Chapter 4

Replaced by Machines? The Intelligent (Ro)Bots as the Disruptive Innovation for Human Workforce in Cross Cultural Perspective

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Abstract

The rise of artificial intelligence (AI) and its growing capacity in sensing, cognizing, and performing, is directly exposing the human workforce to the competition with more and more intelligent machines. The potential replacement of the human workforce by AI has become the starting point for a scientific discussion not only for human resources management, but also for organizational anthropology and cross-cultural management. Managers should know the nature of machines replacing humans, and develop strategies to deal with the phenomenon. This chapter presents examples of professions that can be replaced by technology. It also shows a case where such a replacement has already happened. It tries to answer the question if the human workforce can be universally (globally) "disrupted" by autonomous technologies, and it lies the foundation for future research regarding the acceptance of technology in various cultures.

Keywords: artificial intelligence, bots, cobots, human resources, autonomous technologies, disruptive innovation.

Introduction

In the digital revolution, the number of innovations is growing exponentially. According to Moore's law, the processing power of computers doubles every two years

(Schaller 1997). Thus, the technologies that were innovative yesterday can quickly lose their position today, even if current research suggests this pace is slowing down (Waldrop 2016). Moreover, the new findings in IT, physics, or medicine can create new markets, throwing overboard current market tycoons (Christensen et al. 2015). The example of markets that used to experience disruptive innovations were, for instance, telegraphy (replaced by telephone), chemical photography (replaced by digital photography), typewriter (replaced by software word processing) or VHS tape (replaced by CD, which were replaced by pendrives) (Verganti 2008).

With the development of new technologies, also people are being systematically replaced by robots and software at the workplace (Daugherty and Wilson 2018). Since the Industrial Revolution, professions traditionally performed by human workers have been disappearing (milkmen or switchboard operators are just two of many examples). The rise of AI and its growing capacity in sensing, cognizing, and performing, is directly exposing workers to the problem of looking for professional fields where they can compete with more and more intelligent machines (Akerkar 2019).

The replacement of the human workforce by intelligent machines has become the starting point for the scientific discussion for human resources management, as well as for organizational anthropology and cross-cultural management, with questions regarding the place of intelligent technology in organizational culture and relationship building. The fact that people are being successively replaced with machines is boteworthy in this discussion. It happens regardless of an individual's cultural characteristics proposed by Geert Hofstede (2003), Erin Meyer (2014) or Richard Gesteland (2012). In other words, no matter whether a worker is more individual or collective, long- or short-term-oriented, or how much they avoid uncertainty. The machine, programmed to simulate the behavior requested by managers, has the upper hand. Furthermore, they have such competitive advantages as the speed and the cost compared to people from any culture.

Cross-cultural managers should know the nature and scope of the human replacement by machine for several reasons. First of all, in countries such as Japan, the acceptance for human replacement is higher than in e.g. USA or United Kingdom (Nomura et al. 2015). Hence, the Japanese working in the virtual environment and with artificial agents more willingly than Americans or British do. To replace some workers with the machine in one culture can provoke higher resistance and objections than in another. Hence, a cross-cultural manager should know not only what professions or functions can be potentially replaced by machines, but also what the reaction of particular stakeholders to such replacement will be.

This chapter presents mainly examples of professions that can be easily replaced by technology and a case where such a replacement has happened with artificial intelligence. It tries to answer the question whether the human workforce can be universally (globally) "disrupted" by autonomous technologies, and it lies the foundation for future research regarding the acceptance of such technologies in particular cultures.

Professions endangered by Artificial Intelligence and Robotics

Fast technological changes are affecting the shape of the global labor market. Innovations changing the form and scope of activities performed by humans in every culture are appearing every year. In order to identify professions threatened by technological innovations in the second decade of the 21st century, reports on global, commercial companies, governmental reports, and postulates of trade unions were analyzed. The most frequently mentioned professions from the global perspective included: postmen, seamstresses, translators, farmers, customer service employees, drivers, and cashiers. The following subsections indicate how intelligent technologies are influencing the displacement of those workers around the world as well as answer the question what the dynamics of this process and factors affecting its shape are.

Mail Carriers

The number of mail carriers has been steadily decreasing since the emergence of innovations in the form of electronic mail. A report on the postal market by the British Telegraph shows that while in 2008, an average resident of Great Britain received 18 letters a year, this number dropped to 13 in 2013 (Goldhil 2013), and the trend continues. Postcards sent by traditional mail on such occasions as Christmas and holidays are exceptions – they constitute a material proof of social respect and fulfill the role of a gift, which is why they have not been replaced by less tangible e-mails. According to current forecasts, the number of letters sent by traditional post in the UK will fall from 13.8 billion in 2018 to 8.3 billion in 2023 (Davis 2014). Similar trends persist in other European Union countries, where citizens' access to the Internet is growing. With the lower number of letters sent, the demand for traditional mail carriers is dropping too. In a report for the World Economic Forum, the postman's profession was listed as the most endangered profession. According to the upward trend, the demand for their services by 2022 will have decreased by 28% (Myers 2015).

The reason for the increase in the popularity of e-mail is its speed and low cost. Before the Internet, people had to wait for mail disproportionately longer than today (even a few weeks in comparison to a few seconds now), the correspondence was occasionally lost, and people had to pay for the parcel. At the moment, due to digitization, less paper is used, which is especially important for those who are sensitive to environmental issues. In the postal market, the machine competes effectively with humans due to finding a completely new environment in which the service is offered. The speed of action and reaction becomes a distinctive feature of modern economic and social life. Due to the fact that a person in the postal market is not able to compete with the speed of data transmission in a virtual environment, they gives way to machines and software.

In addition to e-mail, mail carriers are also replaced by smart drones. For several years, subsequent attempts have been made to use these machines to deliver

traditional mail. In 2016, a pilot mail delivery program with the use of the so-called hexacopter drone was launched in the French Provence. The machine is able to transfer 6.6 pounds of material over 9.3 miles (Fingas 2016). Zipline, which provides medicines and medical assistance to distant places in Africa, where neither traditional mail nor courier would fulfill their role due to the need for a quick response and unavailability of the location, is another example. The client's task is to place an order which the company is able to send immediately via the drone. The machine will reach speeds of up to 100 kilometers per hour. According to current statistics, Zipline makes about 500 deliveries a day, up to 1.8 kilograms per package, regardless of weather conditions, the average delivery time is 30 minutes. The company provides its services around the clock. Similar practices are inspiring further enterprises and public organizations around the world that are looking for ways to create new, attractive services for their clients.

Sewing Machine Operators

The invention of the sewing machine by Isaac Singer transformed the structure and methods of tailoring at the end of the 19th century. Local tailors saw them as hazards to their workshops – the processing capacity of machines outdid them in terms of speed and the quantity of performed pieces, which made tailors' work cheaper and cheaper. Along with the popularization of sewing machines, manufacturers employing sewists, whose wages constituted the minimum necessary level for the survival and maintenance of the family, started to grow stronger. With the development of globalization, garment factories moved from developed to developing countries (mainly to Asia), in order to reduce costs and increase profits.

Despite the decline in the attractiveness of the profession, tailoring is an important employment sector for modern employees as far as the demand for clothes is also increasing with the growing world population. While in 2017 a person sewing clothes in the United States had a guaranteed minimum salary of 1864 $, this amount in Asian countries was even ten times lower (China – 270 $, India – 255 $, Bangladesh – 197 $), and some factories used to pay their employees even less (Lu 2018). Due to these differences in production costs, the textile market in Asia is developing much more dynamically than in Europe and America. A report prepared by the International Labor Organization shows that the number of sewing workers in India in 2013 reached 16.5 million (an increase of 3.5 million compared to 2010), in China – 6.7 million (an increase of 2 million compared to 2010), and 5 million in Bangladesh (an increase of 3 million compared to 2005) (*Wages and productivity* ... 2014).

The main advantage of Asian employees over the rest of the world was cost competitiveness. With the development of artificial intelligence and its use in tailoring, machines have become even cheaper than workers in clothing factories in China, India or Bangladesh. A pioneering intelligent sewing machine that was created in the first decade of the 21st century did not require a human operator to manufacture a product (Evans 2013). Its task was to execute a command programmed in

the algorithm, thanks to which it was creating items desired by the client. In 2015 SoftWear Automation created an intelligent robot, Lowry, which has the ability to change threads and stitches according to the design thanks to the development of various algorithms . Lowry is able to replace a production line consisting of 10 people and produce 1142 T-shirts within eight hours (almost 100% more than people): per hour, Lowry manufactures the same number of shirts as 17 regular human workers (Bain 2017).

There are several advantages of intelligent sewing machines over human workers. First of all, companies pay just for one algorithm instead of allocating funds for human training. Secondly, machines are faster and more efficient. Thirdly, they make fewer mistakes. For these reasons, there is a growing interest among American and European companies in returning to their home markets and setting up smart sewing factories. In addition to lower production costs, the company does not have to pay for the shipment of clothes from distant Asian countries, which a significant advantage.

A report of the International Labor Organization shows that if the clothing companies currently in Asia were to exit the market to open smart factories in their home countries, more than 60% of people employed in this sector may lose their jobs (even 88% in Cambodia) (Bain 2017). An intelligent sewing machine can, therefore, have a significant impact not only on the economy of the 21st century, but also on social and political conditions in remote parts of the world.

Professional Translators

In a globalized world, understanding languages is crucial in business and establishing special relationships between people. Until the first decade of the 20th century, professional translators were responsible for the communication process between people speaking different languages. According to the data provided by Common Sense Advisory, the value of global translational services in 2012 reached 33.5 billion dollars (Kelly and DePalma 2013).

In most countries around the world, work with official documents and interviews requires a diploma in linguistics and the certification of a sworn translator. Such constraints are associated with the need for comprehensive knowledge possessed by certified translators. In addition to linguistic skills, an expert must have intercultural competencies that, so far, have not been programmed in the form of an algorithm known to humans. The requirements for having official documents certified by a sworn translator are connected with trust that is more characteristic of human-human than human-machine relations. Low trust in machines limits the possibility of their use in public space and provides an opportunity for a relatively stable level of employment among sworn translators.

Despite the emergence of software that allows automatic translation without human aid, it has numerous imperfections. This fact, in consequence, limits the scope of its use to informal rather than formal situations. However, software based on artificial intelligence is being used more and more frequently during informal

business meetings, an area in which sworn translators used to work regularly in the past. Software using natural language processing can translate full sequences of statements in real-time. An example of such an innovation can be Dash Pro earbuds that are equipped with iTranslation. With the help of devices placed in the ear, the conversation participants simultaneously hear the translation in their language. The device can translate in forty languages using general as well as professional vocabulary, such as legal, medical and business.

Although newer and newer algorithms based on deep learning methods are appearing on the market, the results of their work are still not entirely satisfactory. During an experiment conducted at Sejong University in Seoul, up to 90% of translations from Korean to English and from English to Korean did not meet the standards set for sworn translators (Ben 2017). Despite initial failures, the quality of automatic machine translations is improving year by year. On the one hand, their use allows for a reduction of costs. On the other, a seemingly small error can result in an unfavorable commercial contract. Whether machines will completely replace human translators will be decided not just by the cost of their services, but rather by the amount of credibility and trust that they will be able to inspire in the eyes of business partners and public officials.

Farmers

For centuries, agriculture has been an area of human activity characterized by a strong dependence on nature. Problems with predicting the weather and the size of the harvest resulted in famine, as well as social and political revolutions. People sought to increase their domination over agriculture to ensure sufficient food supply and social stability. With the invention of agricultural machinery, the number of people working on farms in developed countries started to decrease systematically. New solutions in the field of artificial intelligence are deepening this trend even more – the demand for farms and plantations for manual workers and technicians is decreasing each year.

New algorithms are looking for a chance to minimize the resources used (money, fertilizer, water, space) while maximizing the results (harvest size). Kumba Sennaar (2018) points out three main areas of artificial intelligence applications that limit the need for human work:

- creating autonomous robots that prepare seeds and control their growth faster than human-workers;
- developing a system for monitoring the condition of soil and seeds which suggests when irrigation or fertilization should be carried out;
- constructing systems forecasting the state of harvest based on environmental and weather conditions.

There are already several practical examples of artificial intelligence used in the areas mentioned above. The robot See&Spray identifies weed and destroys it

mechanically or chemically thanks to the use of drones (Stoltzfus 2018), Harvest CROO uses GPS and modern algorithms to replace human workers collecting fruits with machines, the Platix application allows automatic recognition of plant disease and suggests solving the problem without a human expert (Sennaar 2018), aWhere monitors weather and crop conditions, thanks to which farmers can hire contract agents for a shorter time (Tiller 2018).

According to the data provided by the American Bureau of Labor Statistics, the number of jobs for people currently employed on farms will decrease by 4% in 2016-2026 (Bureau of Labor Statistics 2018). It is expected that with new algorithms and technologies, this trend will be deepening. Artificial intelligence displaces workers from the agricultural sector because it can act faster, identify the problem more precisely, and it is cheaper. Although its impact on the labor market still seems insignificant, the current forecasts include only known solutions in the field of artificial intelligence. Further areas of its application in agriculture can reduce employment among people even more effectively while maximizing harvesting and providing healthier food at a lower price.

Helpline Workers

The number of vacancies for helpline workers (call center staff) has been decreasing since natural-language processing has been implemented in bots. Bots are programs that can imitate people. A chatbot is a type of bot that allows a conversation (Maliszewski 2018). That is an innovation that responds to the decreasing demand for people responsible for communication with organizations' environment. Bots are replacing workers on the helpline, receiving complaints, answering customer questions, suggesting a particular offer. The collected information is selected according to the assumption of the algorithm, creating reports for managers.

Stephen Mann (2018) indicates that the use of bots in interactions with the environment provides three basic values. First of all, their presence streamlines the customer service process, allows the interaction of one bot with a virtually unlimited number of recipients, and the conversation is possible 24 hours a day. Secondly, the use of bots is cheaper than the employment of human workers. In the case of process automation, there is just a one-off cost of creating the algorithm, its implementation on the website, and possible maintenance. Thirdly, emotional neutrality, and the effectiveness of bots translate into higher customer satisfaction with the service.

A report created for Gartner summits (2011) suggests that due to the proliferation of bots, by 2020, 85% of consumer interactions with enterprises will be based on artificial intelligence and automation. This will have a decisive impact on the decline in employment among people working in customer service centers around the world. In Great Britain alone, in 2018, there were 6,200 customer service centers, employing 1.3 million people. According to the ContactBabel analyses, by 2021, it will have released over 45,000 employees and replaced them with intelligent systems, including chatbots (Wood 2018).

Call center enterprises are the most exposed to the reduction of jobs in this area. In the United States, they employed 2.2 million employees in 2015, while in India, at the same time, the figure was 3.1 million (White 2015). The large-scale use of bots responsible for contact with customers can reduce the number of vacancies dedicated to human workers not only in both developed and developing countries. In the case of the latter, their retraining may not be possible, thus putting some of them at risk of social exclusion.

An attempt to use chatbots for contact with a company's environment is also observed in public organizations. The Swedish National Tax Board introduced a chatbot named Erik, which answers citizens on questions about tax settlements, already in 2004 (Erik 2018). The British National Health Service (NHS) is working on an application that would be an alternative to the traditional line 111, used for reporting accidents (Donnelly 2017). The City of London is introducing the TravelBot app, which allows visitors to contact virtual programs that help tourists visiting the city. While chatbots are replacing employees in enterprises, they seem to play a different role in public organizations. They started to support clerks in terms of the most routine work. Thus, a customer itself can choose what kind of contact (virtual or real) is more appropriate for them.

The advantage of bots over human workers in their interaction with customers is the low cost of their maintenance, the lack of negative emotions resulting from fatigue or irritation, as well as the immediacy of reaction. On the other hand, it is observed that consumers prefer direct contact with other people than interaction with a machine. Automation can be perceived as ignorance, which, ultimately, reduces satisfaction. Although the use of bots in the helpline sector affects the decline in jobs, the total displacement of human workers from this industry is still not a foregone conclusion.

Drivers

One of the most dynamically developing areas of the application of AI is autonomous vehicles. The sensing and cognizing systems allow programming a car in such a way as to meet all safety standards and deliver passengers to their chosen destination. Although this technology is still in the testing phase, it has already begun to affect the level of employment among professional drivers.

In 2013, Milan transportation service launched an autonomous metro line covering the distance of 4.1 kilometers (7 stations). In the following years, its range was regularly increased. One train is 48 meters long and can accommodate 536 passengers, offering 72 seats. All autonomous trains are controlled from the headquarters in Bignami (Chiandoni 2013). The comprehensive Automatic Train Control (ATC) program supervises the speed of the train, its technical condition, and passenger safety. No major problems in adapting the system convinced the carrier to expand its range and encouraged more cities to introduce similar innovations. In 2020, autonomous metro lines are operating in Copenhagen, Honolulu, Rome, Taipei, Milan, and Thessaloniki. With the introduction of the aforementioned innovations, the

demand for queue drivers is being systematically reduced. On the other hand, there is a growing demand for experts in the control and maintenance of systems whose task is to prevent any problems arising from the functioning of autonomous machines.

However, the metro is not the only area where autonomous vehicles can be used. From the beginning of the 21st century, there have been several international projects to create autonomous passenger cars. The area is dominated by two companies: Waymo (a project initiated by Google) and Tesla (manufacturer of electric cars). Tesla is working on a program that analyzes the surroundings of the vehicle, and bypasses the obstacles as well as adjusts the speed to the driving conditions. One of the company's initiatives is to involve professional drivers in the training program. Their decisions on the road are analyzed by learning programs which are then implemented in autonomous cars and tested in natural conditions (Daugherty and Wilson 2018). In 2018, Waymo started a similar program in American Phoenix aimed at the promotion of autonomous taxis. According to the creators' idea, a taxi will be ordered via a mobile application. After entering the vehicle the passenger will receive information about the travel time and price, remaining in constant voice contact with the service provider (Koroces 20180.

There is a high interest in popularizing this technology in many cities around the world. The British company Addison Lee announced the introduction of an autonomous taxi in London by the end of 2021, assessing the investment value at £ 28 billion (Khan 2018). By 2020, similar services are expected to start operating in Tokyo where trials in the real environment were successfully carried out already in 2018 (McCurry 2018). The introduction of the autonomous taxi will have an impact on the decline of employment among professional drivers around the world. Their physical presence in the car will not be needed, but their professional skills can be used for training programs, map updates, and parameter creation. It is worth noting that research on the willingness of consumers to use autonomous vehicles alone has still not been conducted. Their price competitiveness may not be enough to repress people from the transport market if potential consumers do not see them as safe and trustworthy solutions.

Cashiers and Storekeepers

Since 2010s, people employed in the trade have been gradually removed from the labor market. On the one hand, transfer of commerce to the Internet can be seen. On the other, there is the widespread use of AI in both small stores and supermarkets. Especially in the latter, the growing influence of modern technologies on the gradual but progressive reduction of employment can be identified. Three main trends are worth mentioning: beacons, self-checkout, and entire autonomous stores.

Beacons are devices that are based on Bluetooth technology whose task is to send a signal that can be identified by other devices located nearby (Lalik 2015). Beacons found their application, inter alia, in hypermarkets. Their main goal is to guide customers to the goods that are on their shopping lists. One of the pioneers in this area is Carrefour, which installed in its Romanian stores more than 600

devices of this type in 2015. They allow customers to find the sought-for goods without the help of the store's service (Supeala 2015). Visitors to the supermarket are encouraged to install the application where they can enter their shopping list. The application learns and suggests that customers buy goods that best suit their current profile, updating after every purchase (Samuely 2015). A traditional shop clerk was not able to remember all customers and evaluate what product would be best for them. In the long run, the use of beacons is linked with the reduction of customer advisors in stores and better matching between a particular offer and consumer's requirements.

Self-checkouts also have an impact on the reduction of supermarket staff. With their aid, the customer scans the prices of his/her own purchases without staff assistance. Self-checkouts were used for the first time in 2003. Since that time, their popularity has been constantly growing. Recently, they are also used in restaurants and

The case of Fukoku Mutual Life Insurance

While single professions can be potentially replaced by AI, some firms started introducing artificial intelligence in their processes at the cost of human workers. Fukoku Mutual Life Insurance was established in 1923 by a famous Japanese businessman and philanthropist, Kaichiro Nezu (https://www.fukoku-life.co.jp/). By the end of the 20th century, Fukoku became one of the major players on the Japanese insurance market, holding shares in various companies like airlines, banks, railway companies or manufactures, both in Japan and abroad (Carr 2012) with around 2% of the Japanese insurance market shares and JPY 749,706 million of total revenue. While not the biggest or the most influential company of its kind in Japan, in early 2017, Fukoku caught the attention of the world, appearing in the headlines of almost all mainstream media of the globe – the company decided to replace part of its workers with AI.

Fukoku Mutual Life Insurance, as many similar companies, had a vast portfolio of financial and insurance products, varying from saving funds to life insurances (https://www.fukoku-life.co.jp/). One of its product types was a whole range of medical insurance plans. An activity, which is the most time and resource consuming when medical insurance is considered, is the calculation of payouts (Figure 1). Traditionally, after a client fills in a claim, employees of the insurance company read and analyze all the attached documentation. After their assessment, a separate team of workers verifies and signs off the assessment, giving the green light to deliver a decision about the amount of payout to the client (IBM Watson Explorer Insurance Use Case). In some cases, where handwritten memos and documents could be challenging to understand (and analyze), this system faces a bottleneck, and the workload, as well as the time needed for the decision by the client, could become noticeably extensive. What is more, in such cases also an inaccurate assessment could cause a financial loss to the company.

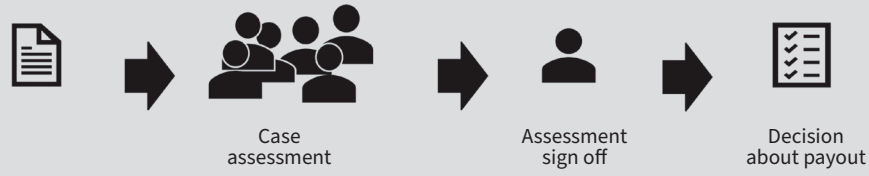

Figure 1. Scheme of the traditional payouts calculation process

cafes. While in 2018 there were 200,000 self-checkout machines in use around the world, it is estimated that by 2020 their number will reach 330,000 (Griffith-Greene 2018). An increasing number of consumers are deciding to use a self-checkout to save time or reduce contact with staff. There is an increase in acceptance for this type of solution. Initially, only 30% of all customers used self-checkout. In 2018 this number reached, depending on the country and the store, even 70% (Jamieson 2018). According to current statistics, further dissemination of self-checkout systems may lead to the liquidation of about 30,000 jobs in the United States by 2026 (Jamieson 2018). European countries observe similar trends.

An even more significant reduction of personnel is linked with fully automated stores. The first facility of this type, Amazon Go, was launched in 2018 in Seattle. Its idea is the lack of cash registers, monitoring the store using cameras, using artificial intelligence to help customers. Shopping at Amazon Go involves scanning

Fukoku had a separate department dedicated to the payouts. Its employees were responsible for calculating the payouts, based on the analysis of plenty of documents delivered by the clients, such as medical bills or hospital invoices. All in all, thousands of documents were analyzed every day. While the workers of Fukoku were well trained in doing their job, the process had the same pitfalls as in any other of Fukoku's competitors. In order to seek efficiency and accuracy, the company decided to incorporate an innovative solution. The board of Fukoku decided that by March 2017, it would replace 34 of employees– one-third of the payouts department – with an AI alternative, IBM Watson Explore platform (McCurry 2017).

IBM Watson Explorer is a machine learning and natural language processing-based platform, developed based on IBM Watson – a 'question-answering' supercomputer system demonstrated in the late '00s. IBM Watson Explorer could analyze company documents to perform cognitive exploration of patterns on the data, similarly as a human would, but better and far faster. The platform was named after Thomas J. Watson, the first CEO of IBM. As IBM described, Watson Explorer could "analyze structured, unstructured, internal, external and public content to uncover trends and patterns that improve decision-making, customer service, and ROI". The platform replaced the human workers in the case assessment phase, but the result of the assessment was still signed off by a qualified human employee (Figure 2).

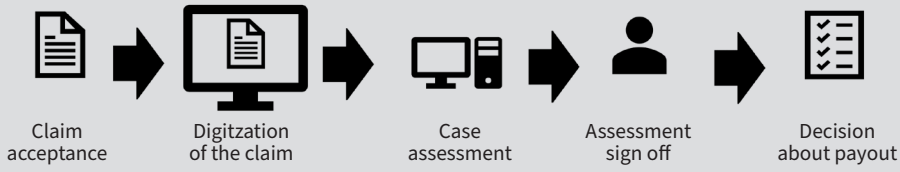

Figure 2. Scheme of the payouts calculation process with artificial intelligence

According to IBM estimations, the system could decrease mistakenly paid claims by 20% and workloads of an insurance company by 30% (IBM Watson Explorer Insurance Use Case). The initial implementation cost was estimated as the equivalent of 196 million yens and would cost 14 million yens to maintain. However, even with such high implementation costs, Fukoku estimated that AI would help to save about 140 million yen per year (Griffin 2017).

the application after entering the store, selecting and packing the goods. The bill is calculated automatically after leaving the store thanks to Just Walk Out system (Forrest 2018). Several companies have announce their plans to introduce automated stores. Sainsbury, for instance, is working on a "scan, pay and go" program, which they intend to introduce in their stores in London (Page 2018). According to the Bureau of Labor Statistics in the United States alone, 3.5 million people are employed as cashiers (Forrest 2018). The creation of automated stores will effectively reduce the demand for their services and it will change the shape of the labor market not only in the US, but also around the world.

Is the Case of Fukoku the Future or an Exception? – A Role of Cultural Factors in Automation

While being so open about reducing employment in order to implement AI solutions might be an exception, the use of algorithm systems to perform "human tasks" is not. Its competitors followed the move of Fukoku. Dai-Chi Insurance and Japan Post Insurance have both introduced AI in their processes. However, they did not fire their employees (McCurry 2017). Also worldwide insurance companies are implementing AI. The practice of Fukoku is getting more and more common, but most companies do not openly admit it (Ng 2017). Nowadays implementing AI might be a challenge for the Public Relations departments, since replacing workers with a computer is ethically ambiguous. In the future AI might be a solution to many societal problems. However, in various cultures, the approaches towards AI and automation of labour may differ from each other and determine the deployment of AI solutions.

In countries like Japan, decreasing and aging population is a widely studied challenge (Figure 3). With the increased ratio of the elderly population and decreased

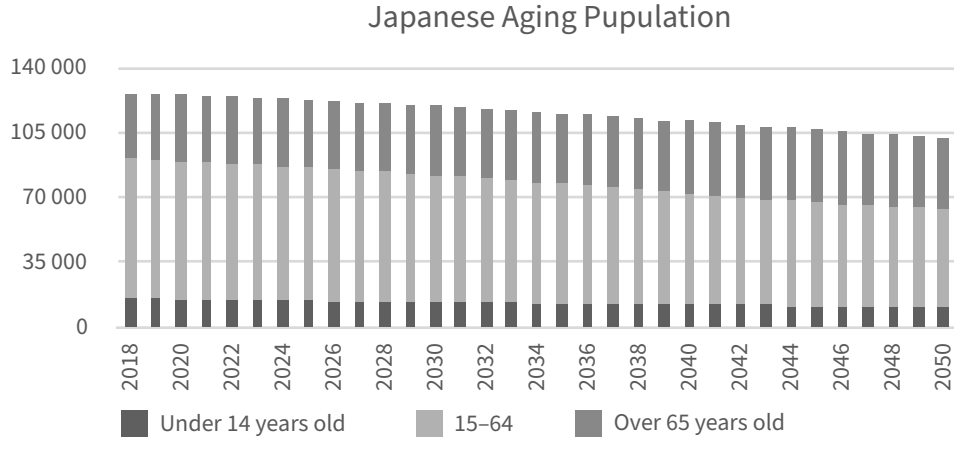

Figure 3. Forecast of Japanese population number by age
Source: Statistics Bureau of Japan 2019.

number of the active labor force, Japan is facing a severe threat of labor force deficit in the future. This is the main reason why the Japanese government is working on the strategy that is meant to introduce the concept of Society 5.0 whose essence is the common adoption of robots into society that may balance the negative effect of aging society (Gladden 2019). Similar forecasts are made for many other countries too. The deficit of labor may be solved by the introduction of AI and robots in many industries. In the case of Japan, it is estimated that by 2035, 49% of jobs in Japan could be performed by robots or artificial intelligence. Similar (yet lower) numbers are estimated for UK (35%) and US (47%). Nowadays, Japan is the leader of the introduction of artificial intelligence solutions in many areas of life (Jozuka 2015). One of the reasons why the Japanese society accepts artificial agents is the presence of such entities in the Japanese culture. There have been plenty of examples of technologies being popularized in Japanese movies and press for decades which turned out to be the main component of the national brand (Iwabuchi 2015). It seems that people have got used to such solutions and perceive them as an answer to the demographic challenges they are already facing.

Yet there are many aspects of how business cultures vary in terms of human relationships, communication, cooperation (Meyer 2014; Gesteland 2012; Hofstede 2003). These cultural factors also affect the human resources management and manager's strategic thinking (Graham 2009). While, to our knowledge, there is no empirical evidence of such differences in the context of AI, a decision about applying AI solutions to a company's everyday tasks is of strategic nature. Thus, as any other decision, it might be profoundly affected by the managerial and national culture. What might seem the right solution in a Japanese firm may be considered too risky or unethical in other parts of the world, or even in a firm of the same origin but with different organizational cultures (Lau and Ngo 1996).

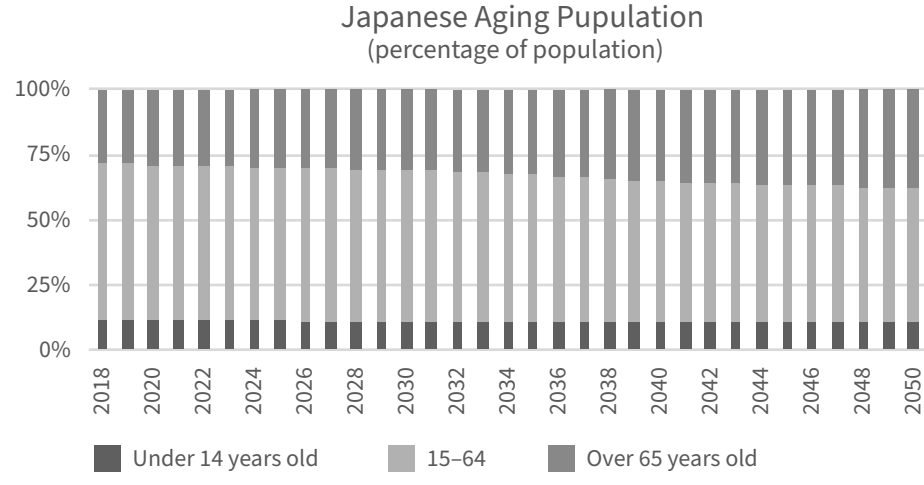

Figure 4. Forecast of age percentage of the Japanese population
Source: Statistics Bureau of Japan 2019.

An example of such a cooperation between human and artificial agents is cobots, already introduced by many companies. While we have shown one of many cases where AI replaces human workers in Japan, the European approach seems to be different. Companies such as online vendors like the UK-based Ocado (Harris 2017), Swiss and Italian hotels (Bonaretti et al. 2020), as well as German carmakers Mercedes-Benz and BMW (Hollinger 2016) have decided to introduce automatic processes that cooperate with human employees and create mixed human-machine teams. For instance, cobots are autonomous devices that are designed to work with humans and not instead of them. They are defined as "robotic devices which manipulate the object in collaboration with a human operator" (Colgate, Wannasuphoprasit and Peshkin 1996) and, in contrary to industrial autonomous robots, do not have to be separated from human workers (Peshkin and Colgate 1999). Cobots are intended for direct interaction with a human, sharing their work and increasing their efficiency. Such solutions are already implemented in manufacturing (Akella et al. 1999), facilities maintenance (Veloso et al. 2012), education (Timms 2016) service personalization (Bonaretti et al. 2020) and other areas. Semi-automatic devices reduce costs by increasing productivity. Thus, they fulfill the needs of employers who think of applying autonomous devices. However, they are not to replace human workers – they enhance their productivity. Cultures that are based on individualism, are long-term and profit-oriented may be more apt to accept full automation than relationship-oriented collectivists which prefer the cobotic approach. This hypothesis, however, has not been investigated yet and constitutes a substantial lacuna for further studies. In order to maximize the benefits of any form of automation, the technology running should be individually designed to each culture (Chien et al. 2018; Sheridan et al. 1983). Moreover, it seems that various professions are perceived differently across cultures. Being a clerk in China may be more prestigious than working in the same profession in Greece or Turkey. On the same principle, human sellers may be more appreciated in the middle eastern cultures, where there is a cultural tradition to bargain before purchase, than in other parts of the world (Salacuse 1998). Such differences in collective images and traditions across cultures may stand behind various acceptance rates for full/partial automation.

Conclusions

There is little doubt that AI, bots, and robots are going to change the future of work. The fears about AI replacing humans are natural, particularly considering the examples presented in this chapter. However, the real power of artificial intelligence will be demonstrated when it starts enhancing human productivity, rather than replace human workers. Thus, the introduction of autonomous devices and software should not be considered as a threat to humanity, but as a chance to push it towards new achievements that can actually help future employees. We have presented scenarios

and examples of technology replacing human workers, in which machines seem to be an alternative to humans in the workplace characterized by repetitiveness, routine, and low emotional context. However, our intention is not to draw a pessimistic view of the future of work. The proliferation of artificial intelligence in various areas of labor does not necessarily mean that human workers will become useless. The main reason why machines are taking over the jobs of individuals in all of the professions mentioned above is their superiority in three areas: speed, accuracy, and cost. Intelligent (ro)bots are faster than humans, capable of completing more actions than humans at the same time, and their reactions to orders are instantaneous. What was also noticed is that the effects of their work are more precise and standard. Above all, however, intelligent (ro)bots are perceived as cheaper. All in all, these three elements increase performance and reduce the costs of labor. Although the entrepreneur must pay for creating an algorithm or a machine, in the long run, it is still less than paying monthly salaries for the whole line of human workers.

So why are we not ready for full automatization? There are several reasons. One is the current state of artificial intelligence. Today, it is still far from the natural, human intelligence – machines cannot fully replace human workers yet. While AI can perform specific tasks far faster and more accurately than humans, we have "only" achieved narrow AI (Bostrom 2017), limited to performing a very specfic task, although it can perform this particular activity better than a human would (Kaplan and Haenlein 2019). Yet, we are still far from the general AI – a level in which a machine can be applied to several areas and can autonomously solve problems in various tasks or areas of work – similarly as a human would do. Now, unless programmed for dealing with or learning from specific exceptions, AI cannot compare with humans in terms of the application of knowledge to new, unknown situations. Thus, in general (not in the domain of a particular activity), it will perform worse than humans.

Another possible reason can also be the sophistication of machines used for the automation of work. While, in general, machines increase performance, overuse, or over-complexity of automated solutions can cause the opposite effect (Wilson and Daugherty 2018b). The real-life example of this problem comes from the Tesla car manufacturer. According to the initial plans, the production of Tesla Model 3 was intended to be fully automated, like in a science-fiction reality (Randall 2018).[1] However, the extent of sophistication was too elevated. The number of production reached 2000 units per week, instead of the planned 5000 – less than a half. In 2018, Elon Musk, the CEO of Tesla, decided to reduce the automation of production and said that humans are "underrated" as workers (Musk 2018).

Furthermore, as we have demonstrated, cultural factors and perception of AI may play a role in how automation is implemented in various firms. To study to what extent those approaches, different between countries, are affected by managerial cultures would be an interesting topic for future inquiries.

1 Elon Musk even called it an "Alien Dreadnaught" (Randall 2018).

Given the above examples, we can conclude that the future of technology should be about technology enhancing human powers, the same way as the plow transformed food production. Not about replacing them. The companies which try to replace their workers entirely with AI will miss the full potential that AI brings (Wilson and Daugherty 2018a) or may even run into problems, as Tesla did. Thus, the big challenge of future research should not be about finding ways to deal with the replacement of humans by technology, but how intelligent and autonomous technology can be applied to human work tasks in order to improve human performance (Rodriguez et al. 2019). Moreover, we should think of the ways to adjust the work tasks and to allow a close collaboration of individuals with the machine (McKendrick 2018). This can require changes on both the technology and the human side. However, such solutions could lead to a collaborative intelligence – a situation where human collaborates with machines and the joint power of both natural and artificial intelligence work to increase the performance (Wilson and Daugherty 2018a).

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Key Terms and Definitions

Artificial Intelligence (AI) – a system's ability to correctly interpret external data, to learn from such data, and to use this information to achieve narrowly defined (with the current state of technology) goals and tasks through flexible adaptation.

Autonomous technology – a type of technology based on Artificial Intelligence that is able to make decisions and perform tasks without human assistance.

(Ro)bot – a software agent or a device capable of carrying out a complex series of actions automatically. Robots act in the physical world, while bots act in the digital sphere.

Cobot – an autonomous device designed for direct interaction with a human and intended to work with humans, sharing their work and increasing their efficiency.

Disruptive innovation – a type of innovation that creates a new market or/and eliminates from the market companies or products that are perceived as its direct predecessors.

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