest massive amounts of data that a human brain lacks the time or capacity to handle. When cognitive solutions are combined with advanced automation, then systems can be trained to exercise judgement when performing tasks.

# Robotic applications within the Retail value chain

With data from the Office of National Statistics showing Retail vacancies in the UK averaging an all-time high of 100,000 in the 12 months to October 2016, and the increasing payroll costs associated with the National Living Wage legislation, it's hardly surprising that automation is being hailed as a possible solution.

The scope of the revolution is massive, and businesses of the future will feel the impact at every level of the value chain and across the entire customer journey – from their basic strategy, right through to their delivery mechanics. Whether it's a faster, cheaper means of production that's closer to the consumer or an algorithm that facilitates the hiring of the best staff – the long robotic arm of technology can, and will, reach far and wide.



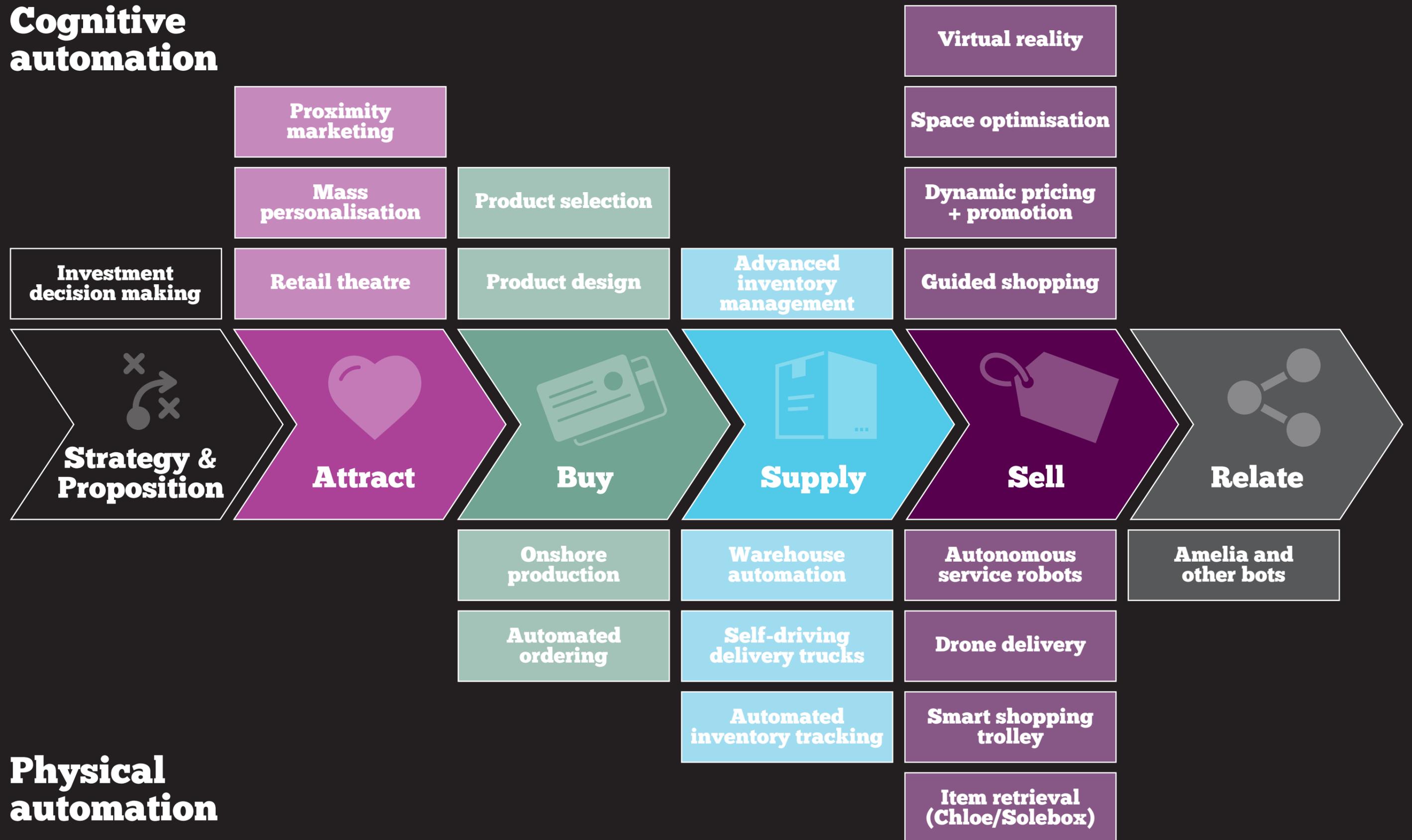
So where in the chain will we see the greatest value? Well that depends. After all, the automation of sales staff at a luxury goods retailer will have a very different impact on customers to the same process in a DIY store. Only by understanding what your future value proposition needs to be will you be able to determine how and why the new technologies can help.

**“Technology appears to be resulting in faster, wider and deeper degrees of hollowing-out than in the past. Why? Because 20th-century machines have substituted not just for manual human tasks, but cognitive ones too. The set of human skills machines could reproduce, at lower cost, has both widened and deepened.”**

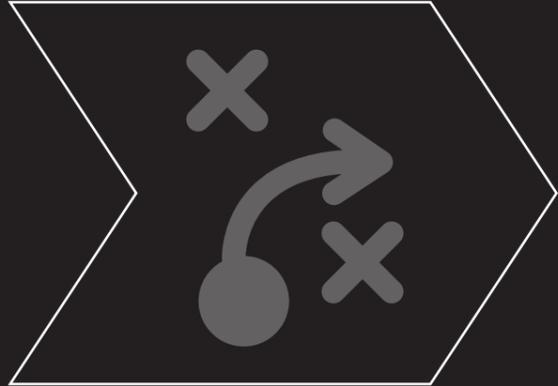
Andy Haldane, Chief Economist at the Bank of England

Source: <https://www.ons.gov.uk/employmentandlabourmarket/peoplenotinwork/unemployment/datasets/vacanciesbyindustryvacs02>  
[http://www.zdnet.com/article/future-enterprise-companies-will-be-ran-by-robots/?loc=newsletter\\_large\\_thumb\\_related&ftag=TRE17cfd61&bhid=27269171161392473203821961153211](http://www.zdnet.com/article/future-enterprise-companies-will-be-ran-by-robots/?loc=newsletter_large_thumb_related&ftag=TRE17cfd61&bhid=27269171161392473203821961153211)

# Cognitive automation



# Physical automation



# Strategy & Proposition

The good news is, not all jobs have the same chance of being automated. According to research conducted by The University of Oxford, there's only a 1.5% chance of CEO roles being fully automated. Coming up with instinctive or lateral solutions and the art of negotiation are still human territories it seems. But that's not to say that all CEO level roles are safe from the rise of the smart machines, as executives in Hong Kong are finding out...

## A robot on the board of directors? How investment decision making is changing

It might sound like science fiction, but one Hong Kong Venture Capital firm, Deep Knowledge Ventures, has already hired an artificially intelligent algorithm to its board of directors. The 'Validating Investment Tool for Advancing Life Sciences' (Vital, to his friends) uses a complex algorithm to predict which companies will be a good investment. By mixing human intuition and expertise with a machine's logic, the company believes it can build the perfect collaborative team.

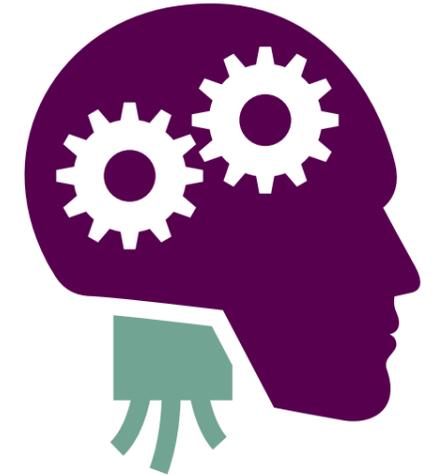
Source: <http://www.oxfordmartin.ox.ac.uk/downloads/academic/future-of-employment.pdf>  
<http://observer.com/2014/05/v-c-firm-names-robot-to-board-of-directors/>

The fact is, as AI matures we're entering an era where a significant proportion of work considered inherently 'human' can be automated. But incorporating these new technologies into your business requires a major transformation from top to bottom. As Vinodh Swaminathan, Managing Director of Innovation and Enterprise Solutions at KPMG, observes:

**“This is not a technology discussion. This is a business strategy discussion, It starts at the top with leadership and stakeholder management.”**

## Summary

It may be some time before AI replaces strategists, but if AI isn't part of your corporate strategy, it probably won't work.





# Attract

## More data. More insight. More success.

Companies now have more information at their fingertips than ever before. Automated data-gathering systems mean that businesses have instant access to a range of information on their customers, their competition and the various market trends. As more data allows greater customer segmentation, brands can talk directly to people with targeted messages that are engaging and relevant. The technology even allows companies to track the success of these messages and fine tune their approach if necessary. This more agile way of working can improve both the customer's experience and the marketing department's conversion rates. Big data is now big business. There are now countless examples of this kind of data gathering within the Retail space.

## Proximity - the fifth 'P' for a long list of prestigious retailers

Product. Price. Promotion. Placement. The renowned 4 Ps of Marketing – a concept created by E Jerome McCarthy in 1960. And now, arguably, we have a 5th 'P' – Proximity Marketing. Proximity Marketing uses cellular technology to send targeted marketing messages, via a Wi-Fi or Bluetooth signal, to mobile phones that are in close proximity to a business.

Whilst the audience is limited to those within close range of a store, the message is a fast, user-friendly way to reach the consumers most likely to buy.

World-famous brands such as Hamleys, Longchamp, and Hackett have all deployed beacons in their Regent Street stores with the aim of pushing exclusive and personalised marketing to customers via this type of iBeacon technology.

As they pass by, shoppers receive alerts and tailored content about everything, from new in-store promotions to exclusive offers only available to visitors of that store. The app also allows shoppers to input their own preferences.

Source: <https://www.forbes.com/sites/gregpetro/2014/10/08/how-proximity-marketing-is-driving-retail-sales/#e0f09563ed43>  
<http://www.ibeacon.com/londons-regent-street-adopts-ibeacon/>  
<https://www.marketingweek.com/2014/06/04/hamleys-armani-and-hackett-to-use-ibeacons-for-personalised-marketing/>

## Mass personalisation - getting consumers to vote with their thumbs

The fact that AI can now take on the cognitive load required to formulate personalised offers and refine these based on actual customer response, means we're heading for a level of mass personalisation hitherto unknown. Smart systems are now at the forefront of the race to grab consumer attention with most growth coming from mobile.

Shop Direct, which runs very.co.uk and Littlewoods, predicts that AI is now the key to the future of online Retail. Shop Direct's Chief Executive Alex Baldock says:

**“You have three seconds to seize the shopper's attention - it's called thumb stopping, the three-second audition. That's where personalisation comes in.”**

## Retail theatre goes to the next level

The growth of in-store analytics mean businesses can now utilise all sorts of different customer data and use it to improve footfall and customer service, utilise space more effectively and improve store layouts. This also means that customer 'theatre' has become an integral part of the shopping experience with many stores using interactive screens and booths to grab attention.

Source: <http://www.telegraph.co.uk/business/2016/11/08/artificial-intelligence-the-next-big-bet-for-online-retailers-sa/>  
<http://global.tommy.com/int/en/newsroom/archive/2015/tommy-hilfiger-transforms-sales-experience-with-launch-of-innovative-digital-showroom/c29731>

## Tommy Hilfiger

Tommy Hilfiger's new digital showroom in Amsterdam is an example of how technology is shaping the future of Retail. Through an interactive touchscreen table customers are able to view every item in the Tommy Hilfiger collection, zooming in to view design details and textures and clicking on each item to reveal price, colour options and sizes. They can even design their own custom orders by dragging and dropping items onto a blank background to create different looks. At the end of the process, customers are emailed with a PDF of their complete order.

Tommy Hilfiger expects that within two to three years all of its showrooms worldwide will be equipped with this technology. CEO of Tommy Hilfiger Daniel Grieder said:

**“We believe this technology will revolutionise the fashion industry and play a big role in the stores of the future. I don't think bricks-and-mortar stores will die out, but they will definitely change.”**





# Buy

## Automation is transforming products and the way we source them

The application of the algorithm is potentially endless. Design, pricing, space optimisation, product selection – all these processes can be optimized by harnessing this type of technology. Even the process of buying stock can be automated using an algorithm. But does this mean we're losing the human touch? Well not necessarily. Most businesses would argue that technology such as computerised design tools can help us cut out some of the more tedious processes, but they can't replace human insight entirely. Where technology and human initiative work together however, the opportunities are limitless.

### Adidas

Adidas, for example, has announced it's to bring its shoe production back to Germany. It's new 'speed factory' has only 160 staff and is able to make a pair of trainers in just 5 hours, as opposed to several weeks.

By moving production to a single location, businesses can simplify very complex supply chains and drive efficiency. Plus, by moving the means of production closer to the final consumer, supply can be more closely matched to demand, particularly in FMCG and fast fashion.

## The trend for onshore production

Thanks to advances in the technology available, factory processes are becoming increasingly automated. Manufacturers that, in the past, moved their operations to China or India are returning to Europe as the processes of production become more efficient and cost effective. Automated production lines are revolutionising the face of manufacturing and the race is on to see which companies can adapt the fastest.

## Products thought up and designed by... robots?

Rather than using software to simply draw a designer's vision, new technology allows designers to use computer power to generate the idea itself. The traditional design process can be a laborious one, but now we have software that's capable of sorting through all the design possibilities for a specific product with specific measurements, and selecting the best option. This means businesses can get their product to the market faster whilst reducing their costs.

### Autodesk

Autodesk, a 3D design, engineering and entertainment software company, is testing software that can optimise the design of 3D printed physical objects with genetic algorithms. Once constraints and fundamental requirements are specified by the human designer, the AI designer starts whittling away at a solid mass that fits the constraints, learning as it goes until the optimised design for the object is reached.

## Product selection tools that map market trends

Algorithms can also be useful when it comes to stock selection – keeping companies informed about market trends and helping them build their range of products accordingly. Many leading retailers now use assortment planning software to help them manage demand and meet the 'anytime, anyplace, anywhere' expectations of today's 'martini consumers'.

Two such retailers are beauty company Birchbox and one of Turkey's leading online fashion brands Trendyol. By using data to determine in advance how a product might perform, both these companies have been able to successfully reduce or increase inventory in response. So instead of buying now and hoping for sales later, or resorting to discounts when stock doesn't sell, retailers can take a more informed view on how much to invest.

## Automated ordering systems that keeps the shelves full

The concept of retailers, particularly supermarkets, using systems that combine inventory data, delivery lead-times and demand forecasts to determine when an order should be placed is not new.

What is new is the sophistication of the technology. The range and volume of data feeds that are used and the ability for the system to learn based on actual performance means that the need for human participation is rapidly diminishing.



Source: <http://www.adidas-group.com/en/media/news-archive/press-releases/2016/adidas-expands-production-capabilities-speedfactory-germany/>  
<https://www.theguardian.com/world/2016/may/25/adidas-to-sell-robot-made-shoes-from-2017>

Source: <https://autodeskresearch.com/projects/dreamcatcher>  
<https://econsultancy.com/blog/68525-how-birchbox-and-trendyol-approach-data-and-personalisation/>



# Supply

## Robotics will fully replace manual labour. True or False?

If it's true, the rise of the machine means the decline of manual labour, but it also means companies can improve their supply chain and cut their costs, with employees freed up for high-value work and consumers can receive a faster, more efficient service.

An ever-better customer experience is what today's consumers are striving for. And it's something that many companies are starting to provide, whether that's through better relationship-based marketing, more efficient delivery mechanisms or a technologically enhanced experience in store.

**“For new technologies to be fully embraced they need to be implemented in the most useful ways possible.”**

James Bartram, Creative Technology Director, ais London

## Faster, cheaper, more efficient - welcome to the ultimate robot warehouse

JD.com is an example of this kind of robotic efficiency at work in the supply chain. Producing everything from smartphones to nappies, its automated warehouse can process up to 20,000 packages in just one hour. Due to robotic unloading systems, barcode scanning, automated vans and even drone deliveries, the company now employs one person where it would have employed 500 and has drastically reduced the travel time associated with order fulfilment.

## One for the road - driverless logistics now a reality

With driverless logistics now rapidly becoming a reality too, companies can also make a positive impact on the environment with cleaner, more efficient transport that can cut down on human error and improve traffic flow. 'Smart trucks' and 'truck platooning' is now predicted to become the future of road haulage with vehicles travelling in long convoys with one main truck connected wirelessly to the others.

## Say hello to Tally - the Automated Inventory Tracking Robot

The weekly shop may never be the same again with the arrival of Tally – a new kind of Retail worker who can tell immediately when a store shelf is running low on cornflakes or the tomato soup is in the wrong spot.

Tally is currently one of a number of robots being tested in a handful of Target stores in San Francisco. He (or she) is the creation of Simbe Robotics, a small start-up making robots for the Retail industry. Its goal is to create robots that will tackle "dull, dirty, mundane tasks 10 times better than their human counterparts", according to CEO and co-founder Brad Bogolea.

Bogolea estimates that in an average store it takes an employee 20 to 30 hours a week to audit between 10,000 and 20,000 products. Tally, however, can scan 15,000 items in an hour.

## Simulation to underpin advanced inventory management

Inventory management approaches have traditionally focussed on marginal gains associated with maximising product availability rather than achieving a more optimum balance of labour costs, inventory and availability.

High-street retailers need a fundamentally new approach that enables transformational improvements, helps to proactively manage changes to the customer proposition and answers the challenges raised by discounters and channel specialists.

Retailers are beginning to investigate the use of simulation technologies to underpin high-performance replenishment processes that balance availability with reductions in operational costs and inventory.

This kind of simulation allows experimentation within a safe, virtual environment and can provide feedback and results in days rather months. This allows companies to act with confidence when operating outside existing organisational models.

## Anheuser-Busch

Anheuser-Busch and logistics specialist Otto have already made the world's first commercial shipment by self-driving truck. Otto's autonomous truck transported a trailer of Anheuser-Busch's Budweiser beer 120 miles through the US state of Colorado, from Fort Collins to Colorado Springs. Whilst a driver was present for the journey, they merely monitored things from the sleeper berth and did not intervene at any time.

This journey is an important milestone for the logistics industry.

James Sembrot, Sr. Director, Logistics Strategy at Anheuser-Busch said:

**“We hope to see this technology widely deployed across our highways to improve safety for all road users and work towards a low-emissions future.”**

Source: <http://ir.jd.com/phoenix.zhtml?c=253315&p=irol-newsArticle&ID=1979115>  
<http://uk.reuters.com/article/uk-china-jd-com-idUKKCN01903D20141020>

Source: <https://blog.otto.to/proudly-brewed-self-driven-95268c520ba4#t11s1ltt5>  
<http://fortune.com/2016/04/28/target-testing-robot-inventory-simbe/>  
<http://www.simberobotics.com/>



# Sell

## Welcome to a new in-store experience

From physical robots that can show you where the toothpaste is, to algorithms that know what you want before you do, technology is now at the heart of the shopping experience, whether we like it or not.

Businesses can now have real-time knowledge of their customers both on and offline. And it's an all-channel approach that will ultimately win the day – a 360-degree experience that's seamless, so all the customer sees is the brand and how it makes them feel. With online and offline activities fully integrated, it's now possible to browse online, make an appointment in a digitally enabled store, then have the technology in that store highlight items for you, access their specific details, and even bring them to you. From intuitive mobile apps to drone deliveries, the opportunities across all sectors are mind-boggling.

## The shopping trolley that's happy to help

Wal-Mart is currently looking to compete with the ultra-convenience offered by online retailers by developing a smart shopping trolley. As well as saving customers from the physical effort of pushing a laden trolley around, the technology will also be able to help customers find items on their shopping list.

Wendy Roberts of Five Elements Robotics who helped to develop the cart with Wal-Mart said:

**“Robotic shopping carts are an emerging opportunity for robotics companies as brick-and-mortar stores look for innovative ways to match the convenience of Amazon.com Inc. and other online retailers.”**

Source: <https://www.bloomberg.com/news/articles/2016-06-14/wal-mart-experimenting-with-robotic-shopping-cart-for-stores>

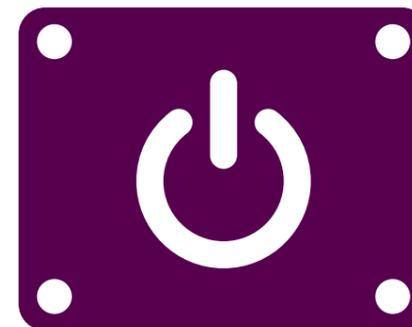
## Optimising space, pricing and promotions

Space is at a premium in today's Retail environment and businesses need to utilise every inch to make their profit. Shelf space optimisation is a fine art that can be optimized by an algorithm. For instance, stores can allocate space for commodities in proportion to their sales figures or specify a more effective aesthetic layout, which can both increase sales and cut labour costs.

Businesses now also use algorithms to adapt their pricing structures to reflect a wide range of specific factors, such as desired profitability, stock levels, historical customer interest, seasonality, competitor prices and sellers' inventory levels.

Pricing analytics are key for any retail business looking to compete against online pure players. Retailers who don't develop such a capability are likely to become trapped in a cycle of discount and promotion.

Taxi firm Uber's surge pricing model is now a notorious example of algorithmic data in action. By setting their prices based on the laws of supply and demand, Uber has succeeded in dominating the market and effectively re-written the rules of pricing.



Source: <http://www.vfc.com/news/company-news/detail/14593/using-the-impersonal-to-personalize-the-shopping-experience>  
<http://www-03.ibm.com/press/us/en/pressrelease/48479.wss>

## Cold... warmer... hot! Welcome to the ultimate guided shopping app

North Face customers can now find exactly what they want faster than ever with the launch of their new mobile shopping app, Watson. It's the first mobile app experience to put Watson, the powerful artificial intelligence computer owned by IBM, to use in a Retail environment. The app allows you to speak to it openly on the phone – where the Watson-powered shopping assistant will engage you in a question-and-answer conversation to help figure out exactly what you need.

Watson's artificial intelligence works by being taught things. As it learns over time, the AI should get better and better at recognising what people want. According to its creators, it will also soon have the ability to understand synonyms! Cal Bouchard, Senior Director of ecommerce at North Face said:

**“This is unprecedented. No one out there is using this AI Watson technology with natural language question-and-answer with the consumer. We think this is game-changing.”**

## HOT OFF THE PRESS:

In December 2016, Amazon has made its first delivery using a drone in the UK. The package arrived safely at its destination in Cambridge, 13 minutes after being ordered. As part of the testing for the Amazon Air service, the delivery took place on December 7th, although it was only revealed on December 14th. The Cambridge fulfilment centre is home to the drones, which, once the ordered package is on board, travel along an automated track to the launch area. The drones then take off and fly completely autonomously, guided by GPS to their destination. They are capable of carrying items weighing up to 2.7kg (5lbs).

**“Using small drones for the delivery of parcels will improve customer experience, create new jobs in a rapidly growing industry, and pioneer new sustainable delivery methods to meet future demand. The UK is charting a path forward for drone technology that will benefit consumers, industry and society.”**

Paul Misener, Vice President of Global Innovation Policy and Communications, Amazon

Further afield, JD.com is already looking at a deal that will see drones servicing 200,000 distribution points in rural China. So, even in remote areas, the impact of this technology is starting to be felt.

Source: [https://www.amazon.com/b?node=8037720011&ref\\_=aa\\_art\\_btn&pf\\_rd\\_r=72J86BBY00Z3PPXZV6B9&pf\\_rd\\_p=615a7245-ee18-4b25-bbd4-94d0e77d278d](https://www.amazon.com/b?node=8037720011&ref_=aa_art_btn&pf_rd_r=72J86BBY00Z3PPXZV6B9&pf_rd_p=615a7245-ee18-4b25-bbd4-94d0e77d278d)  
<https://www.youtube.com/watch?v=NrmMk1Myrxc>

## Visualise this... your very own virtual dressing room

With the right application of technology its now no longer even necessary to imagine how a certain item of clothing might look, or how a sofa would go with your furnishings at home. With augmented reality and remote product visualisation technologies, companies are able to cut back on returns and customer dissatisfaction by creating virtual dressing rooms where they can try on clothes, or working out exactly how a piece of furniture, or an entire new kitchen, would look in their house.



## Check-out becomes no check-out

When you shop at Amazon Go you won't need to decide between assisted check-out or self check-out and you won't get caught in a long check-out queue. In fact you won't get caught in any check-out queue. There are no queues because there is no check-out!

In its new 1,800 square feet grocery store in Seattle you simply walk in, pick out what you want and walk out. Amazon is calling this "just walk out" shopping. Once you've signed in with the new Amazon Go app, you simply take the products you want and then 'go'.

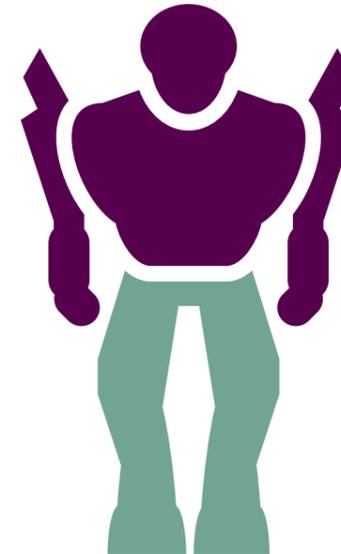
Using the same types of technologies found in self-driving cars, such as computer vision, sensor fusion, and deep learning, Amazon has said it wants to "push the boundaries of computer vision and machine learning to create a store where customers could simply take what they want and go".

Currently in beta testing and only accessible by Amazon employees, the degree to which the technology incorporates facial recognition is not clear, but to weed out the genuine shoppers from the shoplifters this could be part of the solution.

## The robots that are born to serve

Meet Chloe. She smiles, says thank you and never has a bad day. She's also a robot.

American retailer Best Buy has employed Chloe to help customers at its Chelsea store in Manhattan. She sifts through music, movies, and games, bringing you what you want quickly without the hassle of sorting through rows of messy shelves.



Another U.S. bot that's only too happy to help will soon be seen in home improvement store chain Lowe's. The bots will help manage inventory and show customers where to find products. The 5-foot tall NAVii machine can navigate itself through store aisles whilst avoiding obstacles, as well as greet customers, ask if they need help and walk them to the correct location. As NAVii robots can also be programmed to understand as many as 25 languages, it might not be long before your friendly service robot is also multi-lingual!

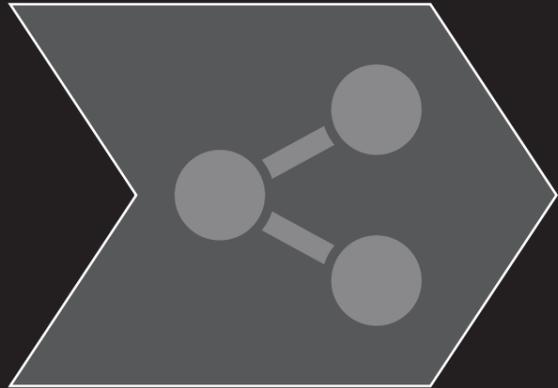
Meanwhile, in Germany, fashion retailer Solebox has opened a new store in Berlin that employs a robot in the stock room to collect shoes in your size and deliver them straight to you on the shop floor.

## Navigating the in-store maze

For anyone who has ever been lost in a store searching for that one item that eludes them, help is at hand. A new app, Ubamarket, can now arrange shopping lists into the order items appear in a particular shop. Shoppers make their list within the app then just select a participating store. The app then re-orders the items according to where they appear in the aisles.

Then, once shoppers reach the checkouts, they simply scan the app at a payment point and pay without having to load all their purchases onto the conveyor belt. Loyalty points can also be earned within the app and future editions will enable automatic payment via a pre-stored credit card.

Source: <http://www.par.com/material-handling/packaging-palletizing-systems/automated-retail-solution/>  
<http://www.fellowrobots.com/#NAVii™>  
<http://www.lowesinnovationlabs.com/lowebot>  
<http://retail-innovation.com/robot-working-in-german-shoe-store/>  
<http://ubamarket.com/faq.html#question-list>



# Relate

## The Robots that learn from their mistakes

The modern customer now has extremely high expectations in customer service and one bad experience with your technology is all it takes to erode their loyalty. Different businesses have had different approaches as to how best to incorporate customer-facing technology, some with more success than others. After all, as we've already discussed with regards to supply chains, robots can add to the smooth running of something and provide a convenient service, but they can never fully replace the need for manual processes and human interaction... can they?

The fact is, robots are a great tool when it comes to freeing up human labour, and sometimes the most efficient way to solve a problem needn't actually be by talking to a real human being. Many automated services have been around for years, asking for your account number and details and reeling off options. Often this can be frustrating for customers, but with the introduction of software that can actually learn from your responses over time, perhaps the perfect balance between human and robot has been found?

**“I believe there is no deep difference between what can be achieved by a biological brain and what can be achieved by a computer. It therefore follows that computers can, in theory, emulate human intelligence – and exceed it. In short, the rise of powerful AI will be either the best, or the worst thing, ever to happen to humanity. We do not yet know which.”**

Professor Stephen Hawking

## Introducing Amelia...

Amelia is an artificial intelligence platform that can understand, learn and interact in the same way a human would. Amelia can read natural language, understand context, apply logic, infer implications, learn through experience and (wait for it) can sense emotions!

Her skills mean that Amelia can quickly become an expert in any field. Enfield council in London has already employed her to help residents find information and complete the initial steps in standard applications such as planning permission. IPsoft, who created Amelia, say of her capabilities:

“She determines how to resolve a problem based on knowledge of the topic and process involved. If Amelia cannot answer a question, she will alert a human colleague, observe the following interaction and learn how to respond to comparable questions in the future.”

Functioning as an extension of a company's existing workforce, Amelia has the ability to transform what's possible in the workplace. It's hoped that, by completing the more tedious tasks within a business, Amelia will free up her human colleagues so they can concentrate on higher-value work that drives up quality levels, productivity and service.

**“There have been concerns about the long-term prospect that we lose control of certain kinds of intelligences. I fundamentally don't think that's going to happen. I think that we will be very proactive in terms of how we field AI systems, and that in the end we'll be able to get incredible benefits from machine intelligence in all realms of life, from science to education to economics to daily life.”**

Eric Horvitz, Technical Fellow at Microsoft & MD of Microsoft Research

Source: <http://www.ipsoft.com/amelia/>  
<http://www.ipsoft.com/2016/07/18/first-public-sector-role-for-amelia-as-enfield-council-deploys-her-to-boost-local-services/>  
[http://www.hitachi.com/rd/portal/highlight/robotics/emiew3\\_01/](http://www.hitachi.com/rd/portal/highlight/robotics/emiew3_01/)

## Your at-home personal assistant

Social robotic technologies like Amazon Echo and Jibo are another way that the retailer/consumer relationship is being transformed, allowing businesses interact with customers in their homes.

Mobile apps and convenient delivery already make our lives far easier. But what if you could talk directly to your very own at-home personal assistant? That's what robots like Amazon Echo and Jibo are offering – and it may not be long before robots in your home, ordering your pizza or reading your kids a bedtime story, are the norm.

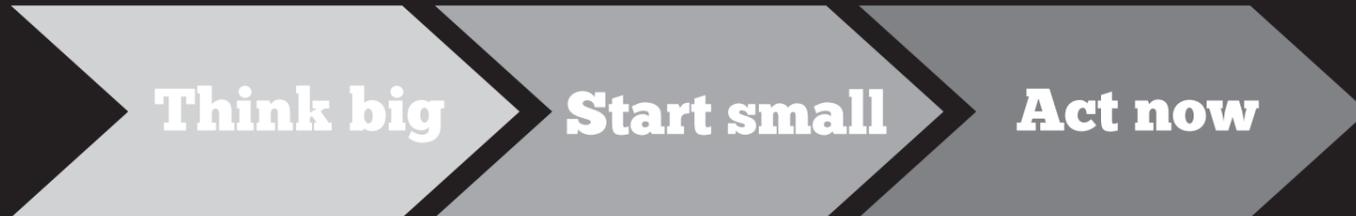
## Human or robot? Can you tell the difference?

Robots are successfully integrating themselves into every part of our daily lives. They can pick out your shoes, find you a job, and even read your body language. Hitachi's automated customer-service bot can not only recognise its environment and approach customers that need help, but even learn new behaviour and information and share this with its fellow bots. But what does this mean for us mere mortals?

Well, firstly, bot technology is not, as yet, infallible. It took just 24-hours for Microsoft's chat bot Tay to become racist and sexist! Designed to talk like a teenager, Tay quickly fell victim to a group of twitter trolls who fed her offensive messages. Which gives rise to a major point regarding this type of tech – humans are unpredictable and the bot can only act on the quality of the information it is given. Despite this glitch, Microsoft remains confident that the future lies with AI bots and is investing heavily in this area.



# How to get started



Evaluate what is available / will be soon



Investigate what competitors and other industries are doing

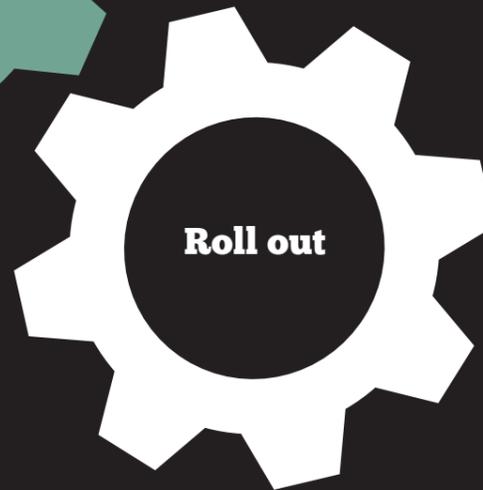
Identify where applicable in own business



Develop strategy for adoption



'Experiment' with high priority opportunities



Develop and implement change management strategy

## Think big – start small – act now

Agreeing what you are setting out to achieve is only the first step. Setting a vision which is right for your organisation about where you want to play and why will leave the no so small challenge of actually implementation. The key to integrating the right tech into your business model is a staggered approach. 'Test, move on. Test, move on.' should be the mantra of any company looking to strengthen its technological capabilities. Implementing an overhaul of your entire business model in one go is risky. A safer approach for many businesses is to stay more agile – able to define the right areas of capability in which to test innovations, whilst simultaneously remaining focussed on your core business.

## Use data and insight to prioritise

The pace of change is fast and multiple consumer demands mean you're likely to be stretched several ways at once. That's when data and fact-based insights can be used to prioritise a more varied and dynamic portfolio of projects. It's far easier to place your bets when you've got hard facts to go on.

## Take a twin track approach

For some organisations, e.g. fashion retailers, this prioritisation approach may simply be too slow. When trends change so quickly, organisations have to be able to respond accordingly. The old static 5-year-plan is no longer relevant in an ever-changing trading environment. In some cases, this may mean adopting a twin track approach. For example, creating a traditional longer-term infrastructure programme, alongside a network of 'innovators' who deliver an agile, continuously evolving customer offer.

The biggest challenge facing organisations will be creating alignment at the Exec level about what to do and why.

To do this effectively exec teams will need to:

- 1) Be clear where your organisation needs to win, match or follow the market in order to be successful
- 2) Evaluate what cognitive technologies are available and are likely to become available in the near future.
- 3) Investigate how your competitors use automation and what the implications will be if they beat you to the punch.
- 4) Look for areas within your business that may be suitable for automation—not just those that are routine and repetitive, but those in which you are looking to create/ maintain a competitive advantage.
- 5) Develop a strategy for technology transformation that considers opportunities, challenges and risks.
- 6) Experiment with automation, both alongside and in place of human workers.
- 7) Develop a change management strategy to demonstrate the value of automation to your workforce, address automation anxiety, overcome organizational resistance, and speed up adoption.

# Making it work: The human impacts

There's no doubt that the current technical revolution is a time of great innovation and excitement. But, for many, it may also paint a more worrying picture of the future where armies of unemployed, drift from one menial task to the next. Channel 4's recent TV series 'Humans' has already taken this thread and run with it. And, historically, science fiction writers have always focussed on the more negative aspects of the machine revolution. But in the same way that the Industrial Revolution transformed society for the better, so the rise of robotic technology has the potential to change not only the face of Retail but the face of the planet.



However, from a Retail point of view, it's also worth remembering that humans will always be humans. There will always be consumers that resist certain technologies; kindle sceptics who prefer the feel of a physical book and music lovers who revert to vinyl records. The trick is to remember that one size rarely fits all. Because ultimately, we're not machines.

## Cultural shift

The move towards a constantly evolving, tech-enabled business model represents a significant cultural shift. It can be a frightening prospect for many businesses that prefer to cling to the 'way we've always done it' mentality. But business leaders can, and must, change their mind-set if they want to compete for market share. Standing still is simply no longer an option.

## Social impact

The social impact of this new future is inevitable. As robotic capability improves and replaces many of our back-office work and manual labour, businesses will have to look to redeploy and retrain its talent. But there's certainly room for balance with many organisation's choosing to optimize their activities with technology that works in conjunction with human insight.

## Change capability

An organisation's capability – and capacity – to execute change is critical in today's fast-moving environment. This is where the customer value proposition, leadership style and operating model must come together to deliver your end goal in a consistent and compelling manner. Change capability will become an even bigger determinant of business success than it ever was.

**“Creativity is a big part of cognition... when machines can do that, maybe we will be obsolete. But until then—and I think that's some ways off—I think we have a big future for human beings to do lots of interesting things in the realm of work.”**

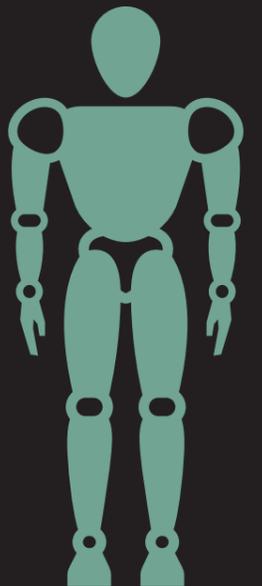
Constance Hunter, Chief Economist, KPMG

# Conclusion

The robots are coming! It can sound like a frightening future, but it doesn't need to be. Change for any organisation is always challenging, but when the rewards are many and various, it makes no sense to stand still. In fact, it will most likely be the death of your business.

We've seen how this future touches every part of the value chain, and how other businesses are choosing to respond. Ultimately, it will be for each individual business to work out what's right for its people, culture and customers. Business leaders now have a vast technological arsenal at their disposal. How they choose to deploy it will determine whether they become a viable business of the future.

Whatever the technological advancements however, one basic rule of commerce endures – the customer is king. Especially when that customer is armed with tech of their own and expects to get what they want faster, cheaper and in more ways than ever before.





BOXWOOD

We are working with many leading Retail and Consumer organisations across the globe to help them make the difficult choices that need to be made.

We do this by not only deploying our own deep expertise, but also through a number of partnerships we have with leading AI providers such as IBM Watson and Microsoft Blockchain.

So we know the robots are coming. It needn't be a frightening environment for those armed with the right strategies.

If you need help navigating your way through the technological changes to come:

**Talk to Boxwood.**



Contact for more information:

Matt Clark | Head of Consumer, Partner, KPMG Boxwood

T +44 20 7311 8149

E [matt.clark@kpmgboxwood.co.uk](mailto:matt.clark@kpmgboxwood.co.uk)

15 Canada Square  
London  
E14 5GL  
United Kingdom

Tel +44 20 7964 1700

Email [info@kpmgboxwood.co.uk](mailto:info@kpmgboxwood.co.uk)

[www.kpmgboxwood.co.uk](http://www.kpmgboxwood.co.uk)

# Talk to Boxwood.

© 2017 KPMG Boxwood Limited is a subsidiary of KPMG Holdings Limited, a subsidiary of KPMG LLP, a UK limited liability partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative, a Swiss entity. All rights reserved. The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavour to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation.

The KPMG name and logo are registered trademarks or trademarks of KPMG International.