

REGIONAL DIMENSION OF DIGITAL TRANSFORMATION: THE INTERESTS OF THE EUROPEAN UNION IN THE COUNTRIES OF CENTRAL ASIA

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Abstract. Today, digital transformation leads to the acceleration of processes and at the same time to the complication of relations between actors in world politics. The countries of the Central Asian region (CAR) in today's geopolitical realities are faced with a new challenge - the timely introduction of digital solutions to the dynamics of these conditions. In this context, the purpose of this study is to identify the main directions, problems and prospects of digital transformation of the CAR countries in the new geopolitical conditions.

In this study, the method of game theory is used in the context of international relations on the example of the interaction of the CAR countries and the EU. The authors have carried out work on finding compromise strategies of interaction between the parties leading to certain Nash equilibrium. The results of the study showed that the implementation of joint projects of the CAR and the EU on digital transformation will make it possible not only to update outdated digital platforms,

but also create conditions for increasing the competitiveness of transport hubs on the world market. This is especially relevant in today's unstable political and socio-economic conditions.

The results revealed the problems of interregional cooperation based on game theory strategies in the field of digital transformation. The application of the game theory method helped to analyze the possibilities of regulating the state's position in the international arena. As a result, the authors managed to find a solution to the conflict of interests between the players and establish the optimality of their strategies.

Keywords: *digital transformation, game theory, European Union, actor, integration, digital diplomacy.*

ЦИФРЛЫҚ ТРАНСФОРМАЦИЯНЫҢ АЙМАҚТЫҚ ӨЛШЕМІ: ОРТАЛЫҚ АЗИЯ ЕЛДЕРІНДЕГІ ЕУРОПАЛЫҚ ОДАҚТЫҢ МҮДДЕЛЕРІ

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Андатпа. Бүгінгі таңда цифрлық трансформация процестердің жеделдеуіне және сонымен бірге әлемдік саясаттағы актерлер арасындағы қатынастардың күрделенуіне әкеледі. Орталық Азия аймағының (ОАА) елдері геосаяси жаңа сын-қатерге – осы жағдайлардың динамикасына цифрлық шешімдерді уақтылы енгізуге тап болды. Осы тұрғыда осы зерттеудің мақсаты-жаңа геосаяси жағдайларда ОАА елдерінің цифрлық трансформациясының негізгі бағыттарын, проблемалары мен перспективаларын анықтау болып табылады.

Бұл зерттеуде ойын теориясы әдісі қолданылды. Бұл әдіс Орталық Азия мен ЕО елдерінің өзара іс-қимылы мысалында халықаралық қатынастар контекстінде қолданылады. Авторлар Нэштің белгілі бір тепе-теңдігіне әкелетін тараптар арасындағы өзара іс-қимыл стратегияларын іздеу бойынша жұмыс жүргізді. Зерттеу нәтижелері ОА және ЕО-ның цифрлық трансформация жөніндегі бірлескен жобаларын іске асыру ескірген цифрлық платформаларды жаңартып қана қоймай, әлемдік нарықта көлік тораптарының бәсекеге қабілеттілігін арттыру үшін жағдай жасайтынын көрсетті. Бұл әсіресе қазіргі тұрақсыз саяси және әлеуметтік-экономикалық жағдайларға қатысты.

Нәтижесінде цифрлық трансформация саласындағы ойын теориясының стратегиялары негізінде аймақаралық ынтымақтастық мәселелерін анықтады. Ойын теориясы әдісін қолдану мемлекеттің халықаралық аренадағы жағдайын реттеу мүмкіндіктерін талдауға көмектесті. Авторлар ойыншылар арасындағы мүдделер қақтығысының шешімін және олардың стратегияларының оңтайлылығын таба алды.

Түйін сөздер: *цифрлық трансформация, ойын теориясы, Еуропалық Одақ, актор, интеграция, цифрлық дипломатия.*

РЕГИОНАЛЬНОЕ ИЗМЕРЕНИЕ ЦИФРОВОЙ ТРАНСФОРМАЦИИ: ИНТЕРЕСЫ ЕВРОПЕЙСКОГО СОЮЗА В СФЕРЕ ЦИФРОВИЗАЦИИ СТРАН ЦЕНТРАЛЬНОЙ АЗИИ

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Аннотация. На сегодняшний день цифровая трансформация приводит к ускорению процессов и одновременно к усложнению отношений между субъектами в мировой политике. Страны Центрально-азиатского региона (ЦАР) в сегодняшних геополитических реалиях столкнулись с новым вызовом – своевременным внедрением цифровых решений под динамику этих условий. В этом контексте цель данного исследования – выявить основные направления, проблемы и перспективы цифровой трансформации стран ЦАР в новых геополитических условиях.

В данном исследовании был использован метод теории игр. Данный метод применяется в контексте международных отношений на примере взаимодействия стран ЦАР и ЕС. Авторами проведена работа по поиску компромиссных стратегий взаимодействия между сторонами, приводящих к определенным равновесиям Нэша. Результаты исследования показали, что реализация совместных проектов ЦАР и ЕС по цифровой трансформации даст возможность не только обновить устаревшие цифровые платформы, но и создаст условия для повышения конкурентоспособности транспортных узлов на мировом рынке. Это особенно актуально в современных нестабильных политических и социально-экономических условиях.

Полученные результаты выявили проблемы межрегионального сотрудничества на основе стратегий теории игр в сфере цифровой трансформации. Применение метода теории игр помогло проанализировать возможности регулирования положения государства на международной арене. В результате авторам удалось найти решение конфликта интересов между игроками и установить оптимальность их стратегий.

Ключевые слова: цифровая трансформация, теория игр, Европейский союз, актор, интеграция, цифровая дипломатия.

Introduction

The Fourth Industrial Revolution or Industry 4.0 (I40) has truly become a challenge for the CAR countries. Although a number of modern authors evaluate new technologies as an opportunity to eliminate technological dependence and increase productivity [1]. We believe that such conclusions are quite justified. The countries of the CAR, like other countries of the world, are rapidly moving towards a new socio-economic, political formation.

Digitalization is becoming the main tool of its formation.

The dynamics of the last five years shows that the leaders of the Central Asian states (CA) and representatives of the European Union (EU) show great interest not only in the development of economic, cultural and humanitarian cooperation, the parties often note an increase in interaction in the field of digitalization [2].

The issues of digitalization

development in trade between the EU and the CAR countries have now become relevant due to the difficulties of transit through regional transport corridors. As a result, the countries of the CAR and the EU are looking for ways to expand trade and economic cooperation, including through the digitalization of transport and logistics infrastructure.

In this regard, we consider it important to analyze in detail the regional cooperation between the EU and the CAR, in particular with Kazakhstan, as the leader of the region. It is also necessary to investigate the degree of readiness of the parties to carry out digital transformation in various areas of the economy, especially in trade, transport logistics, water conservation and mining.

Literature review

According to data from the World Bank (WB), the United Nations (UN), and national statistical agencies, almost all the CAR countries are dynamically expanding the role of information technology in the work of the private and public sectors. The governments of such countries of the region as Kazakhstan, Uzbekistan, Kyrgyzstan managed to create a basis for the transition to a digital state.

Nevertheless, today the role of digital transformation in replacing old growth drivers with new ones is being evaluated in scientific circles [3],[4]. A number of authors are deeply studying the value chain model used in terms of the prospects for value creation and value management, taking into account digital technologies and social media platforms [5]. Kazakh authors raise the issues of increasing the role of digital diplomacy as a new actively developing tool of public diplomacy [6].

As the data show, Kazakhstan was the first among the Central Asian countries to express interest in the development

of these areas. The country's leadership has set a strategic goal - to become one of the largest digital hubs in the region. Such ambitions of Kazakhstan are quite justified, given the fact that in 2022 Kazakhstan ranked 28th in the UN E-Government Development Index [7]. This is the highest indicator in the region and among the CIS countries.

To understand the agenda of the topic of digital transformation in the Central Asian region and, in particular, in Kazakhstan, we consider it important to consider the period before the coronavirus pandemic (conditionally from 2017). At that time, the Russian side was very interested in the issue of actively increasing joint digital development with the Central Asian countries. As a result, joint work within the framework of the digital agenda of the EAEU led to joint work of IT companies and the introduction of products of the state program «Digital Kazakhstan». Later, the other countries of the Central Asian region will begin to adopt the experience of Kazakhstan.

The analysis carried out within the framework of the study showed that today the process of digital transformation in the Central Asian countries is already undergoing the stage of modernization of online public services systems. As world practice shows, the use of digital technologies by public sector employees is already a significant barrier to development [8]. This issue has become especially relevant for Kazakhstan and Uzbekistan. In particular, in the case of Kazakhstan, we are talking about considering the possibility of upgrading eGov online public services systems. As a result, it became necessary for the country to transfer them to one large platform. Indeed, as experts note, the platform is outdated and needs to be upgraded. And the country's authorities considered

many options for a flexible and smooth transition, rather than choosing a new platform and building everything from scratch.

The issue of further modernization of Kazakhstan's digital platform was raised in September 2021. Then the Minister of Digital Development, Innovation and Aerospace Industry of the Republic of Kazakhstan, B. Musin, said that the platform from «Sber» (Сбербанк - a Russian company) is «the most suitable» for the country and meets the «requirements» of the National Security Committee. Prime Minister of the Republic of Kazakhstan A.Mamin noted that «only the Sber platform allows us to deposit codes in the national security agencies...». As a result, within the framework of the Eastern Economic Forum (September 3, 2021), A.Mamin and the head of the group of companies «Sber» G.Gref signed a memorandum of cooperation in the implementation of projects on digital transformation of the Republic of Kazakhstan. The question also concerned the transition to a platform model of digitalization and the concept of Data-Driven Government.

As a result, it followed from the text of the memorandum that the parties had agreed on a deal. The authorities identified «BTS Digital» LLP as a strategic partner on the part of Kazakhstan, and the ministry entrusted the provision of the GovTech platform service for a three-year period with subsequent prolongation to «НИТ» JSC. As a result, the Russian side was determined that a corresponding contract would be signed between Kazakhstan and the Sber.

However, at the time of the escalation of the conflict between Russia and Ukraine, the issue of further development of relations in this area remained unfinished. In this regard, the prospects for the development

of the sphere of digital transformation are of particular interest. Who can claim the status of a strategic partner of the region in this area? And what barriers can arise as a result of the conflict of interests of various actors?

The policy of multi-vector digital transformation of Kazakhstan

Almost six months after the signing of the memorandum of cooperation in the field of digital transformation (March 25, 2022), the Ministry of Digital Development, Innovation and Aerospace Industry of the Republic of Kazakhstan reported that the signing of an agreement between the government of the country and Sberbank, stipulated by the memorandum, is no longer on the agenda. In addition, the publication of the department noted that «in connection with the current situation in the world, the Ministry is considering the development of several scenarios and is preparing for each of them».

Although this statement did not specify which scenarios were being considered and who could be Kazakhstan's partner in digital transformation, there were clear trends in the country's cooperation with other stakeholders. For example, the countries of the region had long-standing ties within the framework of the «Digital Strategy of CAREC 2030» of the Asian Development Bank (ADB). It provided an approach to scaling digital technologies in the region. It is worth noting that in 2021 The ministers of the CAREC member countries approved the «Digital Strategy of CAREC 2030», which defines the areas of cooperation for expanding digitalization in the region.

However, the policy documents of the governments of the Central Asian countries indicate that the priority of the development of digital technologies is gaining experience, technologies of

a number of successful technological countries of the world and training specialists on their experience. According to the program documents, one of the main issues of digital transformation for the CAR countries is the digitalization of transport corridors. In particular, we are talking about solving scientific, technical and organizational problems of logistics, the introduction of UN standards in cargo transportation.

This direction is currently being studied by the authors from the point of view of the impact of digitalization on the logistics sector. In particular, the aspect of the introduction of sustainable logistics practices, preparation of companies for the transition to digital technologies is considered [9]. The current state of technological development in the field of digitalization and physicalization of supply chains is analyzed [10]. Scientific works concerning the issues of digital transformation of the procurement process are presented in a large volume [11]. As practice shows, all these issues somehow affect the optimization of business processes in the CAR countries [12].

In general, as the analysis shows, major international players are actively working in the Central Asian region due to the growing need to increase markets. Thus, China is seeking to expand its presence in Central Asia by promoting its «Digital Silk Road» strategy. The World Bank (WB) is working to expand Internet connectivity and create an integrated digital infrastructure through the implementation of the Digital CASA regional program [13]. Within the framework of the Eurasian Economic Union, a single digital economy is being created between the member states in order to expand sectoral and intersectoral digital transformation. Thus, at the last

forums in 2023, the leaders of the EAEU countries focused on the development of digital infrastructure and management of integration processes within the framework of the «Digital Agenda until 2025».

Digital transformation – democratization of digital solutions

At first glance, several reasons contributed to the decision of the CAR countries, and in particular Kazakhstan, on the independent development of digital transformation:

Firstly, the conflict in Ukraine was crucial in the development of the Sber platform in Kazakhstan, which had a negative impact on Russia's image in the international arena;

Secondly, public criticism of the transfer of digital independence to another country was increasingly heard;

Thirdly, it is possible that the country's authorities were afraid of falling under Western sanctions if they were imposed against the Sber.

Nevertheless, we consider it important to note that in matters of the development of digital transformation, the CAR countries, especially Kazakhstan, intend to develop digital technologies according to the principles of «transparency and accountability». To date, not always, and not all citizens of the countries of the region have access to platforms so that governments are accountable to them for how they collect and use data. This is evidenced by statistical data.

The implementation of the main processes of digital transformation requires special implementation methods. In this context, the works of the authors are of interest, which analyze the processes of digital transformation and their impact on the attitude of local authorities (for example, on the COVID-19 pandemic) [14]. According to the studies we have studied

in the field of digital transformation, one of its main features is the democratic principles of digital platforms [15]. This aspect of digitalization has become

especially relevant after the public outrage in the CAR countries, attempts to overthrow and seize power [16].

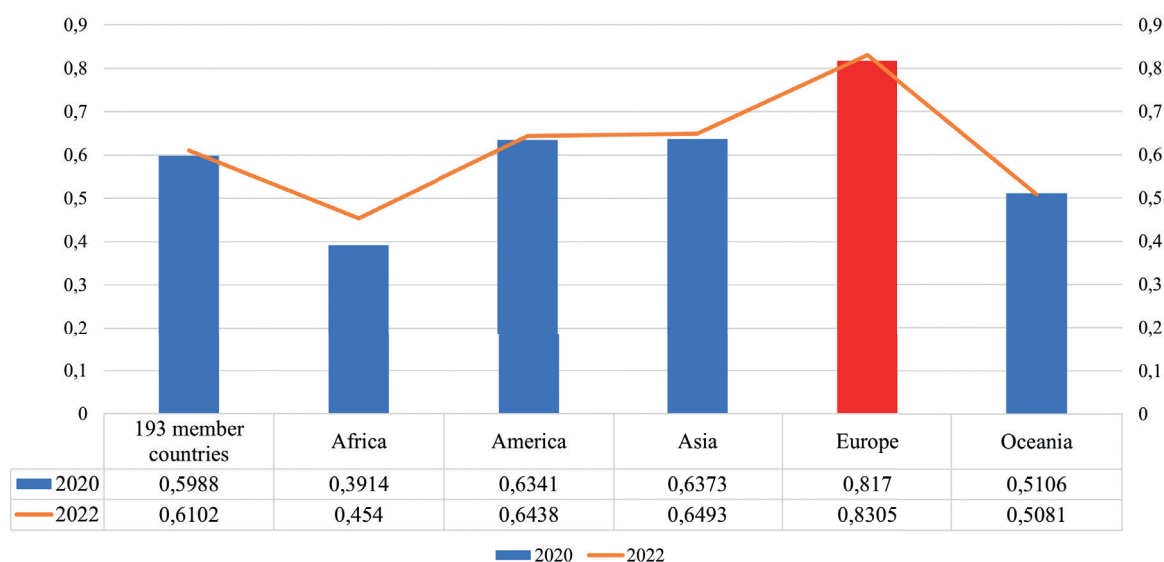


Figure 1. Comparison of world regions by EGDI levels, in 2020 and 2022 [7].

Source: author’s elaboration.

According to the global and regional averages of the UNEGDI, the EU countries are leading in terms of availability and provision of online services in certain sectors.

According to the UN, 1/3 of the leading countries in the development of e-government are European. Countries such as Denmark, Finland lead the first places in the world ranking.

It should be recalled that since independence, the CAR countries have tried to introduce democratic principles to varying degrees and with varying success. Today, more than 30 years after gaining independence (since 1991), the CAR countries continue to adopt and implement the experience of democratic countries of the world, in particular the EU, with varying success.

Finally, the authorities of the CAR countries are interested in the issue of digital transformation not just in obtaining digital solutions, technologies or ready-made platforms from their

partners. The commitments made by the CAR governments within the framework of the open government data system still require implementation, and the work being done in this direction requires transparency and accountability. At the same time, it is important to pay attention to the fact that as of 2022 According to the e-government development index, Russia was at the level of 0.8162 (42nd place in the world), while Kazakhstan has 0.8628 (28th place), and according to the e-participation index, Russia has 0.6023 (57th place), Kazakhstan has 0.8068 (15th place). In addition, Russia ranks 42nd in the ranking of 58 European countries with the highest EGDI values.

Taking into account the above, we hypothesize that by choosing a strategy of openness of the CAR countries to the democratic principles of digital transformation development, a period of active involvement of the region in EU digital projects has begun.

EGDI rank	A country	Sub-region	Rating class	2022
1	Denmark	Northern Europe	VH	0.9717
2	Finland	Northern Europe	VH	0.9533
5	Sweden	Northern Europe	VH	0.9410
8	Estonia	Northern Europe	VH	0.9393
24	Lithuania	Northern Europe	V3	0.8745
29	Latvia	Northern Europe	V3	0.8599
34	Poland	Eastern Europe	V2	0.8437
42	Russian Federation	Eastern Europe	V2	0.8162

Table 1. Comparison of EGDI ranks of the countries of the subregions of Europe [7].
Source: author's elaboration.

Research methods

Within the framework of this article, the method of game theory was used to analyze the process of interaction in the field of digitalization. The «game» consists in the participation of two or more parties (CAR and EU countries) leading a «struggle» for the realization of their interests. Our task is to determine the goals and strategies of each of the parties that can lead to a win or loss. Before proceeding to the establishment of the strategies of the parties, we consider it important to analyze the current interaction of the parties in matters of digitalization.

Firstly, at the present stage, the EU's attitude towards the countries of the region is remarkable in that Brussels initially did not consider any special approach to this or that Central Asian republic. Rather, in their interaction, the EU proceeds from the fact that the CAR countries are part of a common region. So, for example, today the EU is building its agenda for Kazakhstan based on the EU Strategy for Central Asia adopted in 2019. In this regard, we consider it important to further study the issue of the development of relations, including in the field of digital interaction, between the

countries of Europe and Central Asia in a regional aspect.

The four-year project for the region, which is part of the trade and economic strategy of the European Union, fully corresponded to the plan for the digital transformation of the CAR countries. The CAR countries attempted to strengthen economic ties with the European Union within the framework of the Strategy. To this end, Brussels launched in 2019 three multi-year programs totaling 28 million euros, which are aimed at supporting the rule of law, trade, and investment in the region.

The most important platforms for the implementation of the CAR's tasks in relation to the EU were the annual EU-Central Asia forums (held since 2019). The last such forum was held on March 10, 2023, in Tashkent. Among the most breakthrough forums, it is worth noting the holding of the «EU-Central Asia Economic Forum: Bringing two Regions Closer» #EUCA21 (Bishkek, 2021). Just the same, the Forum provided participants with a platform to coordinate measures in three main areas of the event: «green» recovery, improving the business

environment and digitalization.

In October 2022, at the initiative of Kazakhstan, the first meeting of the heads of State of Central Asia and the European Union in the C5+ format was organized. And according to the results of the visit, it became known that Sh. Michel expressed support for the large-scale reforms carried out within the framework of building a «just Kazakhstan». It is obvious that the dialogue on democracy, human rights, and the rule of law is important not only for the EU, but also for the CAR countries.

A week after the visit of Sh. Michel to Astana, the capital of Kazakhstan was visited by German Foreign Minister A. Baerbock. We consider it important to note the fact that A. Baerbock arrived with a large delegation of businessmen and specialists in the field of infrastructure. World practice shows that strategies and technologies are recognized as the key driving forces of digital transformation in business [17]. It is also important to pay attention to the fact that one of the topics of the negotiations in Astana was the supply of rare earth metals, which are extremely necessary for the new technological economy of Germany and the EU as a whole. It should be noted that digital transformation is related to the use of rare earth metals. Now China is the main supplier, and dependence on China has become critically dangerous for the European Union. In this regard, the CAR countries, in particular Kazakhstan, may well be considered as an alternative.

At the high-level session of the second Economic Forum «European Union - Central Asia» (May 18-19, 2023), A.Smailov said that Kazakhstan plans to reduce the transit time from China to Europe through its territory to five days. During his speech, Deputy Prime Minister of Uzbekistan Zh.Khodjaev proposed the use of measures to ensure faster and

safer movement of goods. As he noted, «in this direction, we propose to develop joint approaches in the digitalization of trade, including the involvement of expert and technical support from the EU for the unification of legislation in the field of e-commerce in Central Asian countries». The study of the program materials suggests that Tashkent attaches particular importance to the simplification of international trade procedures. As for the representatives of the other countries of the region, the Head of the Cabinet of Ministers of Kyrgyzstan A.Zhaparov, the Prime Minister of Tajikistan K.Rasulzoda, Minister of Finance and Economy of Turkmenistan S.Joraev, were united in the relevance of the issues under consideration to improve the business climate, stimulate the transition to digital technologies, strengthen trade and transport ties between the EU and Central Asia [18].

Thus, the study of the materials allowed us to consider the relationship between the CAR countries and the EU) in the development of digital transformation) conditionally in 3 stages:

- the stage of preparation for the EU Strategy (period up to 2019). It is important to understand that the EU, as an international actor, has not previously considered the CAR countries as a partner in the field of digitalization;
- the stage of declaring digital connectivity and supporting the development of the digital economy (2019-2021);
- the stage of implementing agreements (from 2021).

It is obvious that the mutual exchange of positions /opinions leads to a clash of interests of the conditional two parties. In this case, we believe that it is of particular scientific interest to analyze the simulated interaction of the CAR and the EU in the issue of carrying out the «correct» digital transformation.

Today, models of conflict situations between the two sides are usually given, which in mathematical terms can be represented through the method of game theory. The application of the game theory method is due to the interest in understanding the decision-making strategies of game participants in conditions of uncertainty. Various authors propose models of cooperative competition as a reference. The most interesting is an attempt to develop a tool that, based on the principles of classical game theory, would allow scientists to determine which games can be played in response to various conflict situations [19].

As noted in the World Bank research, in many countries of the region there are still no centralized web portals where citizens can leave feedback and comments or discuss their problems on forums. In the position of the EU leaders, the CAR countries are at the stage of «testing for an in-depth partnership». So, for example, officials in Brussels, as well as a number of authors, have a question about the possibility of the CAR countries to continue modernization and reforms, to get away from their authoritarian past [20].

A game is modeled in which the CAR authorities (player 1) and EU partners (player 2) can give preference to one of two forms of cooperation in the field of digitalization: through «existing

agreements» or «deepening cooperation». Thus, player 1 in his argumentation, possibly under the influence of a third party, may focus on the negative consequences of further deepening cooperation. Or, within the power structures of both sides, in the issue of interaction in the field of digital development (built on the principles of maximum transparency, accessibility and mass participation, as well as direct contact between society and the authorities), an opinion may arise about prematurity.

So, each of the players has two conditional strategies: leave everything as it is and move on to the latest forms of cooperation. The goal of each of the players is to maximize their own winnings. In general, if you look at the root of the issue, then the interests of the players are not opposite. There are two Nash equilibrium situations in this bimatrix game. However, the players' winnings in these situations are different, with the first situation beneficial to player 1, and the second to player 2. As a result, within the framework of this example, the following assessment is given: the winnings of each player are determined by the usefulness of the chosen form (on a scale from 0 to 5). The corresponding winnings of the players are indicated in the table (first the winnings of player 1 are indicated, then player 2).

Player Strategies		CAR Authorities - Player 2	
		The format of cooperation according to the existing agreements	Format of in-depth cooperation
EU authorities - Player 1	The format of cooperation according to the existing agreements	5;1	0;0
	Format of in-depth cooperation	0;0	1;5

Table 2. The payment matrix of the game in two strategies for cooperation in the field of digital transformation. Source: author's elaboration.

This mathematical model of the game is projected on the relations between the EU countries and the CAR. Thus, when creating a common base, both initiators (the leading countries-initiators of the promotion of digital partnership) and partner countries (the countries that coordinate the ways of implementing projects) will come to the moment of a conflict of interests in one form or another. In other words, there is a situation of conflict of interests at the intercountry level. This assumption is justified by the fact that, naturally, the governments of the CAR and the EU countries have different directions in foreign policy priorities.

Nevertheless, we consider it important to answer a number of questions from a mathematical point of view: which of the equilibrium situations can be accepted as satisfactory to all players (the principle of optimality)? That is, what is the optimal solution? What is necessary for the CAR countries in promoting digital transformation through international cooperation with the EU?

Research results

The situation between the countries of the CAR and the EU can be demonstrated by the example of the mathematical game presented earlier. Both equilibrium situations are not only equilibrium, but also Pareto optimal. In classic models, players do not communicate before the game starts, but make a choice simultaneously and independently of each other (as provided by the rules of the non-coalition game). In this case, we did not consider an antagonistic game of two parties whose interests are opposite. It is beneficial for players in the EU and CAR models to communicate before the start of the game and agree on a joint action plan.

Thus, the parties would be able to come to the conditions of a cooperative

game, when players can make decisions in agreement with each other. The main task in a cooperative game is to divide the total winnings. The total win in this game in situations where one of the two forms of communication is carried out, player 1 and player 2, is 5. It would be natural to divide this winnings equally between the players, i.e. 2.5 each. At the same time, the players agree to spend half of the political events together on 1 strategy, and the second half on 2 strategies, i.e. with a probability of 1/2 to jointly choose each form of dialogue. However, it should be noted here that in this case we are talking about a non-coalition game (with the independent choice of their strategies by the players), when a set of winnings (2.5; 2.5) is unattainable.

Therefore, we will conduct the reasoning for player 1. It is beneficial for him to realize the situation (1 strategy, 1 strategy). But player 2 benefits from the situation (2 strategy, 2 strategy). Therefore, if player 1 chooses «strategy 1», then player 2 can choose «strategy 2», and they will both lose: in the situation (strategy 1, strategy 2), the winnings will be (0, 0). Then it makes sense for player 1 to choose «strategy 2», because in the situation (strategy 2, strategy 2) he gets a win of 1 (i.e. more than 0). But player 2 can reason similarly and choose «strategy 1», then in the situation (strategy 2, strategy 1) they will both lose again. The fact is that with such a development of events there will be no common and unified solution. Taking into account the specifics of the development of relations in the issue of digital transformation between the countries of the CAR and the EU, we consider it important to make a forecast regarding the further scenario of the development of this topic using the previously applied method of game theory.

A trivial example of a «dominant strategy» from the standpoint of game theory is the decision regarding the influence of the CAR countries on the decisions of the EU countries. EU countries can respond to the emergence of new requests from the CAR countries

immediately or consider in the future. Both sides enter into a two-stage game in which the first move is made by the CAR countries. The game situation with the indication of payments is shown in the form of a tree (see the figure below).

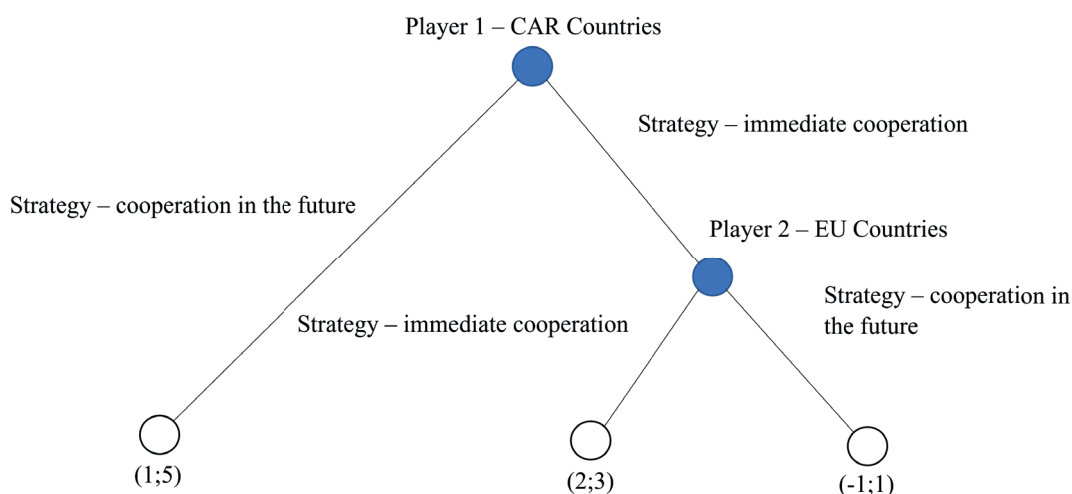


Figure 2. Illustration of a game about solving cooperation between the CAR and EU countries. Source: author’s elaboration.

The same game situation can be presented in another form (figure below). Two states are indicated here – «immediate cooperation» and «cooperation in the future». Obviously, the second equilibrium is untenable. It follows from the detailed form that it is impractical for EU countries to react slowly to the emergence of new requests from the CAR countries: when choosing a strategy «in the future», EU countries

receive 1 (payment), and when responding immediately to requests – 3. The CAR countries also know that it is not rational for the EU countries to start actions to ignore requests for digital transformation and democratic transformations.

An analysis of the circumstances of the interaction between the CAR countries and the EU countries shows that mutual concessions are taking place. Also, after the socio-political unrest in Kazakhstan,

Player Strategies		EU Countries - Player 2	
		Strategy – development of joint projects	Strategy – cooperation in the future
CAR countries - Player 1	Strategy – development of joint projects	2;3	-1;1
	Strategy – cooperation in the future	1;5	1;5

Table 3. Matrix of the compromise format of the game on the solution of cooperation between the CAR countries and the EU. Source: author’s elaboration.

Kyrgyzstan, Uzbekistan in different time periods, significant concessions on the part of the authorities are noticeable. And that is why the CAR countries decide to continue using the «cooperation in the future» strategy. The threatened losses in the amount of (-1) will not be incurred by the CAR countries.

Such a rational equilibrium is characteristic of a «partially improved» game, which obviously excludes absurd moves. It is also worth noting that within the framework of the development of the mathematical model of game theory, there are also examples when the interests of the parties clash according to an advanced scenario. This proves once again that it is useful for the parties to think about the possible reactions of their partners in the game.

Isolated calculations, even based on the theory of decision-making, are often, as in the situation described, of a limited nature. It follows from the above analysis that it is in the interests of the EU countries themselves to develop a base for accepting requests from the CAR countries and its further processing. It is obvious that a successful digital transformation, as was

shown by the example of the game theory method, will be possible with the mutual cooperation of two parties (the authorities – the people / EU countries and the CAR countries). In some ways, the presented model of «CAR countries and the EU» echoes another model of behavioral norms of «investors and the government» [21].

In general, in the context of the growing integration agenda within Central Asia, the governments of the countries demonstrate interest in the experience of indicative European integration. Due to the fact that, as part of its Strategy, the EU considers the CAR countries as part of a common region, we consider it important to consider the likelihood of how the CAR and EU countries develop the sphere of digital transformation within the framework of a mathematical model.

To come to a decision according to the rules, it is important to check whether the payment matrix has a saddle point. If yes, then we write out the solution of the game in pure strategies. We believe that player I chooses his strategy so as to get the maximum of his winnings, and player II chooses his strategy so as to minimize player I's winnings.

Players	B1	B2	a = min(Ai)
A1	5	1	1
A2	1	5	1
b = max(Bi)	5	5	

Table 4. Payment matrix for example. Source: author's elaboration.

We find a guaranteed win determined by the lower price of the game $a = \max(a_i) = 1$, which indicates the maximum net strategy A1. The top price of the game is $b = \min(b_j) = 5$. Which indicates the absence of a saddle point, since $a \neq b$, then the price of the game is within $1 \leq y \leq 5$.

The next step is to find a solution to the game in mixed strategies. This is explained by the fact that players cannot declare

their pure strategies to the opponent: they hide their plans of action. The game can be solved by allowing players to choose their strategies randomly (mixed pure strategies). Since the players choose their net strategies randomly, then player I's winnings will be a random value. In this case, player I must choose his mixed strategies so as to get the maximum average win. Similarly, player II must

choose his mixed strategies so as to minimize the mathematical expectation of player I.

Thus, a mathematical calculation in the case of a non-cooperative game (with the players independently choosing their strategies) will confirm that there are different preferences/interests among the players, this situation / conflict does not necessarily have to be total. The calculation shows that if one player wins, then the other is not necessarily the loser. The conflict of interest can be partial, and both players can win and lose at the same time. The advantage of game theory, as well as the relations between the CAR and the EU, is the focus on the equilibrium strategies of the players. We believe that in its strategy, the EU can be guided by the high assessment of international organizations in the CAR countries, which note the strengthening of the principles of representative democracy and free market economy [22].

Discussion of the results

From the available materials, it becomes clear that international players perceive the statements of officials from Brussels (in matters of cooperation with the CAR and the European Union) as an attempt to demonstrate «the only tool for ensuring the security of the region and its development». This is somewhat confirmed by the fact that the EU intends to continue supporting the transition of Central Asia to «socially sustainable and climate-neutral growth». Seeing the trend in the development of relations between the Central Asian countries and Europe, the other players in international relations cannot be bothered by their mutual interest in each other.

But in the current geopolitical conditions, the leaders of the CAR countries also talk about equal

cooperation. At the same time, in his speech, the President of the Republic of Kazakhstan K. Tokayev noted that there is an intention to systematically increase the capacity of the Trans-Caspian International Transport Route (one of the key sections of the China– Central Asia– Europe route) through the introduction of digital solutions and infrastructure modernization.

We believe that in the issue of digital transformation, the authorities of the CAR countries are more interested than ever in obtaining the best practices of European countries. We believe that using the example of interregional cooperation between the countries of the CAR and the EU, it is necessary to develop a common Strategy for digital transformation. In this context, it is important to note the possibilities of the Astana International Financial Center, which is a platform for attracting «green» investments. It is based on British law, with an independent court and an International Arbitration Center.

Conclusion

Thus, in the framework of the study, the authors presented situational models (matrices) of the actions of the parties depending on their choice of various strategies. Within the framework of the study, the authors took into account the peculiarity of the application of the game theory method, which consists in presenting possible options when making decisions. Finally, the authors show the options for choosing the optimal strategy by the parties.

It should be noted that the results obtained by data analysis were confirmed through the application of the game theory method. For example, it has been proved that the lack of consistency in the implementation of transformational processes in the CAR region significantly

reduces the potential growth of the economies of all stakeholders. It has been established that digital transformation, implemented on the principles of democracy, is capable of increasing the efficiency of economic activity in the countries of the region.

Using the example of the partnership between the CAR and the EU, we presented an optimal model of interaction, which is based on the method of game theory. In particular, the study describes and modeled game models based on the current state of interaction between the parties. Possible interaction strategies in the future are also modeled. We believe that the models will allow us to determine which strategies are acceptable in response to various situations of conflict of interest.

We believe that as a result of the study, the hypothesis has been proved that due to the choice of the strategy of openness of the CAR countries to cooperation, a period of active involvement of the EU in digital projects in the region has begun. On the other hand, it has been proven that the choice of digital initiatives strategy gives impetus to the emergence of new business opportunities, deepening relations between the parties. As a result of the study, it was found that in the development of relations between the EU and the CAR countries, it is the deepening in the field of digital transformation that can become the optimal solution to the

strategies of the parties.

Analysis of data from the UN, the World Bank and a number of other international organizations confirms the results of the game theory method. Conclusions based on the results of the use of statistical analysis and the method of game theory show that in modern realities, the progressive experience of the EU in the development of digital technologies should play an increasingly important role. For example, the issue of borrowing experience in the development of deepening regional cooperation will become relevant for the CAR countries in the near future. For the EU, the issue of global competition for markets is becoming increasingly relevant. And if we consider it from the point of view of the method of game theory, then this is the choice of the strategy of the balance of forces between the players in the region, when the question arises which game to play correctly.

We believe that the results obtained can be useful for interested government agencies in making managerial decisions and their practical application. Thus, as a result of the study, both positive and negative factors were identified in the decision-making situation for the CAR countries and, in particular, Kazakhstan. For example, the presented matrix analysis can be applied in the issues of strategic planning of digital transformation.

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