

Automation and robotics as a means of improving employee satisfaction and mitigating an aging population - a valuable opportunity for Japan and Serbia

(Аутоматизација и роботика као средство побољшања задовољства запослених и ублажавања последица старења становништва – шанса за Јапан и Србију)

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Foreword

In this essay, I will first use the Geert Hofstede model to analyze the characteristics of Asian and Serbian people in a way that will later on prove to be useful for assumptions stated in how well I believe certain paradigms prevalent in Japan, including but not limited to automation, would fit Serbia. Further on, I will attempt to bring Japan's corporate culture closer to the reader, so that we have a historical context as to why certain phenomena are occurring in Japan, and attempt to draw parallels to this in Serbia by comparing the World Bank data on certain age parameters that I believe are relevant to this study. Later on, the study will concern itself with what automation really is in an attempt to dispel myths when dealing phrases most commonly used in the automation industry. I will mention a few case studies and reference works that aid my case, with finally analyzing the sectors in which RPA and automation might make the most differences in Serbia, from an economical standpoint. Of course, at the forefront of this essay is the human element – making people's lives better and more enjoyable, so I will attempt to cover the benefits that using such systems yield from a non-measurable perspective – opening up our capacities for empathy, caring for children and the elderly. It is my first time taking up a subject as vast and as complex as this one, and I hope that the readers of my work at JTI and hopefully beyond can look past that, and understand the enthusiasm and energy I have approached this matter.

Overview of corporate culture in Japan

The Geert Hofstede model - analyzing and contrasting characteristics of Asian and Serbian people

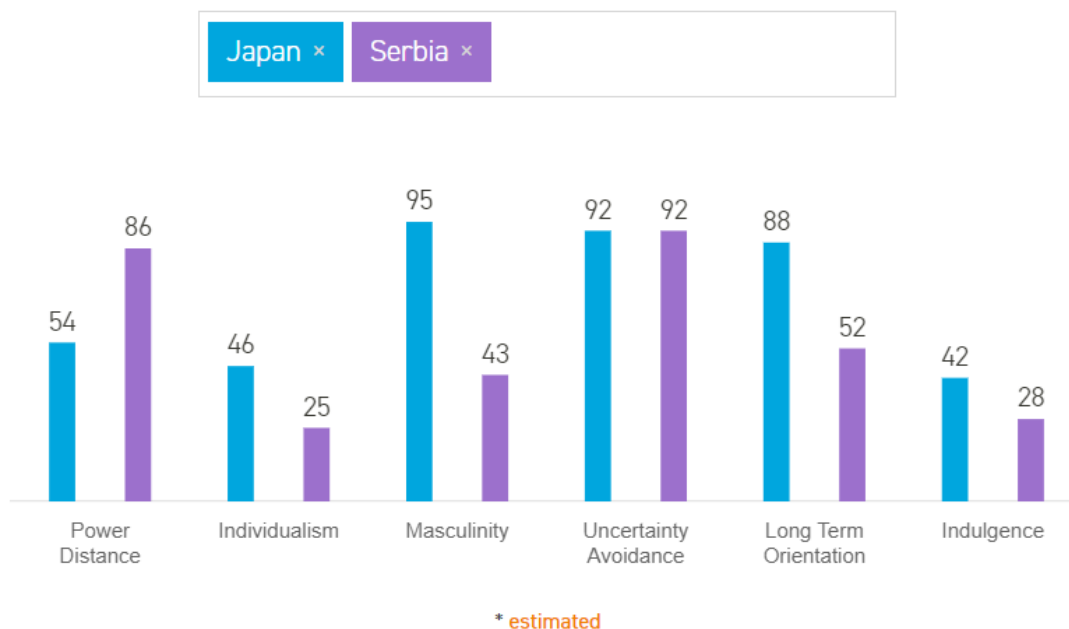
The work ethic of the Japanese people is revered by and large, and it in no small part the key to the success of the Japanese economy as a whole. This characterization of the Japanese can be best perceived by comparing it to rest of Asia (bearing in mind the economic similarities and level of development of these countries, on the global level), and it is perhaps best seen through the lens of the following model, the Geert Hofstede model which analyzes certain traits, as described by the table below.

Indexes / Countries	Power Distance	Individualism	Masculinity	Uncertainty avoidance	Long term orientation	Indulgence
Japan	54	46	95	92	88	42
South Korea	60	18	39	85	100	29
China	80	20	66	30	87	24
Hong Kong	68	25	57	29	61	17
Singapore	74	20	48	8	72	46
Taiwan	58	17	45	69	93	49

Table 1.1: Model of multicultural dimensions across Asian economies

As described by their website¹, the Power Distance Index is indicative of the degree to which the less powerful members of society are accepting of the fact that power is centralized and the extent to which their society attempts to rectify this. The higher this number, the higher the respect citizens have for the hierarchical order present in their society, unwilling to change anything, whereas a low number indicates a constant demand for justification of these inequalities.

Individualism, as the name implies itself, shows the extent to which individuals are expected to take care of only themselves and their immediate family members. We can see that Japan is one of the more individualistic countries in this model. According to this model – Japanese are considered to be collectivist by Western standards, and very individualistic by Asian standards. Perhaps the most interesting and surprising of these would be the “masculinity” trait, in which the Japanese seem to excel at. This dimension represents heroism, assertiveness, and traits one must exhibit in the corporate environment of Japan, if they were to achieve success. We can contrast this even further by comparing it to how Serbia fares in this regard, so that we can have a more complete overview of what these traits actually mean, as evidenced by Table 1.2



Graph 1.2 Multicultural Dimensions - Japan compared to Serbia

Although I’m sure many would characterize Serbian men as masculine, we must not forget that this model is not male-centric; in fact, this scale shows us the degree to which both men and women exhibit traits, which are defined by sociologists to be masculine, rather than feminine. Attention to detail and perfectionism, the pursuit of excellence in providing a service or producing a good is at a much greater level than in Serbia. The accountability for one’s actions – as one of the things that many would agree on is what separates boy from man is paramount to

¹ <https://hi.hofstede-insights.com/national-culture>

the Japanese.

This model assumes an equal factor of uncertainty avoidance between Serbia and Japan. This factor describes the way a society deals with the uncertainty that future brings with it. Japan is no stranger to tsunamis, seismic activity and other natural disasters. Furthermore, their involvement in WW2, including but not limited to the irreparable damage caused in Hiroshima and Nagasaki, is something that makes them deserving of this rating. We're to believe, and rightfully so given the historical facts, that Japan has a contingency plan in place for many events that happen. It has become a fact of life in Japan that life is ephemeral and there is a strong culture and social etiquette attached to important social events, and resisting change is something the Japanese are very good at, even to their detriment. Hence, a high level of this metric is indicative of the extent to which one culture feels threatened by the unknown. However – how come Serbians and Japanese are being assigned the same value in this category? Serbians do not seem to have a history of occurring natural disasters? The answer is simpler than it might seem – Serbians are a hardened and tempered people. I'd take an example from my family to illustrate this point. Let us consider my grandfather – he was born in 1935 and died in 2012. He was born in what is considered to be the Kingdom of Serbs, Croats and Slovenes (a centralist country in which Serbia itself was not a political entity). In 1941, the axis invasion and occupation of Serbia by Nazi forces created what was an annexed “puppet” state of Serbia in service of Germany. Afterwards, after the liberation by the Soviet Red Army and Yugoslav Partisan forces, he lived in a restored Yugoslavia which, this time around, consisted of 6 equal republics, with had a centralist governing regime – communist Yugoslavia, which essentially ended with the death of Josip Broz Tito in 1980, but lived on for a decade on its last legs. Later on, in the 1990s, he would live in the war-torn Federal Republic of Yugoslavia, and the NATO bombing of Serbia in 1999, as well as the assassination of the prime minister in 2003, and then 3 years later he would live in a country which would become into Serbia and Montenegro, and then finally Serbia as of 2006. Had he lived past 2012, he would be experiencing the floods of 2014 and the Coronavirus epidemic of 2020. Quite a lot of events for what is considered to be a “below-average” life span in Japan, for a man 77 years of age. Considering that the vast majority of these changes were not peaceful in the slightest, often riddled with protests, bloodshed, war atrocities and death, it is not a surprise that Serbian people have grown accustomed to whatever the world throws at them. Although these events leave a mark on people, I believe it is the occurrence of these events and the learned resilience that the Serbian people now have, that makes the Uncertainty Avoidance index of 92 completely justified.

LTO – long term orientation is perhaps the most crucial of all factors for this work of mine – it refers to the way society maintains links with its past while dealing with the challenges of the future. Two existential goals that might seem at odds with one another at first glance. A low LTO score assumes a normative society prefer tradition and views social change as a potential hazard, and vice versa. The rationale behind the score of Serbia and Japan can be explained by looking at how long companies in Serbia last, compared to Japan. The idea the *zaibatsu* (財閥) was to provide immediate value through vertical integration of businesses in order to spearhead economic development, it was also designed to provide long-lasting value for generations to come. Although it has lost the relevance it had in the Meiji Restoration period up until the second half of the 20th century, the structure changed into the less stringent *keiretsu* (系列) system which allowed for both horizontal and vertical integration, but in a less strict and interwoven

sense. The names of companies that still exist to this day that belong to what were once the Mitsubishi, Mitsui and Sumimoto conglomerate groupings stretch back as far as 400 years ago! This is proof that the long-term commitments are honored and a central part of Japanese culture. (Addicot, 2017)

This culture is apparent when observed in Korea – taking for example chaebols, hence the benchmark rating of 100 in table 1.1 for South Korea. Serbia, on the other hand, had gone through many political, economic and societal changes in the past, and the privatization/restructuring of domestic enterprises has more often than not led to the loss of Serbian identity as many of them change their workforce and image when the new owner assumes ownership of the company. Many employees are sent on temporary leave before these transactions are finalized, and then their contracts terminated or re-negotiated. (Begovic et al, 2000)

Last, but not least, the measure of indulgence refers to the lack of suppression (opposed by restraint) that society allows for. How freely expressed is the gratification of basic and natural human drives of enjoying life and having fun? Japan and Serbia both exhibit a relatively low score – because this dimension also reflects traits such as pessimism and cynicism. In contrast to indulgent societies, those that display a level of restraint do not have an emphasis on leisure time, hence the explanation for the lower levels in Serbia – leisure activities are often cost-prohibitive and go hand in hand with the economic status of the country.

The idea and the decline of the *nenkō joretsu* seniority principle and *shūshin koyō* lifetime employment principle

One possible definition of the *nenkō joretsu* seniority system is the practice of increasing wages and salaries with tenure inside the firm, correlated with one's age (Witt, 2014). During the Japanese economic boom mid-20th century up until the peak of the economic bubble of the 1980s and the dot-com bubble of the 1990s, this system was the de-facto principle in a great number of firms across Japan. There was very little mystery about the pay each and every employee had, hence there would be no discrimination or envy involved (Haghirian, 2010), compared to modern times, especially in the west, where the practice of hiding one's salary is commonplace. This system assumes that when a new employee (usually hired through the *Shūshin koyō* system of lifetime employment, when university graduates are en-masse recruited through what is the *Shinsotsu-ikkatsu-saiyō* event – simultaneous hiring²) enters the company, they're expected to learn the workings of the company to the very last detail, and that their salary will reflect this fact – being the lowest at the beginning. This system of lifetime employment was successful in Japan's post-WW2 period due to labor shortages – firms provided lifetime employment while college graduates provided loyalty and status to their companies.

² As noted at the beginning of this paragraph, this is not the case anymore, and companies are no longer required to follow this tradition from 2020 onwards, after almost 6 decades of following it <https://www.bbc.com/worklife/article/20190731-why-japans-shkatsu-is-disappearing-for-japanese-youth>

The flaws and the decline of traditional Japanese corporate management systems

The reason why the *nenkō joretsu* system did not persist through the years is manifold, and it has to be looked at from a historical perspective. First of all, compared to western countries, the low labor turnover rate under this system does not allow for a synergy and knowledge transfer between colleagues at the workplace. Despite younger people at medium or even low positions often times being more skilled at certain tasks than those occupying executive-level positions, they are unable to achieve a promotion due to their age, which breeds resentment and dissatisfaction in a company, ultimately reducing productivity and working against the interests of the company as a whole. Furthermore, real macro-economical factors were at play at the time – the depreciation of the yen in 1985 allowed for a more relaxed monetary policy by Bank of Japan, therefore making borrowing cheaper for companies and offering long-term repayment schedules. However, bundled with boom of the speculative asset markets, the 1990s were a period of increased public debt and low growth rates, which would result in a reduction of annual real GDP growth and an increase of unemployment from 2.1% to a peak of 5.4% in 2002, a decade that would be referred to as “The Lost Decade” (*Ushinawareta Jūnen*).

The implications this had on management was manifold. (Bird, 2002) During this time period, many companies had to restructure (“*risutora*”) – whether it was by transferring staff to other branches, increasingly relying upon temp workers and reducing permanently employed staff or forcing employees into early retirement, the 1990s shed a light on the importance of employee performance, rather than seniority as well as communication issues between the older and newer employees (Yoshikara, 1996). Some attribute the Lost Decade to Japan’s inability to respond to globalization (Olejniczak, 2013)

One of the explanations of the abolishment of the *Shūshin koyō* system in 2020 is that this tradition did not apply to foreign multinationals, who often times offered faster promotions and higher starting salaries when compared to companies who were de-facto still operating within the antiquated framework where a lot of senior positions were occupied by an aging population. And it really does make sense – when one thinks about it. The increasingly globalized and interconnected world economy cannot wait for each and every country to adapt their habits, tradition and later on the regulatory apparatus. The *shūkatsu* (short for *shūshoku katsudō*, job-hunting) system does not appear to yield results to the vast majority of job-seekers, and taking initiative is now being rewarded instead of silently penalized.

Furthermore, under the management principles mention above, even top-ranking employees were no strangers to overworking – *karoshi* (death by overworking). The amount of physical duress that these people are exposed to, often times working as much as 12 hours per day, 6-7 days a week, year in and year out wears people out. Data from 1988, for example, illustrates that well over a quarter of Japan’s working population worked over 60 hours per one calendar week, well above the typical 40-hour working week (Koji, 2004). It is especially interesting for the purposes of this research, that data from the Karoshi Hotline Network (a hotline specifically set up with the intent of supporting those suffering from overworking) shows that those who used it the most were in fact wives and family members of workers, due to the workers themselves not being aware of how prone they are to overworking themselves to death. Authors also note the social stigma attached to asking for help in relation to this issue (Tetsuro, 1994).

While the problems of *karoshi* are usually described by have mostly been ameliorated thanks to government policies, the issue persists to some extent even today. Although *karoshi* is usually associated with frailness of body – such as a heart attack, stroke, starvation diet, it is more likely to be a mix of both mental and physical issues, known as *karōjisatsu* (people who commit suicide due to mental stress brought on upon by excessive work). Let us take the example of Maturi Takahashi, a 24-year-old woman that committed suicide in 2015 after excessive overworking at Dentsu Inc., a major Japanese advertising agency, just 8 months after getting her first full-time job (Ministry of Labor, Health and Welfare (April 2016)).

What makes this case especially interesting is the fact that this was not the first employee to take their own life at this company; namely, in 1991, a male worker killed himself under similar circumstances. Furthermore, as an (albeit delayed) reaction to this, the Supreme Court of Japan ordered Dentsu to improve working conditions, in 2000 (裁判所 | 裁判例情報: 検索結果詳細画面, 2016). This has proven that not even a Supreme Court ruling was able to change a company's corporate environment – and that there was a cooperative effort by upper management to make employees falsify their checking in and checking out time (Sankei article, 2016). Shinzo Abe's administration probed a first ever investigation and report on *karoshi* – with the official announcement citing that up to 23% of the major companies in Japan have the possibility of having illegal over-work (Ministry of Labor, Health and Welfare (April 2016)). One of the results of this investigation was the insight into just how understaffed the labor standard inspection office is, compared to the amount of companies that need oversight and investigation! This shows that Japan, despite being a developed country, has a low level of self-regulation in this area, and that social norms that have been in place as a consequence of the traditional corporate management methods referenced in the section above have surely not helped in this area.

The baito – part time job workers

The Japanese word *baito* (バイト) is an abbreviation of *arubaito* (アルバイト) which was borrowed from the German word *arbeit* – work. (MSN, 2013) The term refers to people who have deliberately chosen not to become salary-men, despite the availability of jobs at the time, but recently, it has more often been the case than not that there is indeed a shortage of jobs, and that partaking in these jobs do it due to laziness or the feeling of complacency and comfort they take in these low-paid, low-skilled jobs. Another term commonly heard is “Freeter” (フリーター, *furītā*). It refers mostly to part-time work of university students, and it draws its roots from the popularity German and English languages enjoyed in Japanese universities before World War II, and it is of a newer date, a portmanteau of the word “free” for “freelancer” from the English language, and *arbeit*, as explained above.

The Japanese Institute of Labor (JIL survey, July 2000) distinguishes between 3 groups of freeters, depending on their personality. The first one – known as the “*moratorium freeter*”, is the type of person that is using part-time jobs as a means of putting off taking a regular job until they know what they want to do in real life. In other words, their life is “on pause”, as they are waiting for the conditions to be ideal for their “real” life to begin. The danger of this line of thinking was well described in the anime “Kaiji” (賭博黙示録カイジ), where one of the recurring adversaries gives a speech to the eponymous main character on how people live their meaningless lives,

wasting precious days over nothing, and constantly continuing to tell themselves and everyone else that their real life hasn't started – only to realize on their deathbeds that the life that they lived was the real thing. They have no idea what they want to be in the future.

The second type is the “*dream pursuing*” one, where an individual's specific dreams and system of values are simply incompatible with Japanese society. They pursue their dreams on their own terms and participate in the low-skilled, low-paying jobs while working on their dream. For example, someone who wants to become a DJ or a music producer – they need a job so that they can support themselves, their audio equipment, but not much more than that, so they are fine with using this as a stepping stone. He might seem similar to the *moratorium freeter* but this second type is much more focused than the first one – he knows what he wants and this is something he tries to juggle alongside his real passion. He takes his hobby seriously, and takes the job less seriously than most, knowing he has alternative jobs available to him.

The third, “*no alternative*” or sometimes called the “*can't help*” freeter is the type of person that couldn't, despite having a university education, enroll into a company during the yearly intake, courtesy of the *Shinsotsu-Ikkatsu-Saiyō* system further described in the previous section. This can demotivate people to finish their university degrees, as it is often the case that they become part-time workers due to having to pay for school fees themselves, or to afford living in the big city. In time, they realize that they have no future prospects, and settle for these jobs.

According to the survey of the Japan Institute of Labor, the *moratorium type* is the most numerous one. Nearly a half (39.2% in that specific survey) of freeters identify as that type, with the third category following suit. The dream seekers are the minority. One explanation is that, after the collapse of the bubble economy of the 1980s, Japanese companies stopped training people on the job – this training did not only pertain to the technical know-how and a specialized set of knowledge related the job itself, but in fact helped foster communication skills and a general feeling for the corporate culture in an individual. Companies became very strict in hiring young workers, and did not have the patience nor the resources to hire young people with no abilities, hence people had no choice in becoming freeters and baito.

What are the benefits of being a freeter? Well, holidays are easy to take, and the shifts are flexible – hence a strong accent on personal free time. Jobs are mostly devoid of fun, sure, but also free of any great responsibility. In fact, there even exists a special phrase **Part-time job terrorism** (バイトテロ, *baito tero*), which refers to the malevolent practice of pranks, stunts and jokes that part time employees pull on one another, in an attempt to make their time spent at work more interesting and (Wall Street Journal, 2013). The part-timers often post pictures and videos on their social media in attempts of receiving gratification from their peers, and this part of escapism is often branded as damaging to the reputation of a business, going as far as to negatively impact a company's financial bottom line. Some companies even go as far as to hold their employees financially accountable for loss of business accrued as a result of this behavior (MSN, 2014).

Although it might seem interesting to be a part-timer to a layman, and part-time job terrorism definitely does seem to amuse other likeminded part-timers, seeing a mutual approval of that lifestyle, that it is indeed possible to have fun at the workplace; the overall cons of this lifestyle seem to outweigh the pros. The top-ranked fear of part-timers, as per the 2000 survey is the lack

of a secure future and chances of getting a promotion. Pensions and insurance policies are bottom of the barrel compared to what the rest of the workforce gets, and their disposability, which some argue to be their greatest asset (the ability to switch from one job to another), is also their greatest flaws. In 2000, the average per-hour payment of a person doing a freeter job was 856 yen, which would, assuming standard working hours, *ceteris paribus*, amount to 138,000 yen a month. Full-time workers earned 1,025 yen per hour, or 170,000 yen per month. Not that great of a difference, however, let us take into consideration other factors. Starting your own household is very cost-prohibitive, hence – freeters tend to live with their parents. Their salary, but much more than that, the unlikely chance of them getting promoted or being able to start a proper career, deters them from earning higher pay later on. Companies, understandably, want a young person, ambitious and energetic person that is at the same time easy to mold into their corporate culture, not a 30-year-old who should, by the opinions of many, already have started their own family. Furthermore, once health issues start catching up with you, lack of a proper medical insurance policy makes out-of-pocket expenses difficult to finance. As is the case in many countries, Serbia included, the pension system relies on a high number of workers and a lower number of retirees – but in practice, an aging population means that there are more users of the pension system than are current contributors to it. Proper workers' unions, protecting the interests of the employees, should, at least in theory, provide a legal framework protecting the rights of the workers, but in the case of baito workers, it doesn't exist.

There are, of course, NEETs as well – the **hikkikomori** phenomenon. Hikkikomori (ひきこもり or 引きこもり, lit. "pulling inward, being confined", i.e., "acute social withdrawal"). NEETs – not in education, employment or training, represent an alarming amount of Japanese youth, mostly blaming the economic stagnation of the 1990s for their rise in numbers. The disintegration of the lifetime employment system has brought uncertainty into the lives of many, and with uncertainty discouragement. Some believe that the hikkikomori culture is a reaction to the salaryman lifestyle, but a step beyond what the freeters do, and that freeters would, to an extent, want to be like hikkikomoris, but the reality of the economic situation (their parents not being able to afford their lifestyles) doesn't allow for it.

Stylized facts about the Japanese labor market

Foreign labour is an important determinant in the economy of Japan

Given the labor market inefficiencies of Japan mentioned previously, imported labor has been seen as a possible solution to shortages in industries where there are simply not enough people who want to take the unpopular, low-paying baito job. Foreign workers who are very lowly paid in their home countries are enticed by the comparatively high Japanese wages. Let us take the example of Chinese and Vietnamese workers in Japan. The economy relies upon them for the so-called “3K” jobs - Kitsui (demanding), Kitanai (dirty), and Kiken (dangerous). These jobs are provided to Chinese and Vietnamese workers with the caveat that they have to make a monetary deposit with the agency which intermediates between the Japan International Training Cooperation Organization (JITCO) and themselves, as a guarantee that they will abide by the terms of the contract, working for their assigned employer. However, it is not at all uncommon that a number of these workers abandon the program due to long hours, exploitative working conditions and

limited freedom (Satoshi, 2008). “Since the 1980s, Japan’s manufactures have found it increasingly difficult to recruit workers locally, particularly for low-paid, labor-intensive jobs in the so-called 3K industries...China’s economic reforms created a huge labour surplus in that country, which had to find employment somewhere”. (HK China Labour bulletin, 2011) Officially, in 2008 there were 486,400 foreign workers in Japan: 43.3% of Chinese, 20.4% of Brazilians, 8.3% of Filipinos and others (Mackie, 2010)

One proposed solution to economies in a similar situation as Japan is to relax immigration laws for younger people, and have them populate Japan – a decision that would not go well with the ever-growing number of the elderly in Japan, politically speaking.

At one point in time, Japan bought companies in the USA and employed lots of Americans – but that trend completely reversed

Although the United States remain an important strategic partner for the Japanese economy, the presence of highly skilled American employees has all but diminished in the presence, when compared to the booming economy of the late 70s and throughout the 80s, thanks to the strong Japanese yen under a lax monetary policy (described in above paragraphs). This led to acquisitions and mergers instigated by Japanese companies – for example Lawson’s, a convenience store franchise originally from Ohio in the 1930s, later bought out by the Sara Lee corporation (Consolidated Foods) in 1959, only to be ultimately bought out by the Daiei Corporation in 1975, with its name and shareholder structure changing to Lawson Japan Inc. in 1979. The economic slump of the 90s and 00s reversed this trend and western companies, mostly interested in the automobile industry Japan had to offer, bought up increasingly large stakes in vehicle and vehicle equipment manufacturing companies

Some argue that the labor market landscape has changed so much in the past few decades, that the economy is reliant on part time workers, temporary workers, irregular workers (Keizer, 2009) It is exactly for this fact, that I firmly believe that automation of workplaces is instrumental to a healthier society as a whole, and where Serbia and Japan can truly benefit from one another’s best practices.

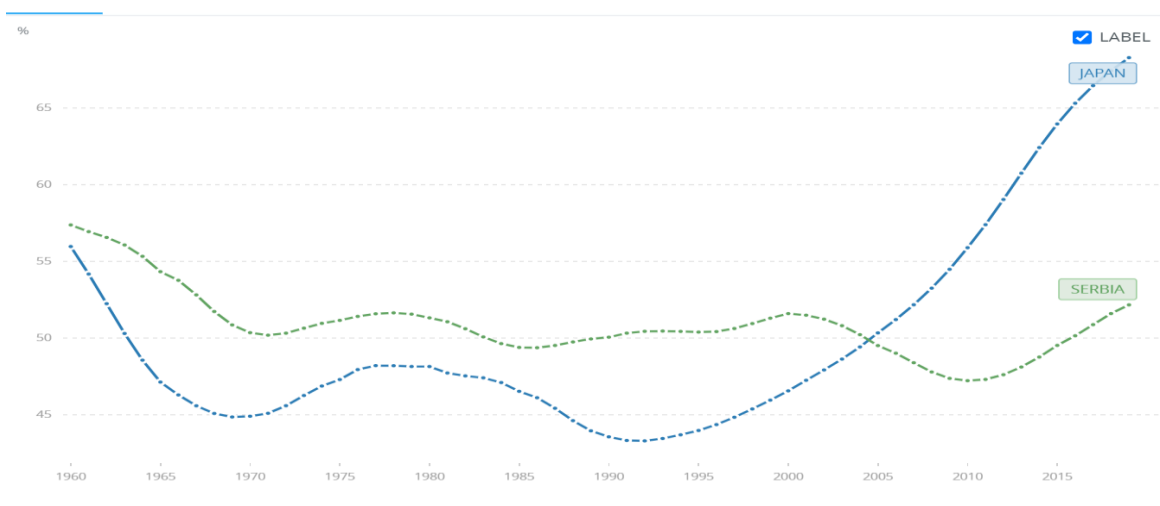
Negative demographic outlooks are a huge detriment to a healthy labor market in Japan

A low fertility rate of 1.4 per woman in 2019 is relatively low compared to the East Asia & Pacific average of 1.8 and in line with that of Serbia (including Kosovo), which is hovering at around 1.5(World Bank Statistics) – this is indicative of a shrinking population. Going a step further, we can calculate the age dependency ratio³, a metric that shows us the ratio of dependents (people younger than 15 or older than 64) to the working age population (those between 15 and 64 years of age), ergo:

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- ³Relevance to gender indicator: this indicator implies the dependency burden that the working-age population bears in relation to children and the elderly. Many times single or widowed women who are the sole caregiver of a household have a high dependency ratio.

$$(\text{Total}) \text{ Dependency ratio} = \frac{(\text{number of people aged 0 to 14}) + (\text{number of people aged 65 and over})}{\text{number of people aged 15 to 64}} \times 100$$

yielding the graph below.



Graph 1.1 – Comparison of age dependency ratios between Japan and Serbia

On the graph, we clearly see that Japan and Serbia had a similar age-dependency ratio of about 50 in 2005, which would continue to rapidly increase in the case of Japan, while moving downwards in the case of Serbia, only to accelerate in the second part of the current decade. A higher ratio indicates more financial stress on working people and possible political instability, while a lower ratio can, as a rule, allow for less of a strain on the pension and healthcare systems (Yashiro, 1996). Furthermore, high dependency ratios can lead to a decrease in rates of saving and investment, stunt housing market growth and radically affect consumption patterns therefore indirectly affecting industry in an economy. Economic theory asserts that workers will, as a rule, save a larger proportion of their income for consumption after retirement. This ensures that the savings can be used by financial intermediaries (banks) or businesses (issuers of bonds, stocks, etc) to finance investments in the real sector. However, due to a decreasing population as a result of lower fertility rates, savings decrease in the long run, while long-term interest rates increase due to increased uncertainty, among other things. Due to a decrease in saving rates, investment rates decrease as well. A well document correlation between the housing market and a labor force exists – when a high age-dependency ratio exists, the investments in housing markets will decrease since the labor force is decreasing due to a high age-dependency population (Santacreu, 2016) The share of the above 65 population of Japan's society rose from 10% in 1990 to 26.6 percent in 2015, whereas the elderly component of the workforce rose from 7.8% in 2006 to 11.8% in 2016, we are seeing a higher work participation of the elderly. This can, in part, be explained by a growing life expectancy in the world, especially Japan, so a 65-year-old in 1970 is clearly not the same in health, skills and abilities as a 65-year-old living in 2020, just going off the notion of how much the world has changed since then. On the other hand – many elders are retired workers that end up being rehired as irregular employees, as a supplement to their meager retirement income. A low dependency ratio promotes economic growth, whereas a high dependency ratio stunts it, due to the simple fact of dependents paying little to no taxes.

As the population gets older, more women are entering the labor force than ever before

Shinzo Abe claimed in 2019 that the employment of women and elderly increased by 2 million people each in the past 6 years, while the labor force contracted by 4.5 million people during the same period (Heizo, 2019). It is clear that, now more than ever, introducing women to the workplace is paramount to maintaining a healthy labor force. Although female labor-participation rate has gone up from 62.7% in 1997, to 70.1% in 2015, a good amount of this increase can be attributed to a lack of people willing to participate in low-paying, part-time jobs in general – hence women filling these positions. (Tanaka, 2019). This can be seen from the graph on the bottom, with the vertical axis showcasing the % of the population aged 15+ as part of the labor force.



Graph 1.2 - Labor force participation rate, female (% of female population ages 15+) (national estimate) - Japan, Serbia (Source: World Bank Statistics)

We observe a steep increase from the onset of the second decade of the 21st century, with a much steeper increase in Serbia, compared to Japan. Labor force statistics by gender is important to monitor gender disparities in employment and unemployment patterns, and from what we can see here, it is apparent that Serbia and Japan suffer from the same problem.

In summary, although these stylized facts tell us a story, they do not tell the complete story of Japan's society and even less tell us of ways how to mitigate them.

Automation in Japan

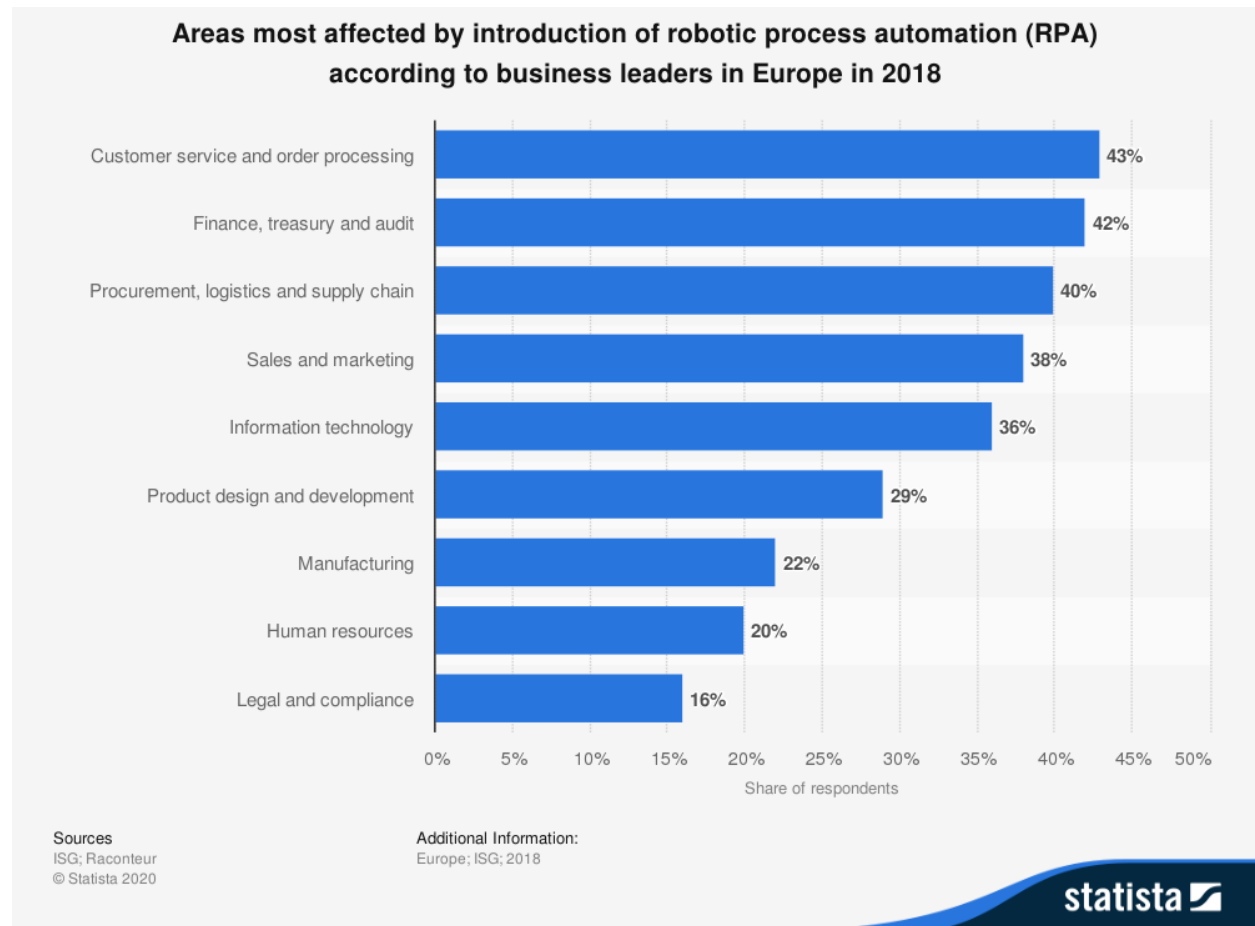
RPA, RDA – What are they, why should we use them, and what is the current and expected value of the market in Japan and Worldwide?

Although confusing to a layman, RDA, RPA and automation in general are nothing too complex for a denizen of the 21st century to comprehend. Usually, when faced with these words, people assume that there is an actual, silvery robot casually strolling around an office, doing things such as delivering mail, serving coffee, operating a computer, holding the door for other employees. That is not really the case. RDA refers to “Robotic Desktop Automation” whereas RPA refers to Robotic Process Automation. The key distinction between the two lies in scope. RDA happens, as the name says – on one desktop (desktop being the literal desktop computer, a machine with one user account and with user’s application software). Neither of these two processes require an actual, physical presence of any “metal tin can” – in fact, it is just a software package that can run on a computer such as the one I am writing this essay for Japan Tobacco International on, or that you are reading it on. Robotic desktop automation tools install on a single machine for one user and can perform data scraping, Excel automation, file transfers, report generation, and more. Some examples are: checking a website for information on a regular basis or automatically pulling reports and emailing them to the correct recipient, et cetera. It’s RPA, except scaled down for a single user. RPA, as a rule, encompasses a much broader spectrum of applications, users and departments. It is, by design, made in a way such that the “robot” learns (copies) what the user does (demonstrates), using AI algorithms (machine learning or process mining for example), various APIs (application programming interfaces) and fine-tuning done by the trainer himself in an attempt to emulate the rudimentary, time-consuming process of business that people have, in the past, done manually. This allows human employees to move from a function of “manual labor” (executing certain actions in a manner devoid of joy and fun, with a near-infinite amount of iterations with very few real differences throughout them) into one of oversight and moderating. It allows humans to participate in other value-adding activities throughout the company, being intellectually stimulated and cooperating with others, rather than with machines, such that it improves their mood. Not only that, but operations groups implementing RPA do not result in employee layoffs, contrary to popular thinking. The reason for this is that those who associate automation with job losses, usually do not take into consideration the alarmingly increasing amount of data that businesses need to process compared to 10 years ago (Harvard Business Review, 2015)

On average, one “robot” can perform structured tasks equivalent to two to five humans – with much less of a scope for error, assuming proper training of the robot, and bundled with the fact that these software packaging require very little nourishment (barring a few more % of CPU usage on your computer) and no rest at all, it is clear why it has become such a popular choice in industries where tasks are often repetitive in nature.

Even more interestingly, the benefits of RPA continue to become apparent when you look at the costs associated with their deployment: the developer hoping to automate a task does not necessarily need to be fluent in a programming language, as long as he has subject matter expertise in the task he is trying to automate. This allows for RPA to originate in an organic way from inside the department that has the need for it, rather than from an external IT department. In fact, there are accounts of people relating to these “robots” as extensions of themselves, because, they are, in a way, emulating the thought patterns of the person who trained them, which usually happens, like I mentioned above, organically from inside the department that needs the automation to happen in the first place, so that they can deal with the ever-increasing workload. (London School of Economics Xchanging, 2015)

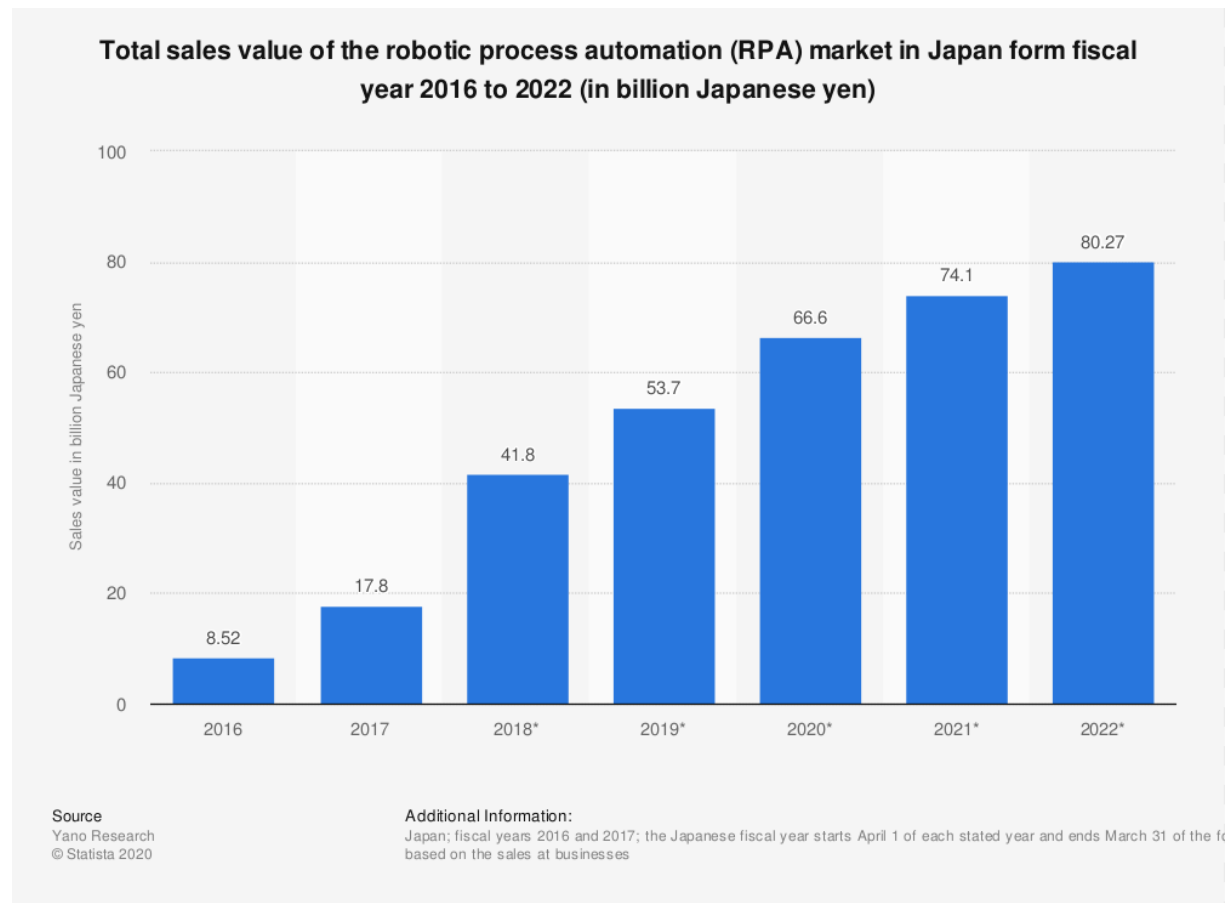
Furthermore, RPA is believed by some analysts to be able to reduce the ever-increasing habits of businesses outsourcing certain parts of their business (usually customer service, data entry) abroad, bringing back jobs to their originating country. We see that in the chart below:



Customer service and order processing has seen the greatest impact by the implementation of robotic process automation (RPA), according to a 2018 survey among European business leaders. 43 percent of respondents believed this business area has become strongly affected. A similar share of respondents also saw the finance, treasury and audit areas as affected by RPA.

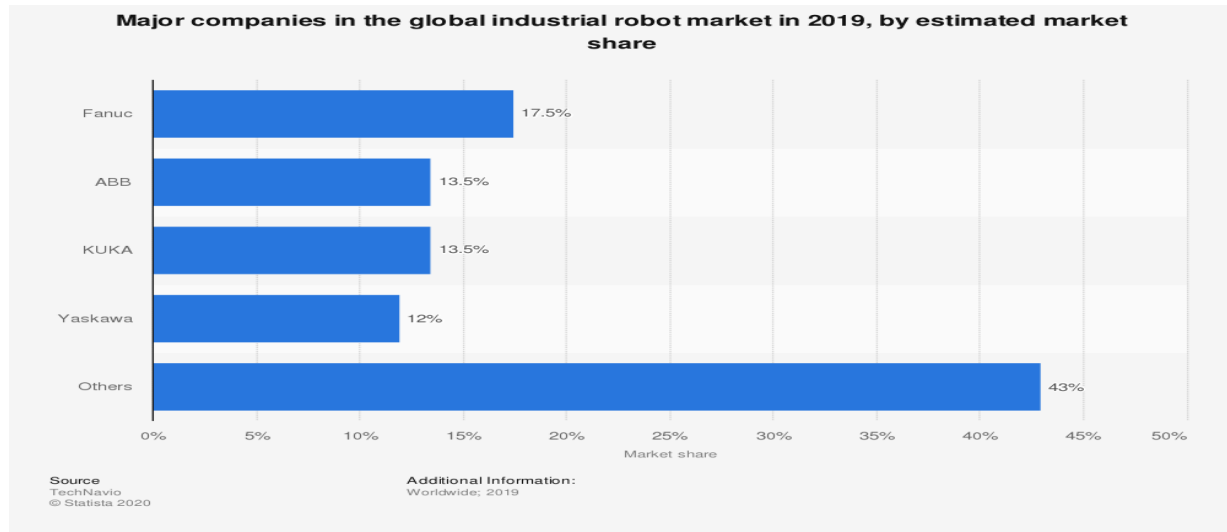
The value proposition is that RPA enables the “repatriation” of certain business processes into local data centers, not to be done by humans, but by robots, which will create not only vacancies but also demand for high-value jobs (now that companies can enjoy the cost-cutting benefits of RPA, which outpace those from outsourcing), with the problem being that jobs and the economies of countries providing outsourcing will suffer as a result – offering a net benefit to the developed countries which started the trend of RPA.

Let us look at the market forecasts for the RPA market in Japan:

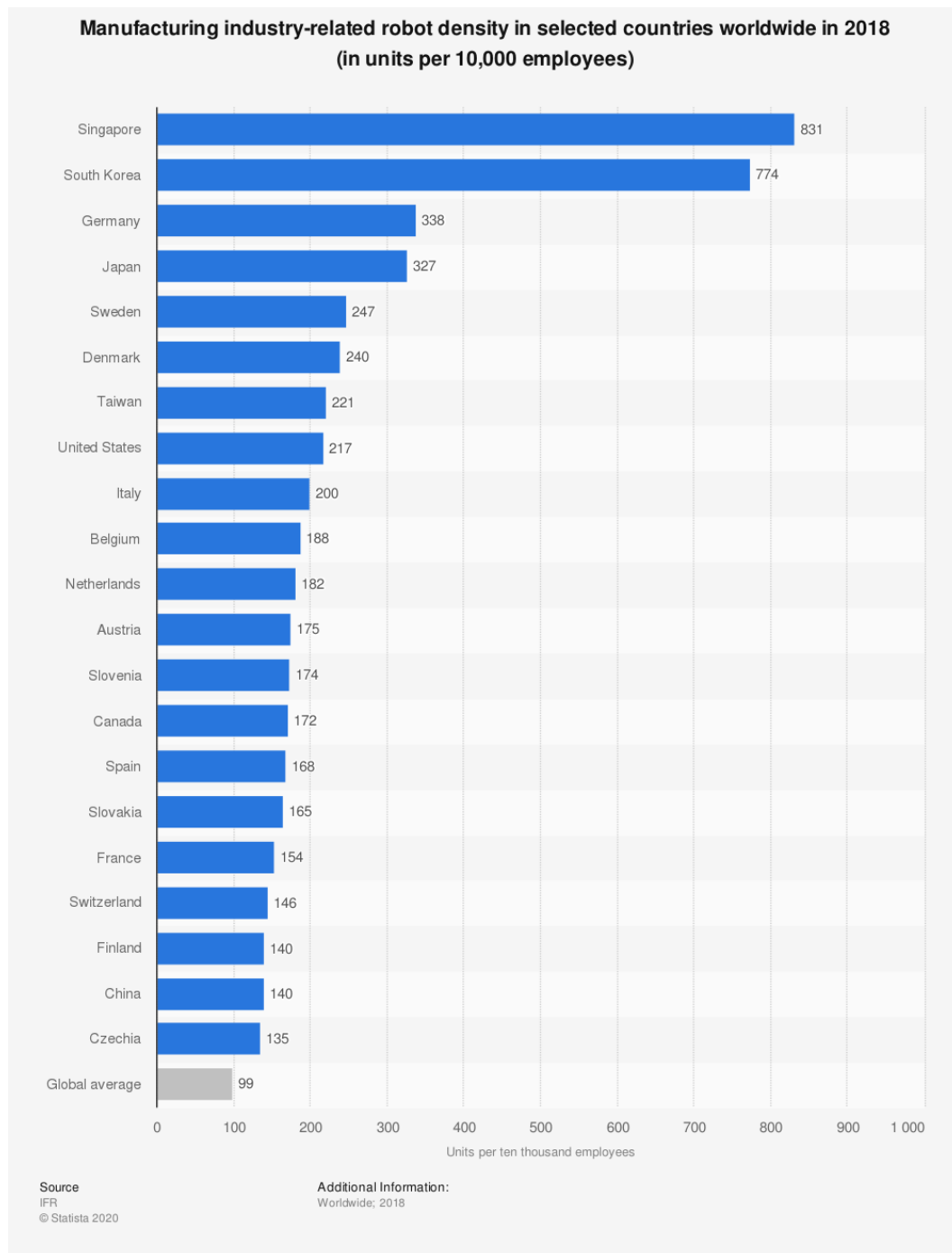


Given the timeframe outlined above, we can see that the RPA market is to grow nearly tenfold within a 6-year period – a market that is truly coming into its own.

To further strengthen the case of why Japan is one of the best partners for Serbia to learn the techniques and best practices of RPA from, we refer to the following graph:

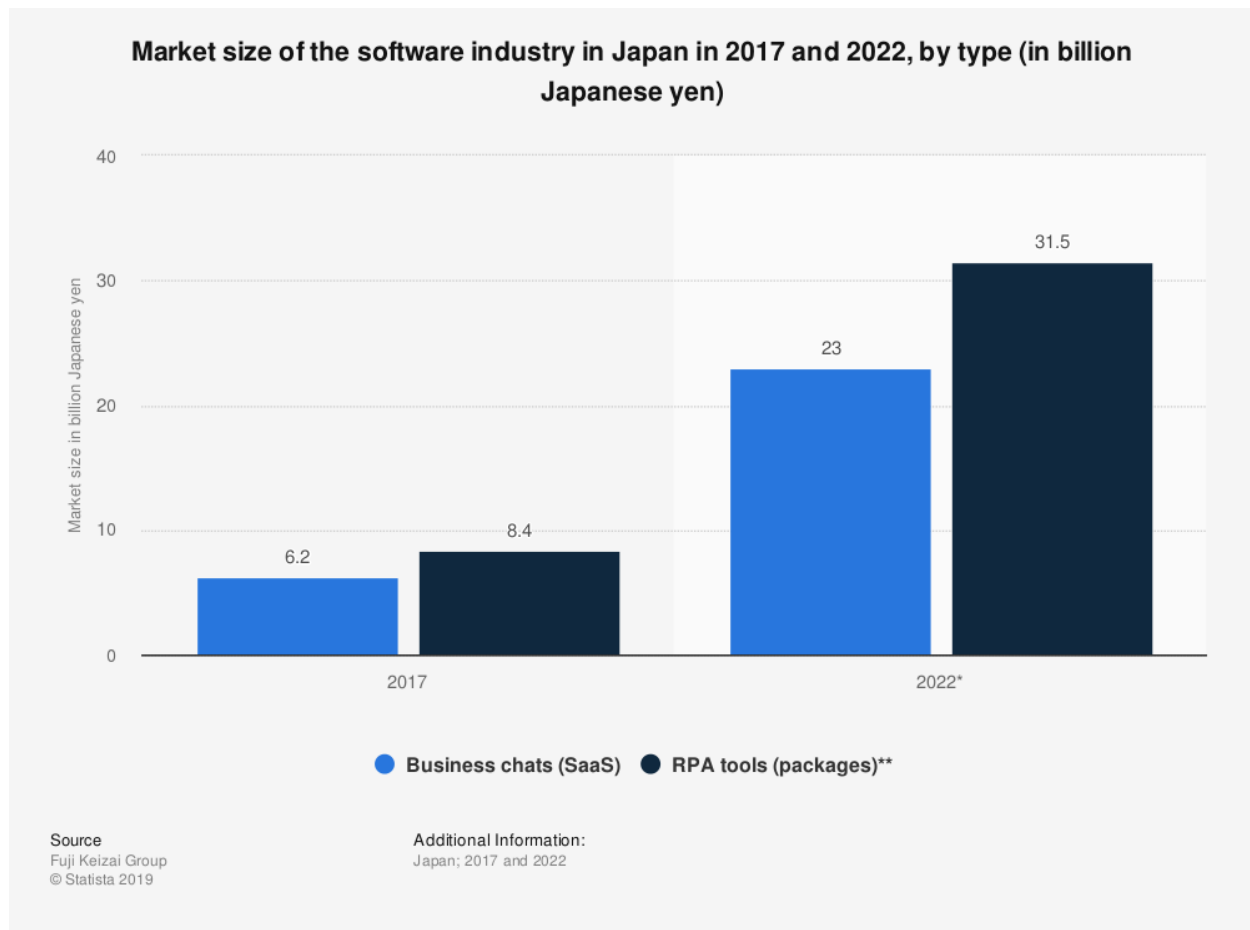


FANUC is a Japanese group of companies that provide automation products and services such as robotics and computer numerical control wireless systems, and we can see that it controls the majority share of the global industrial robot market. With KUKA (German company with a majority stakeholder stake from Midea, a Chinese company) following suit, they are the top two players in the RPA industry.



We see that Japan has almost as 3 times as many RPA units per ten thousand employees compared to China which is, by almost every parameter – at the forefront of manufacturing a vast majority of products. In 2018, Japan had the fourth largest industrial robot density in the manufacturing industry with 327 installations per 10,000 employees.

Furthermore, let us compare the market size of the enterprise software industry in Japan.



The statistic depicts the market size of the software industry in Japan in 2017 and 2022, broken down by type. In 2017, the business chats (SaaS) software market generated around 6.2 billion Japanese yen and was estimated to grow to approximately 23 billion yen by 2022.

In conclusion – why is automation important for Serbia and Japan? Working population is declining in both of these countries, with the “issue” of longer life expectancy (age-dependency ratio) and previously mentioned demographic and cultural issues plaguing Japan, and a vast majority of high-skilled Serbian professionals leaving their country for numerous reasons. Jobs have so many separate systems that humans have to interface with, but are, in actuality, not that difficult to comprehend – it is just complicated and tedious manual labor that looks like something a machine should do.

Risks associated with automating certain sectors of the Serbian job market

Insofar, we’ve only discussed the benefits associated with workplace automation – and there are plenty of them. However, the discussion has mostly been from the perspective of Japan, rather than

that of Serbia. In order to best encapsulate what automation of workplaces can do, we bear in mind actual industrial automation using purposefully built machinery, not just RPA, which we've established already is cost-efficient and scalable, and in a wide variety of ways supplemental rather than hinging on replacing existing jobs. I draw upon the study of "Competitive advantages of Serbian industry sectors" from 2012 by Dobromirov et al, and I've reason to believe that the parameters he referenced in the study have changed significantly in the past 8 years, and in fact, many would argue that they are more relevant than ever.

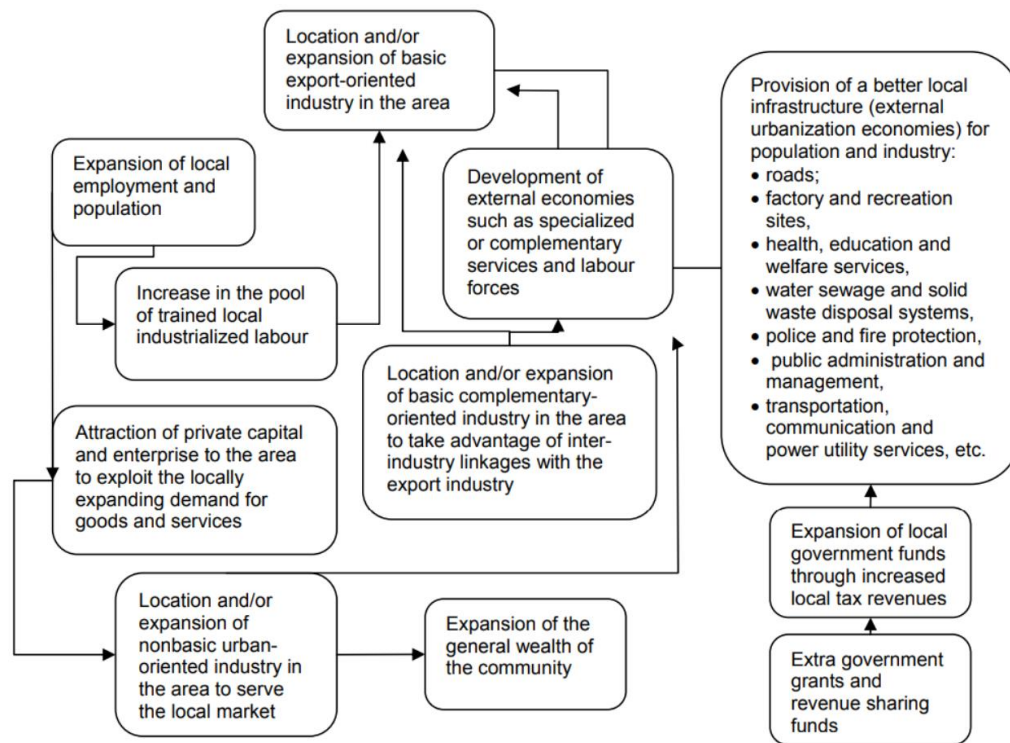


Figure 1. Myrdal's accumulative causation model

In the figure above, we see that he channels Myrdal's accumulative causation model⁴ as a means of measuring competitive advantage of industry sectors (adapted to regional development by Simson, Stough and Roberts), and asserts that every industry sector is determined by the most important supply side elements that add the most marginal value to productivity, thus proposing the following five:

- labour cost (LC),
- availability of experienced labour (AEL),
- availability of raw materials (ARM),
- existence of production facilities (EPF), and
- capital availability (CA).

Assigning a value ranging from 1 to 5 to each of them (1 representing the lowest, and 5 representing the highest rate, with the "Total" representing a mean value of all five ranks in an industry sector)

⁴ "Accumulative Causation" theory developed by Gunnar Myrdal (1898- 1987) in late 1950s. This theory emphasizes a market focus and the way some places pull in capital, skills and expertise to accumulate competitive advantage, with backward effects preventing the disadvantaged locations from developing the internal capacity to compete and prosper.

Using a multiple-decision criteria analysis approach, these five are then estimated in EUROSTAT's end-use category classification of major industry sectors, which are:

- intermediate goods (IG),
- durable consumer goods (DCG),
- non durable consumer goods (NDCG),
- capital goods (CG), and
- energy (E)

Yielding the following table of Serbia's industry sector ratings

Table 1. Industry sectors ratings

	IG	DCG	NDCG	CG	E
LC	4	4	4	4	4
AEL	5	2	5	4	5
ARM	2	2	5	2	1
EPF	3	2	4	3	4
CA	3	3	3	3	4
<i>Total</i>	3,4	2,6	4,2	3,2	3,6

Concluding that “Republic of Serbia has not enough capacities for exporting highly sophisticated final consumption products, since it requires technological finishing and procedural knowhow.”, which goes in line with their findings where the need for automation is really needed “..Serbia has strong potential in exporting intermediate goods, the policy makers should direct the production capacities and enforce production of the intermediate goods that are widely exported for domestic final consumption products production needs”.

By definition, intermediate goods are easier to manufacture, but the number of repetitive tasks involved in their making deter most potential employees from taking up that kind of work.

One expert on the matter, Aleksandar Rodic, states⁵ that “there are serious barriers slowing down investments in robotics, with the main reasons being that Serbia has cheap workforce and that it is imperative for workers not to be laid off when private companies change ownership, which means that investors are neither bound nor motivated to implement top technologies in the Serbian industry” - he essentially confirms the fears of most when talking about RPA, but what he fails to

⁵ <https://www.ekapija.com/en/news/2219607/serbian-economy-in-need-of-robots-automation-better-solution-than-cheap-workforce>

take into consideration is the industries in which these robots will operate in. Yes, when talking about physical/manual repetitive tasks, automation is nowhere near large-scale implementation due to the costs associated with designing and engineering a robot, producing it, installing it and then maintaining it over time. However, the sheer volume of data that companies such as, for example, Posta Srbije (or any public enterprise dealing with processing payments) has to process these days is making technological solutions mentioned above much more lucrative, considering how it will work in conjunction with the employee, not against him.

By automating the bulk of these time-consuming tasks in the service industry and the basic production facilities, we can bring Serbia **a step closer** to the technological and procedural knowhow needed for exporting final consumption products, **while maintaining** the position of a regional leader in the production of intermediate goods and providing services by leveraging the areas we have a competitive advantage in: low labor cost and availability of experienced labor.

How does this help an aging population and a decline in birth rates?

Gerotechnology applications

The coronavirus epidemic of 2020 has had an effect on nearly everyone in the world, with the elderly (labeled as “at risk” groups of contracting the coronavirus and subsequent health complications) being at the forefront of it. What goes underreported, however, is the mental toll that the epidemic is having on those living in aged care facilities such as retirement homes, where we’ve seen multiple times that a COVID outbreak can result in the deaths of many – hence strict regulations are put into place, and the elderly are getting less human interaction than ever before, with weeks upon weeks of solitude being the result of that. To shed more light on just how important robots can be in this sector, we refer to the landmark study of Sparrow and Sparrow, in which they ethically assess the claims made by some roboticists about the ability of robots (and we’re talking about real, physical devices as robots, those that seek to emulate human-like characteristics as to hold a conversation, or medical-grade gadgets) to meet the needs of older persons. Unlike Europe and the USA, Japan is reluctant to allow in cheap foreign laborers, and it is no surprise that the animosity some of the elderly might have for them will be a major deterrent when opting in for care at an institution that predominantly employs non-Japanese people (Sparrow, 2006). However, with the improvements made in making robot care more affordable, have clearly changed this landscape since the beginning of the 21st century – Japan’s overarching “New Robot Strategy⁶” has shown that it is part of their national identity, and that there has never been a more ideal time of putting the ideas into action than now. They cite ease of use must be achieved for a robot transformation to take place, regardless of the industry, and that further advancement of IoT (internet of things) standardization of data-driven devices such as actuators will make it feasible for intelligence/control system alone to offer a range of robot functions in various scenes of society.

In particular, they cite: “..routine operation of robots in the actual scenes of medicine and nursing care in the ever-progressing aging society with declining birth rate will enable provision of advanced medical care that used to be impossible or quality nursing service with lesser burden

⁶ https://www.meti.go.jp/english/press/2015/pdf/0123_01b.pdf

which will bring about a deeper appreciation for robots by each individual.”

Furthermore, they acknowledge⁷ six important areas which require prompt legislation when it comes to introducing robotics in nursing care; these are:

1. Lifting aids
2. Mobility aids
3. Toilets
4. Monitoring and communication systems
5. Bathing
6. Nursing-care devices

From the standpoint of 2020, the fourth point is perhaps the most important one – the one that allows for loneliness to be alleviated the most out of all – “monitoring system platforms consisting of devices with sensors and external communication functions using robot technology, used in nursing care facilities”. Experts in this field voiced their opinions on just how important this kind of care can be in slowing the development of dementia. Having an interactive device in someone’s home, something that helps facilitate an activity of preventing accidents, but also something that improves normal activity during daily life through alleviating loneliness, is a tremendous boon to an elderly person’s life (Hsu et al, 2020). They further go on to elaborate how this can help the aging population problem in rural areas “..In particular, in 2020, older people might be the majority of the population. So that is one kind of social problem. In the Tokyo area it is okay. But in the countryside, no services to older people are provided. So older people there cannot move and cannot get together. So one approach is for them to keep conversation to keep their brains active. So that is why we propose a conversation robot for older people!” We’ve seen in business that the presence of “humanoid robot co-workers” influences the performance of human workers (Vasalya et al, 2018), so it is not too far-fetched to assume, especially under the conditions that the elderly operate under, that they might have a positive effect in assisting the elderly!

Going on about why this is such an important subject, developers mention the increased frequency of ambulances to hospitals in the past decade and how the cause of these incidents that they respond to is mostly elderly people “...falling, with the risk of slipping and having to be bed-ridden, and then **later on a fear of going outdoors.**” – something that is ever more relevant in the context of COVID-19.

I reference a study from Digital Workforce⁸, for which processes are best automated in general.

⁷ https://www.meti.go.jp/english/press/2017/1012_002.html

⁸ <https://digitalworkforce.com/intelligent-automation-solutions/health-robotics/>

Heatmap for Health and Social Care processes

Automation potential HIGH		Automation potential MEDIUM			
CLINICAL - REFERRALS, BOOKINGS	CLINICAL - LAB/PATH/RAD DATA HANDLING	CLINICAL - INTELLIGENT CARE PATH AND OTHER	ADMINISTRATIVE - HR, IT	ADMINISTRATIVE - FINANCE, LOGISTICS	DATA & RISK ANALYSIS REPORTING, RESEARCH
Referrals classification, transferring to the right unit	Classification of laboratory/ pathology/ radiology results	Intelligent OCR and NLP patient questionnaire handling	Substitute employee need estimating and ordering	Making service vouchers and commitments for expenditure	Data transfer to quality register from EMR
Intelligent referrals classification, transferring to the right doctor	Handling the normal results, making the EMR notes, sending the patient an SMS/ e-letter/ETES	Intelligent NLP structuring of prescription data	Rota planning automation	Social care financial assis- tance application handling	Official reporting e.g. waiting times
Structured referrals handling – decisions on admission to care and urgency	Following the arrival of results, transferring to the doctor in charge	Care path – questionnaire, lab request form, visit booking, patient information	On/ off- boarding automations	Sales and purchase invoice checking	Risk/resource analysis on population level
Making bookings for consultations and operations	Creating routine lab/radiology request forms	Services management when patient is transferred b/w home and hospital	Log analysis and reporting, misuse identification	Delivery order handling	Analyzing EMR notes, identifying patients with a specified risk
Checking and handling free consultation times	Checking the results handling	Transferring patient questionnaire data directly to EMR	Data transfers between it- systems	Alignment of orders, purchase invoices and deliveries	Research data collecting and analysing

Insurance and finance industry applications – allowing traditionally “soulless” industries to show empathy

Whether it's Japan or Serbia – finance and insurance industries are not what spells out empathy. They're profit and target-driven, KPIs, APYs, interest rates, repayments, deadlines, all this lingo you need a college degree to understand does not instill confidence into the general population that they are trying to act in your best interest, take it from someone who's majoring in Economics and Finance. Koichi Hasegawa, former CIO of Barclays bank, understands this fact, and underlines that that digital robots can be a net positive for society as a whole when implemented in these industries, and that empathy is at the core of it all, citing examples of companies who have attempted RPA on a larger scale than usual. He likens RPA to Doraemon, the anime and manga character – a magical assistant, with the only caveat of robots used in RPA not having a body, but being invisible and less chatty. (TEDx talk, 2019) He cites a huge mismatch of talent in Japan by the end of 2030 (referencing a Mitsubishi Research Institute study), a surplus of 1.2 million clerical workers and a deficit of over 1.7 million skilled professionals. This, in and of itself, presents a pitfall, but also an opportunity if RPA is thrown into the mix – an opportunity for retraining workers into skilled professionals, alongside an opportunity for people to connect more with one another and alleviate loneliness and ostracism felt by employees around Japan, due to the monotonic nature of their work. “When we are handcuffed by manual work, we lose our capacity to be human. By automating work, empathy emerges, we say, “Genba ni kami yadoru, the best ideas come from the front line”” As seen on the example of Sompo Japan, one of Japan's leading insurance companies, empathy comes in many shapes, ways and forms. Hasegawa references the 2018 landslides, typhoons and heavy rains that decimated West Japan. In these situations, insurance companies want to go and assess the damage as soon as possible, making payments to families so that they can continue to live their lives to the fullest extent possible, conditions permitting. In cases of heavy rain, 18000 households were affected, and the “digital robots” helped save over **38000 manhours** of processing manual paperwork, such that victims and their families got payments within two days. This allowed for human employees to go outside, care for the people suffering, offer a helping hand and advise them – something a robot cannot do so well now. It might not seem like much, but things like these mean a lot – as it allows for time to be spent elsewhere where it matters, such as family and personal wellbeing, as mentioned before.

It is also worth mentioning that only by initiating empathetic behavior from the side of humans, will robots and software be able to allow for more of it to flourish between people. Sampo is no stranger to it, of course, with decisions such as not employing smokers⁹ that may be polarizing to many, but in my opinion necessary – you wouldn't necessarily go to a nutritionist whose employees look unhealthy and malnourished, as it shows dishonesty and lack of empathy towards people who should be helped. In my opinion, given that the findings in the first part of this essay (Geert Hofstede model) describe Japan as a very masculine society, automation will yield the most benefits in the area of parenting and early childhood development period of children. Men in Japan are very rarely associated with parenting. In Japan, both men and women are entitled to take up to a year off work when their child is born, however, very few men do it. In fact, in 2018, only 6% of men did so, compared to 82% of women.¹⁰

I believe that this attitude will change – men will realize that robots can do the bulk of their work, and that they can, as the epidemic has shown, work from home just as easily given modern tools. This allows for added flexibility in legislature in many areas of working law, but more than that, it allows for societal change – telling fathers that it's okay to be a father, not always a worker, because robots can be workers, but they cannot be fathers.

Of course, this is a process that needs time, and there are definitely some jobs, especially highly paid ones that require a skillset that a robot just cannot emulate. However, when speaking in a macro sense, I believe that automation has a huge potential on not just reversing traditional gender roles, but subverting them completely – allowing for both men and women to participate much more in the care of their loved ones, whether young or old.

Conclusion

Citing yet again the national strategy of Japan's Ministry of Economy, Trade and Industry, ".**tactful** employment of robots in various scenes of society will lead to a formation of various new industries (maintenance, contents, entertainment, insurance etc) one after another in collaboration with robots." I am surer than ever that Serbia can learn from Japan, especially in the automation of key workers in the context of a pandemic or any other state of emergency that might arise in the future.

The question that remains to be answered is what constitutes as "tactful employment" – our two societies are just as similar as they are different, as the model from the first section of this essay shows, and further studies on what the attitude of the general population is on automating certain workplaces need to shed light on the right way to implement these technologies that Japan is pioneering. However, as someone familiar with the industries operating in Serbia, I can tell you that the transportation and customer service industries are the first ones in need of improved workflows and automation. Although it is a matter of politics and vested interests other multinational companies operating in Serbia might have, I firmly believe that companies such as FANUC which I've mentioned before, should open up offices in Serbia, harnessing domestic talent

⁹ <https://www.japantimes.co.jp/news/2019/04/11/business/corporate-business/sampo-japan-nipponkoa-himawari-life-insurance-wont-hire-graduates-smoke-next-year/>

¹⁰ <https://www.bbc.com/news/world-asia-51127022>

in a way retains them here, working for the benefits of both of our nations, synergizing with existing Japanese manufacturers such as Panasonic or the newly rumored Toyo tires company in Indjija which is already implementing IoT solutions.¹¹

The synergetic value made possible by scaling RPA processes offered by these companies is too good to pass from an economic standpoint, but much more so from a social one – which is mitigation of the causes of brain drain in Serbia (Radonjic & Bobic, 2020) which mostly seem to be related to working conditions and/or the macroeconomic situation, which will increase economic welfare, that can further pave the way for automation and robotics in the health care and education sectors – allowing workers in those areas to reap the benefits both financially and psychologically, and pass them on to the end-users (the old and the sick in retirement homes, hospitals, and children in the K-12 system). As shown at the start of this essay, the Geert Hofstede model asserts that Japan and Serbia share the same “Uncertainty Avoidance” index – something that I firmly believe is determined by the troubled history of our two people within the geopolitical context of the 20th and 21st centuries, and I am convinced that, with proper planning, these newfound knowledges in the field of automation will, if implemented in a cohesive overarching manner, certainly make the future brighter for generations both new and old, and uncertainties certainly avoidable.

¹¹ <https://mondo.rs/Info/Ekonomija/a1208514/Fabrika-Toyo-Tires-stize-u-Srbiju-sta-proizvode.html>

References

KEIZER, A.B., 2011. Flexibility in Japanese internal labour markets: The introduction of performance-related pay: APJM. *Asia Pacific Journal of Management*, 28(3), pp. 573-594.

Coe, N.M., Johns, J. & Ward, K. 2011;2010;, "Transforming the Japanese Labour Market: Deregulation and the Rise of Temporary Staffing", *Regional Studies*, vol. 45, no. 8, pp. 1091-1106.

Kamata Satoshi. Nobuko Adachi (ed.). ["Japan's Internship Training Program for Foreign Workers: Education or Exploitation?"](#). Translated by Adachi. *The Asia-Pacific Journal*, Shūkan Kin'yōbi April 25, 2008, pp. 30–33

Hofstede, G., What about Japan?, <https://www.hofstede-insights.com/countrycomparison/japan>
http://www.ilo.org/safework/info/publications/WCMS_211571/lang--en/index.htm Accessed on September 21 2020

Addicott, David A. C. (2017) "The Rise and Fall of the Zaibatsu: Japan's Industrial and Economic Modernization," *Global Tides*: Vol. 11 , Article 5

Takenaka, Heizo (2019-03-26). ["Elderly workers: Expectations and challenges"](#). *The Japan Times*. Accessed on September 25th 2020

Santacreu, Maria. ["Long-Run Economic Effects of Changes in the Age Dependency Ratio"](#). *Economic Research - Federal Reserve Bank of St. Louis*. Federal Reserve Bank of St. Louis. Accessed on September 25th 2020

New model of privatization in Serbia (Zivkovic, B. et al), 2000
<http://www.clds.rs/newsite/Novi%20model%20privatizacije.pdf> Accessed on September 21st 2020

Bird, A., (2002), *Encyclopedia of Japanese Business and Management*, Routledge, New York
Fu, H. 2016, "From 'Entering into a Firm' to 'Entering into a Profession': An Anthropological Approach to Changing Personhood in Japan", *British Journal of Industrial Relations*, vol. 54, no. 3, pp. 552-573.

Yoshikara, H., (1996), *Mijukuna Kokusai Keiei (Immature International Management)*, Hakuto Shobo, Tokyo

Witt, M.A., (2014), Japan: Coordinated Capitalism between Institutional Change and Structural Inertia, in Witt, M.A., and Redding, G. (eds.), *The Oxford Handbook of Asian Business Systems*, Oxford University Press

Haghirian, P., (2010), Understanding Japanese Management Practices, Business Expert Press

Olejniczak, T., (2013), Japanese Management: 50 Years of Evolution of the Concept, Acta Asiatica Varsoviensia, 26, pp. 23-41

Dore, R. (2007). 'Insider management and board reform: for whose benefit?'. In M. Aoki, G. Jackson and H. Miyajima (eds.), Corporate Governance in Japan: Institutional Change and Organisational Diversity. Oxford : Oxford University Press, pp. 370 – 95.

Radonjić, O. and Bobić, M. (2020), Brain Drain Losses – A Case Study of Serbia. Int Migr. doi:10.1111/imig.12710

Marioka, Koji (2004). "Work Till You Drop". *New Labor Forum*. **13** (1): 80–85

Ministry of Labor, Health and Welfare (April 2016).

<https://web.archive.org/web/20170519091011/http://www.mhlw.go.jp/file/06-Seisakujouhou-12600000-Seisakutoukatsukan/0000122726.pdf> Accessed on September 23rd

"社説：電通を強制捜査 企業風土への一罰百戒 - 毎日新聞". 毎日新聞 (in Japanese). <http://mainichi.jp/articles/20161108/ddm/005/070/028000c> accessed on September 23rd

Mackie, Vera (2010). "Managing borders and managing bodies in contemporary Japan". *Journal of the Asia Pacific Economy*. 15 (1): 71–85. doi:10.1080/13547860903488245.

<http://www.sankei.com/life/news/161107/lif1611070048-n1.html> accessed on September 23rd

"平成 28 年版過労死等防止対策白書（本文） | 厚生労働省 - Report from Ministry of Health, Labour and Welfare, 2016; accessed on September 23rd 2020

<http://sankei.jp.msn.com/affairs/news/131020/crm13102009230002-n1.htm> ; accessed on September 23rd 2020

<http://www.japannet.gr.jp/w2002/pre/02udaisc.htm> accessed on September 23rd

Keizer, Arjan (July 2009). "Transformation in- and outside the internal labour market: institutional change and continuity in Japanese employment practices". *International Journal of Human Resource Management*. 7. 20: pp. 1521–1535.

<https://blogs.wsj.com/japanrealtime/2013/09/18/part-timers-terrorize-employers-with-pranks/> accessed on September 23rd 2020

<https://web.archive.org/web/20140117113601/http://sankei.jp.msn.com/economy/news/130812/biz13081215490002-n1.htm> Accessed on September 24th 2020

"Throwaway Labour: The exploitation of Chinese "trainees" in Japan" (PDF). Hong Kong: China

Labour Bulletin www.clb.org.hk. June 2011. p. 70. Accessed on September 24th 2020

<https://japantoday.com/category/features/lifestyle/made-in-america-u.s.-brands-that-became-japanese> accessed on September 23rd 2020

Population Aging and the Savings-Investment Balance in Japan - Naohiro Yashiro, Akiko Sato Oishi, 1996, pp. 59-87 <https://www.nber.org/chapters/c8461.pdf> Accessed on September 26th 2020

Tanaka, Chisato (2019-03-08). ["Six years into Abe's womenomics push, women in Japan still struggling to shine"](#). *The Japan Times Online*. ISSN 0447-5763. Accessed on September 26th 2020

https://www.yanoresearch.com/en/press-release/show/press_id/2085 accessed via Statista on September 26th, 2020

<https://www.helpsystems.com/resources/articles/robotic-desktop-automation-rda-vs-robotic-process-automation-rpa> accessed on September 25th, 2020

Harvard Business Review <https://hbr.org/2015/06/what-knowledge-workers-stand-to-gain-from-automation> accessed on September 25th

<https://www.gartner.com/doc/2656215/predicts--business-it-services> - accessed on September 28th 2020

Robotic Process Automation at Xchanging (PDF), London School of Economics

Eric L. Hsu, Anthony Elliott, Yukari Ishii, Atsushi Sawai, Masataka Katagiri, The development of aged care robots in Japan as a varied process, *Technology in Society*, Volume 63, 2020

Sparrow, R., Sparrow, L. In the hands of machines? The future of aged care. *Minds & Machines* 16, 141–161 (2006). <https://doi.org/10.1007/s11023-006-9030-6>

Vasalya, A., Ganesh, G., & Kheddar, A. (2018). More than just co-workers: Presence of humanoid robot co-worker influences human performance.

https://www.meti.go.jp/english/press/2017/1012_002.html - Revision of the Priority Areas to Which Robot Technology is to be Introduced in Nursing Care

Dobromirov, Dušan & Radišić, Mladen & Ćelić, Đorđe & Bojovic, V.. (2012). Competitive advantages of Serbian industry sector, pp. 33-37.