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IMPACT OF DIGITALIZATION ON CREATIVE ECONOMY: EVIDENCE FROM KAZAKHSTAN

T.I. Kakizhanova[1], S.Y. Umirzakov [2*], Y.A. Bolatbek[1]

[1]Al-Farabi Kazakh National University, Almaty, Kazakhstan
[2]Narxoz University, Almaty, Kazakhstan

**Corresponding author e-mail: samazhan.umirzakov@narxoz.kz*

Abstract. *The purpose of this article is to assess how elements of digitalization influence the creative economy in Kazakhstan. The research is based on econometric modeling and time series data for 2004–2022, covering indicators such as information technology exports, the number of Internet users, fixed telephone subscriptions, mobile cellular subscriptions, and ICT service exports. The results demonstrate that ICT service exports and mobile subscriptions have a strong positive effect on the gross value added of the creative industry (GVACI): a 1% increase in ICT service exports leads to a 1.541% rise in GVACI, while a 1% increase in mobile subscriptions results in a 1.625% rise. In contrast, fixed telephone subscriptions negatively and significantly affect GVACI. The scientific novelty of the study lies in providing one of the first comprehensive empirical assessments of the relationship between digitalization and the creative economy in Kazakhstan over a long period. The practical significance is associated with the possibility of using the results in designing policies for economic diversification, digital infrastructure development, and support of the creative industries.*

Keywords: *creative economy, digitalization, econometric model, Kazakhstan, ICT indicators, gross value added, innovation.*

Main provisions. In the context of a rapidly evolving global economy, the creative economy has emerged as a critical driver of sustainable and inclusive growth. Unlike traditional industries that rely on physical capital and natural resources, the creative economy is rooted in human ingenuity, innovation, and cultural expression. As such, it holds particular relevance for countries like Kazakhstan that seek to diversify their economic structures and reduce dependence on extractive sectors. Digitalization acts as a fundamental enabler of this transformation, offering new platforms for content creation, distribution, and global engagement. However, despite growing recognition of its potential, the creative economy in Kazakhstan remains underdeveloped, hindered by infrastructural disparities, limited access to digital technologies, and a lack of comprehensive policy support. Examining the relationship between digitalization and the creative sector is therefore of strategic importance. This research contributes to a deeper understanding of how digital transformation can foster creative industry development in Kazakhstan, supporting broader goals of economic modernization, cultural innovation, and global competitiveness.

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Introduction. Although the concept of the creative economy appeared on the global stage only two decades ago, it is already recognized as one of the fastest-growing sectors of the modern economy [1]. UNCTAD defines it as an emerging model based on creativity, intellectual property, knowledge, and technology, where human capital is the main driver. In contrast to traditional industries, the creative economy relies on innovation and cultural expression, making it an important source of GDP and competitiveness [2].

The rapid global spread of digital technologies has significantly accelerated the development of creative industries. Exports of creative goods and services have doubled in the last twenty years, and international evidence shows that in regions with better digital infrastructure, the share of creative industries in GDP is substantially higher [3, 4]. Digitalization enables new forms of remote employment, e-commerce, online advertising, and freelancing, which have become especially relevant after the COVID-19 pandemic. At the same time, differences in how countries classify and support creative industries complicate the use of international experience without adaptation to national conditions [5].

In Kazakhstan, the creative economy is seen as a strategic direction for economic diversification and modernization. Government support measures are being introduced, but structural problems remain: insufficient infrastructure, concentration of digital and creative activities in major cities, and limited institutional frameworks. These barriers slow down the development of the sector despite the potential benefits of digitalization [6].

This situation leads to the main research question: to what extent does digitalization affect the development of the creative economy in Kazakhstan? The hypothesis of the study is that digitalization indicators – particularly ICT service exports, internet usage, and mobile cellular subscriptions – have a positive impact on the gross value added of the creative industry (GVACI), whereas fixed telephone subscriptions exert a negative effect [7].

The scientific novelty of this study lies in the empirical estimation of the long-term relationship (2004–2022) between digitalization and the creative economy of Kazakhstan, using econometric models [8]. The practical significance of the findings is associated with the possibility of applying them in the formulation of state policies aimed at strengthening creative industries, expanding digital infrastructure, and supporting innovation-led growth [9].

Literature review. A number of studies have proven that the digital economy has a positive impact on economic growth [10, 11]. The impact of technological advances and digitization on the creative economy is constantly being studied by many researchers around the world. The creative economy, first of all, has a great impact on the development of regions [12]. For instance, MPSW and Sudiro (2025); Vlasenko and Pozniak (2020) underline importance of digital leadership skills in advancing creative economy [13, 14]. If technological change threatens to reduce employment in the future, the creative economy is seen as a way to preserve that employment [15]. The creative economy creates good opportunities for small and medium-sized businesses and increases scaling and export opportunities [16].

Analyzing 29 Chinese provinces, Zhao and et.al (2024) came to conclusion that to improve creative economy in regions, it is vital government to promote digital constructions of provinces. The pandemic has proven that good internet access in remote areas allows people to work from home. And people with access to mobile phones can find good sources of income on social networks. These include online selling, online advertising, blogging, and more. The creative economy is divided into audiovisual products, design, media, music, performing arts, publishing and visual arts. The strong development of these sectors of the creative economy in recent years has been due to the increased access to digital products by

people who love them. And those who can afford a laptop can also run small businesses using it. An example of this is the "freelancers" who have gained momentum in recent years after the pandemic. Freelancers are also present in creative industries [17]. For instance, Wardan and et.al (2023) analyzed impact of digital literacy on creative economy among housewife's in Sumatra [18]. Authors conclude that the creative economy, business sustainability, entrepreneurial attitude can be explained by digital literacy. Thus, even in Islands development of economy might be dependent on technology advancement. Holford (2019) explains automation and artificial intelligence embody prevailing visions of productivity and enhancement, while human ingenuity, meaning creativity in the work environment enables the collective influence on technology development [19]. Duong and et.al (2024) claim that information skills, operational skills, and creative skills positively affect creativity in entrepreneurship [20].

Materials and methods. The term «creative industry» refers to a broad spectrum of industries. According to Kazakhstan's internal definition of the creative economy business structure, the largest sub-sector of the creative economy - which accounts for 38% of GVA - is the IT and game development industry. Determining the effect of digitalization indicators on the creative industry is therefore crucial.

Taking into account the results of the previous literature review, we study the influence of indicators such as Information technology exports, the number of Internet users, Fixed telephone subscriptions, Mobile cellular subscriptions, ICT service exports on the Gross Added Value in the creative industry (GVACI) in order to determine the impact of digital indicators on the creative economy in the Republic of Kazakhstan in the period 2004-2022. GVACI is defined by the following regression equation:

$$GVACI = f\,(ITE, IUI, FTS, MSC, ICT) \quad (1)$$

All of indicators' definitions and measurements are given in the Table 1 below.

During the study, two models were created, linear (equation 2) and nonlinear (equation 2), to avoid multicollinearity:

$$GVACI_t = \beta_0 + \beta_1 ITE_t + \beta_2 IUI_t + \beta_3 FTD_t + \varepsilon_t \quad (2)$$

$$LOG(GVACI_t) = \beta_0 + \beta_1 LOG(ICT_t) + \beta_2 LOG(MSC_t) + \beta_2 LOG(FTS_t) + \varepsilon_t \quad (3)$$

This study examines the impact of key digital factors on the overall GDP for the creative industries in the Republic of Kazakhstan. The study uses data from the World Data Bank (WDI), ourworldindata.org, TheGlobalEconomy.com for the period 2004-2022.

All of indicators' definitions and measurements are given in the Table 1 below.

Table 1 - Model Variables and sources

Variables	Definitions	Sources
GVACI	Total GVA for creative industry, million tenge	Bureau of National statistics of Kazakhstan (2025) https://stat.gov.kz/
ITE	Information technology exports, percent of total goods export	TheGlobalEconomy.com (2025) https://www.theglobaleconomy.com
IUI	Individuals using internet	World Development Indicators (WDI) (2025)
FTS	Fixed telephone subscriptions (per 100 people)	World Development Indicators (WDI) (2025)
MSC	Mobile cellular subscriptions (per 100 people)	World Development Indicators (WDI) (2025)
ICT	ICT service exports (BoP, current US$)	World Development Indicators (WDI) (2025)
Note: compiled by the authors		

The dynamic change of Total GVA for creative industry (million tenge) presented in the table in the period 2004–2022 is depicted in the following graph:

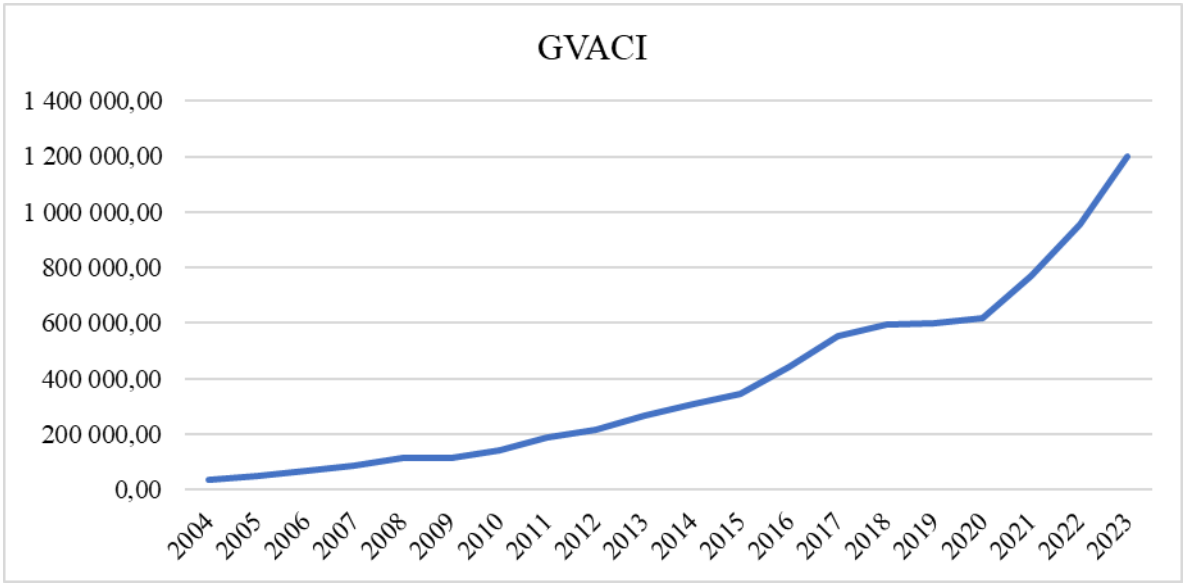

Figure 1 - Evolution of GVACI for Kazakhstan (2004–2022)

Figure 1 shows that Total GVA for creative industry is constantly growing, especially the sharp growth after the pandemic. The creative economy is developing and growing, and of course, the impact of digitalization factors on the growth of GVACI is of interest.

Results and discussion. The correlation matrix in Table 2 shows the pairwise correlation coefficients between the variables under study. Among all explanatory variables in this study, regression models were estimated so that correlation coefficients did not exceed 0.9, that is, multicollinearity did not occur. Only between ICT and ITE there is a strong relationship (0.927).

Table 2 - Correlation Matrix

Indicators	GVACI	ITE	IUI	FTS	MSC	ICT
GVACI	1.000	0.660	0.887	-0.519	0.489	0.764
ITE	0.660	1.000	0.518	-0.287	0.290	**0.927**
IUI	0.887	0.518	1.000	-0.142	0.789	0.531
FTS	-0.519	-0.287	-0.142	1.000	0.459	-0.473
MSC	0.489	0.290	0.789	0.459	1.000	0.210
ICT	0.764	**0.927**	0.531	-0.473	0.210	1.000
Note: compiled by the authors						

The Gross Value Added (GVACI) in the Creative Industries is positively correlated with all other variables except Fixed telephone subscriptions (FTS). In particular, the GVACI output factor is highly correlated with the IUI (r = 0.887) and ICT (r = 0.764) indicators. There is a moderate relationship between GVACI and MSC, which have a relatively low correlation coefficient (0.489). Overall, the correlation analysis provides preliminary evidence of a relationship between macroeconomic indicators. These results indicate that the data are suitable for time series analysis and can be used to investigate the correlation between digital explanatory variables and GVA in the Creative Industries in Kazakhstan.

We can estimate the impact of changes in the explanatory variables of digitalization on the dependent variable, Total GVA for creative industry, in million tenge, by using the linear regression Model 1 and the logarithmic nonlinear Model 2, both of which had significant coefficients and were estimated based on the correlation matrix (Table 3).

Table 3 - Results of Model 1 and Model 2 Estimation (2004-2022)

Model 1- results of estimation GVACI			Model 2- results of estimation LOG(GVACI)		
Variable	Coefficient	t-Statistic (Prob.)	Variable	Coefficient	t-Statistic (Prob.)
ITE	96871.08***	2.818784 (0.0130)	LOG(ICT)	1.541321***	3.579312 (0.0025)
IUI	6008.053***	12.93986 (0.0000)	LOG(MSC)	1.62467***	5.181980 (0.0001)
FTS	-25858.1***	-7.068208 (0.0000)	LOG(FTS)	-1.103392**	-3.579312 (0.0025)
F-statistics	0.976041		F-statistics	0.946481	
Notes: 1) coefficients are statistically significant at ***1%, **5%, *10% level of significance; 2) compiled by the authors					

The results of Model 1 show that Information technology exports (ITE) and Individuals using internet (IUI) are positively correlated with Total GVA for creative industry (GVACI) with coefficients of 0.166974 and 0.145180 respectively, all other things being equal. The obtained empirical data (Table 7) show that Fixed telephone subscriptions in Kazakhstan are negatively and significantly correlated with Total GVA for creative industry (GVACI) with coefficient of -25858.1.

Based on the results of Model 2, it can be concluded that the explanatory variables, except for FTS which are included in the nonlinear model have a positive effect on Total GVA for creative industry (GVACI). Since Model 2 is logarithmic, the parameters in the power model show elasticity. According to the model estimates, a 1% increase in ICT service exports increases Total GVA for creative industry (GVACI) by 1.541%. If MSC increases by 1%, this will lead to an increase in GVACI of 1.625%. Fixed telephone subscriptions have a negative impact on Total GVA for creative industry (GVACI), with an aesthetic value of -1.103%.

Conclusions. The aim of the study was to assess impact of digitalization on creative economy in Kazakhstan. For this purpose, Information technology exports, the number of Internet users, fixed telephone subscriptions, Mobile cellular subscriptions, ICT service exports on the Gross Added Value in the creative industry (GVACI) data spanning 2004-2022 were taken from various official statistical sources. The results of the model show that internet users (IUI) and information technology exports (ITE) have a positive association with the GVACI, whereas fixed telephone subscribers in Kazakhstan have a negative and substantial link with the overall GVA for the creative business. According to the model, for every 1% increase in ICT service exports, Total GVA for Creative Industry (GVACI) will increase by 1.541%. GVACI will grow by 1.625% for every 1% increase in MSC. The fixed phone subscriptions have a detrimental effect on the total GVA for the creative sector (GVACI).

Benefits of Digitalization for the Creative economy. There are numerous advantages to digitalization for the creative industry, such as: 1. Increased resource accessibility: Digitalization makes resources more easily accessible. Professionals in the creative industry can quickly access online sites to obtain the information and resources they require. 2. Expanded audience reach: Digital channels like websites and social media give businesses the chance to reach a wider range of potential customers. Additionally, it enhances communication with prospective clients by getting their input and attending to their needs. 3. Creation of new opportunities: The creative economy's digitalization creates new avenues for industry growth. For instance, creative workers can produce more immersive and engaging products, which raises the worth of their work, because of virtual and augmented reality. technologies 4. Economical effectiveness: The primary benefit is the decrease in production and 376 promotion expenses brought forth by digital technology. Global Challenges' Effect on Businesses and Industries Digitalization's Harmful Effects on the Creative Economy Digitalization has many drawbacks in addition to its many positives for the creative economy.

1. Standardization: As digital technology advances, projects will become less distinctive and special due to the restricted range of things it can produce and the potential for market saturation. 2. Technology dependence: As a result of digitalization, creative workers may find themselves more reliant on software and technology, which could restrict their ability to be creative. 3. Data security: Creative workers who deal with their clients and maintain their data may be seriously threatened by data security problems that arise from digitization. Therefore, we have examined how digitalization affects business management and how different technologies are being used to transform all corporate operations. The market for different aspects of digital transformation is expanding quickly each year, indicating that these technologies will be employed even more extensively in the economy in the future. However, there are benefits and drawbacks to this method that cannot be disregarded when it is applied in businesses, making it impossible to evaluate its effects with certainty. Looking at the creative economy, we can claim that digitization increases the industry's sustainability and efficiency, which in turn increases its economic significance and influence.

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ЦИФРЛАНДЫРУДЫҢ ШЫҒАРМАШЫЛЫҚ ЭКОНОМИКАҒА ӘСЕРІ: ҚАЗАҚСТАН ДӘЛЕЛДЕРІ

Т. И. Какижанова[1], С.Ы. Умирзаков [2*], Е.Ә. Болатбек[1]

[1] Әл-Фараби атындағы Қазақ ұлттық университеті, Алматы, Қазақстан
[2] Нархоз университеті, Алматы, Қазақстан

Түйін*. Соңғы жылдары цифрлық технологиялар адам өмірінің барлық саласына еніп үлгерді. Бүгінде оларсыз бірде-бір саланы елестету қиын. Жаңа қалыптасып келе жатқан креативті сектор да цифрландыру үрдісінің артықшылықтарын сезінуде. Бұл мақаланың мақсаты – цифрландыру факторларының креативті экономикаға әсерін бағалау. Зерттеу барысында 2004–2022 жылдар аралығындағы ақпараттық технологиялар экспорты, интернет пайдаланушылар саны, тіркелген телефон жазылымдары, ұялы байланыс жазылымдары, сондай-ақ АКТ қызметтерінің экспорты сынды көрсеткіштердің креативті индустрияның жалпы қосылған құнына (GVACI) әсері қарастырылды. Модель нәтижелері бойынша, ақпараттық технологиялар экспорты (ITE) мен интернет пайдаланушылар санының (IUI) GVACI көрсеткішімен оң байланысы бар екені анықталды, ал тіркелген телефон жазылымдарының Қазақстандағы GVACI көрсеткішіне теріс әрі статистикалық тұрғыдан мәнді әсері бар. Модель болжамына сәйкес, АКТ қызметтерінің экспорты 1%-ға артса, креативті индустрияның жалпы қосылған құны 1,541%-ға өседі. Сонымен қатар, ұялы байланыс жазылымдары (MSC) 1%-ға артса, GVACI 1,625%-ға жоғарылайды. Ал тіркелген телефон байланысы кері әсер етеді. Бұл мақала креативті экономиканы зерттеу саласына эмпирикалық тұрғыдан маңызды үлес қосады.*

Түйін сөздер: *креативті экономика, цифрландыру, эконометрикалық модель, Қазақстан, АКТ көрсеткіштері, жалпы қосылған құн, инновациялар.*

ВЛИЯНИЕ ЦИФРОВИЗАЦИИ НА КРЕАТИВНУЮ ЭКОНОМИКУ: ДОКАЗАТЕЛЬСТВА ИЗ КАЗАХСТАНА

Т. И. Какижанова[1], С. Ы. Умирзаков[2*], Е.А. Болатбек[1]

[1]Казахский национальный университет имени Аль-Фараби, Алматы, Казахстан
[2] Университет Нархоз, Алматы, Казахстан

Резюме. *Цифровые технологии в последнее время проникли практически во все сферы человеческой деятельности. Сегодня трудно представить себе отрасль, не затронутую процессами цифровизации. Креативный сектор, который лишь недавно начал формироваться как самостоятельное направление, также получает определённые преимущества от внедрения цифровых решений. Цель данной статьи - оценить влияние факторов цифровизации на развитие креативной экономики. В качестве переменных были использованы такие индикаторы, как экспорт информационных технологий, количество пользователей интернета, количество фиксированных телефонных подключений, количество мобильных подписок и экспорт ИКТ-услуг, оказывающих влияние на валовую добавленную стоимость креативной индустрии (GVACI) в период с 2004 по 2022 годы. Результаты модели показывают, что экспорт информационных технологий (ITE) и количество пользователей интернета (IUI) положительно коррелируют с GVACI, в то время как фиксированные телефонные подключения в Казахстане имеют отрицательную и статистически значимую связь с общей валовой добавленной стоимостью креативной индустрии. Модель прогнозирует, что 1% рост экспорта ИКТ-услуг приведёт к увеличению GVACI на 1,541%. Кроме того, 1% рост числа мобильных подписок (MSC) увеличивает GVACI на 1,625%. В то же время фиксированные телефонные подключения оказывают отрицательное влияние на GVACI. Настоящее исследование вносит эмпирический вклад в развивающуюся научную литературу по вопросам креативной экономики.*

Ключевые слова: *креативная экономика, цифровизация, эконометрическая модель, Казахстан, ИКТ-показатели, валовая добавленная стоимость, инновации.*

Information about the authors:

Kakizhanova Tolkyn Isataevna – *Candidate of Economic Sciences, Senior Lecturer of Department of Economics,* *Al-Farabi Kazakh National University, Almaty, Kazakhstan, email: Tolkyn.Kakizhanova@kaznu.edu.kz, ORCID ID: https://orcid.org/0000-0002-2475-0573*

Umirzakov Samazhan Yntykbayevich* *– Doctor of Economics, Professor, Narxoz University, Almaty, Kazakhstan, email: samazhan.umirzakov@narxoz.kz, ORCID ID: https://orcid.org/0000-0003-4019-878X*

Bolatbek Yeldos Alimzhanuly *– PhD student, Department of Marketing, Al-Farabi Kazakh National University, Almaty, Kazakhstan, email: eldos_09@list.ru, ORCID ID: https://orcid.org/0009-0002-7229-7977*

Информация об авторах:

Какижанова Толкын Исатовна *– кандидат экономических наук, старший преподаватель кафедры экономики Казахского национального университета имени аль-Фараби, Алматы, Казахстан, e-mail: Tolkyn.Kakizhanova@kaznu.edu.kz, ORCID ID: https://orcid.org/0000-0002-2475-0573*

Умирзаков Самажан Ынтыкбаевич* *– доктор экономических наук, профессор Университета Нархоз, Алматы, Казахстан, e-mail: samazhan.umirzakov@narxoz.kz, ORCID ID: https://orcid.org/0000-0003-4019-878X*

Болатбек Елдос Алимжанулы *– докторант PhD, Казахский национальный университет имени аль-Фараби, Алматы, Казахстан, e-mail: eldos_09@list.ru, ORCID ID: https://orcid.org/0009-0002-7229-7977*

Авторлар туралы ақпарат:

Какижанова Толкын Исатовна *– экономика ғылымдарының кандидаты, экономика кафедрасының аға оқытушысы, әл-Фараби атындағы Қазақ ұлттық университеті, Алматы, Қазақстан, e-mail: Tolkyn.Kakizhanova@kaznu.edu.kz, ORCID ID: https://orcid.org/0000-0002-2475-0573*

Умирзаков Самажан Ынтыкбаевич* *– экономика ғылымдарының докторы, Нархоз университетінің профессоры, Алматы, Қазақстан, e-mail: samazhan.umirzakov@narxoz.kz, ORCID ID: https://orcid.org/0000-0003-4019-878X*

Болатбек Елдос Әлімжанұлы *– PhD докторанты, әл-Фараби атындағы Қазақ ұлттық университеті, Алматы, Қазақстан, e-mail: eldos_09@list.ru, ORCID ID: https://orcid.org/0009-0002-7229-7977*

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