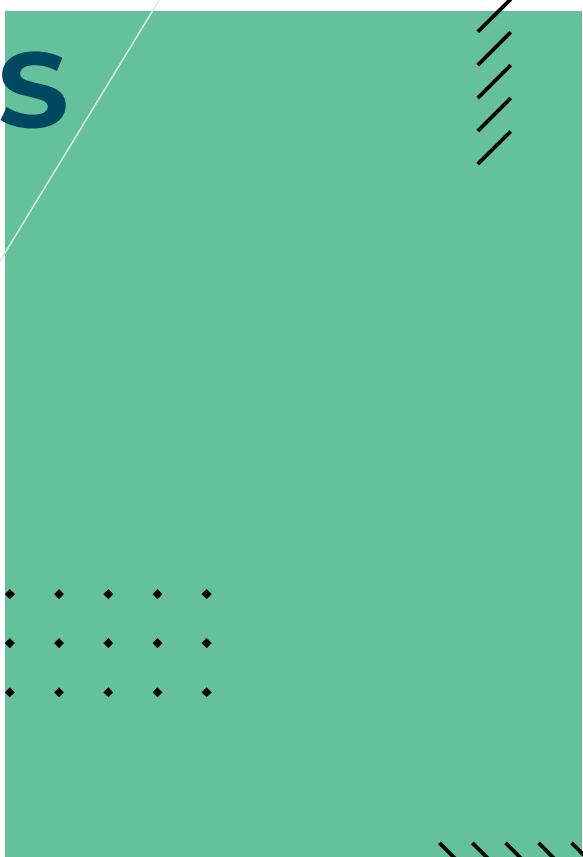


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## How Effective Gamified Technics will lead to Customer Engagement?

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### Abstract

Gamification approach recently has sparked interest among researchers as a new trend of increasing customer engagement (CE) in business-to-consumer (B2C) contexts. However, there is a dearth of exploratory research specifically in Iran Market. This study aims to provide deeper insights into process of customer engagement by analysis of key factors in effectiveness of gamification. To achieve this aim, two main research phases were planned:1) detailed literature review on current studies in this scope and 2) Exploratory semi-structured interview with experts of gamification in small and medium enterprise (SMEs) in information technology (IT) industry in Iran. The synthesis of findings identified there are many game mechanics uses in designing games, which three key factors of feedback, gift and challenge have found to be more effective studies. The finding confirms the effectiveness of gamified mechanism in process of CE, in our sample based on gamified engagement mechanism. Implication of this study may help practitioners in developing more effective gamified CE strategies.

**Key words:** gamification, customer engagement (CE), small and medium sized enterprise (SME), information technology (IT)

### Introduction

Today's ultra-competitive global market is experiencing a rapid proliferation in online or virtual engagement strategies. Gamification has supremacy among these

strategies due to the elements of competition which is challenging and motivating for encouraging behavioral and emotional responses of customers (Harwood & Garry, 2015). Figuring out what engaging the user, applicable feedback in between, and to finally achieve what is a win for the user as well as the organization association, increases the level of co engagement (Singh, 2012).

Gamification has been applied in several areas which range from finance productivity, health, sustainability, news, user-generated content and e-learning (Xu, 2011). Gartner predicts gamification will be a key trend that every CIO, IT planner and enterprise architect must be aware of as it relates to business (Gartner, 2011). In IT industry research, BI intelligence forecast the market share of gamification would increase in 2018 to 5,502 million dollars. Following, in, BI intelligence report, gamification represents the fusion of four trends: “the explosion of social media usage, the mobile revolution, the rise of big data, and the emergence of wearable computing” (BI intelligence, 2013).

Gamification drives participation and engagement by integrating game mechanics and game dynamics into a various context specifically in IT industry such as website, service, online community, content portal, marketing campaign or even internal business workflows. Gamification influences behavior through the use of key concepts from a number of related areas, including game design elements (e.g., game mechanics), customer loyalty programs and customer management in community and cultural and economic situation in community. By consideration of all these facts, this study focused on the effect of game mechanics in process of customer engagement to provide a multilateral contribution for game designers in related area to use the more effective mechanics in gamification strategy.

Despite extensive explanation of gamification merits and shortcomings are provided in the literature, little case study work has sought to confirm gamification as a meaningful concept and provide evidence of its effectiveness as a tool for engaging users in IT contexts. Specifically, in developing countries (e.g., Iran) which the acceptance of gamification and inability to implement a suitable learning environment is of significant. To address this gap, this study aims to provide deeper understanding into the effectiveness of gamification process within the context of

CE. To this end, the contribution of this research is twofold. First, theoretical wise, it offers a conceptual review of the role of affective gamified technics in the process of CE in global market and specifically Iran SMEs in IT industry. Second, by exploratory semi-structured interview with experts of gamification in IT industry, this study is seeking the key factors in gamified engagement mechanics in Iran's IT industry.

The paper is structured as follows. First, we reviewed the literature of key effective mechanics of gamification from global scale and Iran market. Subsequently, we explain the multi-methods research methodology including the qualitative review study and interview adopted to address the research aims. Our discussion of the findings elaborates on three key factors of feedback, gift and challenge. Finally, conclusions are drawn and directions for future research are suggested.

## Literature Review

In contemporary world, advancements in Web technologies have led to the emergence of a diverse form of online games. Online games can range from simple animation games to sophisticated Massively Multiplayer Online Games (MMOG) that users play, interact or compete against thousands of peers in the virtual world (Guo, & Barnes, 2007). One of the most recent forms of online games is called "Gamification" which includes games with a specific purpose (Von Ahn & Dabbish, 2008). Gamification is defined as the use of game elements to promote desired behaviors among customers in non-game contexts; particularly for consumer oriented web and mobile sites, in order to encourage users to adopt the applications. (Deterding, Dixon, Khaled, & Nacke, 2011). Gamification is also striving encourage users to engage in desired behaviors. In connection with the gamification application in IT context, measuring cybersecurity situational awareness, combat spam through community policing, productivity, customer engagement, brand awareness, loyalty and team building in mobile apps and websites are all examples. (Chua, & Banerjee, 2013, October; Fink, Manz, Popovsky, Endicott-Popovsky, 2013; 25 Examples of Gamification in Business, 2017).

## Why effective gamification is a significant marketing strategy?

The most appreciate for game-based marketing is the power of games to affect consumer behavior through game mechanics. McGonigal, (2011) resonated the volunteering attribute of game play by considering games as the only force in the known universe that can get people to take actions without using force when it has contradiction with their self-interest. Game mechanics and psychological conditions of customers exploit are powerful tools that marketers can use instead of cash, which is cheaper in the long- run (Xu, 2011). The effectiveness of gamification in marketing led this strategy significant in global market.

An effective gamification strategy would help marketing planners to approach repeat visits of customers by creating awareness of a product/service in organization. In addition, by appropriate feedback from market, companies could enhance the efficacy of marketing research or simply making sales. All process of product/service design, research and innovation can take the advantage of effective gamification immensely. One of the examples of gamification application refers to education organizations. The MIT University investigated on why games are success in education and found that, “Game players regularly exhibit persistence, risk-taking, attention to detail, and problem-solving, all behavior that ideally would be regularly demonstrated in school”. (Singh, 2012).

Here we provided the significance of effective gamification from CEO point of views. Joel Brodie, CEO and Founder of Gamezebo.com believed that, “....Game-Based Marketing is the first look at combining the power of games with the power of marketing to create an exciting new user paradigm: Fun ware. This is clearly the future.”

Jonathan Epstein, CEO, In-Game Ad Firm Double Fusion, and Founding CEO, Gamespot.com. believed that “....The rise of multibillion-dollar gaming industry demonstrate the appeal that compelling, interactive content has over other more passive form of marketing.... in the field of gaming and the application of gaming techniques ...If you haven't applied games to marketing, advertising, or brand management, it could be game over for you”.

Although the significance of gamification in both academic and practice have been mentioned in literature and advertising market, not all the gamification strategies are effective in various contexts. In other words, there might be possible dangers if the gamification design does not suit the purpose of motivating. In order to assess the effectiveness of gamification process, we need to determine what type of game mechanics should incorporate in specific context (e.g., activities) to meet the psychological and social needs of human motivation (Aparicio, Vela, Sánchez, & Montes, 2012).

### ***How game mechanics motivates engagement behaviors?***

The game mechanics as elements of game design, involves rewards offer at different levels, challenges, points assignments, leaderboards, virtual space & goods, virtual gifts etc. These game elements are used to enhance the effectiveness of gamification. Therefore, game mechanics need to be systematically assessed, with the various elements both separately and in comparison, to another. According to Zichermann, & Cunningham (2011), by deploying some of the basic tenets of game design and discipline, specifically by using game mechanics like points, badges, levels, challenges, and rewards, focusing on making things more fun and rewarding, you can raise various engagement metrics.

Selection of game mechanics that match the objectives and support the needs of human motivation are the most important factors in evaluating effective gamification. Therefore, there are considerable number of studies made efforts to assess and evaluate the effectiveness of gamification through game mechanics in different contexts. Due to this fact, there are numerous approaches in the literature explored the game mechanics items and assigned them to specified categories. As an instance, gamification mechanics are categorized in autonomy, competence and relatedness (Aparicio et.al, 2012).

### **Gamification in Iran Market**

The application of game mechanics and gamification marketing strategy has been reported in few researches in Iran as a case study, such as increasing energy

efficiency via consumers' engagement (Yousefi, 2017) and teach recycling to 7-12 years old children in Iran (Mamaghani, Mostowfi, & Khorram, 2016). However, Iran as emerging economy market needs to grow and improve sectors such as information and communications technology (ICT) and financial services to be able to add \$1 trillion to GDP and create nine million jobs by 2035 (McKinsey & Company 2016). Furthermore, McKinsey global institute reported that, Iran will need to improve productivity and upgrade its industrial infrastructure to new technology, and modern management practices to be able to connect well to international systems that encourages more dynamic competition and innovation. Based on the research and interview with experts, we found five leading companies which had significant leading role in application of game elements in their marketing strategies.

## Methodology

This paper adopted the multi-methods research methodology to review and discover the significance of effective gamification mechanics in customer engagement in both the literature and Iran IT market. To this end, first, we reviewed the literature of key factors of effective gamification strategy from global scale and second, we interviewed with the marketing consultants and experts, and game designers of five leading SMEs in IT industry. Table 1 provides information in regard of enterprises, the domain of their activity, their target customers, and the aim of application of gamification strategy.

Table 1. Name and information of selected SMEs in IT industry

Company name	Activity domain	Target customer	Aim of application of gamification strategies
Hamahang Group	Official representative of sale, distribution, and after sale's services of Samsung mobile and tablet in Iran	The Consumers of digital products and services, The intermediate sellers of companies' products and services with guarantee.	Introduce Hamahang guarantee, customers' attraction, and improve sale performance.

Vistortech	Online store and news website of products and accessories related to information technology (IT) and the mobile phone market	Potential customers of digital products.	Brand positioning, customers' attraction
Avajang ICT Group	Sale, distribution and after sale's services of Gigabyte software and hardware IT products	All customer of digital products and services	Improve the number of sales through customer engagement
Zima news	Online website of IT news and nature	Young generation in Iran	To increase number of site views and increase number of commercial advertisements
Rayane khabar	Monthly news journal in IT area	Iranian 15-17 years old	Increase the gravitation of journal and improve the number of sales

### Findings and Discussion

The findings of literature review reveal that, game mechanics fall into many more or less well-defined categories such as points, virtual economy, levels, leader board, badges, challenges, on boarding and engagement loop (e.g., feedback), loss avoidance, races, territory control and combination condition. While they all need to be balanced and clarified in both aspect of mechanics as objectives and skills. The result of semi-structured interview with experts of gamification in SMEs in IT industry indicated that, effective gamification strategy through feedback, gift and challenge as game mechanics would have the most influence on process of customer engagement in Iran SMEs in IT industry. One of the concerns of expert in regard of target marketing for SMEs was the demographic challenge to engage younger generation. This is in line with the general challenge that SME businesses faced with in all around the world. For example, millennials and Z generation, are valuable segment for small businesses to develop their market in Iran, while their

envision of loyalty packages are based on interaction and engagement rather than mere transaction. Therefore, challenge and feedback mechanics need to be practiced in well-defined social media platforms. Gamification strategies are difficult to manage specifically for SMEs in developing countries as their financial sources are limited. Accordingly, small businesses who want to use gamification to enhance customer engagement need to use prebuilt customer loyalty toolkits that integrate gamified design elements. Synthesize of the results discovered that businesses could motivate their customers to take desirable actions by rewarding them with badges and other incentives for frequent visits to their website, subscription, and purchasing items. Developing and designing gamified mobile app and social media accounts are the best platforms for challenging customers and involving them in game elements. In other words, gamification is a wide concept that give SMEs a competitive edge among their customers in emerging markets like Iran market. Building up gamification mechanics such as social promotional offers into customer engagement loop is an informative way to foster loyal customers. The results also confirms that gamification strategies need to be applied across different industries such as education, sales, health care, and customer service to see which elements are more effective for specific target market in practice.

## Conclusion

This study tries to find how effective gamified system can result in customer engagement in Iran SMEs in IT market though game mechanics. However, the type of partnership, the type of participants and the sub-culture of community could make the function complex and cause heterogeneity among customer in terms of engagement in gamified system. With the progression of information and communication technology (ICT), electronic governance projects and crowdsourcing are the key components that have attracted governmental institution to benchmark the gamification design from SMEs and benefit from customer engagement and involvement in gamified mechanics. According to the findings, by carefully reviewing the literature, this study found several game

mechanics, while the application of gamification strategy in our sample is not as much pervasive as we found in literature. This finding can be justified due to emerging marketing situation of Iran as well as financial limitation of marketing budget of SMEs in IT industries in Iran. Accordingly, in developing countries there are questions of how to design applications that cater to the requirements of customers/consumers in the market. In addition, the synthetize of our interview results indicate that, the differentiation of customer reactions to the game mechanics in gamified system makes the process of customer engagement more complex. As far as discrepancy in social and economic class between upper-middle and lower-middle in Iran is growing, added value to users are not homogeneous even for specific business. Therefore, market segmentation would be an instructive solution to prioritize game mechanics for each segment. For example, most of the expert were believed that gift and challenge are the most effective element for engagement of their specific segment in online store. In conclusion, it is recommended that Iranian marketing associations conduct more research to come up with exclusive design for brands and their target audience. Precisely, by simulating the game mechanics categories in real-life contexts businesses can increase the motivation and engagement of customers by adding tangible value to their experience and make them interested in playing. On the other hand, government and related organizations need to take action to invest in gamification marketing strategies (e.g., Augmented Reality (AR) and Virtual Reality (VR)) as rapid growth of technology and modernization in recent years, end up with customer-centric role for gamification and interest in using gamification for customer contributes to their collaboration, change management, and wellness.

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## Transformation of Fintech: Impact of POS and ATM on Non-Cash Payments

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### Abstract

The banking system of Kazakhstan has undergone many changes in recent years: traditional bank branches are no longer in such demand as 20 years ago. Now banks are intentionally closing branches and transferring their clients to the online format. These steps were especially justified in the context of the COVID-19 pandemic. At the same time, technology has grown: since the beginning of the emergence of point-of-sale (POS) terminals, Automated teller machines (ATM) have developed. To ensure the security of transactions, transfers are tied to an individual, and the transfers themselves have multi-factor identification. The necessity to have payment cards linked to the account is still relevant, even if the user uses applications on his mobile phone to make non-cash transfers. The purpose of this study is to identify the existence of a relationship between non-cash payments and proxy servers for non-cash banking in Kazakhstan. In this scientific study, two hypotheses (zero and alternative) were put forward and tested, of which one was later confirmed. Statistical monthly data cover the period 2004-2020, were obtained from the electronic repository of the Statistical Bulletin of the National Bank of Kazakhstan. To test the relationship of selected determinants have been used program SPSS and Microsoft Excel. Kolmogorov-Smirnov test was used for checking the normality of data distribution (revealed the normal distribution of the

collected quantitative data). This made it possible to find the Pearson correlation coefficient. Further, in the course of the study, a correlation matrix was compiled. It was found the presence of a significant relationship between the amount of non-cash transfers, POS & ATM. This confirms the correct orientation of public policies towards the development of technical systems and the digitization of the economy. The results of this study are important for the banking system and policy dissemination of non-cash payments.

**Keywords:** FinTech, Innovation, Automated teller machines (ATM), point-of-sale (POS) terminals, non-cash payments

## Introduction

Innovation is interconnected with development - this is a truth that can be confirmed by the practical results achieved by a business that has actively invested in new technologies. Moreover, entire economies are introducing an information and technical component into processes, i.e. digitalization is transforming the financial sector. As a result, financial technologies emerge, which are the result of the integration between innovations in the technical and financial fields (Puschmann, 2017). A consequence of the development of IT technologies is the emergence of startups and FinTech applications that are being introduced by the government and business into widespread use (Kang et al., 2016). According to Leong & Sung (2018), FinTech applications can be roughly divided into four main categories: payments; consulting services; financing and compliance.

This article will cover payments. There are several ways to make online payments. First: you can go directly to the branches of banks and operators will be able to transfer cash or electronic money to the account. This method is good for those who are just getting acquainted with banks or, on the contrary, do not want to delve into the banking system. However, during a pandemic, this method is not convenient. Many bank branches are closed or work in reduced mode. To reduce contacts, you can use terminals or mobile applications. Bank terminals for

withdrawing or depositing cash minimize contact, face recognition systems increase the security of transactions. You can use mobile banking, which every bank in Kazakhstan has, from a personal computer. Mobile applications are installed on smartphones and allow you to transfer money online in a 24/7 format. The user must have an account with a linked card (credit or debit), then the application will work, since payments are not impersonal.

Large businesses and representatives of new businesses (startups) are actively using financial technologies to conduct non-cash payments. The shift of interests in this case occurs towards customer focus (Alt et al., 2019; Kumar & O'Brien, 2019; Zavolokina, Dolata & Schwabe, 2016). The financial literacy of people of all ages is increasing every year, leading to a more intelligent use of their assets and the widespread adoption of mobile applications (Sági, Vasa & Lentner, 2020; Puschmann, 2017). Moreover, the state is actively interested in increasing digitalization and financial literacy of the population (Yermekbaeva & Rakhmatullina; 2020). For example, in Kazakhstan in 2018, the state program “Digital Kazakhstan” began to be implemented, divided into five steps (“Digital Kazakhstan ...”).

## Literature Review

Scientists have long noticed that financial stability and economic growth are intertwined. In many countries, moving away from the shadow economy is associated with increased transparency and the number of wire transfers. The security of transactions is ensured by the implementation of the International standard for the exchange of electronic messages between organizations in the financial industry (ISO 20022). For example, in Kazakhstan, the introduction of ISO 20022 into the practice of banks of the second first began in 2019, in Albania in 2017, and in the EU countries since 2016 (Bouille & Haase, 2019; Lindsay, 2015). Usually the implementation of this standard is supported by the government and carried out by the central bank of the country.

Scientists' studies of user satisfaction, point-of-sale terminals and automated teller machines have revealed customer attitudes towards digital innovation in banks (Chocholáková et al., 2015; Adeoti & Osotimehin, 2012). Banks began to apply research findings to improve their ATM programs, and now ATMs are not just for cash withdrawals. Internet banking practically built into the terminal, a multi-factor personal identification system made it possible to make many non-cash transactions more accessible and secure. Payment for using ATMs for transactions in excess of large amounts falls on the user in the form of a commission, which brings additional income to the bank (Alao & Sorinola, 2015; Alagh & Emeka, 2014).

The researchers Aliha, Sarmidi & Said (2020) identified the relationship between the cash supply and the amount of POS and ATM. Moreover, the elasticity of demand for money in relation to POS has been proven, as well as not significant for ATM. In order to use the terminals, you must have payment cards (debit and credit). Scientists are studying indicators that influence the distribution of POS and ATM, the main indicators of which are: economic, banking, energy, technological and demographic (Gjika et al., 2020; Valverde & Rodriguez Fernandez, 2012).

## Methodology

The purpose of this study is to check the existence of a relationship between non-cash payments and proxy servers for non-cash banking in the Republic of Kazakhstan.

To achieve the goal, we will perform the following steps:

*Step 1:* collect and analyze data on the number of transactions for 2004-2020.

*Step 2:* analysis of the number of technical means intended for non-cash payments in Kazakhstan over 17 years.

*Step 3:* check the data for normal distribution (the Kolmogorov-Smirnov test will be used).

#### *Step 4: finding the Pearson correlation coefficients.*

In this study, we will formulate two hypotheses: a null hypothesis and an alternative one.

Hypothesis  $H_0$  - no connection between the number of transactions carried out, ATMs and Pos terminals;

Hypothesis  $H_1$  - there is a connection between the number of transactions carried out, ATMs and Pos terminals.

Dependent variable - number of transactions (thousand); the independent variables are the number of ATMs and the number of Pos terminals.

To check the relationship of selected determinants (finding the correlation coefficient) are used SPSS software and Microsoft Excel.

Correlation analysis is a statistical method for studying the relationship between random variables. In this study, the dependent variable is the number of transactions (thousands). There are several independent variables, namely: the number of ATMs (ATM) the number of Pos terminals as the main proxy servers for cashless banking.

The essence of correlation analysis is to calculate the coefficients of the relationship between variables. These coefficients can be calculated using the statistical programs R, STATA in which various software packages are used to calculate the correlation (Oliveira et al., 2020; Shkolnyk et al., 2019; Nettleton, 2014;). This study will use SPSS.

In general, in various scientific studies it is customary to use the formula for calculating the Pearson correlation coefficient, which is calculated using the formula below (1):

$$r_{xy} = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}, \quad (1)$$

where  $x_i$  – are the values of the X variable;

$y_i$  – the values of the variable Y;

$\bar{x}$  – arithmetic mean for variable X;

$\bar{y}$  – arithmetic mean for variable Y.

The Pearson correlation method is the most common method for numeric variables; it is assigned a value from  $-1$  to  $1$ , where  $0$  is no correlation,  $1$  is complete positive correlation, and  $-1$  is complete negative correlation. This is interpreted as follows: a correlation value of  $0.7$  between two variables will indicate that there is a significant and positive relationship between them.

This research study will test the hypotheses put forward on the basis of data that cover 17 years (2004-2020), taken from the Statistical Bulletin of the National Bank of the Republic of Kazakhstan. In the following parts of the article, analysis, calculations and results will be presented.

### ***Analysis Determinants***

National payment systems play an important role in shaping monetary policy. There are two such systems in Kazakhstan: the International Bank Transfer System (ISMT) and the Interbank Clearing System (ICS). In this article, monthly indicators from 2004 to 2020 were taken from the Statistical Bulletin of the National Bank of Kazakhstan. This made it possible to identify the cyclical nature of the development of economic and financial processes. For example, you can pay attention to 2008, 2009 and 2010. Let us remind you that at the end of August 2008 the Financial Crisis began in Kazakhstan. 2009 - stocks of economic entities were spent. In 2010, there is a sharp increase in the number of payments. Figure 1 shows that the situation repeats itself in 2019-2020 (this time we take 2 years, since the crisis due to the COVID-19 pandemic began in late 2019 - early 2020).

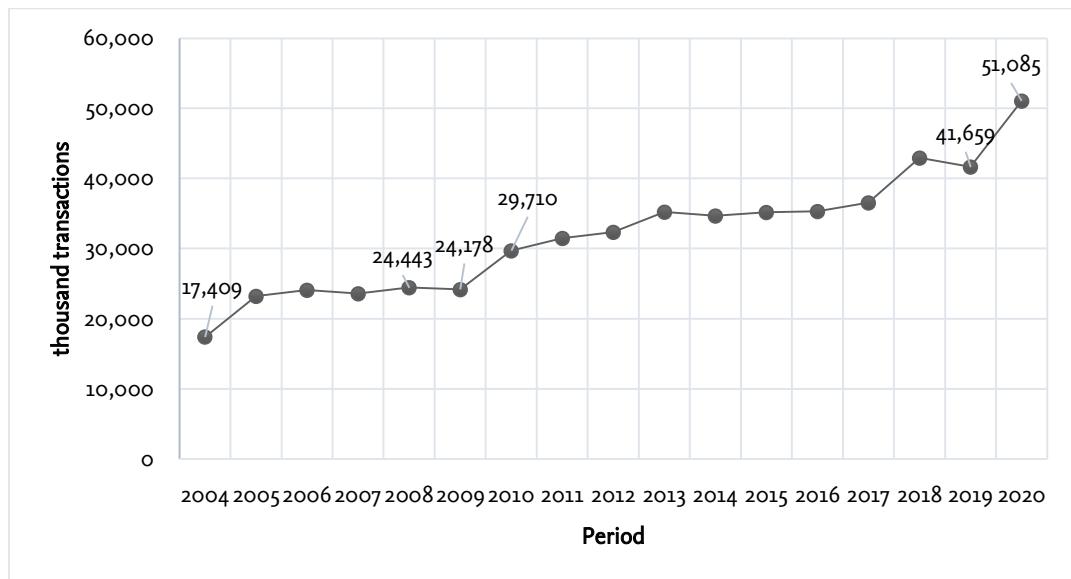


Figure 1. Number of payments 2004-2020.

The record year for the number of transactions was 2020. This year, for the first time in Kazakhstan, the number of transactions on non-cash money transfers exceeded the number of cash withdrawals. In general, the increase in remittances is steady. Figure 2 shows a sharp decline in the number of remittances in 2010 and 2020. It turns out that the number of transfers is growing, and less money is transferred through payment systems.

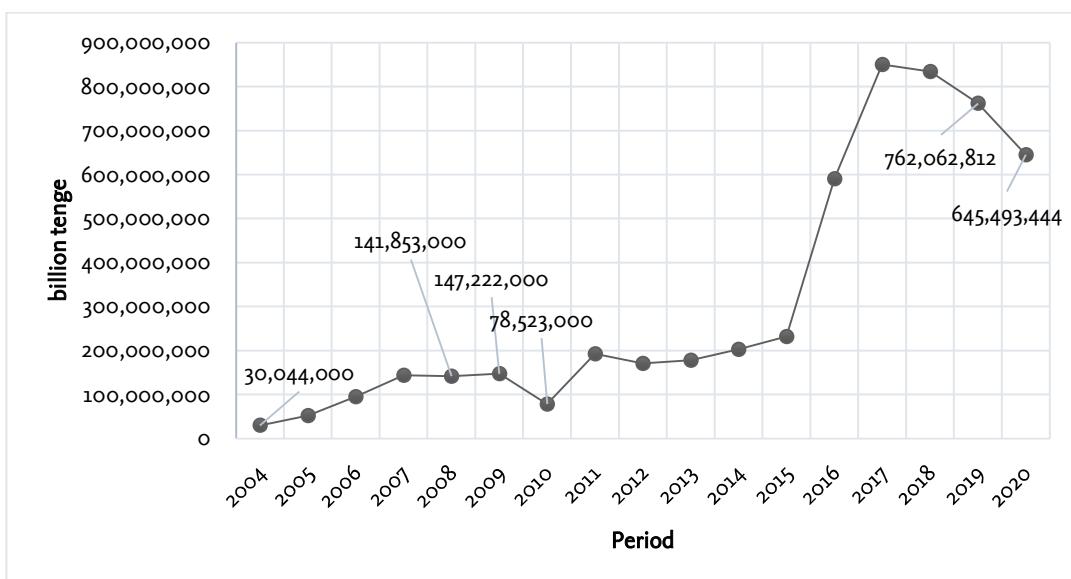


Figure 2. Volume of payments 2004-2020.

The largest volume of transferred tenge was in 2017 and so far Kazakhstan has not reached this mark. Maybe there is less cash? No, cash in circulation is shown in Figure 3. The smooth growth of cash was in 2008 and in 2009, in 2010 there is a sharp upward leap. The cash money supply behaves similarly in 2019-2020. In the following Figure 3, it can be seen that the cash money supply has been growing in similar periods. This shows that in post-crisis periods a lot of money is diverted to the shadow economy.

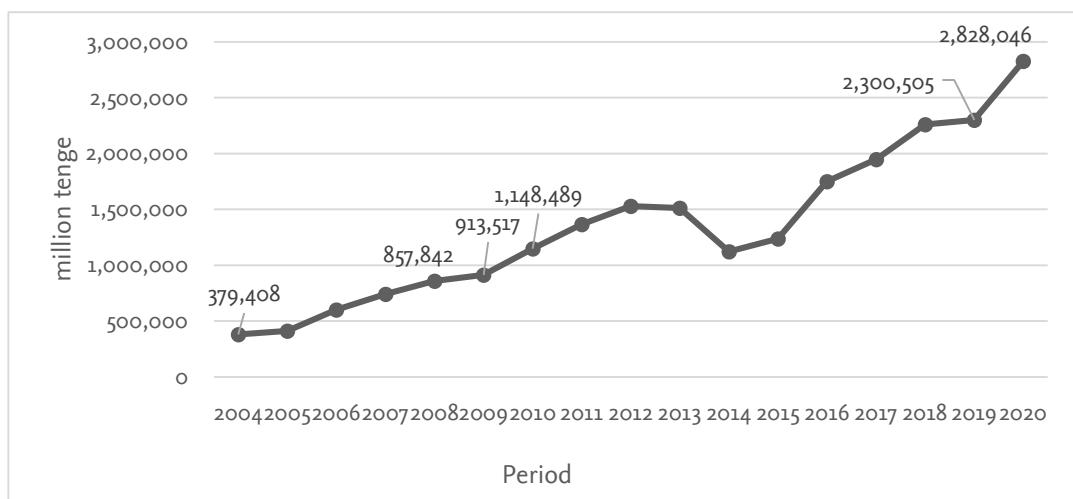


Figure 3. Cash in circulation in 2004-2020.

Several conclusions can be drawn from the data collected. First: the economy develops cyclically, in a spiral. Taylor & Bacha, (1976) expressed the opinion that the economy develops cyclically and this is now being confirmed. Stiglitz (2010) examined the 2008 financial crisis and concluded that the financial crisis is affecting other sectors of the economy, including the tech industry. Park, Ali & Chevalier, (2011) argued in support of the fact that tech companies also experience certain difficulties during the crisis, but some companies learn and even make money during difficult times. Sabden (2018) viewed the tech giant as Samsung. And he also cited as an example that this company learns quickly and brings innovation to the business model. It can be added that this company entered the Kazakhstan market with its Samsung Pay application in 2019, in parallel with the Apple Pay application. During the COVID-19 pandemic, these two companies made it possible to pay on the spot using cell phones. In any case, for such payments to take place, you need

a bank card tied to the application and to the phone (Ceipidor, 2012). Table 1 shows the change in the number of selected indicators for the last 2019-2020 years.

Table 1. Dynamics of the number and volume of remittances in 2019-2020.

Indicator	2019	2020	Dynamics %
Number of payments, thousand transactions	41615	51085	23
The volume of payments, billion tenge	762062812	645493444	-15
Cash in circulation, million tenge, at the end of the period	26632221	31785976	19

Also, on the presented graphs it is noticeable that the number of transactions increased by 23%, the volume of money transferred decreased by 15%, the volume of cash in circulation increased by 19%. It turns out that in the post-crisis period money goes into the shadow economy.

In the United States, the population prefers to withdraw cash only to pay a certain small amount. If the amounts are close to \$ 100, people prefer to carry payment cards (Shy, 2020).

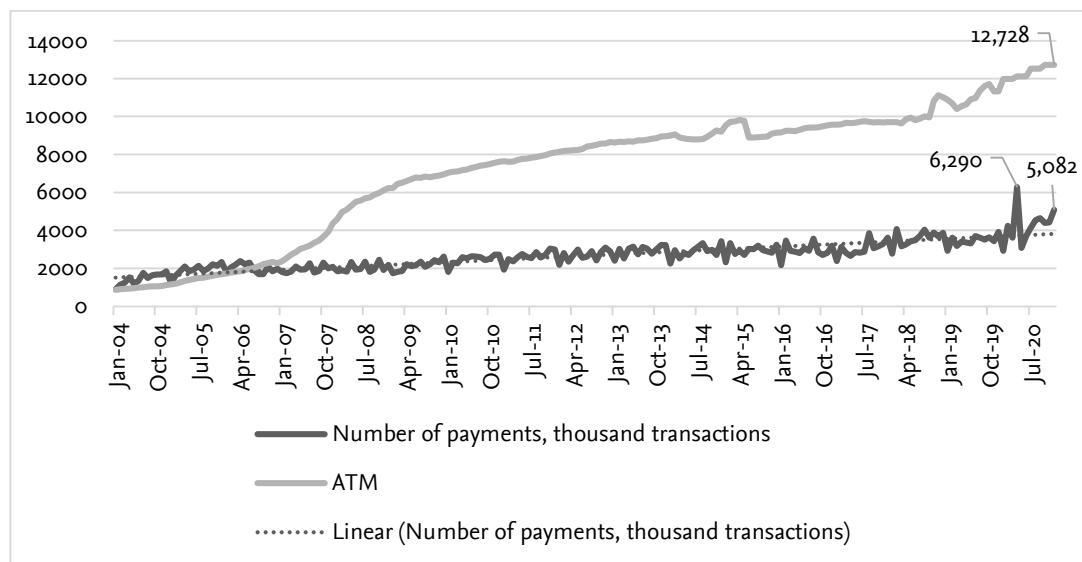


Figure 4. Number of transactions and ATMs 2004-2020.

Figure 4 shows that the peak of non-cash transfers is April 2020 (6,290 thousand transactions). It was in this month for the first time in Kazakhstan that the number of cashless money transfer operations exceeded the number of cash withdrawals. The trend line of transactions is upward. The number of POSs exceeds ATM by 16.6 times, so the POSs are presented separately in Figure 5.

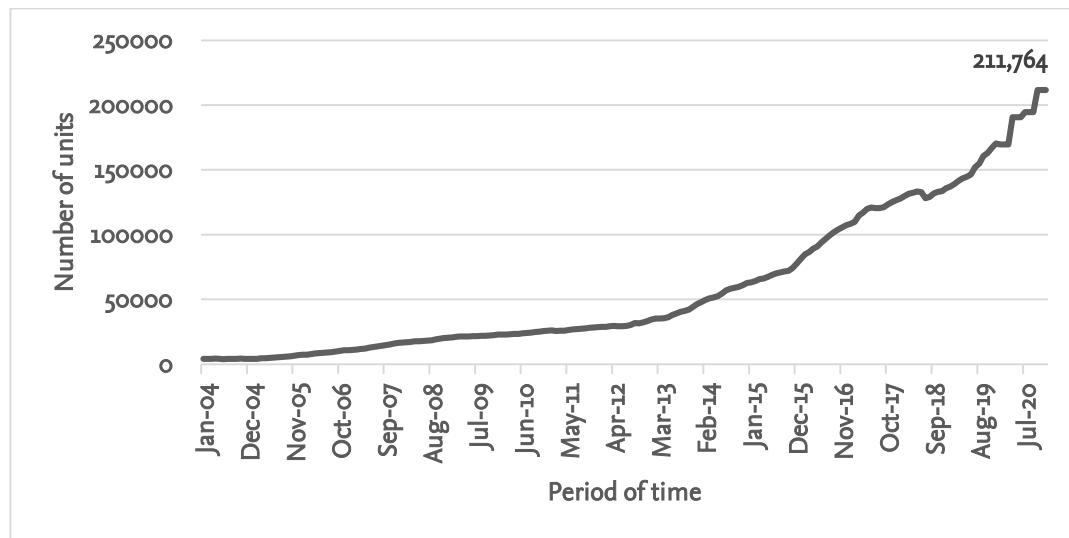


Figure 5. Number of Pos-terminals.

Both figures show upward trends in both the number of transactions and the number of vehicles. ATM and POS were divided into 2 charts, since when all indicators are presented in different figures, April 2020 stands out noticeably (the most acute period of the pandemic and lockdown in Kazakhstan for 2020). Further, in Table 2, three periods were considered with a step of 5-6 years: 2004-2009, 2010-2014, 2015-2020.

Table 2. Dynamics of the number of technical means for non-cash banking in 2004-2020.

Equipment for cashless payments	2004	2009	Growth h, %	2010	2014	Growth h, %	2015	2020	Growth h, %	Growth h for the whole period
	4	9								

Pos terminals	4211	2291	444	2591	6275	142	77	211	171	49
ATM machines	1124	6956	519	7605	9206	21	9 146	12 728	39	10

The largest jump in the number of equipment was observed in the first period: 2004-2009. The increase in the number of Pos terminals and ATMs at that time was by 444% and 519%, respectively. An increase in the number of equipment in 2020 compared to the base year 2004 of Pos terminals by almost 50 times, ATMs by 10 times.

### **Findings and Discussion**

Moving on to descriptive statistics. Data for each indicator was taken monthly from 2004 to 2020 (total number of observations 204). The source was the website of the National Bank of Kazakhstan, Statistical Bulletins for 17 years. For convenience of presentation, the data were encoded, shown in Table 3.

Table 3. Coding determinants.

Designation	Decoding	Source
V <sub>1</sub>	Number of payments, thousand transactions	National Bank of the Republic of Kazakhstan
V <sub>2</sub>	Pos terminals, pcs.	
V <sub>3</sub>	ATMs, pcs.	

Using the SPSS program in our study allowed us to apply descriptive statistics and calculate the correlation between the selected indicators (Valente et al., 2020). To check the normality of the data, the Kolmogorov-Smirnov test was used, the results of which are shown in Table 4.

Table 4. Test data for normal distribution.

One-Sample Kolmogorov-Smirnov Test							
			V2	V4	V5		
N		204		204	204		
Normal Parameters <sup>a,b</sup>	Mean		2670,44	59216,45	7233,66		
	Std. Deviation		770,612	56456,984	3359,255		
Most Extreme Differences	Absolute		,053	,212	,139		
	Positive		,053	,212	,108		
	Negative		-,048	-,165	-,139		
Test Statistic			,053	,212	,139		
Asymp. Sig. (2-tailed) <sup>c</sup>			,200 <sup>d</sup>	,000	,000		
Monte Carlo Sig. (2-tailed) <sup>e</sup>	Sig.		,167	,000	,000		
	99% Confidence Interval	Lower Bound	,157	,000	,000		
		Upper Bound	,177	,000	,000		
a. Test distribution is Normal.							
b. Calculated from data.							
c. Lilliefors Significance Correction.							
d. This is a lower bound of the true significance.							
e. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 2000000.							

According to the test results, the mean, standard deviation, extreme differences and the significance of the error were shown, which is not more than 0.5. It turns out that the data taken are quantitative, have a normal distribution, so Pearson's

correlation coefficients were calculated. Further, such a correlation matrix was compiled, the result is in table 5.

Table 5. The obtained correlation coefficients.

		Correlations		
		V1	V2	V3
V1	Pearson Correlation	1	,836**	,834**
	Sig. (2-tailed)		,000	,000
	N	204	204	204
V2	Pearson Correlation	,836**	1	,806**
	Sig. (2-tailed)	,000		,000
	N	204	204	204
V3	Pearson Correlation	,834**	,806**	1
	Sig. (2-tailed)	,000	,000	
	N	204	204	204
**. Correlation is significant at the 0.01 level (2-tailed).				

The correlation coefficient between technical means and the number of non-cash transfers is high. POS and non-cash transactions have the highest correlation (0.836), ATM and transactions also have the highest correlation coefficient (0.834). The statistical significance of the coefficients is high. This indicates a significant relationship between the indicators. Moreover, both technologies have overlapping linear relationships and complement each other (0.806), which by the way excluded the conduct of regression analysis in this study.

## Conclusion

Hypothesis  $H_0$  - lack of connection between the number of transactions performed and ATMs - is rejected.

Hypothesis  $H_1$  - the presence of a connection between the number of transactions performed and ATMs - is accepted and has evidence.

To move cash registers and other customer service out of bank branches, banks are deploying ATMs. During quarantine, these measures are especially relevant. Our results show that banks are focusing on servicing POS terminals (in 2020, POS exceeds ATM by 17 times) more than on ATMs. At the same time, both technologies help to increase non-cash transfers in the country.

The adult population (aged 16+) makes non-cash transfers using ATMs and POS terminals. It turns out that in Kazakhstan, to increase the number of non-cash payments, it is necessary to increase the number of equipment for payment, involving all known methods. The spread of mobile applications, the use of NFS systems, QR codes also has a positive effect on the increase in the number of online transfers.

Limitations in the study: this article does not take into account the points of payment with QR codes as the determinant of non-cash payments. The idea was to preserve the time series from 2004 to 2020, and in Kazakhstan, the beginning of the implementation of QR codes for payment began in 2017. Therefore, in the future, scientists will be able to study the relationship between QR codes payment and non-cash transfers.

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## The Evolutionary Role of Higher Education in Sustainable Development: Pandemic 2020–2021

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### Abstract

This article investigates the role of higher education in the economic development of the country. The research aims to investigate the theoretical and methodological basis of the role of higher education and human capital in economic growth, evaluate the current state of higher education within pandemic COVID-19, and develop scientifically and applied recommendations to strengthen capacity and improve the competitiveness of human capital in the developing countries.

An analysis of the existing researches and debates is made. We defined the state of higher education in Kazakhstan and considered the changes in education within the context of COVID-19. We made multiple correlations and regression analysis based on the education coverage index and GDP(mln KZT), where defined the moderate correlation between two variables. Statistical data is studied in a period from 2000 to 2019.

This paper contributes to the literature by fulfilling a theory of human capital development in the knowledge economy, revealing the relational mechanism between higher education, sustainable development, and the economic boundary of this relationship. It also contributes to the further understanding of the role of higher education in economic development. This study result implies to strengthen

capacity and improve the competitiveness of human capital, draft human capital development policy.

**Keywords:** SDG, COVID-19, human capital, higher education

## Introduction

United Nations Member States approved the 2030 Agenda for Sustainable Development in 2015, where 17 sustainable development goals (hereafter - SDGs) were introduced. The aims of SDGs are ending poverty, improving health and education, reduce inequality, and spur economic growth.

In the past several decades, tertiary education has played a significant role in SDGs, was counted as an investment for the future (Nafukho, F. M., Hairston, N. R., Brooks, K., 2014). Extensively growth of the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship are impossible without the high quality of education. Especially, it is significant to provide high-quality education for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations. Investments in education lead to economic growth and allow achieving sustainable growth. This phenomenon has been widely observed by T. Schultz (1961) and G. Becker (1964).

The overall goal of this paper was to pursue the role of HEIs in sustainable development in the context of the COVID-19 pandemic. This paper has made some significant contributions to the field of education studies, economics and sociology. This paper contributes to three strands of the literature and evidence on the evolutionary role of Higher Educational Institutions and their response to COVID-19. These point out the role of HEIs in SDGs.

There are two hypothesis: 1) Output of education impacts on economic sustainability of country; 2) Pandemic will impact on human capital negatively.

The paper consisted of six parts: 1) literature review, where we had considered the role of education in sustainable development. 2) Methodology of research. 3) State of HEI before COVID-19. 4) The impact of COVID-19. 5) Economic modelling. 6) Discussions and conclusion.

### **Literature review**

The first attempts to quantify human capital began to be accepted from the beginning of the XX century. Economists tried to calculate the cost of human capital, the impact of education on economic growth, and government spending on education and the upbringing of the population using economic, mathematical, and statistical research methods. I. Fischer (1906), S. Forsyth (1914), L. Dublin (1930) made a great contribution to these studies.

Forsyth investigated the cost of human capital based on financial losses. He considered financial losses as a result of average life expectancy, life expectancy, and age-related mortality rates.

Dublin and Lotka (1930) published the work 'The Monetary value of a person, in which they estimated the age and annual earnings of a person until the end of life by subtracting the number of living expenses.

Stehle (1943) investigated how a person's abilities affect earnings.

The term "Human capital" was first introduced by J. Mincer in 1958. Mincer (1958) created the first models of the income distribution of individuals by the level of professional education.

Becker popularized the concept of human capital in the late 50s of the 20th century. Initially, Becker (1964) wanted to evaluate returns of secondary and higher education, however, the gap of investment of human capital was defined. It was clear that wages were increased by age of a person, and the pace of rising was connected with the education of human. It was found that unemployment is related to the level of education, as well as the phenomenon of private job changes

by young people. Becker has investigated how expenditure on job training impact human capital's income. Employees had to invest in human capital for the maximization of future profit. However, labour turnover was one of the main problems of employers at the time. It was important for an employee to define returns of investment in human capital, therefore, the initial age of employers might be lower than in other companies.

In the 60s of the last century, Becker claimed that if earlier the main motivating factor was the growth of physical labour, now it is necessary to focus on the quality of labour resources, increasing the level of education and skills. Namely, the development of human resources was the result of the development of the economies of the USA and the USSR in the 60s. Subsequently Becker (1992) continued to deepen his research without changing the initial setting with some further reference to emergency situations and the investment in the staff development as a way to improve the resilience of organizations.

R. Reich (1991) noted the need to develop public schools to form the human capital of the future and indicate three new fundamental work categories for the development of economies as: routine production services, in-person services, and symbolic analytical services.

This insight paved the way for the considerations of L. Turow (1996) who argues that human capital will replace physical capital. Thereby confirming that for the development of countries it is necessary to accumulate and increase human capital. Many countries have begun to struggle for a strategically important non-renewable resource.

The Organization for Economic Co-operation and Development will focus its attention (Bassanini Scarpetta, 2000) in the long-run elasticity of output to human capital connected to the returns to schooling.

E. Tan (2014) noted that the concept of human capital is widely used as a tool for shaping the political course of education. However, it should be noted that the concept covers not only the field of education and training but also many other

areas such as health and migration of citizens and consequent emergencies which require an adequate feedback from the human resources.

According to neoclassical Economics, individuals invest in their education to earn higher incomes in the future. Tan considered the theory of human capital from the point of view of methodology, empirics, applied nature, and moral perspectives. The study revealed that the current theory of human capital has its limitations and contradictions.

In last years the multidisciplinary approach will confirm the role of human capital in the increasing of resilience capacities of organizations (Bianchi 2016; 2019) and their impact on how societies in emergency situations (Pereira, Temouri, Patel 2020) and the pandemic crisis triggered by COVID-19.

As a result of school closures insufficient level of communication affect on students' welfare and their soft skills and thereby their long-term wages. (Fuchs-Schündeln, et. al., 2020)

At the moment no theory can replace the current theory of human development but it seems that the analysis of quantitative statistics can allow to face the challenge of understanding if and how culture and organisations play a role in processes affecting the human capital and the impact on it of widespread and prolonged emergencies.

## Methodology

The qualitative analysis is made on the state of HEI based on secondary data of governmental statistics and evidence.

Calculation of education coverage index based on OECD method. The education covered index is calculated taking into account that the required length of education and the average length of training are replaced by the net primary education coverage rate (children aged 7-10 years), the gross secondary education

coverage rate, and the gross higher education coverage rate(governmental statistics, 2021)

$$\text{Dimension index} = \frac{\text{Actual value} - \text{minimum}}{\text{Maximum} - \text{minimum}} = \frac{\text{Actual val}}{100 - 0} \quad (1)$$

$$\text{Education coverage index} = \frac{\sum \text{index of enrollment ratio in primary,sec.,high edu}}{3} \quad (2)$$

We made correlation and quadratic regression analysis based on the education coverage index and GDP (mln KZT). Statistical data is studied in a period from 2000 to 2019.

## Findings and Discussion

### ***State of HEI before COVID-19***

Before the pandemic COVID-19, Kazakhstan was aimed to provide high-quality education to whole students. According to 17 goals for sustainable development, youth is the main driver of economic growth. However, economic growth occurs if youth get skills and opportunities to reveal their capacity. 2019 was announced the year of youth in Kazakhstan, that youth could enlarge their knowledge and skills to adapt to the modern labour market and conditions of changing world. Human capital is one of the main factors of sustainable growth and decreases poverty.

The growth of the middle class and youth stimulate the massification of higher education in the world. World Access to Higher Education Day (hereafter-WAHED) (2018) decided to decrease inequality in access to higher education at the local, national, and global level. Jamil Salmi, the expert of WAHED, offered an analysis of state politics of equality that based on 2 ways of stimulation access to higher education: financial and non-financial. (HSE, 2011). Kazakhstan, like other East European and Central Asia countries, mostly used merit-based entrance exam, which is known as National test for school graduates. The state provides grants to one-third of students. The majority of grants are given to education and technical majors (Informburo, 2018). Over 40% of grant holders are from the vulnerable community.

N.Nazarbayev (2018), former president of Kazakhstan, said that number of universities should be reduced, and we should improve the quality of education. Majority believe that decreasing the number of universities will help the education system.

On the other hand, According to the National Bureau of Economic Research (2016), increases in university presence are positively associated with faster subsequent economic growth. However, the correlation of GDP and quantity of universities is negative (-0,099) in the period of 1991-2020.

Currently, 125 HEIs (Figure 1) and 38470 teaching staff (Figure 2) are in Kazakhstan. The majority of HEIs are concentrated in Almaty city.

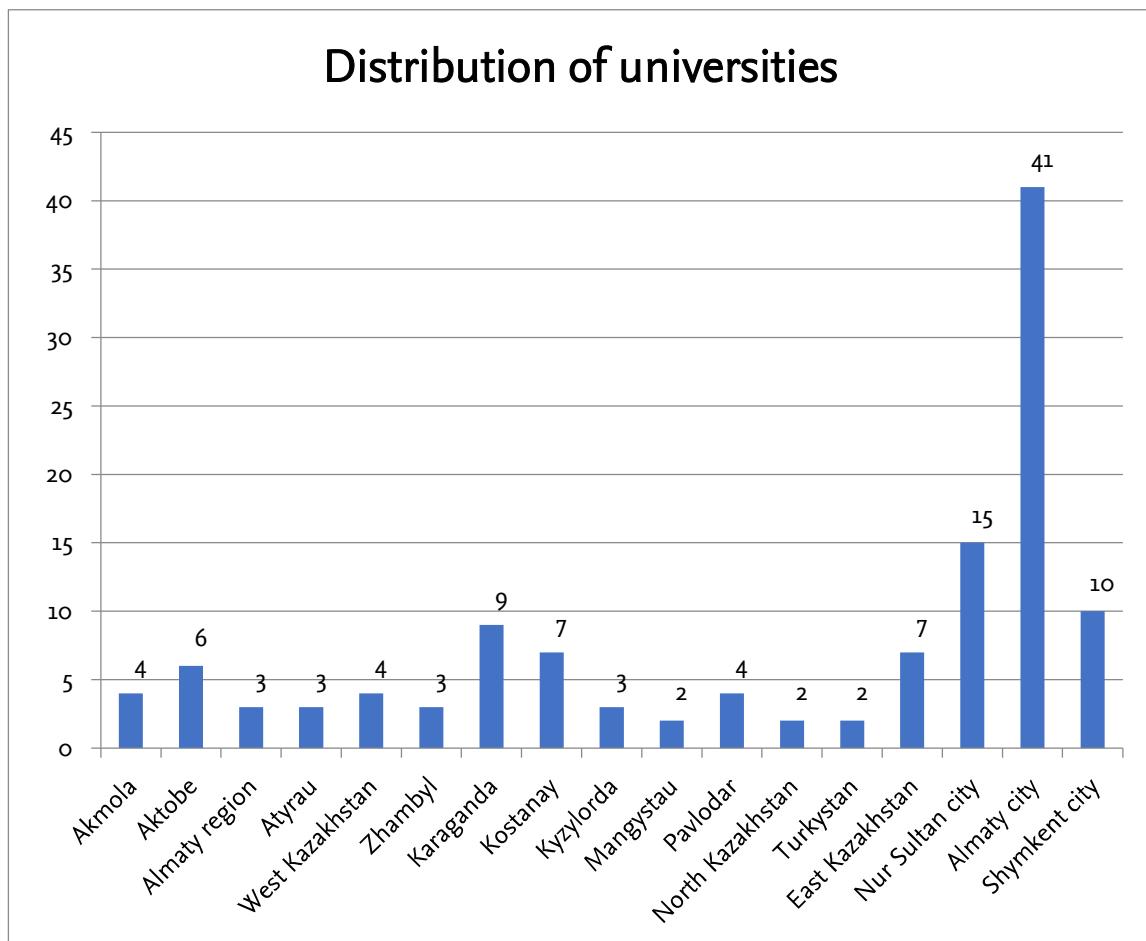


Figure 1 – Distribution of universities-2020

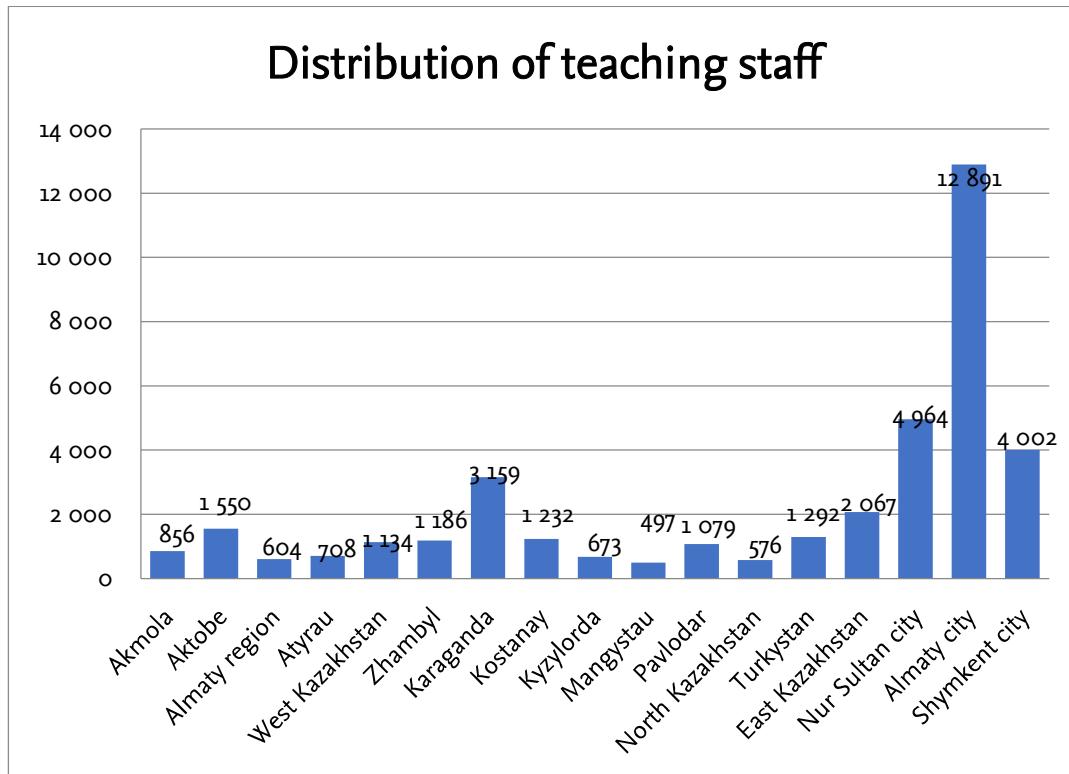


Figure 2 – Distribution of teaching staff -2020

Quality of HEIs could be assessed by employers. According to BCG research (2019), applicants have academic achievement and diligence, but lack of creativity, the ability to structure, synthesize information, presenting themselves, capability to comprehend and network.

For better or for worse, science and technology are powerful agents of change, depending on how they are steered (Global sustainable development report, 2019, p.30). R&D impacts many aspects of social life and changes lifestyle and habits. Innovations influence demand for human resources and lead to structural change. However, only 8542 (22%) of teaching staff are doing researches at HEIs. Expenditure on R&D in 2019 is approximately \$195,7 mln, which is 0.13% of GDP. Innovations in computer sciences, artificial intelligence and biotechnologies might provide solutions to the majority of the challenges facing the Sustainable Development Goals.

386 organizations (104 state, 269 private, 13 foreign) 21 843 scientists involved in R&D in Kazakhstan. The quantity of scientists is 852 per million people while in developed countries this indicator varies from 3000 to 7700 per million. However, the quantities of scientists are decreasing each year. Expense on salary in 2017 is approximately \$74,9 mln, which indicates \$282 as the average wage (Science and innovation of Kazakhstan 2013-2017, 2018).

Expenditure on education is 4-6% less than the recommended budget, which is required to achieve the 4<sup>th</sup> sustainable development goal. Kazakhstan spent 20% of the general budget of education on higher education. However, according to government statistics (Dynamics of basic socio-economic indicators, 2020), expenditure on education in Kazakhstan is approximately \$5,54 bln, ie 3.35% of GDP respectively. In developed countries as the USA (4.99%, 2014), Germany (4.93%-2014), Canada (5.27%, 2011) this indicator is higher (Total government expenditure on education, n.d.).

A challenging problem that arises in this domain is how the education system could handle the Pandemic. To our knowledge, no study has yielded in the discourse of pandemic. To overcome this problem, in the next section we analyse the pieces of evidence of the COVID-19 outbreak, economic and social consequences of closing schools.

### ***Impact of COVID-19 pandemic***

Many countries closed schools and universities and transferred students to distance learning as a response to COVID-19. The pandemic changed the ordinary life cycle and produced many challenges and some opportunities, namely, lower quality of education, inequality, technical unreadiness, migration limitations, and economic instability.

94% of students will feel the effect of closing schools (UN,2020). Moreover, as a result of the gap term at school, that caused by quarantine, the average final national test outcomes of graduates in Kazakhstan decreased by 1.1 points (64.6

points-2020, 65.5 points-2020) in comparison with 2019. It means that the level of first-year students is lower than a year ago. First-year students are studying online because of restrictions, that might impact on students' grade or knowledge. Any gap in human capital accumulation that arises today because of the pandemic may have long-lasting effects, not only for countries but also for individuals, as shown by the long-term effects on education and health of children born during the 1918 flu pandemic (World bank, 2020, p. 41).

Tejedor, S., et al. (2021) considered COVID-19 crisis as a possibility to assess ICT skills of teachers and students, as well as, university tools. During Pandemic kazakhstani universities used MS Teams, ZOOM, google classroom, hangout meet, skype, and their platforms as Moodle, Platonus.

UN (2020) has reported that decreasing the level of education as the result of COVID-19 would lead to a lower quality of human capital, and increase inequality among population. The increasing level of inequality in access to high-quality education has risen that increase the gap among students. Probably distant learning would be less effective to all students, although students from the vulnerable population would be even less effective. Only students who have a good connection and the required number of computers and other devices could use the opportunities of online learning. Students from countryside mostly had bad or low-speed Internet. Many lecturers struggled because of lack of ICT skills. (Bokayev, et al. 2021). A. Zhumagaliev(2019), Minister of Digital Development, Innovations and Aerospace Industry of the Republic of Kazakhstan, has announced that 81,3% of the population has access to the internet within the program Digital Kazakhstan, while students complain about the speed and quality of the internet.

Always in Kazakhstan, distance learning makes a challenge for teachers and lecturers, who do not have the required qualification in online teaching, and for students, who don't have access to the internet and computers. Real coverage of education is decreasing because of poor internet connection in the distant countryside. Moreover, students and teaching staff faced cyberattacks, low speed of internet, and freezing of study platforms. Above mentioned issues lead to

insufficient level of education. In addition, distance learning effects on quality of education, because of an insufficient level of education, which lead to economic losses in the future (World Bank,2020).

Education plays a significant role in preparing human for the economically active population of the nation, to improve transfer educational system aims to learn people the required skills. As a result of the pandemic, the negative effect of education might lead to the growing quantity of functionally illiterate students. The skills of graduates will be lower, which might effect their future employment. Negative impact on education and reducing years of learning, lead to diminishing expected income on 2.9%. Economic losses would be up to \$1.9 bln. in Kazakhstan (World Bank,2020).

Migration from region to region is complicated because of many restrictions on travel. In Kazakhstan, 604345 students (full-time, part-time, and external) studied at the universities in the years 2019-2020. 564 787 are local, 32 333 from CIS countries, and 7 225 non-CIS countries (304 Afghanistan, 807 China, 4450 India, 228 Jordan, 888 Mongolia, 279 Turkey). 142 762 students graduated from the university in 2019-2020, including 1590 international students. However, most students couldn't continue their studies because of closed borders. According to BridgeU (2020), COVID-19 will impact worldwide student mobility.

COVID-19 outbreak impacts the financial stability of the population. According to the forecast of World Bank(2020) GDP in Kazakhstan will decrease 3% in 2020 and increase 2.5% in 2021. Many people have lost their income because of strict quarantine. The unemployment rate in Kazakhstan has risen and reached 5%, that effect purchasing ability. As a result, 12 360 students took a withdrawal from universities because of financial issues(Higher Educational Institutions of the Republic of Kazakhstan,2020). According to the World Bank evaluation, the level of poverty worldwide might grow from a forecasted 8.3% to 12.7%. It is expected an economic shock for the labour market of Kazakhstan.

Youth unemployment is decreasing from 2001 to 2019, from 16.6% to 3.7% respectively (Figure 3). In the third quarter of 2020 youth employment reached

3.9%. The employment of graduates is 74%, while the average salary is 103285 KZT(approx. \$250). As a result of pandemic and lockdown, many universities didn't hold job fair for graduates.

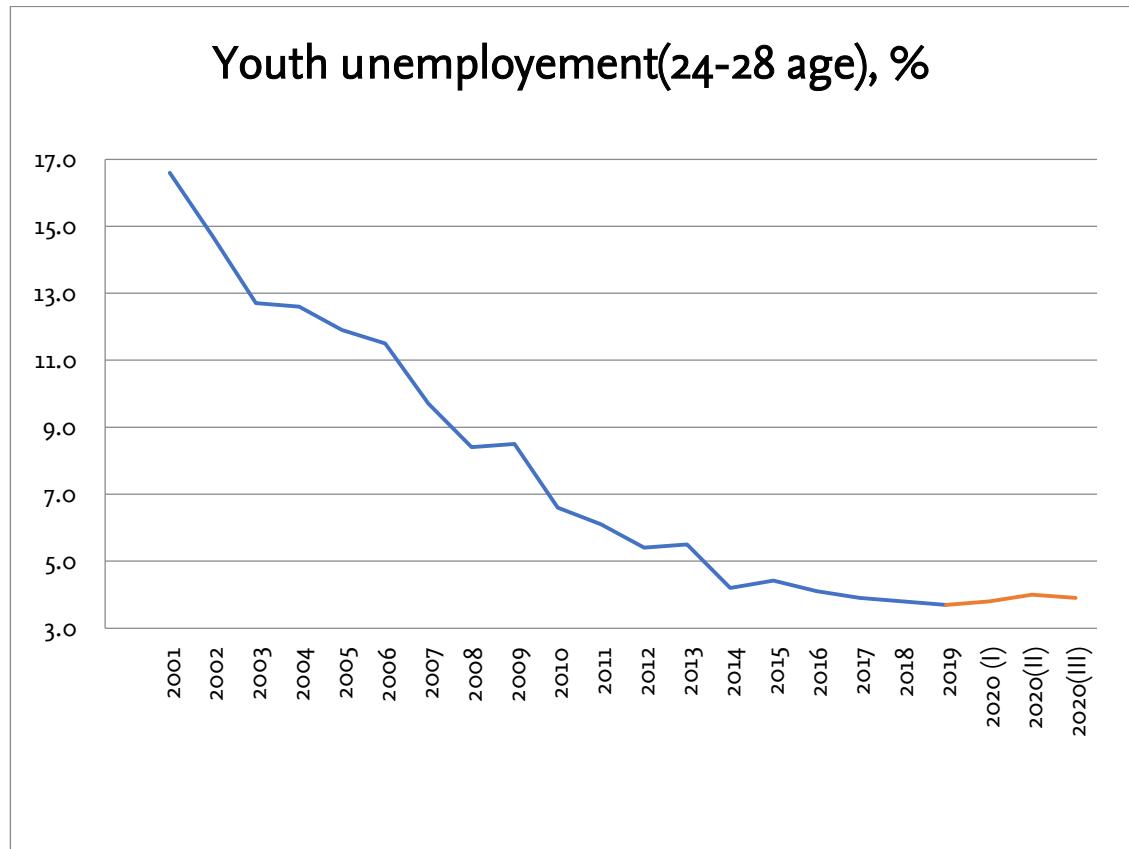


Figure 3 – Youth unemployment (24-28 age), %

Controversially, the opportunities in the digital world appeared as a result of the coronavirus pandemic. COVID-19 opens access to a new perspective for scientists, i.e. ability to participate in online conferences from leading researchers. Also, many universities provide open access to their library sources. The school closures have required students to become more independent in their learning and enhanced teachers' digital skills (Deslandes-Martineau, M., etc., 2020)

In the post-pandemic era, accessibility to education will be easier and education will be cheaper.

## Regression modelling

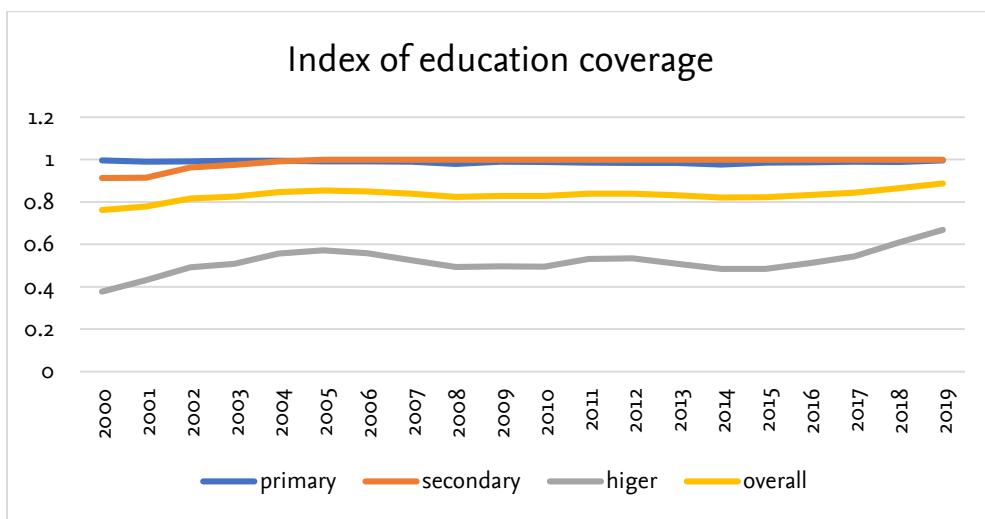


Figure 4 – Index of educational coverage in Kazakhstan

The index of coverage in primary education is almost 1, secondary education is 1, while the higher education index is rising and reached 0,66 in 2019 (Figure 4). An increase in involvement in higher education leads to a growing skilled working force in the future.

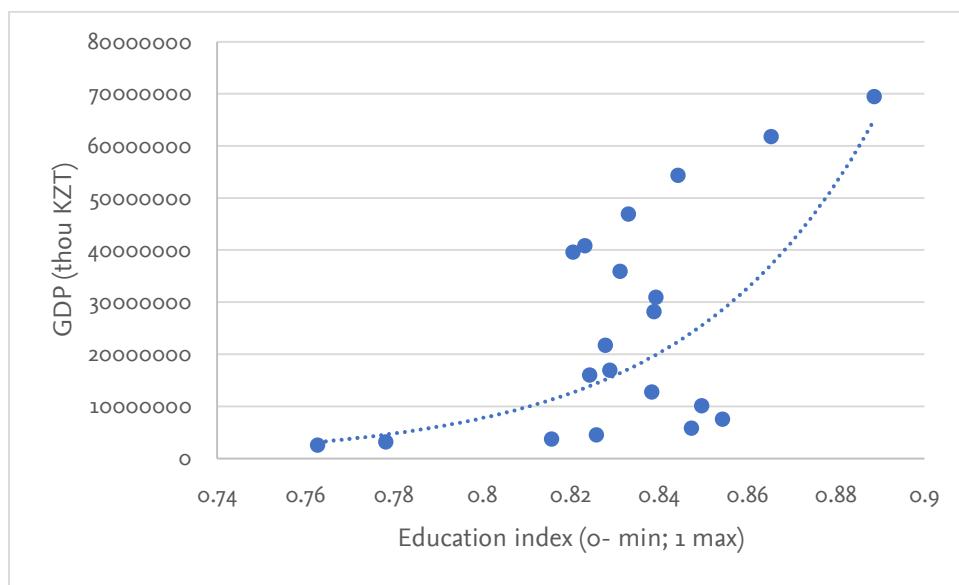


Figure 5 – Scattered plot: correlation of GDP and Index of education coverage in Kazakhstan 2000-2019

According to Figure 5 and table 1, GDP and index of education coverage correlated moderately positively.

Table 1. Correlations

		GDP	IEd
Pearson Correlation	GDP	1.000	.664
	IEd	.664	1.000
Sig. (1-tailed)	GDP	.	.001
	IEd	.001	.
N	GDP	20	20
	IEd	20	20

According to Table 1, analysis indicates strong correlation between GDP and index of education.

Table 2. Model Description

Model Name	MOD_12
Dependent Variable	GDP
Equation	Quadratic
Independent Variable	IEd
Constant	Included
Variable Whose Values Label Observations in Plots	Unspecified
Tolerance for Entering Terms in Equations	.0001

We made quadratic regression analysis based on the education coverage index and GDP (mln KZT). Statistical data is studied in a period from 2000 to 2019, with 20 total cases. Index of education is considered as independent variable, while GDP is dependent (Table 2).

Table 3. Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.719	.517	.460	15395237.155

The independent variable is IEd.

51,7% of our values fit the regression analysis model. In other words, 51,7% of the dependent variables (GDP) are explained by the independent variables (index of education coverage) (Table 3). And 48,3% of the variation is caused by factors other than the predictors included in this model.

Table 4. ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	4311084690008971.50	2	2155542345004485.80	9.095	.002
Residual	4029226559914684.50	17	237013327053804.970		
Total	8340311249923656.00	19			

The independent variable is IEd.

The ANOVA Table 4 reports p-value is .002, that is less than .05 or 5% therefore the overall model is a statistically significant.

## Conclusion

COVID-19 has changed the life routine of ordinal students and universities. The lessons of the pandemic should teach how to overcome future pandemic. According to Merkus and Schafmeister (2021) there is no evidence that the outcome of online tutoring is worse than face-to-face education. However, lack of IT technologies, internet and ability to study at home may affect on results of studies. The results of gap years during the pandemic will impact future losses because of the low level of literacy of students. GDP and education coverage correlated strongly (0,664). 51,7%

of the GDP are explained by the index of education coverage. Output of education impacts on economic sustainability of country. Higher education enrollment may decrease as a result of the absence of personal computers, laptops, which means that a more illiterate population. Pandemic will impact on human capital negatively.

HEIs should be ready for any external shocks that may interrupt traditional tutoring. Therefore, universities didactic portals and ICT skills of teaching staff and students must be at a high level to overwhelm external shocks that may affect on education system. Some HEIs were not ready to transfer tutoring from traditional to the online format, students don't get high-quality education. Distance learning may become a key to solve issues of transferring from offline to online tutoring.

It is known that youngsters communicate a lot with their peers, that is why there should be taken some measures to reduce infection transition as routine immunisation, high standards of personal hygiene and practice, particularly handwashing, and maintaining a clean environment. Pandemics may be extremely contagious thereby physical distancing should become a daily routine and part of the culture. Good ventilation and sanitization of university facilities should be also one of the priorities to reduce cases of infections among youngsters. Introducing 'Ashyk' application to enter the building of the university is one of the ways to reduce infection among students.

However, coronavirus opened opportunities to scientists and universities. Researchers can participate in the conferences and workshops distantly. The digital skills of students, teachers, researchers are expanding. The closure of universities led to the development of online teaching, so in the post-pandemic era, accessibility to education will be easier and education will be cheaper.

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## New Trends in the Professional Training of Young People in the Modern Conditions

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### Abstract

The transformation of the importance of vocational education and training, the determining the development trajectories occur due to the structural changes that are under the influence of technological factor changes. Especially, digitalization, automation, robotics, the artificial intelligence, the transition to industry 4.0, the changing nature of consumer demand directly affect the restructuring of the labor market. The listed factors accelerate the development of new professions in demanded areas and the disappearance of outdated ones, they stimulate the improvement of needed skills and meet the modern requirements from employers for educational programs. The purpose of research paper is to identify the new trends in the training of competitive young employees, taking into account the conditions of digitalization of economy. The research methodology includes general scientific and theoretical research methods. Methods of tabular representation of data is used as statistical tool. Originality of the research is that It is relevant and necessary to develop new model of training young specialists, involving the implementation of educational, research, innovative and entrepreneurial, spiritual and moral activities that meet modern trends. Authors carried out the analysis of the level and quality of training of national personnel in terms of ensuring the future needs of the labor market of the Republic of Kazakhstan in the conditions of

digitalization of economy. It includes the factors affecting the reproduction of competitive national personnel and their provision with high-quality jobs, identifying new trends in the training and retraining of professional personnel and improving their skills, examining the features of training competitive national personnel in the system of ensuring the balance of labor resources and jobs. The paper was prepared within the grant project of the Ministry of Education and Science of the Republic of Kazakhstan APo9260584 «Employment restructuration in Kazakhstan in terms of social and economic tensions».

**Keywords:** youth labor market, training, new trends, digitalization, education.

## Introduction

The transformation of the importance of vocational education and training, the determining the development trajectories occur due to the structural changes that are under the influence of technological factor changes. Especially, digitalization, automation, robotics, the artificial intelligence, the transition to industry 4.0, the changing nature of consumer demand directly affect the restructuring of the labor market. The listed factors accelerate the development of new professions in demanded areas and the disappearance of outdated ones, they stimulate the improvement of needed skills and meet the modern requirements from employers for educational programs (Cedefop, 2018a).

According to the forecasts of labor market researchers, about 65% of today's students will be involved in specialties that currently do not exist (the main drivers of these changes are new technologies and new working methods), which means that it is necessary to rethink the quality and content of training programs, introduce new mechanisms for retraining and advanced training of specialists. It is possible to forecast future changes in the policy of implementing additional and continuing education, as well as an increasing role of non-formal education. For example, it is expected to reduce the share of professions that require routine tasks and increase the role of such skills as ICT literacy, the ability to solve complex multi-level problems (Cedefop, 2018b).

The key factor of the country's competitiveness in the context of the formation of Industry 4.0 is high-quality human capital, the most important component of which is education, its quality and accessibility. According to the Organization for Economic Cooperation and Development (OECD), an increase in the duration of education for 1 year leads to an increase in gross domestic product (GDP) by 3-6%, an increase in education spending by 1% leads to an increase in GDP by 0.35% (The challenges of Industry 4.0 and the need for new responses, 2018).

The purpose of research paper is to identify the new trends in the training of competitive young employees, taking into account the conditions of digitalization of economy. There is carried out the analysis of the level and quality of training of national personnel in terms of ensuring the future needs of the labor market of the Republic of Kazakhstan in the conditions of digitalization and suggested the ways of solving the problems of training personnel for the digital economy of country.

### **Literature review**

The analysis of theoretical approaches of determining the competitiveness of specialists in the labor market allowed us to distinguish two conceptual schemes that reflect different points of view and forms of its manifestation.

The proponents of the first scheme identify the competitiveness of personnel as the quality of the labor force (qualification, training profile, age, gender, etc.) and determine the measurement of competitive advantages in the labor market as comparison of the integral characteristics for different competing labor force categories (Ozernikova, Danilenko, and Kravtsevich, 2007)

Representatives of the second conceptual scheme consider the competitiveness of personnel in the labor market as "the competitiveness of labor resources", "the competitiveness of personnel", "the competitiveness of employee". In our opinion, the allocation of such concepts corresponds to the levels of competitiveness, in particular: its level (individual, at the level of an individual employee); micro-level

(corporate, at the level of an organization, enterprise); macro-level (state, regional) (Sadova, 2016).

The existing theoretical approaches to the disclosure of the essence of the concept of "employee competitiveness" link the competitiveness of an employee with the competitiveness of his labor force or ability to work, which passes certain stages, namely: the competitiveness of the individual, the competitiveness of the graduate of an educational institution, the competitiveness of the employee, the competitiveness of labor resources.

According to the classification of employees, Rasmussen (2019) divides employees into three categories: «Skill»; «Rule»; «Knowledge». Based on this classification, the structure of the labor market in different countries by type of categories of employees in the composition of the employed with the allocation of the «highest» trajectory, in which more than 25% of employees work in the specialties of the «Knowledge» category (Shirinkina, 2019).

Taking into account the current trends in the development of the labor market, technological transformation, and the development of global skills and knowledge, the hierarchy of personnel competitiveness is highlighted as global level, national level, corporate and personal level. The competitiveness of national personnel at the global level can be achieved when all three components work – national, corporate, and personal (*Learning throughout life in the conditions of the new economy*, 2006).

The key factors for improving the competitiveness of national personnel include: globalization of financial and labor markets, migration of labor, including highly skilled labor, which exerts cost pressure on the national labor market and is a powerful incentive to increase the competitiveness of personnel; global economic transformation that requires a new quality of labor resources, which is defined as intellectual capital; transition to an innovative model of economic development, involving the formation of intellectual capital; a new quality of management that can ensure an increase in the competitiveness of personnel within the framework

of implemented business projects (*How to update the HR strategy for the digital world, 2017*).

As we see, the time of rapid technological changes is an important condition for economic growth and the competitiveness of the national economy: improvement of training and the development of talents (special innate potential and acquired abilities of the employee).

## Methodology

The research consists of the methodology of comparisons, generalizations and systematic analysis with using the data of the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan, International Rating Agencies, the United Nations, etc., including:

- system-structural approach - studying changes in the professional and qualification structure of personnel training;
- integrative-developmental approach - studying the professional training of practice-oriented personnel;
- synergetic approach- justifying directions for improving the level of training and retraining of personnel, taking into account all factors and conditions;
- competence-based approach - determining the role of professional competence in the training of qualified specialists.

When analyzing the level and quality of employees' training in the conditions of ensuring the future needs of the labor market in digital economy, the following methods are used: factorial, functional analysis and graphical methods.

## Findings and discussion

It is obvious that the main driver of human capital development and an indicator of the global competitiveness of the economy is the high proportion of Knowledge workers engaged in cognitive non-routine work. Kazakhstan is not included in the

ranking of countries on the top development trajectory. In this regard, the formation of a single professional and educational space with the participation of the state, the system of professional and higher education, as well as employers becomes necessary to improve the quality of human capital and the competitiveness of national personnel.

As for Kazakhstani state on this issue, there are all the main levels of training presented in accordance with the International Standard Classification of Education (ISCED, Table 1).

Table 1. Graduation of students by level of education

Код	Name of the training level	2010		2015		2019	
		people	%	People	%	people	%
ISCED 2	Number of graduates of the main secondary school (9 classes)	281988	35,6	224674	32,8	235404	34,9
ISCED 3	Number of graduates of the general secondary school (11 classes)	151448	19,1	129406	18,9	143089	21,2
ISCED 3 ISCED 4	Graduates of TPPSE organizations (technical and professional, post-secondary education)	190469	24,0	165946	24,3	144080	21,4
ISCED 6	Graduates of higher educational institutions	161964	20,4	147184	21,5	130691	19,4
ISCED 7	Graduates of Master programs	6 843	0,9	15816	2,3	19233	2,9
ISCED 7	Graduation of residency trainees		0,0	603	0,1	1300	0,2
ISCED 8	Graduation of doctoral students	207	0,0	533	0,1	721	0,1
	Total	792919	100,0	684162	100,0	674518	100,0
Note-Source: Bureau of national statistics of the Agency for strategic planning and reforms of the Republic of Kazakhstan, 2019							

From 2010 to 2019, the number of graduates at all levels of education decreased by 118.0 thousand people (among the main reasons we can note the decline in the birth rate in the second half of the 90s). The largest group of graduates in the organizations of the category of post – secondary education is the graduates of the TPPSE. The share of graduates of postgraduate education (undergraduates, residency and doctoral students) has increased and is about 3.2%. In other groups, there was a decrease in graduation, including the number of university graduates decreased by almost 30.0 thousand people.

Based on the study, the trend of slowing the growth of higher education coverage is associated with the high cost of education, the quality of education (the possibility of obtaining paid education abroad), insufficient efforts to develop higher education, the possibility of obtaining free vocational education within the framework of the TPPSE development program, etc.

According to the materials of World Bank, spending on HE in 2017 in the most developed countries amounted to more than 1% of GDP, in Russia and Belarus was about 0.8%. In Kazakhstan, this indicator is almost 3 times lower and amounted to 0.3 %, (for reference: in the subsequent years, this indicator was 0.4%).

Over the period from 2000-2019, the level of higher education coverage in Kazakhstan increased by 23% (from 31% to 54%), which corresponds to the level of countries with an upper-middle income (Gross enrolment ratio in higher education, 2019). However, in comparison with China, where this indicator increased from 7% to 51%, or 44%, from 2000-2019, or with Russia and Belarus, the gap in the level of higher education coverage was 35% and 40%, respectively, by 2019, the dynamics of this indicator is low in Kazakhstan.

Admission and training of personnel in Kazakhstan (Admission of students in the main areas of training, 2019) was carried out mainly through the educational services from the funds of the population and enterprises (70% of university students' study at the expense of their own funds and the funds of enterprises (1.2%). According to the data, enterprises have a passive influence on the structure of national personnel training.

Thus, 50% of university students in Kazakhstan are trained in the specialties 5Bo10000 – «Education» (28%) and 5Bo70000 – «Technical sciences and technologies» (22%). As for the technical sciences, 50% of students are trained in 7 specialties: - 5Bo70200 – «Automation and Control»; - 5Bo70300 – «Information Systems»; - 5Bo70400 – «Computer Engineering and Software»; – 5Bo70800 – «Oil and Gas Business»; - 5Bo71800 – «Electric Power Engineering»; – 5Bo71900 – «Radio Engineering, Electronics and Telecommunications»; – 5Bo72900 – «Construction».

From the side of population (mainly due to the purchase of educational services), the least popular technical specialties are: - 5Bo70500 – «Mathematical and computer modeling»; - 5Bo71000 – «Materials Science and technology of new materials»; - 5Bo71500 – «Marine Engineering and Technology»; - 5Bo72200 – «Polygraphs»; - 5Bo72300 – «Technical Physics»; - 5Bo72500 – «Technology of woodworking and wood products»; - 5Bo73300 – «Technology and design of textile materials»; - 5Bo73800 – «Technology of materials processing»; - 5Bo74600 – «Space engineering and technologies»; - 5Bo75300 – «Chemical technology of refractory non-metallic and silicate materials». Only 3% of students study in these specialties, including 366 people at the expense of the population and enterprises.

Vocational training of students of TPPSE is carried out in 15 enlarged groups of specialties, including 186 specialties under the state educational order and 161 specialties on a paid basis. 45% of TPPSE students are trained in three specialties: 0100000 – «Education»; 0300000 – «Medicine» and «Pharmacy»; 0500000 – «Service, Economics and Management» (Technical and vocational, post-secondary education in the Republic of Kazakhstan, 2019). TPPSE specialists are trained mainly for the service economy – education, management, finance, accounting, and services.

There are 265.2 thousand people are trained on the state order basis, and 224.1 thousand people are trained on a paid basis. The priority group of training specialists under the state order (the largest number) is formed in such specialties as: - 1200000 – «Production, installation, operation and repair (by industry),

Transport Operation» (44.2 thousand people); - 0500000 – « Service, economics and Management» (33.2 thousand people); - 0100000 – «Education» (30.2 thousand people).

The second priority group of training specialists, for which 34% of the state order is allocated, is carried out in the following specialties: - 1500000- «Agriculture, veterinary medicine and ecology»; - 1300000- « Communications, telecommunications and information technologies. Electronic equipment»; - 1100000 – «Transport»; - 1400000 – «Construction and public utilities».

A small share is occupied by specialties related to mechanical engineering, maintenance, and the mining industry.

When considering the professional and qualification structure of national personnel training, it is necessary to take into account a number of factors that directly or indirectly determine it, in particular:

The factor of urbanization is the main feature of the development of not only Asian countries, but also Kazakhstan. Large cities and urban agglomerations are becoming drivers of employment in the service sector. In Kazakhstan, the share of the urban population is about 55%. It is predicted that the rate of urbanization will accelerate after 2020 and by 2050 the share of the urban population may reach 64.6% (World Development Indicators, 2018).

This situation is caused by a significant number of single-industry towns (27) and small towns (69% of the total number of cities), which act as an intermediate link of migration between rural areas and large cities. The arrival of rural residents from the surrounding villages, low-skilled immigrants, and the departure of the most skilled labor force to larger cities exacerbate the tension in the labor market of these cities. The majority of internal migrants are young people of working age, which leads to a decrease in the share of the economically active population (Demographic statistics. Population migration, 2019)

The migration factor is the search for a stable and well-paid job, the possibility of obtaining professional and higher education. In Kazakhstan, there is an increase in

the intensity of internal migration flows by more than 2 times from 1.9% in 2000 to 5.2% in 2019, 80% of which is accounted for by intra-regional migration, 17-20% - by inter-regional migration. In 2010-2019, 77% of migrants were people of working age, the largest outflow occurred in the southern and northern regions of the country, including Akmola, North Kazakhstan, East Kazakhstan, South Kazakhstan, and Zhambyl regions. The main regions of population inflow were the cities of Nur-Sultan (Astana) (10.5%), Almaty (30.8%), Almaty (12.6%) and Akmola regions (6.4%). In 2015-2019, 42% of the total number of migrants who moved to Nur-Sultan (Astana) were migrants from neighboring regions, and 70% of those who moved to Almaty were residents of Zhambyl, South Kazakhstan and Almaty regions. In Kazakhstan, the structure and quality of migration in the category of migrants in the age group of 15 years and older with higher education continues to deteriorate. From 2000-2019, 171.4 thousand people with higher education left the country, and 82.9 thousand people arrived, mostly with low qualifications and education, the balance was 88.5 thousand people, which represents a big loss for our country (National report "Youth of Kazakhstan", 2018).

The problems of insufficient competitiveness among young professionals and the unbalanced labor market in Kazakhstan include next points:

- employment of young professionals mainly in low-productive industries. Thus, in 2018-19, 16.7% of employed youth worked in the trade sector, 14.2% – in agriculture, 11.1% - in education;
- the unattractiveness of entrepreneurship for young people. Thus, the main share of employed youth is made up of employees (76.1%), self-employed young people account for 23.9% and in most cases is associated with low income and productivity in rural areas as an alternative form of employment. At the same time, a significant part of employees is in the city (64.2%) and self-employed youth-in the countryside (66.4%). The most pressing problems of young entrepreneurs are the lack of start-up capital, high rents, lack of business experience and tax reporting (National report "Youth of Kazakhstan", 2018");

- the level of education of employed youth. Thus, 42.9% of employed youth have higher and incomplete higher education. Moreover, there is a high differentiation of hired youth (48.9% with higher education) and self-employed youth (only 25.2% with higher education) people (Kazakhstani people were offered a job in the Eurasian Union, 2019);
- high wage differentiation. According to official data, the average monthly nominal accrued salary of working youth for the last years averaged 115.4 thousand tenge (Bureau of national statistics of the Agency for strategic planning and reforms of the Republic of Kazakhstan, 2019), which is almost one and a half times lower than the average monthly nominal accrued salary for the economy as a whole. The lowest wages are observed in agriculture, health care, and public administration. The segment of highly paid youth covers only a part of the employed youth;
- the quality of the jobs offered, mainly in industries with relatively low productivity and low wages, hinders the desire of young people for decent work;
- a relatively high level of youth unemployment in the city as a result of the process of increasing internal migration «village-city». The availability of work or lack of it, the opportunity to get an education, and the advantages of large economic centers are among the most important motivating factors for the outflow of young people from rural areas;
- differentiation of unemployed youth by level of education. Thus, among unemployed youth, 35.9% have higher and incomplete higher education, and 39% have specialized secondary education. At the same time, unemployment among young people with higher and incomplete higher education is 3.3%, among young people with secondary and vocational (special) education-4.2%, with basic, secondary, general, primary-4.8% (Bureau of national statistics of the Agency for strategic planning and reforms of the Republic of Kazakhstan, 2019);
- high unemployment among young women at 4.6%, compared to 3.4% for men for the last year;

- barriers to youth employment, in particular: insufficient work experience, professional knowledge, skills and qualifications; the gap between the professional orientation of young people and the needs of the labor market, employment outside the specialty, etc. Thus, according to official data, the expected graduates (universities and colleges) in the period from 2013-2019 were more than 3 times higher than the expected demand for labor (taking into account vacant jobs). It should also be taken into account that a significant part of the economically active population of different age groups also applies for free jobs;
- differentiation of the quality of education between the city and the village, related to the quality of the teaching staff, infrastructure, funding, material and technical base, etc.

One of the key challenges in training competitive personnel is to ensure that they are in line with the changes in the labor market and the professions of the future under the influence of digitalization. In this regard, the areas of competitive skills development deserve special attention. In the labor market, it is important not only to get a profession in a specific specialty, but also certain skills that often change faster than the list of professions that has been formed.

To solve the problems of training personnel for the digital economy, it is necessary to:

- develop and implement a digital educational platforms, electronic textbooks, effective digital learning tools for optimizing the educational process, improving the level of qualification;
- have a partnership of IT companies in the creation of laboratories, basic departments and entire faculties in universities to reduce the gap between theory and practice;
- train the future IT specialists starting from school: creation of IT clubs, IT centers, IT classes, digital platforms for learning the basics of programming according to the methods developed by IT market leaders, for obtaining knowledge and skills for young people from remote regions of the country and providing assistance in

finding jobs, participating in various IT competitions and getting a part-time freelance work;

- develop programs for the professions of backend and frontend developers, web developers and data analysts on-the-job at online courses Coursera, «Yandex. Practical training» and provide opportunities for professional mobility of young personnel. In 2015-2019, the number of vacancies in these professions increased by 140%;

- create a unified search system «Unified search system. Work without Borders» on the national platforms of the EAEU countries for interactive interaction between job seekers and employers; to form a common labor market, accelerating the processes of free movement of labor and ensuring the mobility of labor resources, improving the quality of education, obtaining the necessary skills and qualifications. It is projected to receive 1 million requests, 100 thousand responses for vacancies, and 10 thousand invitations from employers in one calendar year (Kazakhstani people were offered a job in the Eurasian Union, 2019).

One of the promising directions of training of competitive personnel and formation of skills of future studies are in the field of Data Science, emerged at the crossroads of different specialties: computer science, mathematics, statistics, economics and business. There are significant employment opportunities in this area today.

Nowadays, it is becoming relevant and necessary to develop training programs in the field of Data Science: since 2015-2019, the number of students at the University of California at Berkeley has grown from 100 to 1100 students in the specialties of law, cognitive neurology, geography, history, civil engineering, immunology, demography, psychology, business and others (Data Science for Undergraduates: opportunities and opportunities, 2019); in Russia, the specialty of Data Science is taught by MSU, MIPT, NSU, HSE (out of 76 places - 55 at the expense of the state budget, 15 on a paid basis, 6 places for foreigners on a paid basis (Master's program "Data Science", 2019).

In Kazakhstan, this area of training is only developing as an independent specialty for information technologies, as well as for business analytics: short-term training

programs based on the training center Data Science Academy; experimental programs at KBTU; since 2017, AlmaU has been implementing the Business Analytics and Economics programs.

High technologies are radically changing business processes in many sectors of the economy, leading to transformation, the disappearance of old ones, the emergence of new professions, and a shortage of specialists with IT skills. Within the framework of the State Enterprise «Digital Kazakhstan», the target indicator for the growth of new jobs due to digitalization will reach 300 thousand people by 2022 and, the number of graduates in the IT field will increase (Ruzanov, 2019).

Table 2 shows the branches of knowledge in the conditions of the formation of the digital economy and the branches of the economy that form the foundation of Industry 4.0, which allows to imagine the employee of the future, to determine the directions of training competitive specialists.

In the creation of competitive national personnel, a significant role is assigned to the improvement of the activities of higher educational institutions. The new model of the modern University 4.0, involves the implementation of educational, research, innovative and entrepreneurial, spiritual and moral activities that meet modern trends.

Improving the system of technical and vocational education, timely provision of the country's economy with the necessary technical specialists and working professions should become a purposeful educational policy of Kazakhstan, including the introduction and expansion of dual training, the organization of training centers that are in demand in the labor market, on the basis of colleges with a guarantee of subsequent employment of graduates, the development of professional standards and legislative regulation of the process of professional qualifications.

In the conditions of increasing the time of training directly at the enterprise and increasing the status of engineering and pedagogical workers, it is necessary to strengthen the relationship of TPPSE with production. According to the evaluation system developed by the International Labour Organization (ILO), the training of

professional personnel must meet 4 qualitative characteristics and 12 indicators (Challenges of Industry 4.0 and the need for new responses, 2019).

This assessment system can be used for the development of the national TPPSE system, in particular, the indicator of the 4-step system of training of the engineering and pedagogical workers involves: obtaining higher special education (formal training) or special training in pedagogical or business skills (informal training); obtaining non-academic work experience; preliminary training in college and certification of skills; continuous professional development.

Table 2. Knowledge and economic sectors in the context of the formation of Industry 4.0

Industry 4.0	
Knowledge	Industry
Mathematics, Physics, Chemistry, Biology	Production and maintenance of computing and communication equipment
Computer science, programming	Creating software and management systems (management tools)
Data transmission, communications	Communications
Electrical Engineering	Energy industry
Materials Science	Production of electrical equipment
Robotics	Chemical industry
Metrology	Mechanical engineering, precision engineering, machine tool construction
Linguistics	Transport and logistics
Information security	
Sociology, social psychology	
In-depth analytics	
Requirements for the quality of specialists 4.0	
<ol style="list-style-type: none"> <li>1. General and special skills and abilities: <ul style="list-style-type: none"> <li>- flexibility of mind, creativity, organizational skills;</li> <li>- depth of mind, understanding of abstractions and logic (mathematical abilities);</li> <li>- good memory, logic, observation (technical ability);</li> <li>- good memory, flexibility of mind (linguistic ability).</li> </ul> </li> <li>2. Programs for identifying and developing talents and abilities from preschool age</li> <li>3. School, special and higher education programs focused on Industry 4.0.</li> <li>4. Lifelong learning programs for Industry 4.0</li> <li>5. Professional development of employees:</li> </ol>	

<ul style="list-style-type: none"> <li>- the formation of competencies with which you can safely integrate into the new digital space and enjoy its benefits;</li> <li>- modernization of the education system, taking into account the needs of "New Labor 4.0»;</li> <li>- formation of a mobile workforce</li> </ul>
Challenges of digitalization in Kazakhstan
<ul style="list-style-type: none"> <li>-insufficient understanding of the economic benefits of digitalization in the business environment;</li> <li>- lack of qualified personnel;</li> <li>- insufficient development of domestic technologies and competencies;</li> <li>- limited financial resources needed for digitalization;</li> <li>- insufficient development of telecommunications infrastructure.</li> </ul>
Note-compiled based on the source (Ruzanov, 2019)

An increase in the number of students on a paid basis may lead to an unsecured future needs of the labor market for the required specialists. The growth in the number of employees with higher education in the economy is not always a positive trend. The analysis showed that in the formal sector of the economy, almost 50 percent of the jobs are found to be inconsistent with the employee's received specialty, and in the informal sector, the discrepancy reaches up to 80%.

## Conclusion

Thus, in order to train competitive youth employees that meet the long-term needs of a balanced labor market in the context of digital transformation of the economy, it is necessary to: create conditions for improving the quality of human capital by training future employees with high-quality and in-demand skills and competencies; reduce the disproportions in the demand of the new economy for personnel, create conditions for retraining and advanced training of employees; development of a national system for forecasting the needs of the new economy in professional personnel and improvement of the national system of qualifications; modernization of the education system, in particular: development of educational programs according to international standards and requirements of the new

economy, industry 4.0; updating programs of professional and higher education, professional development, taking into account digital skills at the industry, regional and national levels; improving the quality of training and motivation of teaching staff; partnership between the state and private business, aimed at training qualified personnel with technological and digital competencies; improving the mechanisms of interaction between students and potential employers, creating favorable conditions for the development of high-tech companies and start-ups for the training of qualified personnel in demand by the digital industry market; development of new competence centers in the most popular technological areas with skills in the labor market 4.0, a new type of thinking, professional skills on Digital Skills and Soft Skills; development of co-financing mechanisms from the state, business structures of innovative pilot programs for the acquisition of new skills; creation of new jobs related to cognitive technologies and algorithmized processes support for entrepreneurship and small businesses; creating conditions for the development of talented young people, developing mechanisms for attracting and motivating them, developing forms of remote work, freelancing, self-employment, outsourcing, temporary project teams, etc.

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