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PERCEPTION OF USING SERVICE ROBOTS IN KAZAKHSTAN AND RUSSIA

This paper presents a comparative analysis of the clients' perception on the service robots' usage in Kazakhstan, and Russia. The main idea is to find out the level of people's understanding and acceptance of robotization in these neighbor countries, as these may influence the business development.

The researchers adopted survey method to collect respondents' views on the issue of interest. The research population includes people above 18 years of age in the two countries.

The statistical results differ for the studied countries, with Russia where the respondents are more positive about the robotization, compared to Kazakhstan, where the respondents show lower interest in that development, 62% and 52% respectively (Figure 12). The main question of interest is would the implementation of robots affect negatively the number of visits to robotized businesses, e.g., bank offices, hotels and restaurants, etc. More than 43% of the respondents in Kazakhstan expressed dissatisfaction with the ethical aspect of robots usage (Russia – 18%), and 42% of Kazakhstanis reported that they fear job loss due to automation, in comparison with 23% of Russian respondents.

This research contributes to the understanding of how the customers in the two studied countries consider the expected changes in the business and what may be their response to those changes. The limited number of respondents does not allow generalization of the results and conclusions, much bigger samples may be helpful to generalize. However, the findings are very informative and helpful in the decision-making process, as robotization requires financial investments and the attitude of the clientele about the quality of service they get is directly linked to the change of demand and business financial results. Based on these findings the hotel managers will be better prepared to decide if, when and how to introduce robots in the hotel business.

Key words: Robotization, Artificial intelligence (AI), consumers' attitude, services.

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Қазақстан мен Ресейде қызмет көрсету саласында роботтарды пайдалануға көзқарас

Бұл мақалада Қазақстан мен Ресейде қызмет көрсету саласында роботтарды пайдалану туралы тұтынушылардың қабылдауының салыстырмалы талдауы ұсынылған. Негізгі идея – осы көрші елдердегі адамдардың бизнестің дамуына әсер етуі мүмкін роботтандыруды түсіну және қабылдау деңгейін анықтау.

Зерттеушілер респонденттердің пікірлерін жинау үшін сауалнама әдісін қолданды. Зерттеуге екі елдегі 18 жастан асқан адамдар қатысты.

Статистикалық нәтижелер зерттелетін елдер үшін әр түрлі: Ресейде респонденттер роботтандыруға Қазақстанмен салыстырғанда оң көзқараспен қарайды, респонденттер бұл дамуға аз қызығушылық танытады, сәйкесінше 62% және 52% көрсетті (Сурет 12). Негізгі зерттеу сұрағы – роботтарды енгізу роботтық кәсіпорындарға, мысалы, банк кеңселеріне, қонақүйлер мен мейрамханаларға және т. б. адамдардың қызмет алуға келуіне теріс әсер ете ме? Қазақстандағы респонденттердің 43%-дан астамы роботтарды пайдаланудың этикалық аспектісіне наразылығын білдірді (Ресей-18%), ал қазақстандықтардың 42%-ы ресейлік респонденттердің 23% салыстырғанда автоматтандыру салдарынан жұмысынан айырылып қалудан қорқатынын хабарлаған.

Бұл зерттеу екі елдегі тұтынушылардың күтілетін бизнес өзгерістерін қалай қабылдайтынын және олардың осы өзгерістерге реакциясы қандай болуы мүмкін екенін түсінуге ықпал етеді. Респонденттердің шектеулі саны нәтижелер мен қорытындыларды жалпылауға мүмкіндік бермейді, жалпылау үшін әлдеқайда үлкен үлгілер пайдалы болуы мүмкін. Дегенмен, нәтижелер роботтарды тұтынушыларға қызмет көрсетуде қолдану туралы шешім қабылдау процесінде

кажет етеді және клиенттердің олар ұсынатын қызметтердің сапасына қатынасы сұраныстың өзгеруімен және бизнестің қаржылық нәтижелерімен тікелей байланысты. Осы шешімдерге сүйене отырып, қонақ үй басшылары қонақүйде роботтарды қашан және қалай қолдану керектігін талдай алады.

Түйін сөздер: Роботтандыру, жасанды интеллект, тұтынушылардың көзқарасы, қызметтер.

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Отношение к использованию роботов в области услуг в Казахстане и России

В данной статье представлен сравнительный анализ восприятия клиентами об использовании роботов в области услуг в Казахстане и России. Основная идея состоит в том, чтобы выяснить уровень понимания и принятия роботизации людьми в этих соседних странах, поскольку это может повлиять на развитие бизнеса.

Исследователи использовали метод опроса для сбора мнений респондентов. В исследование были включены люди старше 18 лет в двух странах.

Статистические результаты различаются для исследуемых стран: в России респонденты более позитивно относятся к роботизации, по сравнению с Казахстаном, где респонденты проявляют меньший интерес к этому развитию, 62% и 52% соответственно (Рисунок 12). Основной исследовательский вопрос заключается в том, повлияет ли внедрение роботов негативно на количество посещений роботизированных предприятий, например, банковских офисов, гостиниц и ресторанов и т.д. Более 43% респондентов в Казахстане выразили недовольство этическим аспектом использования роботов (Россия – 18%), а 42% казахстанцев сообщили, что опасаются потери работы из-за автоматизации, по сравнению с 23% российских респондентов.

Это исследование способствует пониманию того, как клиенты в двух исследуемых странах относятся к ожидаемым изменениям в бизнесе и какой может быть их реакция на эти изменения. Ограниченное число респондентов не позволяет обобщать результаты и выводы, для обобщения могут быть полезны гораздо большие выборки. Однако полученные результаты дают важную информацию, которую следует учитывать в процессе принятия решений по применению роботов в обслуживании клиентов, поскольку роботизация требует финансовых вложений, а отношение клиентов к качеству предоставляемых ими услуг напрямую связано с изменением спроса и финансовыми результатами бизнеса. На основе этих решений руководители отелей могут анализировать надо ли, когда и как применить роботы в банке или отеле.

Ключевые слова: Роботизация, искусственный интеллект (ИИ), отношение потребителей, услуги.

Introduction

The clients' perception about using service robots in the service businesses, including finance and hospitality (e.g., banks, hotels, restaurants, tour-operators, etc.) is of huge importance, because their business results depend to a very high extent on the clients' judgment of the quality received. The clients will use, and will continue to use, the services of the particular entity only if they find the quality of services satisfactory vs the price paid. In the same time, there is a strong orientation of the business managers and owners to introduce service robots, both for face-to-face and back-office operations. This research adds understanding on the clients' perception and readiness to accept being served by robots and robotized systems in Kazakhstan and Russia.

The statistical results differ for the studied countries, with Russia where the respondents are more positive about the robotization, compared to Kazakhstan, where the respondents show lower interest in that development, 62% and 52% respectively (Figure 12). The main question of interest is would the implementation of robots negatively affect the number of visits to robotized businesses, e.g., bank offices, hotels and restaurants, etc. More than 43% of the respondents in Kazakhstan expressed dissatisfaction with the ethical aspect of robots' usage (Russia – 18%), and 42% of Kazakhstanis reported that they fear job loss due to automation, in comparison with 23% of Russian respondents.

The practical significance of this study is to identify the attitude of existing and potential customers of organizations in the service sector and

the hotel sector to go to service using robots, which will correctly determine the development strategies of these companies.

The implementation of robots and artificial intelligence (AI) in the services in all industries is not a new idea and it has been studied by many researchers (e.g., Bondareva, 2016; Ivanov, Webster & Berezina, 2017; Gasumova & Porter, 2019; Ermakova & Kovyazin, 2020; Choi, Choi & Kim, 2020; Bianki et al., 2021; So, Kim, Liu, Fang & Wirtz, 2023; Mariani et al., 2023; Rasul et al., 2024 and other). There are very interesting recent publications about the application of robots in the hotel business, which are addressing the consumer response in case of service by robots. For example, Soliman et al. (2024) are studying the drivers of the consumer behavior towards service robots, and Moriuchi et al. (2024) analyze factors affecting human-robot interactions, as well as Wang et al. (2023), which covers consumer resilience to service robots at the front desk. Most of the researchers were studying the usage of robots as an idea per se, the effects of such changes on the business based on the consumers' attitude, has not been considered much, although Lu, Cai & Gursoy (2019) and other scholars underline the importance of this aspect. At the same time, one of the major ideas of the World Economic Forum is to substitute up to 75% of the employees in the hospitality industry with robots. According to Christine Lagard 85 million jobs will be substituted by robots by 2025 (European Central Bank, 2020). If these WEF's and ECB's signals materialize, and 85 million jobs are lost by 2025, we will face a combination of two negative effects. First, a significant percentage of the current customers will not have enough willingness and ability to purchase products, and pay for services as usually, because of their reduced available financial resources. Second, the customers' perception about the quality of services they may expect to get in the specific businesses may not be universally positive (e.g., Borghi, Mariani, Vega & Wirtz, 2023; So, Kim, Liu, Fang & Wirtz, 2023) and this may be another reason to reduce their visits there. At the same time the vast majority of the managers perceive the robots as a substitute of the labour force with better workers, who work 24/7, do not get vacations, do not need health service, etc. and as a result lead to increased operational effectiveness, efficiency and profits.

Of course, we must take into consideration that the development and application of human-like robots of both types: humanoid (looking like people) and android (looking like moving and speaking machines) robots, may stimulate positively the

customers' perception, but at least in the beginning it may have a negative effect as well. This study is looking into answering on comparative basis the question from the three angles: will the business efficiency improve, will the quality of services improve, and will the customers' perception be positive, at least in some specific operations, such as hotel check-in and check-out procedures (e.g., Ivanov, Webster & Berezina, 2017).

In addition, we consider the characteristics of the national culture in Russia and Kazakhstan as a possible explanation of the differences between the statistical results from the survey in the two countries.

Therefore, the objectives of this study are to analyze on comparative basis for the two countries – Kazakhstan, and Russia, the following:

1. The consumers' perception about the quality of services after possible robotization.
2. The changes of the business efficiency as perceived by the managers.
3. The changes of the customers' attitude towards using different businesses served by robots.

Literature review

In our research we use definition of robots and robotized systems of The International Federation of Robotics (IFR), which coincides with The International Organization for Standardization definition of "service robot" as a "robot in personal use or professional use that performs useful tasks for humans or equipment". This definition is convenient for the survey, as it corresponds to the level of understanding of this issue by our respondents, which is generally basic.

Dozens of excellent research papers on the usage of service robots in different businesses have been published in the last 10 years, e.g. Ivanov & Webster (2017, 2018), Bondareva (2016), Van Doom et al. (2017), Huang & Rust (2018), Buhalis & Sinarta (2019), Ivanov, Webster & Berezina (2020), So et al., (2022) to mention just a few. By industry, there are many research papers, including for example electronics (Jörling et al., 2019), and automotive industry (Fernandes and Oliveira, 2021), where industrial types of robots are applied, as well as healthcare services (Ermakova & Kovyazin, 2020) and social sphere (Gasumova & Porter, 2019). Kim et al., (2023) studied hotels, and Mende et al., (2019) – the food and beverage industry. Moreover, some researchers focus on higher institutions and educational sphere (Sousa & Rocha, 2019; Machado et al., 2023). The spectrum

of publications includes from descriptive analysis of the active implementation of artificial intelligence (AI) and robots used for repetitive, tiring and causing stress operations (e.g., Huang & Rust, 2018; Fuentes, Moraleda et al., 2020) who studied from the simple cases of luggage and room services provided by robots in hotels, to analyzing the robots, artificial intelligence and service automation (RAISA) as becoming «increasingly influential on service quality and service experience» (e.g. Kuo et al., 2017).

Lu et al. (2020) and other scholars raised the issue of the necessity to research and analyze

the effect of robots' application on the service quality and customers' satisfaction, which relates to the customers' perception of what RAISA adds as quality of service and additional value to the clients. Schepers et al. (2022) underline that the use of robots can add satisfaction in all possible applications, from low-cost services where mechanical robots are usually used, to full-service providers. The intensity of robotization can be illustrated with the numbers of robots installed and used in China (Figure 1) and the operational stock in the world in 2011-2021 (International Federation of Robotics, 2022).

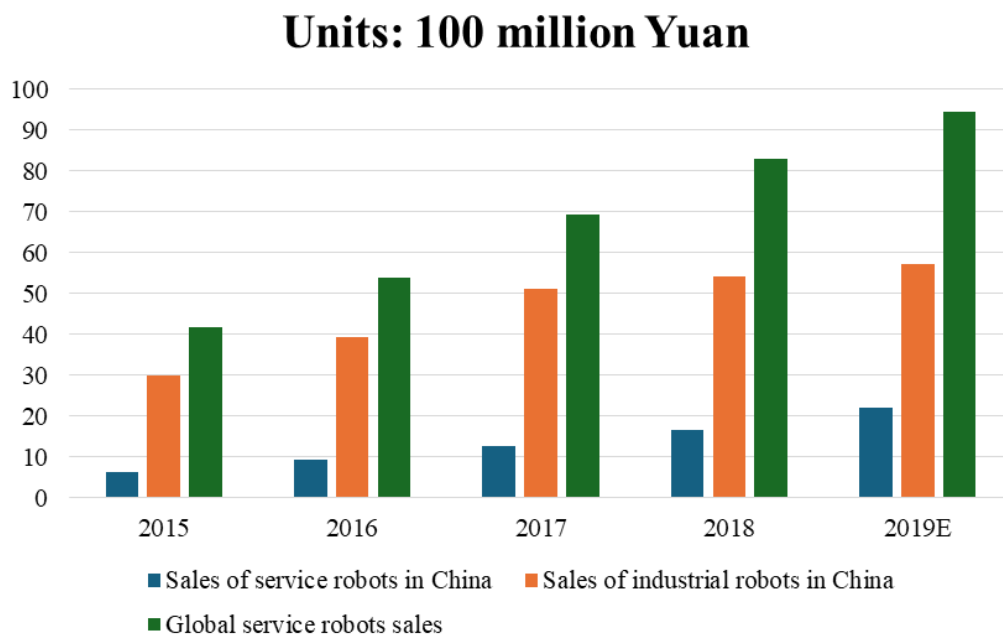


Figure 1 – Global and China service and industrial robots sales

Note – Compiled by the author based on the source: International Federation of Robotics, 2022

It is clear, that when the quality of service is discussed, we have to differentiate between the machine-type robots, which perform the specific operations but do not look like humans, and the so-called anthropomorphic (humanoid) service robots, which are designed to look like human beings, and as Wirtz et al. (2018) and other scholars suggest, they can, and they do interact meaningfully with the customers during the performed operations. Mende et al. (2019), and other suggest that the anthropomorphism is a desired, even preferred characteristic of the service robots, as it makes the

interaction of the customers easier compared to interacting with a set of speaking boxes. For example, Sheehan et al. (2020) found that anthropomorphism enhances brand and product fondness. However, other scholars disagree, stating that the too-much-human-like robot can inspire negative feelings of the clients, if they consider it as “a threat to their human identity” (Mende et al., 2019, p. 539). It is clear that with the development of anthropomorphic (humanoid) robots and their massive application in industry and at home, more people will get used to them and will probably prefer humanoid designs.

Operational stock of industrial robots in the world (in thousands)

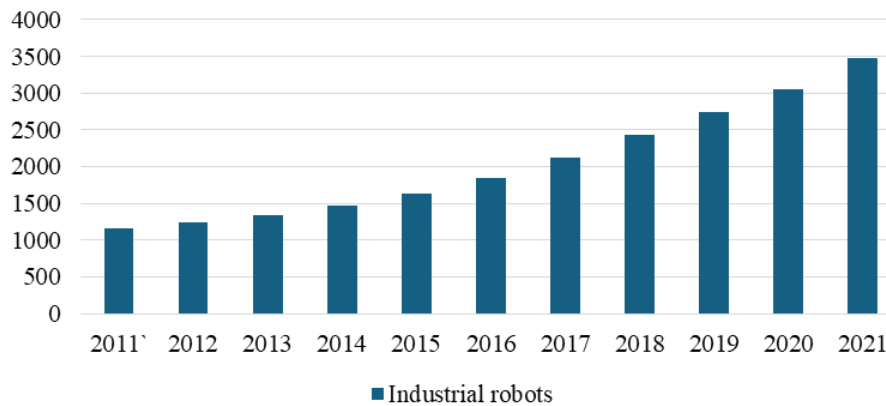


Figure 2 – Operational stock of industrial robots in the world for 2011-2021
Note – Compiled by the author based on the source: World Robotics, 2022

However, according to the uncanny valley theory (Mori, 1970, as per So et al., 2023) there might be a turning point (U-shaped relationship) between the customer and the human-like robot (e.g., Murphy et al., 2017; Crolc et al., 2021). So et al. (2023), for example, analyse the influence of robot anthropomorphism on consumers' trust, receptivity, and the effect on satisfaction. Huang & Rust (2021) believe that when the service robots have to higher extent human-like appearance, this is liked by the clients and there is rarely any discomfort in the process of being served by them. In this study we concentrate on the comparative analysis of the findings of the survey in Russia and Kazakhstan, and we do not analyze the uncanny valley effect as our respondents have limited personal experience with service robots.

Modern development of technology has a huge impact on the activities of almost all economic entities in the modern world. Of course, there are some countries where robotization processes and the use of AI technologies are being implemented more intensively than others, for example, Japan, China, Korea. However, in our countries, many enterprises operating in various industries are beginning to actively introduce them into the practice of their activities.

There are many research papers on robotization in the two studied countries (e.g., Bondareva, 2016; Tikhomirov et al, 2018; Melnichenko & Borodach, 2019; Gasumova & Porter, 2019; Ermakova &

Kovyazin, 2020; Starovatova, 2023), which study the process of transferring from managing people to managing robotized systems. One of them analyzes the consumer perception towards robots, based on the findings of a study in hotels and restaurants in Russia (Ivanov, Webster & Garenko, 2018). The authors found out (Table 2, p. 28) that the preferences towards human employees vs robots in a hotel is rather high (Mean 4.18 of 5), although being served by a robot will be an interesting experience (Mean 4.04). The authors analyze the results including the gender and general attitude towards new technologies of respondents' effect. It is interesting that the main areas of implementing service robots in the hotel are luggage carrying (Mean 4.32), taking customer orders for new towel, etc. (Mean 4,22), processing card payment (Mean 4.12), processing cash payments (Mean 4.02), providing information for the hotel facilities (Mean 4.06) and providing information about the destination (Mean 3.98).

Methodology

Our analysis is based on survey, which was used to collect data from the recipients in the two studied countries – Russia and Kazakhstan. We applied survey, a non-probability convenience sampling method. The research population included people above the age of 18 living in Semei, Astana and Pavlodar in Kazakhstan, and St. Petersburg and Barnaul in Russia. The sampling frame included

hotel employees and managers, as well as alumni of our universities, and their colleagues and friends who are active customers of hotel services.

The two samples included 132 respondents in Russia, and 126 in Kazakhstan. In terms of gender distribution, Russia demonstrates a significant skew towards males, comprising 87% of the sample population, whereas females represent only 13%. In contrast, Kazakhstan exhibits a more balanced gender distribution, with 57% males and 43% females (Figure 3).

Regarding age composition, Russia's population is predominantly concentrated within the 18-25 age bracket, constituting 47% of respondents. Meanwhile, 26-40-year-olds and 41-65-year-olds each represent 26.5% of the population. Similarly, in Kazakhstan, the largest age group is within the 18-25 range, comprising 38% of respondents, followed by 41-65-year-olds at 37%, and 26-40-year-olds at 23%. Those aged 65 and above constitute a marginal 2% of the surveyed (Figure 4).

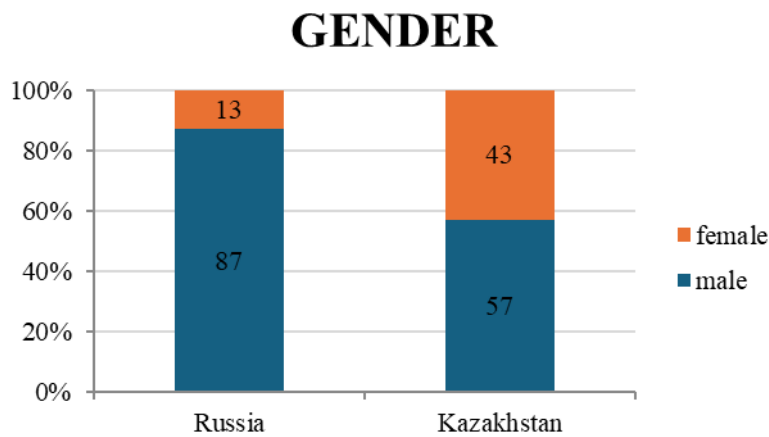


Figure 3 – Gender distribution of respondents
 Note – Compiled by the author based on the survey data

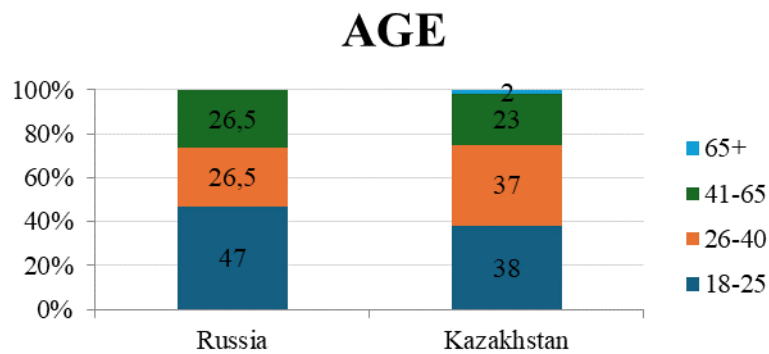


Figure 4 – Age composition of respondents
 Note – Compiled by the author based on the survey data

Determining the age structure of the respondents is vital for the purposes of our study, as it will allow us to identify specific features in relation to robotization attitude, being the factor influencing individuals' perspectives, experiences, and adaptability, thereby

providing insight into how different age groups perceive and interact with robotic technologies.

Education levels vary notably between the respondents of two countries, with Russia exhibiting a higher proportion of individuals with advanced

degrees. Specifically, 60% of respondents in Russia hold postgraduate qualifications, whereas in Kazakhstan, this figure is comparatively lower at 46%. Additionally, 27% of Russian respondents possess a PhD, compared to 12% in Kazakhstan. Conversely, a higher percentage of individuals in Kazakhstan hold college degrees (36%) compared to Russia (8%) (Figure 5).

Geographically, a substantial majority of respondents from Russia reside in urban areas, with 55% located in the capital city, followed by 32% in large cities, and 13% in smaller cities. In contrast, the distribution of respondents in Kazakhstan indicates a lower urban concentration, with only 8% residing in the capital, 35% in large cities, and 57% in smaller cities (Figure 6).

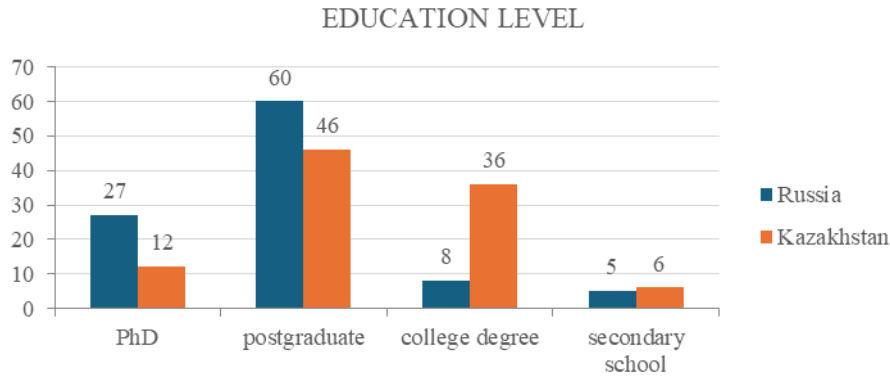


Figure 5 – Education levels of respondents
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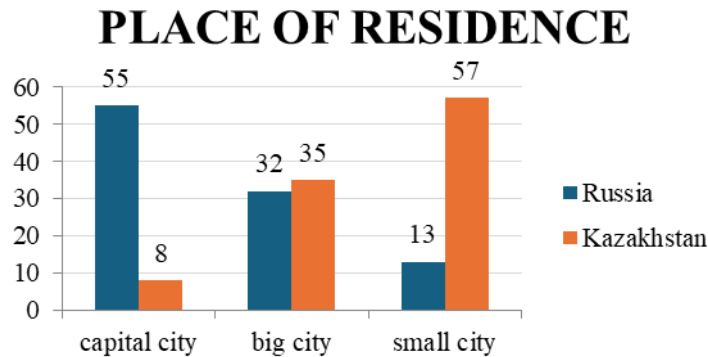


Figure 6 – Place of residence of respondents
 Note – Compiled by the author based on the survey data

When considering employment positions, Russia displays a higher percentage of individuals occupying mid-level and top-management roles compared to Kazakhstan. Specifically, 60% of respondents in Russia hold regular employee positions, while 24% and 16% are in mid-level and top-management roles, respectively. In Kazakhstan, 48% are regular employees, with 28% and 24% in mid-level and top-management positions, respectively (Figure 7).

In terms of occupational sectors, education emerges as a predominant field in both countries, with

45% of respondents in Russia and 46% in Kazakhstan working within this sector. Additionally, IT is quite prominent in both countries, accounting for 8% and 7% of respondents in Kazakhstan and Russia respectively. However, there are notable differences in other sectors. For instance, in Russia, the business sector comprises 10% of respondents, while in Kazakhstan, tourism occupies a more significant share at 12%. Conversely, the restaurant business, media, hotel industry, and construction sectors exhibit varying degrees of prevalence across the two countries.

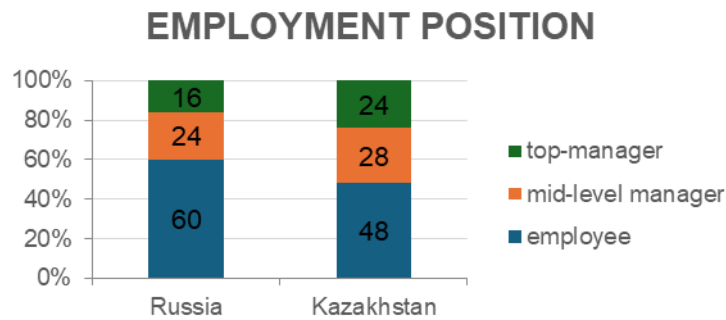


Figure 7 – An employment position of respondents
 Note – Compiled by the author based on the survey data

Results and discussion

Given the relevance and high significance of these processes, the purpose of our research is to study the influence of technologies based on the use of artificial intelligence on the formation of the business environment of domestic companies, as well as to identify factors that promote or hinder the introduction of these technologies into business practices.

The project working group conducted a primary study based on a sociological survey of respondents from various companies and organizations in Kazakhstan (Semey, Pavlodar, Astana), as well as Russia (St. Petersburg, Barnaul). The research is

conducted using a questionnaire based on Google form.

It was revealed that 42% of respondents from various companies from Kazakhstan are already actively using these technologies. In Russia, only 28% of respondents have experience of using it. The reasons why AI technologies and robots have not yet been put into practice include the high cost of development and implementation, as well as maintenance (31% Kazakhstan and 42% Russia) (Figure 8).

At the same time, 47% of respondents in Russia plan to introduce these technologies into the activities of their companies, while in Kazakhstan this figure is only 38% (Figure 9).

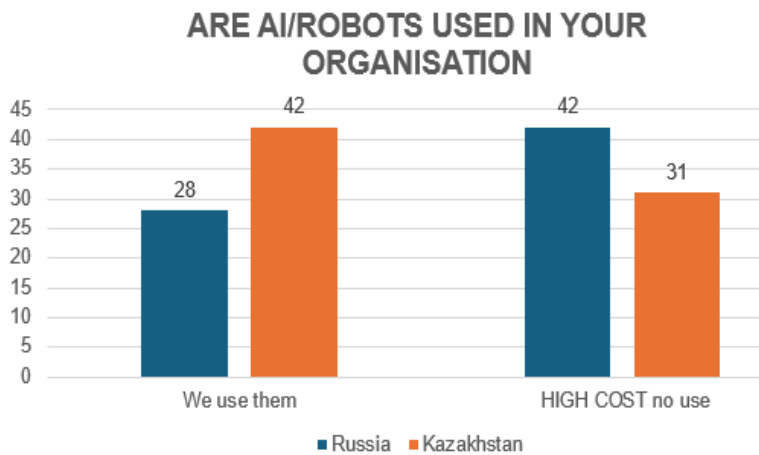


Figure 8 – AI technologies and robots used in the company
 Note – Compiled by the author based on the survey data

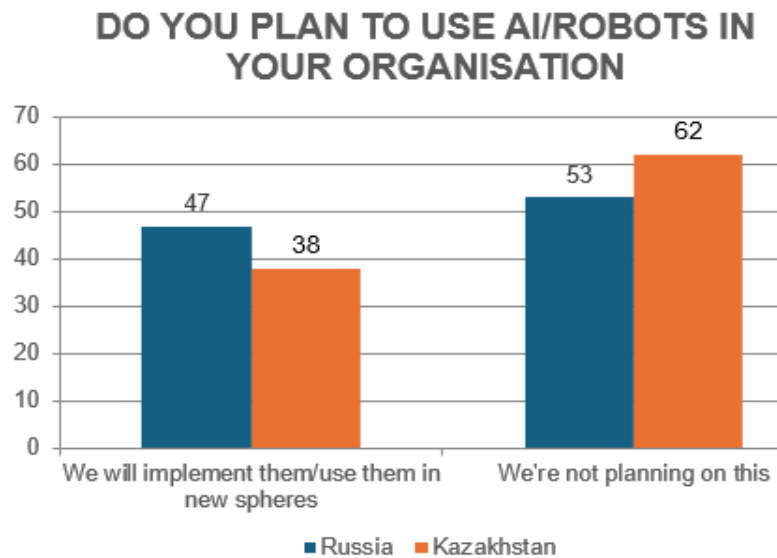


Figure 9 – Plans to implement AI/ robots

Note – Compiled by the author based on the survey data

It is important to identify the attitude of people, as real or potential customers of various service enterprises, to the format of service using robots. Although this form is already being actively implemented in many countries, such as China, Japan, and Korea, these technologies are being introduced very cautiously into the practice of domestic companies.

The findings of the survey show (Figure 10) that about 30% of Kazakhstani respondents have significantly higher perception about being served by human operators compared to Russia, while the majority of Russian respondents presume the combined application as a good idea.

Russian respondents noted that they are ready to be served by both robots and people in such areas as trade (67%), hotel business (55%), preparing food and drinks (57%), financial consulting (41%), educational online platforms (52%). Altogether, these results show that the Russian respondents are more positive about the implementation and use of AI and robots in services in almost all areas: trade, finance and banking, hotels, public catering establishments (restaurants, cafes, bars), gyms, medical services, education, and tourism.

In such areas as medical care, the fitness industry, and child care, the majority of respondents in both Russia and Kazakhstan prefer service only by people, not trusting artificial intelligence (this is 70%, 54% and 78% of Russian respondents and 58%, 55 % and 68% of Kazakhstani respondents, respectively).

The majority of respondents in Kazakhstan noted that the use of AI and robots will improve the quality of customer service (72% of respondents, vs 40% in Russia). This can be seen as indication that the quality of services in Kazakhstan is not considered satisfactory compared to respondents' judgment in Russia (Figure 11).

The respondents give similar results for the expected improvement of the efficiency of business processes (66% of respondents in Kazakhstan vs 67% in Russia), and for the expected reduction of company costs (69% of respondents in Kazakhstan vs 67% in Russia) (Figure 11).

About 35% of respondents in Russia and 18% of respondents in Kazakhstan believe that the use of robotics will not in any way affect the quality of customer service in their companies, nor will it lead to an increase in efficiency: 20% in Russia and 23% in Kazakhstan (Figure 11).

Perception of using service robots in Kazakhstan and Russia



Figure 10 – Respondents perception about servicing
Note – Compiled by the author based on the survey data

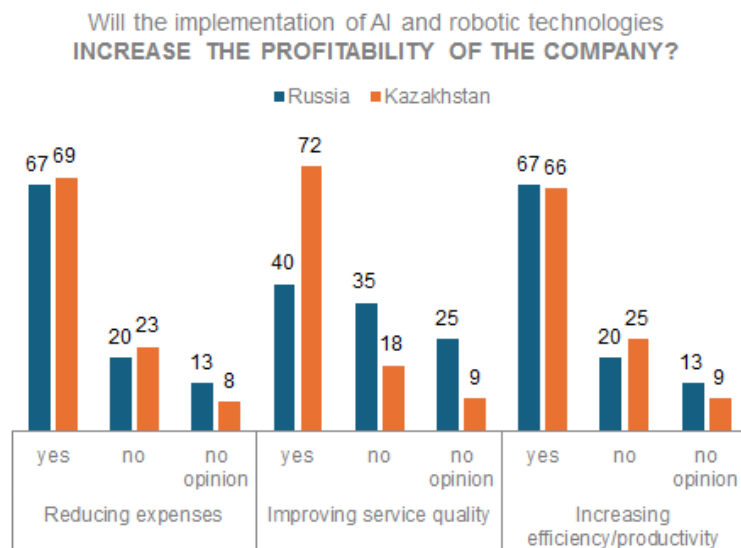


Figure 11 – The impact of AI and robotics technologies on the final results of the company’s activities
Note – Compiled by the author based on the survey data

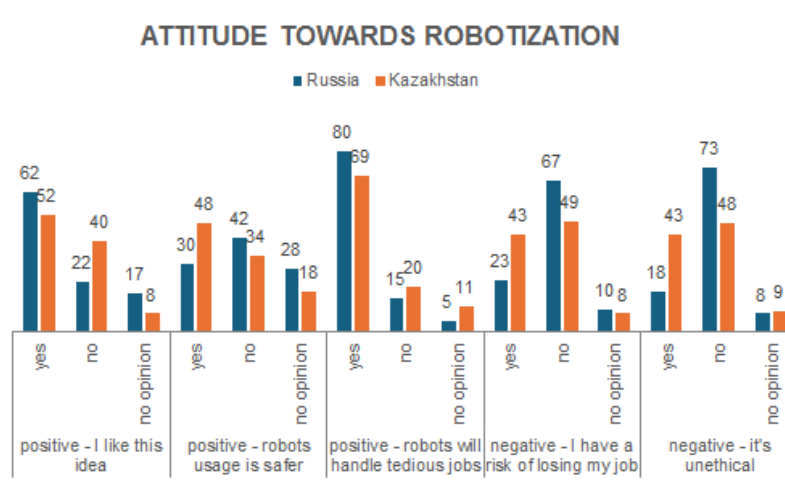


Figure 12 – The clients' attitude towards AI and robotics technologies usage
Note – Compiled by the author based on the survey data

At the same time, some respondents express concerns about the risk of losing their jobs as a result of the active implementation of these technologies in their company's practice (43% in Kazakhstan and 23% in Russia). In general, 43% of respondents in Kazakhstan and 18% in Russia also have a negative attitude towards the use of robotics in the public service sector. A fairly important issue, from the point of view of researchers, is the issue of the ethics of replacing people with robots and robotic programs. As the survey results show, 18% of respondents in Russia and 43% in Kazakhstan consider unethical in the practice of domestic companies if this leads to substitution of employees with robots (Figure 12).

Conclusion

The research findings allow us to formulate the following conclusions:

1. Robotization and AI technologies are already an objectively existing reality that penetrates all spheres of human life, so people need to acquire basic knowledge and be ready to use these technologies both in private life and in the workplace (e.g., Bondareva, 2016; Tikhomirov et al, 2018; Gasumova & Porter, 2019; Ermakova & Kovyazin, 2020; Starovatova, 2023). About 42% of the respondents in Kazakhstan report usage of AI and robots in their companies (Figure 8) compared to 28% in Russia. Obviously, such a difference has influenced the responses, as the Kazakhstani respondents have a better knowledge of the pros and cons of use of robots versus the respondents in Russia.

2. In the same time, the responses of people who have direct knowledge from their companies, as well as from being served as clients, might be effected by their expectation if the AI and robots implementation may lead to their substitution, and loss of jobs (43% in Kazakhstan and 23% in Russia) (Figure 12).

3. Although neighbor countries, there are some significant differences between the obtained statistics for Kazakhstan and Russia based on the survey results. For example, there is a significant difference between the respondents' judgement about the quality of services. About 72% of the respondents in Kazakhstan expect improvement of quality of the services after implementing AI and robots, while only 40% of the Russian respondents agree with that (Figure 11).

4. In the same time, this research (Figure 11) shows identical percentage of respondents in the two countries agree that the efficiency of business processes (66% of respondents in Kazakhstan vs 67% in Russia), and the expected reduction of company costs (69% of respondents in Kazakhstan vs 67% in Russia).

5. The age of the surveyed respondents affects their attitude towards the use of AI and robotization technologies: young and middle-aged respondents have a more positive attitude towards the use of these technologies in services.

In general, the introduction of these technologies will significantly increase the efficiency of companies operating in various sectors of the economy by reducing labor costs, intensifying work processes, increasing the level and quality of service

to the population (service enterprises), as well as the quality of products (for industrial enterprises). Additional research on the topic, including cross-cultural analysis of the influencing factors in the two countries will add important information to help making relevant decisions in the AI and robots implementation.

According to the authors of the study, the main trends in the development of new technologies based on artificial intelligence will be the following in the next 20-25 years:

- there will be certain shifts in the use of labor – this is a transition from the concept of reducing the labor cost to the organization of production without the use of human labor (production without people). As a result, technological unemployment is projected to be about 50% by the middle of the 21st century (Bondareva, 2016);

- artificial intelligence-based systems will be gradually introduced into public administration systems to manage social infrastructure facilities and law enforcement systems;

- robots will create new standards of efficiency in every business sector;

- making profits for new companies using these technologies will no longer be associated with the creation of real industries (for example, AliBaba, Facebook, Uber, etc.);

- markets for the production of robots in “home conditions”, the so-called illegal markets, which will pose a certain threat, the appearance of “malicious robots”, will develop rapidly;

- there will be significant changes in state of technological security, including military, social, technological and economic security, the ability to defend one’s country in hybrid contactless wars;

- the requirements for the competitiveness of countries in the new hybrid environment will increase.

Human civilization will move to a new level of development, with a hybrid habitat forming, and people will become part of this new hybrid world in which robots and AI will be presented in all spheres of life, precisely AI learning to educate themselves, making independent decisions in respond to environmental changes. And there are both positive and negative effects of this change. Since in the framework of this study we do not set the task of investigating various kinds of consequences, as a result of the robotics development for society, we focus on the impact of robotics on the business sector only. Business is interested in the active implementation of these technologies, as they can significantly reduce costs and increase efficiency.

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