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Industrial Revolution 4.0: The Changing Technology Landscape and its Effect upon Customer Service Employees

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1. Background

In the autumn of 2019 HCCM members asked us to look at the increasing technological changes that are occurring in business, and in particular their effects upon customer-facing employees.

Digitalisation has been with us now for some time and its effects upon both our work and personal lives are well recognised (e.g. downloading and streaming of music and video, storage of data files, video conferencing etc.). However, lately we are seeing the increasing application of two further advances: **artificial intelligence** (AI) and the associated **use of robotics**.

These technological changes are impacting the world of work and the longer-term impacts are yet to be known (Susskind 2020). Given the use of such advances in customer management functions it is to be expected that they will impact the work of customer service employees, their roles, and the interfaces they will have with the customer going forward. A key concern for organisations today is how such technological advances may change customer relationships and the impact that these will have on how customer service employees both enact and enjoy their roles. This report aims to focus on ways in which technological change may impact customer service roles.

With the arrival of the COVID-19 pandemic our need to understand the application of technology as an interface between organisations and their customers has become even more important; this is also true of interactions with other stakeholders such as partners, suppliers, and between employees. The pandemic has hastened our use of technology for communication and for the delivery of many customer facing activities previously conducted in the physical space, such as is being seen in the retail, healthcare, and sport/leisure sectors.

Currently referred to as '**Industrial Revolution 4.0**', technological advances such as digitalisation, artificial intelligence, and robotics, are having significant impacts on the work of humans across many fields. In so doing, advances in technology are changing the nature of work for many employees – this report aims to provide insights into these changes.

2. Research Objectives

The aim of this report is to give insights into how advances in technology are changing customer focused roles and the managerial and leadership implications of this.

The objectives of this report are to:

1. Provide a basic introduction to three technological advances influencing business today: **digitalisation**, **artificial intelligence** and **robotics** and their application in customer related tasks

2. Understand how these technological advances may impact **customer experience** and the service encounter for customers

3. Identify the aspects of **customer service employment** that may be replaced by new technologies

4. Summarise both the **benefits** and **challenges** posed by such technological changes

5. Consider the implications for management and leadership

3. Research Method

This report has been compiled by accessing current subject relevant literature and publications, as well as consultation with experts working in technology and change.

We also include case examples of the application of these technological advances where appropriate.

4. Technological Advances

Technological change is wide in scope and reach. We do not intend here to provide a detailed technical explanation of new technologies – rather, the aim is to provide a succinct review of the key advances affecting customer-focused roles and present a brief summary of three particular categories of new technological change: **digitalisation**, **artificial intelligence** and **robotics**.

4.1. Digitalisation

"Digitalization is the process of employing digital technologies and information to transform business operations"

<div align="right">Source: Munro et al (2017)</div>

Digitisation or **digitising** refers to the process of taking physical materials previously in analogue format and turning them into digital formats. Examples include turning music or the written word into a digital format to be listened to or read online. Digitisation has been with us for some time now and we are familiar with using digital formats in our phones, televisions, laptops, cars, and many other devices we use in both our home and work lives.

Digitalisation is a term used to describe the transformation of our business or personal lives to use digital. Put simply, it is the shift to use digital platforms to perform and automate tasks that we previously performed manually via analogue formats. It includes the use of mobile devices or 'smartphones', video conferencing or apps that enable us to transform data, images, voice, and so on, and to store, distribute, share, or view them. Examples are numerous and include the digitalisation of banking systems that enable customers to view and manage their accounts online; in retailing the digitalisation of the customer buying process and distribution logistics; or in healthcare the digitalisation of patient records and data to enable easier access to and transfer of patient information between staff.

Digital transformation is affecting us all and its impact upon organisations is expanding rapidly, in large part due to the increasing customer expectations for the immediacy and ease of experience offered by digital. This has given rise to the importance of an omnichannel strategy that provides a seamless experience through the customer journey (Barwitz and Maas, 2018). Given these wide-ranging effects, digital has been referred to as a 'general purpose technology' (GPT) – that is to say, it broadly affects most aspects of our lives and has had a significant impact on the economy, as did the introduction of steam power or electricity (Muro et al., 2017). It has led to the re-orientation of many industries causing significant structural changes such as those we are currently seeing in the retail and banking sectors.

Digital transformation is therefore about changes to business operations and how organisations adapt and manage their internal functions in order to automate outbound service systems. It is essentially about the use of computers and information systems to manage processes and increase automation and efficiency in product or service delivery. In so doing, the roles and tasks of service employees will be changed – for example, we are now seeing the rapid escalation in the use of digital by employees to deliver services via remote working.

4.2.   Artificial Intelligence

"A system's ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation."

Source: Kumar et al (2019)

Artificial Intelligence (AI) refers to the ability of a computer or system to take data from the external environment around it and use that data to learn, analyse, adapt, and perform tasks normally undertaken by a human being. AI can achieve specific goals or tasks normally handled by a human because it is able to perform the cognitive functions of a human – these may include perception, visual or pattern recognition, language or speech recognition, learning, or the ability to analyse and interpret complex data with incredible accuracy and speed.

This enables AI computers to undertake relatively complex tasks previously conducted by humans across a range of situations. In the words of Jim Sterne: "Artificial intelligence is a machine pretending to be a human" (Sterne, 2017:4) and Sterne summarises the capabilities of AI in terms of the "3Ds":

- **Detect:** AI can detect and identify the most relevant data to work with for predictive purposes and/or to perform tasks

- **Decide:** AI can reach decisions by recognising the rules that hold within the data, weigh up the various characteristics and reach a decision relevant to the task

- **Develop:** AI can learn and develop as it works with data and undertake 'deep learning' to change how it views and evaluates the environment. It is therefore able to be flexible and adaptive in how it works and develops

Source: Sterne (2017)

Examples of AI usage today are widespread. First, in the customer domain AI enables a number of online interfaces during the customer journey, such as search engines (e.g. Google Search), online assistants (e.g. Siri), and recommendation agents used in online retailing, such as Amazon product recommendations.

AI enables the personalisation of customer interactions such as via predictive analytics to personalise offers to customers to improve retention and reduce churn; the use of intelligent call routing to match customer profiles to service representatives; or enables the use of 'bots' such as chat-bots that enable a computer to undertake conversations with customers.

Secondly, AI is able to undertake highly complex data analysis that enables businesses to interrogate customer data and form predictive modelling regarding customer behaviour and market performance (at the current time AI is being used for predictive modelling in the recent COVID-19 virus pandemic).

Thirdly, AI can be used to perform may complex tasks within organisations such as medical diagnosis in healthcare, image recognition or facial recognition technology, or the targeting of online advertisements to customers through the analysis of customer data from social media.

With social media sites overtaking television as a source for news for young people, news organisations and publishers can use artificial intelligence (AI) technology to target and post stories more effectively and generate higher volumes of traffic.

Finally, we see AI in a wide range of consumer products – in home-based intelligent agents (such as Amazon's Alexa or Echo products), products that enable people to control their heating or lighting remotely (such as Hive), or AI enabled hearing aids (such as Oticon or Livio AI). This is referred to as the '**Internet of Things**', i.e. the ability to manage much of our lives via remote devices connected via the Internet (see Resources).

4.3.   Robotics

"Intelligent machines that can understand and respond to their environment and perform routine or complex tasks autonomously"

Source: Bernard Marr (2020)

Robotics, as the definition states, embeds artificial intelligence into machines so that they can respond to their environment and perform both routine and quite complex tasks. Robotics is now playing an increasing role in internal business functions such as manufacturing and logistics as well as in direct interfaces with the customer.

Robots can be used to perform human tasks that are highly routine, repetitive, or often heavy or dangerous, but may also be quite complex such as in factories, laboratories, hospitals and healthcare, retail, and in distribution centres. Robots can be built to perform in environments which are particularly dangerous to humans such as in waste management, bomb disposal, or search and rescue operations.

We increasingly see their use in distribution centres to manage the "last mile" logistics in delivery to customers. This use of robotics for logistics, coupled with driverless/autonomous vehicles, offers the potential to make the delivery of goods to customers in businesses and homes totally automated. An example is of robotic automated delivery to customers is the trial by the Coop, one of our HCCM members, in the use of robotic delivery systems in Milton Keynes (see Resources). In this sense robots are able to take over not just cognitive and perceptual functions of the human but can also perform complex task and manual operations.

Robotics can be used in physical customer settings such as stores, restaurants, or bank branches for tasks such as guiding store traffic, providing product or store information, or interacting with customers to answer their question. 'Pepper' is one such example of a customer facing robot that can be used by customers to source information, provide guidance or conduct Q&A activities (see Resources). Robotics is also being developed to perform tasks for customers such as in the assembly of flat pack furniture (Burdick, 2018).

The sophistication of robotics continues to grow. 'Sophia', a robot created by Hanson Robotics, demonstrates particularly advanced capabilities such as being able to hold complex conversations and express emotions and empathy, perhaps the true test of whether a robot can totally replicate the human being (see Resources).

4.4.   Summary: Technological Advances

Whilst AI and robotics are in a relative early stage of innovation in comparison to digitalisation, they are already impacting business processes and the workforce in terms of human resource requirements. The extent to which such automation becomes adopted will in some respects be dictated by the level of diffusion of such innovation into customer behaviour (Rogers, 2003).

Customer acceptance of technology such as AI may be influenced in part by the degree to which an AI agent can pass as human. The "Turing Test" (devised by the founding AI computer scientist Alan Turing in the 1950s) is a mechanism for testing if humans can detect if a system is run by AI or a human (Walker, 2017). The degree to which AI systems feel human to customers will be an influencing factor on their adoption and usage, and therefore will affect the likely impact on human employee resources.

5. Impacts of Technology on Customer Experience

If we want to look at the effects of the increased computerisation of customer service tasks and how it might affect organisations and their workforces, it is useful to start by thinking of how service encounters and the nature of customer experience will be changed by technology.

In this section we look at how the customer's experience is likely to change – as this varies by market or industry sector so too will the level of impact upon the workforce.

5.1. Changes to the Service Encounter

A service encounter is the two-way interaction between the customer and a service provider. New technological innovations that change interfaces with customers are impacting the landscape for services (referred to as the 'service-scape').

LaRivière et al., (2017) have looked at this new service-scape and how it will affect both employees and customers. They refer to this new form of service delivery as 'service encounters 2.0' to reflect the changing context in which customer encounters will take place, and define it as:

> *"any customer-company interaction that results from a service system that is comprised of interrelated technologies (either company or customer-owned), human actors (employees and customers), physical/digital environments and company/customer processes."*

Source: LaRivière et al., (2017)

The totality of this new form of service encounter will be created by a coming together of a range of agents both human (using human intelligence – HI) and artificial (using AI, robotics, and digitalisation). The delivery network for services going forward should be viewed as encompassing both technology (intelligent agents) and employees (human agents), within a service network of other providers that may be both human and/or artificial. Customers will interact directly with these various agents in networks of service delivery.

Today we can already see examples of this new service-scape in the retail sector, where firms such as Amazon are using a high level of automation consisting of AI, robotics, and digital, both through website interactions and in their logistics, warehousing, and in the delivery system, which in due course may include some form of autonomous end-delivery to the customer such as the drone delivery system currently in trial (see Resources).

Finally, technology is changing the service encounter by enabling customer-to-customer interactions, and in some instances the co-creation of value between customers and service providers. The effect of this new service encounter should be more flexibility and control for the customer, but also a new form of customer experience.

5.2.   A New Model of Customer Experience

So how will this new coming together of human and technological service delivery affect customer experience? What will customer experience look like in the next decades with the advancement of these new technologies, and how should organisations craft or design that experience? What will firms need to consider when crafting this new experience for customers?

One way to think about these questions is by using a model developed by authors Bolton et al., (2018) who have looked at customer experience delivery through 3 dimensions or 'realms' (see Figure 1). These are the **physical**, **social**, and **digital** dimensions (digital being used as a generic word for all forms of technology we have previously discussed).
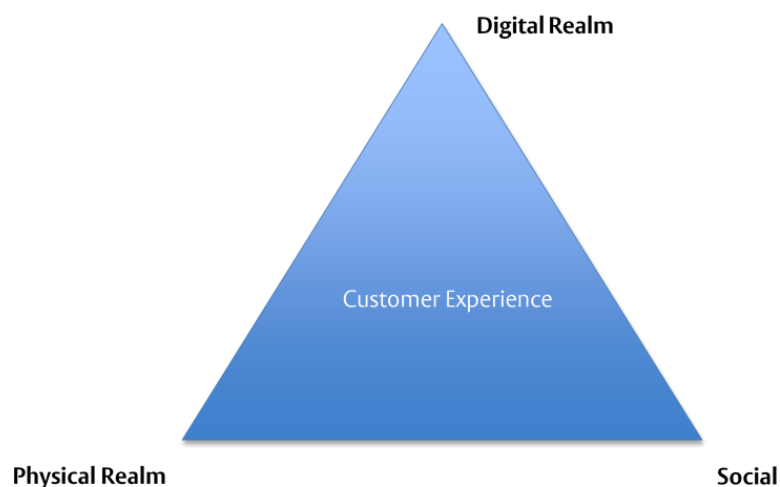
Adapted from: Bolton et al., (2018)

Figure 1: Dimensions of the new Customer Experience

Digital: As identified in the previous section, technology will increasingly be the mechanism for delivery of services and will provide a rich environment for interactivity, whether firm-to-customer, or customer-to-customer. It will be the mechanism for service delivery, either throughout the customer journey or at particular touchpoints. This will include information exchange (customers both seeking information about products and services, as well as providing information to firms) as well as technology enabling products and/or service delivery.

The digital realm in Figure 1 refers to all forms of innovative technologies that enable the service encounter. These will mostly be accessed via mobile, location-based apps, virtual reality, and other technology delivery systems. An example of this is the Disney "Magic Band" used by families to manage their experience at Disneyland including accommodation, access to rides, restaurants, and merchandise purchase (see Resources).

Technological transformation and its impact upon service delivery and customer experience will disrupt how employees undertake their roles. Employment disruption is often assumed to be a worst-case scenario of workers losing their jobs, i.e. technology has a binary 'substitution' or 'non-substitution' effect on employment. In fact, the impact can be more nuanced than this and authors such as Susskind (2020) identify both substitution and complementary effects of automation.

In some instances, technological automation may complement human work rather than replace it. Susskind (2020) points to three positive complementary effects of technological automation.

First, the 'productivity effect' making employees better at what they do or freeing them up from routine tasks to do other, more meaningful, useful work. The outcome of this complementary effect is that productivity should increase and be passed on to customers in terms of enhanced, better quality services.

Second, Susskind proposes that the effect of employees being freed up for other forms of work will lead to economic growth as it leads to greater demand for goods and services by customers.

The third effect is that not only will it stimulate growth of existing markets, but that it will also create new markets as new types of services are created and delivered. New jobs will emerge, and the nature of existing roles will change. The focus for employers will be to ensure the development of appropriate skills to meet the changing nature of the services being offered.

This shift to new forms of employment is evidenced by figures in the US for the shift to digitally focused jobs:

> *"By 2016, the share of employment in occupations with high digital content—defined as occupations with digital scores above 60 on a 100-point scale— more than tripled, from 4.8 to 23 percent of employment, while employment in occupations with medium digital content (scores of 33 to 60) increased from 39.5 to 47.5 percent. By contrast, employment in occupations with low digital scores (below 33) declined precipitously, from 55.7 to 29.5 percent."*

Source: Muro et al., (2017)

Bolton et al., (2018) propose that we can look at the digital element of customer experience as being on a 'density' continuum from low to high, where density is the degree to which technology is a central part of the delivery of the customer experience. The level of digital density will vary from sector to sector and firms should consider the degree of technology that currently – and potentially – will be introduced into their customer journey experience. An understanding of the level of density will determine the degree of impact technology is going to have upon employees' work experiences.

The Physical Realm: Although organizations are increasingly moving to digital platforms, in many sectors the physical element may remain central to the experience. The physical manifestation or location of an organisation may be the way in which the offering is delivered or used (e.g. health spa or hospital); alternatively, the physical can be the source of brand identity for an organisation, for example through buildings, locations, signage, or livery, and is often how both customers and employees identify with, and relate to, a brand at corporate and/or product level.

In some service-scapes, the offering itself is a physical experience such as in travel, tourism, hospitality, the arts, or leisure. Balancing the contribution that can be made by technology with the physical delivery will be the challenge for such brands.

Brands such as The National Trust (nationaltrust.org.uk) will retain a high degree of physical, whilst the digital realm can play an important supporting role to customer experience at key touchpoints such as new customer recruitment, servicing of membership, knowledge sharing, and as an enhancement to actual physical visits via online. On the other hand, sectors such as retail or banking are shifting more significantly onto the digital realm with some supporting physical contribution.

The physical realm may be used to balance the less personal and more distant aspects of digital customer interactions, for example in retailing – whilst traditional stores and outlets may reduce considerably due to online shopping, the idea of "showrooming' is now emerging where customers will visit a showroom location to be able to look, feel, see, and hear products and/or services as sensory experiences will remain important, with the purchase process online.

Similarly, for employees some form of physical space and connectedness with their organisation will remain important. Organisations will need to balance the employee work environment in terms of the use of technology (for example increasing remote working) and the need for staff to identify with a location or physical space for the organisation in which they work. This sense of identity will be important to staff.

The digital and physical realms will be complimentary but must remain appropriately balanced. Bolton et al., (2019) view the physical realm ranging across a 'complexity continuum' from low to high according to the level of complexity of the physical manifestation of the offering.

Social Realm: Social interactions have always been at the heart of customer experience and the lives of customer service employees. Person-to-person interaction and the sense of belonging to a group, to a company or organisation, or to a community, will remain important.

The service encounter involves many actors including customers (be they B2C or B2B), employees, management, partners, distributors, or other agents representing the brand. It will be important for organisations to continue to enable these social interactions, albeit increasingly via technology.

Whilst the social realm may be delivered face-to-face (f2f) or digitally, it will be important to recognise the role that social connection plays in the customer's expectations of the brand. The interplay between the physical and digital nature of social connection will be an important touchpoint for effective customer experience – for example, customer forums or personalised digital systems enable brand-to-customer or customer-to-customer interactions, but brands may offer digital interfaces through customer events that enable f2f social exchange.

Both physical and digital touchpoints of service delivery will enable and enhance the social realm. Our future social interactions may be between humans, but also at times with service robots such as 'Pepper' previously mentioned or Chatbots. Bolton et al., (2018) view the social realm on a "Presence" continuum from Low to High depending on the nature of the service offering and the degree to which social connection needs to be present.

5.3. Summary: Impacts of Technology on Customer Experience

Brands will need to ensure that they enable customers to co-create value – that is, experiences that are meaningful and add value for them – via the effective combination of these three realms of service-scape delivery: **digital**, **physical** and **social**. People will spend more time digitally, using mobiles or other devices, and using them as information sources, channels to purchase, or means of communication with others – but physical and social interactions will still play an important role.

Experiences of the COVID-19 lockdown have emphasized our needs for physical and social connection despite our increased use of technology to communicate. If the pandemic has taught us anything, it should have reassured us all that whilst digital is an incredibly useful tool, as humans we still have strong needs for the social and physical elements in our lives.

We must remember this with our workforce too – feelings of connectedness to a physical location and social group of people will remain important, and firms will need to take this into consideration when managerial decisions are made about technology-based transformation of work practices. Staff performance may need to be re-evaluated in the context of the redressing of the balance between these three dimensions of employee work experiences.

6. Impacts on Customer Service Roles

If customer experience going forward will rely on effective delivery of service across the three dimensions of the digital, physical, and social, then we can assume that customers will evaluate experiences based on their expected requirement for each dimension – particular emphasis will be needed at the intersections of these realms. Firms will need to recognize the nature of their offering (dictated by the experience requirements of customers in the market sector) and the expectations customers have of the relative balance of delivery across the three dimensions.

Bolton et al., (2018) represent the relative balance of delivery required in different markets by using a 3D cube to represent the 3 dimensions and their high/low continuums. This enables different service offerings (B2B and B2C) to be mapped (see Figure 2 below).

Customers may of course vary in their expectations by segment with, for example, some customers requiring more digital/less physical and others more social/less digital and so on. The value of this model is that it enables a firm to consider the relative importance of each dimension for their customers (based on customer insights) and identify changes to delivery and therefore potential employee tasks.

The model therefore serves two purposes – first, to identify where service encounters currently sit across the three dimensions; and second, to design how they could shift with advances in technology and consider at the same time the impact on workforce requirements.

As an example, if a firm recognizes that service encounters will move towards low physical complexity and low social presence with high digital density (such as moving from physical call handling to the use of Chatbots), it will need to consider the effect on employees, in particular in terms of:

a.   the technological skill retraining or complementary change to job requirements, and;

b.   the loss of social presence and connection with the customer and the effect upon staff

For many employees, the social and personal element of customer relationship interactions may have been the reason they entered customer facing work originally and this may affect the likelihood for some to remain in such roles.
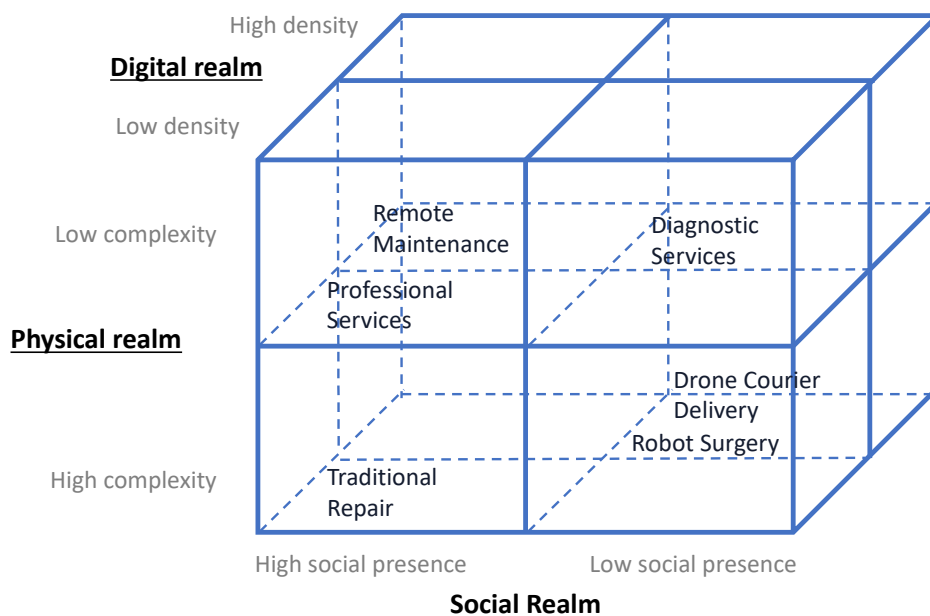
Source: Adapted from Bolton et al. (2018)

Figure 2: The new intersection of customer experience

6.1.   Job versus Task

When we consider the effect of technology upon work it is useful to differentiate between job versus task. Most jobs, whether they be highly skilled professional jobs (such as lawyer or doctor) or lower skilled jobs, are made up of a series of tasks and some, but maybe not all, may be replaceable by technology.

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Some tasks will be easier to automate than others, particularly if they are routine in nature. Susskind (2020) recognises these when he warns of the danger of assuming that technology will predominantly replace at the less skilled end of the workforce. Consideration of the effects of technology should instead best be approached from the perspective of the tasks or elements of a job that can be replaced or improved by the application of technology.

> *"Once you break down most professional jobs into tasks that make them up, many of these tasks turn out to be 'routine' and can already be automated. The fact that educated professionals tend to use their heads, rather than their hands, to perform their task does not matter. Far more important is whether the tasks are 'routine'."*

<div align="right">Susskind, (2020)</div>

6.2. Levels of Intelligence

Technology is currently replacing at task level rather than at the total job level, but we can assume that AI will replace employees as the totality of the tasks of a job become automated. Huang & Rust (2018) propose that the decision to automate a job occurs when AI can do some of a job's tasks better than a human being in order to meet the firm's strategic goals (which will most often relate to profitability).

But there will be a transition stage (known as augmentation) when AI progresses and replaces human employees because it has the ability to take over all of a job's tasks and, at that stage, the employee becomes totally replaced. In order to identify the progression of technology replacement or its complementary effects, we need to consider the nature of the tasks involved in a particular job, and the level of 'intelligence' required to perform the role. Huang and Rust (2018) propose four hierarchical levels of intelligence ranging from mechanical up to empathetic, as presented in Figure 3.

Empathetic

Intuitive

Analytical

Mechanical
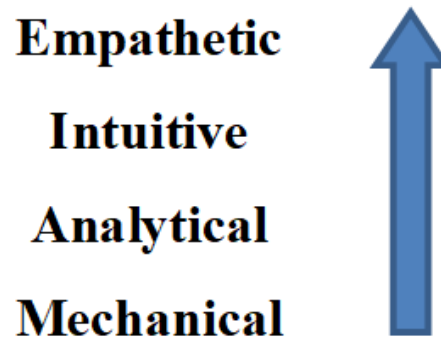
Figure 3: Four levels of Intelligence in Service Roles

6.3.   Implications for current and future roles

In customer service work we have employees working at all four levels of intelligence and the Huang & Rust (2018) framework is useful to analyse the effect that artificial intelligence will have upon both roles and skill requirements. The effects of technology replacement can currently be seen at lower skill level tasks which are easier for AI to replace, but it is moving up to higher intelligence tasks.

We have already seen widespread examples of AI and smart robots replacing routine tasks on production lines, in warehouses, in store or online (see Resources). We are also seeing AI capabilities used for relatively complex tasks such as in data analysis. Eventually, AI will even be capable of performing intuitive and empathetic tasks.

By specifying various AI replacement mechanisms for service, innovative ways of providing services are emerging. As that happens the scale of job replacement may become more substantial.

For examples of technological effects upon customer focus roles across the four intelligence levels see Table 1 below.

Type of Intelligence	Skills/Labour required	Nature of the role	Examples
Mechanical			
• Minimal learning and adaptation • Precise, consistent, efficient • Regular routine tasks	• Limited training or education • Call centre agents, retail salesperson, drivers, distribution staff	• Simple • Standardized • Routine • Transactional • Commodity service	• McDonald's touch screen kiosks • Robot Pepper in stores • Virtual chat bots
Analytical			
• Learns and adapts systematically based on data • Logical, analytical, and rule-based learning • Rational decision-making	• Technical skills requiring training and expertise in data and analysis • Data analysts, accountants, financial analysts, marketing, and customer analytics	• Analytical • Rule based • Logical thinking • Data, information, and knowledge-based service	• Toyota in-car intelligent systems replace problem diagnosis by technicians • H&R Block tax preparation systems • Marketing analytics systems
Intuitive			
• Learns and adapts intuitively based on understanding • Artificial neural networks based on statistical-based deep learning • Bounded rational decision-making	• Hard thinking professionals that require creative thinking for problem-solving skills	• Complex tasks requiring intuitive, holistic, contextual, and experiential interaction and thinking • Personalized, idiosyncratic, experience- and context-based service	• Deep Mind • Alpha Go • Quill • Physicians and healthcare roles • Marketing managers • Consultants • Lawyers
Empathetic			
• Learns and adapts empathetically to experience • Emotion, affective recognition, and communication • Decisions include emotions	• Soft skills, social, communication, and relationship building skills • Thinking jobs requiring people skills	• Social and emotional communication • Highly interactive services • Tasks requiring empathy or emotional analytics • High touch services	• Chatbots that communicate and learn from it • Sophia type robots that interact with customers as if employees • Psychiatrists, physicians, social care, healthcare, financial services

Source: Adapted from Huang & Rust (2018)

Table 1: Potential Effects of AI to Customer Service Roles

7. Managerial and Leadership Implications

As can be seen from Table 1, some of the tasks that can be performed by technology are those typically undertaken by a manager – it is therefore appropriate to ask what the effect of technological automation will be on organisational structures and the roles of managers and those who lead both human and artificial intelligence. If many of the tasks of managers are similarly replaced or adjusted by technology, where will a sense of direction and leadership come from?

When addressing this question, we should be mindful of the distinction between management and leadership. **Management** is a functional role that encompasses the skills of organisation and planning, budgeting, facilitating processes, and ensuring appropriate use of resources in order to achieve organizational goals. **Leadership** is about the relationship between a leader and the team, with the leader providing direction, vision, inspiration, and motivation to others (Maccoby 2000).

The two roles are not mutually exclusive, and most senior management roles encompass important elements of both; however, this distinction is important as we can see that managerial tasks are more likely to be subsumed into AI or robotics given their functional nature.

Given the importance of authority within management roles, researchers have explored the extent to which employees would take direction from AI/robot managers and found via experimentation that in fact employees may, in certain circumstances, be prepared to do this (Young and Cormier 2014). We can, however, assume that staff, in whatever fields they perform, will still require human leadership and a strong sense of direction, which may be at a senior level or dispersed throughout the organisation.

Different leadership styles will continue to emerge as technology progresses, but we can look at the likely traits that will be needed in our leaders as we move forward with the application of technology. A useful article by Chamorio-Premuzic et al., (2018) proposes four traits: **humility**, **adaptability**, **vision** and **engagement**, and we summarise their thinking in Table 2 below.

Leadership Trait	Summary Description	Example cited by the authors
Humility	As knowledge and expertise increasingly resides in any part of the organisational structure and at any level (often quite junior), leaders will need to be willing to listen and accept input from others irrespective of position, role or status.	Nestle 'reverse mentoring programs'. Leaders learning to learn from peers and those lower down the organisation.
Adaptability	Those in leadership positions will need to be responsive to new ideas and be prepared to change their perspective as technological developments change. Effective and speedy communication of change and a willingness to concede and adapt to change will be important.	Carlos Vila CEO of BBVA Spanish bank transformed the company from a bricks-and-mortar operation to a digitally led financial services organisation by being prepared to adapt and transform in the light of technological change.
Vision	Vision will be even more important as technological disruption rapidly affects existing business models. Clarity of communication to employees and the ability to motivate and inspire staff to follow will be important.	The authors cite many leaders of digital tech companies such as Amazon, Tesla, Facebook, Tencent, Alibaba, and Google, who have clearly articulated visions for their organizations, despite short-term uncertainty.
Engagement	In a rapidly changing environment, it will be important for leaders and employees to remain constantly engaged and attuned to external change including changes to relationships amongst stakeholders. Agile thinking and speed of response will be important. Two-way effective and timely dialogue across the organisation will be required to support engagement by all.	German e-commerce giant Zalando uses digital tools for leaders to capture and respond to topics of interest from all employees. These include zTalk, a live chat application; zLive, a company-wide social intranet; and zBeat, a tool that regularly surveys employees about their current work experiences.

Source: Adapted from Chamorio-Premuzic et al., (2018)

Table 2: Four Proposed Leadership Traits for an AI World

Whilst these four traits have always been important for leaders, this research recognises that there will be an increasing need for leaders to develop and use emotional intelligence (soft skills) in greater measure than hard skills (which will increasingly be automated).

It is interesting to consider the effect of deeper levels of emotional intelligence being a pre-requisite for leadership and how it will change who may be promoted to such positions – for example, increasing levels of emotional intelligence could positively influence the drive to improve diversity and inclusion in organisations.

These four traits may be more equalizing in terms of the criteria for leadership roles as it moves from hard to soft skills, and could therefore change the traditional profile of who is appropriate for leadership; we will need managers and leaders who are able to work alongside the complexity of technology, yet apply emotional intelligence and effective social presence when interacting with employees, which may lead to gender and cultural changes in leadership.

8. Summary: Benefits and Challenges

We summarise our understanding of the effects of technological change on customer service work by looking at the benefits and challenges that have been identified.

Figure 4 presents the four key benefits: **accuracy**, **prediction**, **speed and efficiency**, and **re-deployment of labour**. It is the latter benefit that will require the most careful attention. New workforce models will be required that change the focus of human endeavour, and consideration will need to be given to the re-skilling of employees as AI both substitutes and complements the existing tasks undertaken by customer service employees. New working practices will emerge such as increases in remote working or 4-day working weeks, which will in turn create changes in work/life balance and attitudes towards the role of work in our lives.
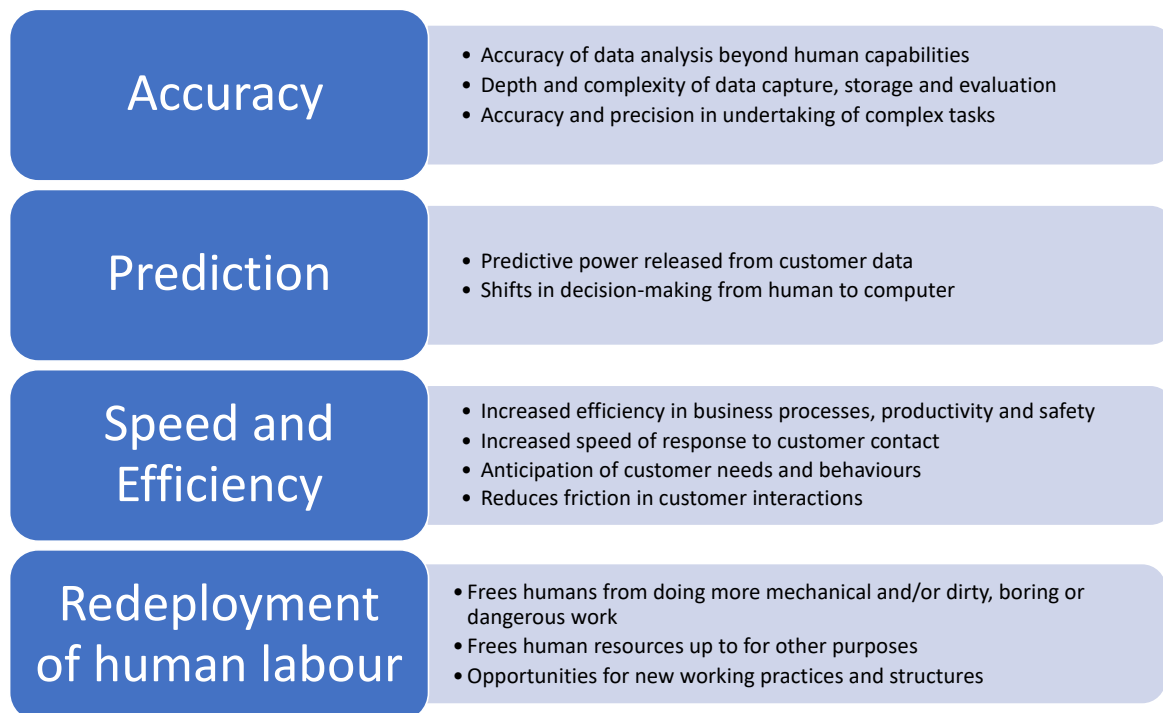
Accuracy	• Accuracy of data analysis beyond human capabilities • Depth and complexity of data capture, storage and evaluation • Accuracy and precision in undertaking of complex tasks
Prediction	• Predictive power released from customer data • Shifts in decision-making from human to computer
Speed and Efficiency	• Increased efficiency in business processes, productivity and safety • Increased speed of response to customer contact • Anticipation of customer needs and behaviours • Reduces friction in customer interactions
Redeployment of human labour	• Frees humans from doing more mechanical and/or dirty, boring or dangerous work • Frees human resources up to for other purposes • Opportunities for new working practices and structures

Figure 4: Benefits of technological change

However, at the same time organisations will face challenges as our working lives are changed by technology. Figure 5 identifies three significant effects of technology that relate to both customers and employees that firms will need to be aware of and consider in terms of technological transformation. Ethical considerations include the growing concerns regarding privacy, intrusion and the security of data apply to both customers and employees.

Secondly, and most importantly for customer service employees, the move to high density levels of technology will change the nature of relationships between staff and customers. Whilst technology will increase ease of access, convenience, and effectiveness of solutions for the customer via complex service systems, automation will reduce the degree of connection and direct contact between customer and organisation which will change the working experience for employees.

At the same time, customer expectations of the standards of speed and efficiency of delivery will continue to be raised, creating what is termed the "crisis of immediacy" (Parise et al., (2016). As customer expectations of service delivery grow this will place greater pressure on organisations and their staff (Bolton, et al., 2018).

We can expect that the distancing of human contact will impact trust in relationships and organisations will need to work harder to build and maintain trust, both in customer-brand relationships but also between employer-employee.

Finally, it can be assumed that where substitution of jobs by technology does take place there will be significant impacts on employment in the sector, and that both management and staff may be impacted.

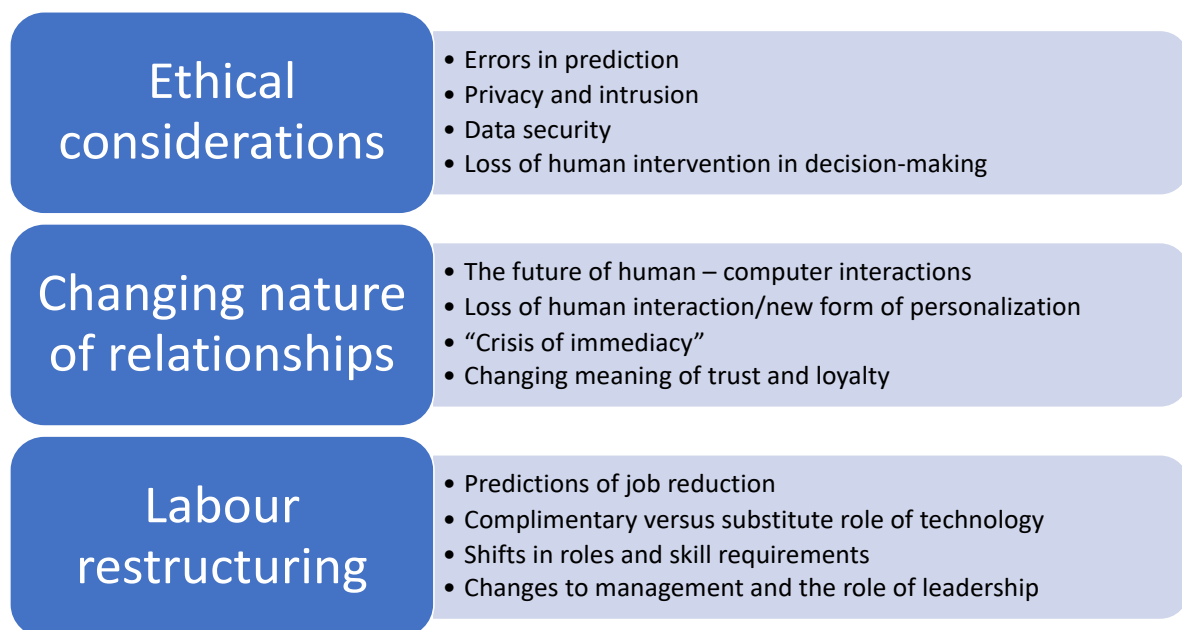| Ethical considerations	• Errors in prediction • Privacy and intrusion • Data security • Loss of human intervention in decision-making
Changing nature of relationships	• The future of human – computer interactions • Loss of human interaction/new form of personalization • "Crisis of immediacy" • Changing meaning of trust and loyalty
Labour restructuring	• Predictions of job reduction • Complimentary versus substitute role of technology • Shifts in roles and skill requirements • Changes to management and the role of leadership

Figure 5: Challenges of technological change

9. Managerial Implications: Questions organisations should be asking

We provide below a listing of questions that customer service organisations may find useful as a starting point for considering their current and future approach to the impact of new technologies, particularly AI:

- What service delivery tasks in our organisation require what composition of intelligences and what combination of HI and AI?

- For our strategic objectives, what composition of intelligences and what combination of HI and AI is required?

- How can we identify customer heterogeneity for preference for human or machine service? Do we know the preferences of our customer segments?

- How can we streamline processes for human and machine service provision?

- Should we fully automate service at the four intelligences levels, if so how?

- How can we connect humans and/or machines for collective intelligence?

- Can we identify the job migration for our services at the higher intelligence level?

- How can we retrain workers for intuitive and empathetic level skills to retain employability?

- How do we educate and develop entry level employees for intuitive and empathetic skills to retain employability?

- How do we identify and develop future leaders to have an emphasis on emotional intelligence?

(Adapted from Huang and Rust 2018)

The implementation of new technological advances by customer service organisations will be driven by the market, and specifically by customer adoption of new forms of service delivery.

As technology continues to advance and create business transformation for organisations, it will be crucial to consider the future needs of the workforce and how to best support employees through the technological change they will experience, at both task and job level.

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11. Recommended Reading

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12. Resources

Artifical Intelligence:
Video resource: https://www.youtube.com/watch?v=ad79nYk2keg

Robotics:
Coop Milton Keynes trial:
https://www.youtube.com/watch?v=AbQN-a2d1s0

Sophia by Hanson Robotics:
https://www.youtube.com/watch?v=Sq36J9pNaEo

Pepper customer robot:
https://www.youtube.com/watch?v=Jky9I1ihAkg

Amazon Drone Delivery Trial
https://www.youtube.com/watch?v=MR9PoBAssw0

Internet of Things:
Oticon AI hearing aid
https://youtu.be/5VdIQhVwE0o

Disney Magic Band:
https://www.youtube.com/watch?v=2buVLVO-6F8

Henley Centre for Customer Management

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