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Educational development in a period of transition: the case of Kazakhstan

The development of education in the post-socialist space is one of the most interesting objects for comparative research. Countries that had similar or even identical education systems before the fall of the socialist regime can today serve as a research platform for testing modern theories of social development. According to modernization theory, the "underdeveloped" post-socialist countries had to catch up with their more "advanced" Western counterparts. Due to the fact that in all countries the goals of the reforms were similar, the expected result should have been more or less the same.

However, despite the recommended reforms of Western consultants, different trajectories are observed in the educational system. Obviously, the prevailing tendencies in the educational system are divergence instead of convergence. According to the theory of dependence, the world is a single economic system, and countries, in turn, perform different roles and functions.

On the example of Kazakhstan, we see that over 30 years of independence, the education system of independent Kazakhstan has received a worthy international recognition.

During the years of Independence, a national model of education has been formed, aimed at improving the quality of training of human resources, meeting the needs of the individual, society and the state. A regulatory legal framework has been formed. The laws of the Republic of Kazakhstan "On education", "On higher education", "On science", "On the rights of the child in the Republic of Kazakhstan", "On the state educational accumulative system", "On the commercialization of the results of scientific and (or) scientific and technical activities "," On the status of a teacher "and others.

Key words: Post-socialism, educational transformations, transitory period, theories of modernization and dependency.

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Ауыспалы кезеңдегі білім беру жүйесінің дамуы: Қазақстан жағдайы

Постсоциалистік кеңістіктегі білім беруді дамыту салыстырмалы зерттеудің ең қызықты нысандарының бірі болып табылады. Социалистік режим құлағанға дейін өте ұқсас немесе тіпті бірдей білім беру жүйелері болған елдер қазіргі заманғы әлеуметтік даму теорияларын тексеру үшін зерттеу алаңы бола алады. Модернизация теориясына сәйкес, "дамымаған" постсоциалистік елдер өздерінің "дамыған" батыстық әріптестерін қуып жетуі керек еді. Барлық елдерде реформалардың мақсаттары ұқсас болғандықтан, күтілетін нәтиже көп немесе аз болуы керек еді. Алайда, Батыс кеңесшілерінің ұсынылған реформаларына қарамастан, білім беру жүйесінде әртүрлі траекториялар байқалады. Әлбетте, білім беру жүйесінде конвергенцияның орнына дивергенция басым тенденцияларға ие. Тәуелділік теориясына сәйкес әлем біртұтас экономикалық жүйе болып табылады, ал елдер өз кезегінде әртүрлі рөлдер мен функцияларды орындайды.

Қазақстанның үлгісінде біз Тәуелсіздіктің 30 жылы ішінде Тәуелсіз Қазақстанның білім беру жүйесі лайықты халықаралық мойындауға ие болғанын көріп отырмыз.

Тәуелсіздік жылдарында адами ресурстарды даярлау сапасын арттыруға, жеке адамның, қоғам мен мемлекеттің қажеттіліктерін қанағаттандыруға бағытталған білім берудің ұлттық моделі мен нормативтік құқықтық база қалыптастырылды. Қазақстан Республикасының "Білім туралы", "Жоғары білім туралы", "Ғылым туралы", "Қазақстан Республикасындағы баланың құқықтары туралы", "Мемлекеттік білім беру жинақтау жүйесі туралы", "Ғылыми және (немесе) ғылыми-техникалық қызмет нәтижелерін коммерцияландыру туралы", "Педагог мәртебесі туралы" және басқа да Заңдары қабылданды.

Тәуелсіздіктің отыз жылында 67 жоғары оқу орны жұмыс істей бастады. ЖОО-дағы ПОҚ дәрежелілігі 24,3%-ға ұлғайды. Интернационализация деңгейі 18708 шетелдік студенттерге артты. 2011 жылмен салыстырғанда 2020 жылы 950 студент академиялық ұтқырлық бағдарламасы бойынша білім алды. 2014

жылмен салыстырғанда, 2020 жылы гранттар саны 4057-ге артты. 1993 жылмен салыстырғанда бүгінгі күні 1030 адамға артық Президенттік стипендия алады. 2018 жылмен салыстырғанда ақылы оқуға дайындық бейіні бойынша ҰБТ-дан босатылған ТжКБ түлектерінің контингенті 23478 адамға артты.

Түйін сөздер: постсоциализм, білім беру жүйесінің өзгеруі, ауыспалы кезең, модернизация және тәуелділік теориясы.

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Развитие образования в переходном периоде: случай Казахстана

Развитие образования в постсоциалистическом пространстве является одним из самых интересных объектов для сравнительного исследования. Страны, в которых до падения социалистического режима были довольно похожие или даже идентичные системы образования, на сегодняшний день могут служить исследовательской площадкой для проверки современных теорий социального развития. Согласно теории модернизации, «слаборазвитые» постсоциалистические страны должны были догнать своих более «продвинутых» западных коллег. В связи с тем, что во всех странах цели реформ были похожи, то и ожидаемый результат должен был быть более или менее одинаковым. Однако, несмотря на рекомендованные реформы западных консультантов, в образовательной системе наблюдаются разные траектории. Очевидно, что в образовательной системе преобладающие тенденции имеет дивергенция вместо конвергенции. Согласно теории зависимости мир представляет собой единую экономическую систему, а страны, в свою очередь, осуществляют разные роли и функции.

На примере Казахстана мы видим, что за 30 лет независимости система образования независимого Казахстана получила достойное международное признание.

За годы Независимости сформирована национальная модель образования, направленная на повышение качества подготовки человеческих ресурсов, удовлетворение потребностей личности, общества и государства Сформирована нормативная правовая база. Приняты законы Республики Казахстан «Об образовании», «О высшем образовании», «О науке», «О правах ребенка в Республике Казахстан», «О государственной образовательной накопительной системе», «О коммерциализации результатов научной и (или) научно-технической деятельности», «О статусе педагога» и другие.

За тридцать лет независимости стало функционировать на 67 вузов больше. Остепененность ППС вузов увеличилась на 24,3 %. Степень интернационализации увеличилась на 18708 иностранных студентов. По сравнению с 2011 годом в 2020 на 950 студентов больше прошли обучение по программе академической мобильности. По сравнению с 2014 годом, в 2020 году количество грантов увеличилось на 4057. По сравнению с 1993 годом на сегодняшний день получают Президентскую стипендию на 1030 человек больше. По сравнению с 2018 годом контингент освобожденных от ЕНТ выпускников ТиПО по профилю подготовки на платное обучение увеличилось на 23478 человек.

Ключевые слова: постсоциализм, образовательные трансформации, переходный период, теории модернизации и зависимости.

Introduction

The development of education in the post-socialist period is one of the most interesting objects in the field of comparative research, since the study reveals the main trends in the development of educational systems in the context of globalization, ways to overcome the crisis in the field of education.

Post-socialist countries, which had fairly similar or even identical education systems before the fall of socialist regimes, can serve as a serious testing ground for modern theories of social development. However, the peculiarities of the post-socialist transition did not become the main subject of interest of Western sociologists, at least in the field of education.

The purpose of the article is to investigate how Kazakhstani education has developed over thirty years of independence and its compliance with world trends.

Research methods

The study used a comparative method. The information base was the results of research by domestic and foreign scientists on the development of education in the transition period on the example of Kazakhstan.

Literature review

From the standpoint of comparative studies, the world educational space unites national educational systems of different types and levels, significantly differing in philosophical and cultural traditions, the level of goals and objectives, and their qualitative state. At present, it is customary to talk about the modern world educational space as an emerging single organism in the presence of global trends in each educational system and the preservation of diversity (Ivanova S., 2021).

As a result of the collapse of the Union of Soviet Socialist Republics in 1991, a unified education system with its own regulatory and legal framework common to all republics, a single language of communication and education was destroyed. The countries of the post-Soviet space began to develop their own national educational systems, some of them, based on the Soviet educational system, others, focusing on Western educational norms and rules (Mirosyan T., Elkina I. 2018.).

The initial transition period after the revolutionary changes of 1989-1991. It was greeted by researchers with a certain interest; however, most developments in post-socialist education were viewed from the point of view of modernization theory. In their opinion, the "underdeveloped" post-socialist countries had to catch up with their more "advanced" Western counterparts. The researchers based their opinion on the assumption that "there is one Western educational model that needs to be replicated in post-socialist countries, and that there is only one way to implement this model" (Bain, 2010). Reform recipes for countries were similar, so the outcome was expected to be more or less the same.

The term "post-socialism" was quite neutral and therefore suitable for describing the ambiguous present and unclear future – and not only post-socialist countries, but rather the world as a whole. It emerged immediately after the collapse in the role of a conventional concept from attempts to comprehend the emerging situation, the direction of development of which could not be predicted. And it blended well with other popular "post-" models at the time, such as postmodernism (Jameson, 1991) and postcolonialism (Spivak, 1990), all of which expressed a sense of a break with what came before and of change opening a new era.

Post-socialist countries have been termed "countries in transition," implying the temporary nature of the post-socialist period (Rado, 2001). Almost three decades have passed, and the transition is far from over. Post-socialism is still alive and well (Silova, 2010), and many vestiges of the socialist past can still be observed in the educational structures of the former socialist countries. Despite the similar nature of the reforms advocated by Western consultants, different trajectories of change in education can be observed. Divergence instead of convergence seems to be the dominant development trend. The divergence approach argues that, despite economic transformation and modernization processes, countries not only maintain their cultural differences, but there is also a return to roots movement and a struggle for local culture, values and character traits (Waitzberg, 2007).

At the beginning of the transition, researchers observed two competing trends – "borrowing from the West" and "returning to the roots" (Anweiler, 1992). It appears that in at least some countries in the region, the latter trend has become predominant over time. This can be explained not only by the cultural choice of peoples: such a turn can also be due to the economic context. Some countries began to develop their economic potential in accordance with the needs of the world market, while others decided to rely mainly on the export of their natural resources, because the "shock therapy" of the transformation of the planned economy into a market economy turned out to be too radical. Weizberg (2007) notes that the main object of modernization theory is the theory of dependence, which assumes that the world is a single capitalist economic system in which different countries perform different roles and functions. "Core" or "developed" countries produce industrialized products with high added value and sell them to "peripheral" or "developing" countries, which supply cheap raw materials to the main countries. Consequently, not all countries have the same opportunities to achieve the same economic development, and their education systems have different development opportunities. Dependency theory seems to be better suited to explain the differences that are now evident when comparing former socialist countries.

As a result of different strategic choices, the countries of the region can be divided into at least three relatively different groups: the new EU member states; geographically and politically divided countries with a distant and vague prospect of EU membership (for example, Georgia, Moldova, Ukraine); and countries that did not necessarily rely on Western recommendations to reform their education and are looking for their own ways (Silova, 2009). Although the new EU member states seem to be more advanced in reform implementation and manage to achieve better results in education (OECD, 2016), the third

group, consisting of post-socialist countries seeking to build their educational systems on their own, seems to be probably the most interesting object. for a case study. The countries that are outside the zone of direct influence of the EU education policy are Russia, Belarus, Armenia, Azerbaijan and the republics of Central Asia. The Republic of Kazakhstan, which is a typical representative of the third group of countries, can serve as an interesting example of a country seeking its own way of developing education.

Results and discussion

A typical example of a country that is under pressure from global forces and at the same time is trying to find its own path of development is the Republic of Kazakhstan.

By historical standards, 30 years of Independence is a short period. But, for a quarter of a century, a lot has changed. A new generation has grown up. Almost 50% of the population) were born in independent Kazakhstan.

How did Kazakhstani education develop against this background and does it correspond to world trends? To what extent does modern Kazakhstani education contribute to the country's sustainable development?

Thanks to the close attention of the Head of State to the education system, painstaking and creative work of hundreds of thousands of teachers, the education system has achieved serious results.

Hundreds of Kazakhstani schoolchildren win gold medals at international subject Olympiads and competitions. More than twelve thousand of the most talented students studied at the best universities in the world under the President's program "Bolashak". For 30 years of independence, about 140 thousand of our citizens have received higher education in foreign universities. In TIMSS-2015, our schoolchildren showed impressive results, which turned out to be higher than the international average and the indicators of their peers from the USA, England, Germany, Canada, Australia, Israel, Sweden, Denmark, the Netherlands, Poland, Czech Republic, Lithuania, Malaysia, Turkey and others. countries.

For 2021, the number of countries in which Kazakhstanis can study for free within the framework of intergovernmental agreements concluded at the initiative of the Ministry of Education and Science has increased.

To date, grants to Kazakhstanis are allocated by Slovakia, Azerbaijan and Vietnam.

Also, Kazakhstani students will be able to receive a diploma from the prestigious US university – the University of Arizona, while continuing their studies in the republic. We are talking about students of the North Kazakhstan University named after M. Kozybayev. This will become possible within the framework of the achieved strategic partnership with this university.

To date, fourteen Kazakhstani universities have entered the international academic ranking QuacquarelliSymondsWorldUniversityRankings, which is one of the most authoritative rankings of universities in the world. Moreover, this year some universities have strengthened their positions, moving up several ranks.

Over the years of independence, 6 state programs have been implemented aimed at developing the education system.

For our study, the system of higher education for the years of independence seems to be relevant.

Let us compare the results of the higher education system at the time of gaining independence in Kazakhstan and today (table 1).

Table 1

At the time of gaining independence	Today
Functioned 61 higher educational institutions	128 higher educational institutions and over 30 years of independence 3.2 million personnel with higher education were trained
The graduation of specialists with higher education amounted to 42.2 thousand people	176.4 thousand people

As can be seen from the table, over the 30 years of independence, 67 more universities began to function. This is a significant result.

Since 1999, the universities of Kazakhstan have switched to a new model of forming the student contingent of higher educational institutions on the basis of the state educational order (table 2).

Table 2 – Qualitative composition of the teaching staff (PPP)

Years	Graduation of teaching staff of universities
1999	24%
2021	48,3%

As you can see, the degree of teaching staff in universities increased by 24.3%.

A law was also adopted to expand the academic and managerial independence of universities.

Since 2010, Kazakhstan has been a member of the Bologna Process. The transition to a three-stage model of personnel training has been carried out: bachelor's – master's – doctoral studies.

An important indicator of the quality and attractiveness of the Kazakh system of higher education is the degree of its internationalization (table 3).

Table 3 – Degree of internationalization over the years of independence

Years	Number of foreign students
2010	10 361
2016	12 837
2019	39 558
2020	29 069

As you can see, since 2010, the degree of internationalization has increased by 18708 foreign students. This is a fairly high figure.

The number of Kazakhstani universities in the QS international ranking of the best universities in the world has grown from 5 to 10 (for 2011, 2020, respectively).

Al-Farabi Kazakh National University entered the top 200 best universities in the world according to the QS rating.

Since 2011, a program of academic mobility of students has been implemented. About 18 thousand students were trained in the best foreign universities (table 4).

Table 4 – Academic mobility program

Years	Number of students
2011	350 человек
2019	603
2020	1 300 человек

Compared to 2011, in 2020, 950 more students were trained under the academic mobility program.

Since 2005, annually 200 best university teachers have been awarded the «Best University Teacher» grant for scientific research (3 thousand people).

In 2020, for the first time, the «Best University Teacher» competition was held in electronic format.

Since 2019, repeated UNT has been introduced (4 times a year).

More than 6 thousand people were admitted to universities (in 2019 – 3 thousand people). For the first time since 2020, persons who have international certificates (IELTS, TOEFL) have been exempted from taking the UNT block of a foreign language.

Exempt from UNT TVE graduates upon admission to the training profile for paid education. The contingent of admission of such students in 2020 amounted to 35,297 people, in 2018 – people.

Table 5 – Training profile for paid education

Years	Number of students
2018	11 819
2020	35 297

Compared to 2018, the contingent of TVE graduates exempted from the UNT in the training profile for paid education increased by 23,478 people.

An electronic UNT certificate and an electronic certificate of awarding an educational grant have been introduced.

Since 2014, the social project «Mangilik el zhastary – industry!»

Educational grants are allocated annually (Table 6).

Table 6 – Educational grants

Years	Number of grants
2014 год	1 050
2020 год	5 107

Compared to 2014, in 2020 the number of grants increased by 4057.

Since 1993, the scholarship of the President of the Republic of Kazakhstan has been awarded for academic success (table 7).

Table 7 – Scholarship of the President of the Republic of Kazakhstan

Years	Number of people
1993	58
2020	1 088

Compared to 1993, today, 1030 more people receive the President's scholarship.

The State educational accumulative system is functioning.

Since 2011, a world-class higher educational institution – Nazarbayev University has been operating in the country. 62 universities (64.8%) are implementing the experience of Nazarbayev University. In 11 universities with a special status, 168 doctoral students were awarded PhD degrees, and they received their own corresponding diplomas.

The international scholarship «Bolashak» was established by the decree of the President of the Republic of Kazakhstan dated November 5, 1993 No. 1394. Since 2016, more than 100 foreign top managers and 861 foreign scientists have been attracted.

Measures for training personnel in colleges and universities for specialties in demand have been strengthened, the material base of educational institutions has been updated.

Work has been intensified to stop the activities of higher educational institutions that provide low-quality education.

The salaries of the teaching staff were increased by increasing the cost of the state educational grant. In 2011, the Law of the Republic of Kazakhstan «On Science» was adopted, which regulates public relations in the field of science and scientific and technical activities and defines the basic principles and mechanisms of the functioning and development of the national scientific system of the Republic of Kazakhstan.

Since 2015, work has been underway to stimulate scientific activity by commercializing its results. Funding for science has been increased, and an additional 3 billion tenge is allocated annually for scientific research of young scientists.

Today Kazakhstani science is open for collaboration with foreign scientists. Significant scientific achievements were obtained in scientific projects and programs.

As the comparison results show, significant achievements were obtained in the higher education system during the years of independence.

Conclusion

The modern direction of the development of education systems in the post-Soviet countries is integration into the world educational space, the transition to a new educational paradigm, as a result of which it is necessary to rethink the historical heritage of national and foreign pedagogy, search for new effective ways of interaction between research and practical activities.

On the example of Kazakhstan, we saw that over 30 years of independence, the education system of independent Kazakhstan has received a worthy international recognition.

During the years of Independence, a national model of education has been formed, aimed at improving the quality of training of human resources, meeting the needs of the individual, society and the state. A regulatory legal framework has been formed. The laws of the Republic of Kazakhstan "On education", "On higher education", "On science", "On the rights of the child in the Republic of Kazakhstan", "On the state educational accumulative system", "On the commercialization of the results of scientific and (or) scientific and technical activities "," On the status of a teacher "and others.

For thirty years of independence, 67 more universities began to function. The degree of the teaching staff of universities increased by 24.3%. The degree of internationalization has increased by 18,708 foreign students. Compared to 2011, in 2020, 950 more students were trained under the academic mobility program. Compared to 2014, in 2020, the number of grants increased by 4057. Compared to 1993, today, 1030 more people receive the President's scholarship. Compared to 2018, the contingent of TVE graduates exempted from the UNT in the training profile for paid education increased by 23,478 people.

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Managerial challenges and main barriers in universities within the Triple Helix context

The Triple Helix model of innovation is unquestionably the most discussed model for innovation in both developed and developing countries. This model advocates reinforcement of the cooperation between the university, business and government. The world is changing rapidly; consequently, this innovation model is mutating by taking different forms of interactions and collaborating under various conditions, posing various challenges and barriers toward three agents' interactions. There have been many studies on three helices relationships type, three actors` interaction cases and main challenges. However, few studies concerning the Triple Helix model examined the managerial challenges in academia in realizing the Triple Helix Model and University-Industry linkages. A significant role is imposed on universities as the primary source of new knowledge, ideas, creativity and innovation. To push forward the strengthening of the university-industry collaborations within the Triple Helix model in universities of Kazakhstan, we aimed to define the main managerial challenges and barriers in other developing countries in this model realization. As a result, the systematic literature review displayed many challenging aspects in the universities' micro-level management and the main difficulties of university-industry collaborations.

Key words: triple helix, university-industry collaborations, managerial issues.

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Университеттерде «Үштік спираль» моделін жүзеге асырудағы басқару мәселелері мен кедергілері

Triple Helix инновациялық моделі сөзсіз дамыған және дамушы елдердегі инновацияның ең көп талқыланатын моделі болып табылады. Бұл модель университет, бизнес және үкімет арасындағы ынтымақтастықты нығайтуды қолдайды. Әлем тез өзгеруде; демек, бұл инновациялық модель өзара әрекеттесудің әр түрлі формаларын қабылдау және әртүрлі жағдайларда ынтымақтастық жасау арқылы өзгеруге ұшырайды, үш агенттің өзара әрекеттесуінде түрлі қиындықтар мен кедергілер тудырады. Үштік спираль қатынастары, үш актердің өзара әрекеттері және негізгі проблемалар туралы көптеген зерттеулер жүргізілді. Алайда, Triple Helix моделіне қатысты зерттеулер және де академиядағы Triple Helix моделі мен университет-индустрия байланысын жүзеге асырудағы басқарушылық мәселелерді қарастыратын зерттеулер саны шамалы. Жаңа білімнің, идеяның, шығармашылық пен инновацияның бастапқы көзі ретінде университеттерге маңызды рөл жүктеледі. Қазақстанның университеттерінде Triple Helix моделі аясында университет-салалық ынтымақтастықты нығайтуды алға жылжыту үшін біз осы модельді іске асырудағы басқа дамушы елдердегі негізгі басқарушылық қиындықтар мен кедергілерді анықтауға бағытталғанбыз. Нәтижесінде әдебиеттерге жүйелі шолу университеттердің микродеңгейіндегі басқарудың көптеген күрделі аспектілері мен университеттер мен өндірістер арасындағы ынтымақтастықтың негізгі қиындықтары көрсетілді.

Түйін сөздер: үштік спираль, университет-өнеркәсіп ынтымақтастығы, басқару мәселелері.

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Проблемы управления и барьеры в университетах в условиях реализации модели Тройной спирали

Модель инноваций «Тройная спираль», несомненно, является наиболее обсуждаемой моделью инноваций как в развитых, так и в развивающихся странах. Эта модель выступает за укрепление сотрудничества между университетом, бизнесом и государством. Мир быстро меняется, следовательно, видоизменяется и инновационная модель, принимая различные формы взаимодействия и сотрудничества в различных условиях,

создавая различные проблемы и препятствия для взаимодействия трех агентов. Было проведено много исследований по типу трех спиралей отношений, взаимодействия трех субъектов и основным проблемам. Однако проводилось мало исследований, касающихся модели Тройной спирали, где изучались управленческие проблемы в академических кругах при реализации модели Тройной спирали и связей между университетом и промышленностью. Значительная роль отводится университетам как первоисточнику новых знаний, идей, творчества и инноваций. Для способствования укреплению сотрудничества между университетами и промышленностью в рамках модели Тройной спирали в университетах Казахстана авторы статьи стремились определить основные управленческие проблемы и барьеры в других развивающихся странах при реализации этой модели. В результате систематический обзор литературы выявил множество сложных аспектов управления университетами на микроуровне и основные трудности сотрудничества между университетами и промышленностью.

Ключевые слова: Тройная спираль, сотрудничество университета и индустрии, управленческие вопросы.

Introduction

In the State Program of industrial and innovative development of the Republic Kazakhstan for 2020-2025 (hereinafter SPIID), it is planned to carry out work in innovative potential and innovation advancement. This State Program dedicated several areas to strengthen the innovation capacity and its development in Kazakhstan, owing to Kazakhstan's low scores in the Global Competitiveness Index (GCI).

According to Global Competitiveness Report 2019 in GCI by World Economic Forum, Kazakhstan took 55th place and have improved its position by four points compared to 2018. Out of 12 factors of competitiveness, the improvement occurred in 5 aspects, a decrease in 4 factors, and in 3 factors, the positions did not change. Out of 103 indicators, there was an improvement in 33 indicators, deterioration in 49 indicators and no changes in 21 indicators. The competitiveness of Kazakhstan is at an average level in terms of such factors as "ICT" – 44th place, "Education and skills" – 57th place, "Macroeconomic stability" – 60th place. And one of the weakest positions of Kazakhstan is "Innovation potential" – 95th place. An average score of an innovative potential is 32 out of 100. Being aware of the statistics in innovation and competitiveness urges us to develop innovative potential, consequently being competitive. There are various innovation models to implement in the context of Kazakhstani reality. One of the most thriving ones is the Triple Helix Model of Innovation. And the most real and reliable one, since three actors are involved in the realization of this model. The first time this term was used as a biological term for gene splicing, they commercialized this innovative idea, and the Federal support developed an ownership patent. Initially, the innovative biological idea had turned into a valuable business.

The main point is to produce the ideas and then employ these ideas for societal issues, strengthening the nation's whole economy. As the leading agent in this triangle – the universities/ higher education institutions (HEIs), and the industry/ companies, employ the knowledge/skills developed by the Universities. In the Triple Helix Model of Innovation, the University-Industry linkages are typical, thus critical. So, here the entrepreneurial university as a driver of the triple helix [Etzkowitz, 2008: 29]. Although the government plays a crucial part in supporting the business in subsidies/grants, and in the startup development process [Pique et al, 2018: 4] However, UI collaborations remain more significant for innovation management in the context of developing countries. The University -as a knowledge and skills generator, and the industry realise those skills in practical terms by making business and profit. However, in this knowledge transfer process, many issues occur.

Literature review

Generally, the state government documents are devoted to the problematic issues Kazakhstan has to deal with in further development and economic competitiveness areas. One of those documents is the State program of industrial and innovative development for 2020-2025.

World Economic Forum data for Global Competitiveness Index (GCI) is retrieved from the official internet site of trading economics. Due to covid 2019, the GCI 2020 report was missed, and the data displays 2018-2019.

Innovation, innovation management and the Triple Helix model of innovation are widely discussed and explored for the last centuries. Many researchers contributed to the innovation and the triple helix model studies. Such foreign scientists devoted their works to the innovation, triple helix model issues

along with U-I collaborations as Etzkowitz H., Leydesdorff., Drucker P., Zhou Chunyan., Lowe C [Lowe, 1982] Elias G.Carayannis, Elpida T.Samara., Yannis L. Bakouros., Nsanzumuhire Silas., Piqué J., Razak A., Asad Abbas [Asad Abbas et al., 2019],Wan Ming., Hladchenko M., Pinheiro R., Fagerberg, J., Mowery, D., Nelson, R [Fagerberg, 2006] and others. Among Russian scientists, it is worth noting the work of Osmuk L.A [Osmuk, 2019]. Kazakhstani scientists as Dnishev F.M., Alzhanova F.G., Alibekova G.Zh [Dnishev et al, 2015] devoted some of their works to the triple helix model of innovation. Mainly Etzkowitz H worked on research problems as in triple helix model, entrepreneurial science, university-industry linkages, the dynamics of innovation, innovation, etc.; Leydesdorff has many studies in a triple helix, university-industry interactions, innovation system, knowledge-based economy, etc., Carayannis, E – the role of knowledge management, U-I R&D partnerships, Quadruple Helix, innovation ecosystem, innovation, encyclopedia of creativity, innovation and invention, innovation and entrepreneurship -theory, policy, practice etc., Perkmann, M- university engagement with industry, academic engagement and commercialization, open innovation.,Santoro, M- university research centres, university-industry knowledge transfers, U-I interactions, research centres and industrial firms, etc., Hughes, A -Knowledge exchange activities, open innovation, knowledge production, the role of universities, etc., Saad, M- developing countries innovation systems, triple helix strategy, barriers to U-I links, etc.

Research Methodology

The paper aims to explore the managerial challenges the universities face in university-industry collaborations and overall the triple helix model implementation. Besides, we seek to ascertain the main barriers toward collaborations between academia and industry. We employed the systematic review of literature conducted in the field of UIC, such as Silas U.Nzanzumuhire [Nsanzumuhire et al, 2020], Brekke [Brekke, 2020]. We used SLR (a systematic literature review) with limited open recourses available.

A list of relevant literature was obtained using online databases like Web of Science (WoS), Scopus, and Google Scholar; moreover, the books by reliable scientific publishers (Springer, Routledge, Springer reference, Harper etc) were taken into account. We searched these databases by applying different combinations. We employed the following search string in those databases: (University-Industry Collaboration) OR (Triple Helix Management), AND (Triple Helix) all the other key words brought completely irrelevant publications, which were not of our concern. We considered only the articles with open access since the availability of the account access to other publications were limited, or access was not full. Apart from the WoS and Scopus, we used the key search string for the Google Scholar: “triple helix management”.

The period of publications time ranged from 1980 to 2021. The search started in April 2021 and ended in May 2021. Generally, with a key search “university-industry collaboration”, the massive publications were about the overall or too specific UI collaborations, models, practical uses, and realizations. However, in some of those articles, we could find out the challenges and barriers toward implementing the TH model. In the search string: Triple helix management, we could find some articles closely related to our objectives and concerns. The total number in the WoS database with the key search string: Triple Helix Management is 332. In the exact search string, Scopus had 274 publications. A bulk of those papers are from the US, Brasil, UK, China and other European countries. The number of article paper is 169, conference paper 70. All open access papers number 65 Google Scholar displayed 24 000 documents; however, only the first ten was relevant. The key search string “University-Industry collaboration” yielded 1348 results: article 850 with open access – 296 only in Web of Science, and 5727 total and 2669 articles with 1109 open access in Scopus database. Publications obtained after reading the abstracts. Because the articles we aspire to analyse have high legitimacy, the search approach only included peer-reviewed journal papers available in an electronic database. The most relevant articles with open access had been retrieved; in some cases, the full text was not available.

Initially, we wanted to understand the main challenges the academia faced in UI collaborations, and we chose the period started from 1980 since the articles regarding the triple helix from that year are considered a separate model for innovation and was the term was first used in its commercial sense in the Yale Journal of Biology and medicine. Unlike other systematic reviews, this study focuses only on in-depth problems in micro-level management within academia toward realizing the triple helix model. We mainly highlighted the role of managers’ perceptions in the universities and the main barriers in implementing UI co-operations. Some challenges and barriers were described in a certain country as

a case study in realizing the TH model. We seek to learn what gets in the way of such co-operations and what we can do about those obstacles as a developing country. As for the content, publications selected according to whether they answered these questions:

1. Does the publication discuss the problems of UI collaborations?

2. What kind of problem does the article discuss?

3. Do the publication discuss the challenges the universities encounter during the Triple Helix Model implementation?

4. Do those challenges discuss the concerns of the managerial aspects of the university?

Finally, relevant articles and book chapters were downloaded manually to the computer; they were added to the MAXQDA2020 software [https://www.maxqda.com/trial]. In MAXQDA2020 software (demo version), we divided the publications, books, book chapters into two-time range categories. The first-period category documents were from 1980 to 2000, and the second category documents were from 2000 up to the present. Only published work in English language was included. Each relevant article was read repeatedly; major findings were synthesized and compiled into figures.

Discussion and results

For the last decades, there has been many discussions and studies around the triple helix model of innovation, university-industry and university-industry-government collaborations, entrepreneurship and innovation stuff. However, little research had been dedicated to the triple helix management, even less in micro-level management challenges in the universities.

Since the university is the main agent in transferring the knowledge-based economy, it plays a crucial role in implementing the innovation model triangle, thus affecting regional sustainable development. The university plays a significant role in technology innovation as a knowledge-producing and disseminating institution. The university's conventional teaching mission is reimagined as it aids the modernization of low- and mid-tech businesses [Etzkowitz H., Webster A et al, 2000]. Multiple research findings even suggested the urge for theoretical, conceptual frameworks of business education for sustainable development apart from innovative teaching approaches and programs [Adomssent et al, 2012]. Being cognizant of the university role in the sustainable economic development of the whole country urges us to find out, facilitate management challenges, and thrive faster. By management, here again, we imply the THM of innovation management.

The following figure is dedicated to the main challenges to develop a hybrid THM in developing countries and, as for developing countries mentioned, here regarded countries of Central and Eastern European (CEECs). The figure 1 is complied by author based on the scientific article on holistic exploration of barriers and enablers [Razak et al, 2015: 7, 8, 9, 10].

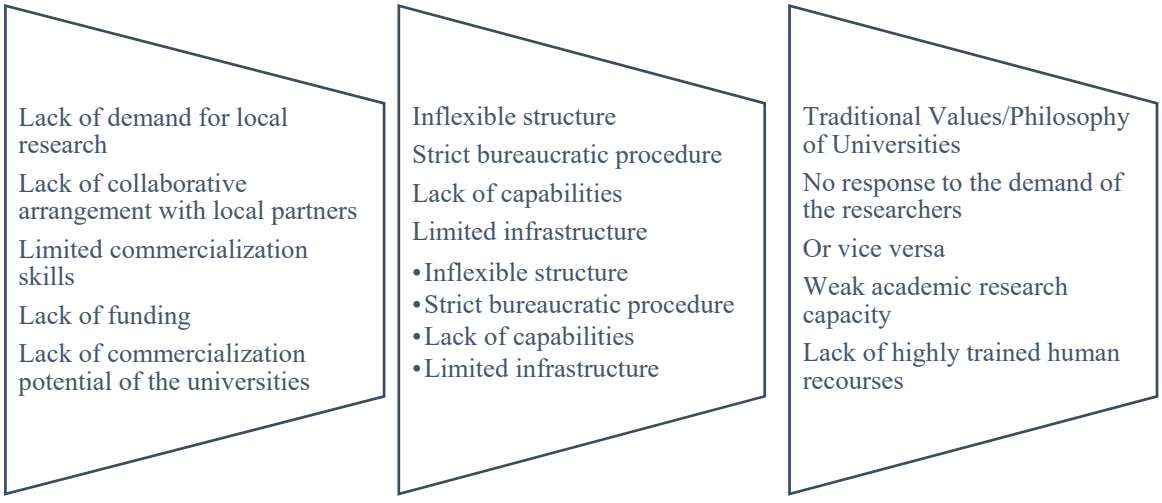

Figure 1 – Main challenges to a hybrid THM development
Note*: compiled by the authors according to Razak et al.,2015

The authors divided these barriers found in this article Razak et al., 2015, into three. The first category goes to the lack of main recourses available in the universities, in either soft skills difficulties, social and financial terms, and the second category concerns infrastructure and procedural policies during the University-Industry collaboration process. The last one involves more of people values and attitudes. By values and attitudes of people, the authors imply the "perception" of the universities` role by researchers, managers and those involved. Furthermore, again, the challenge of academics/researcher and managers` perception of their work in the universities viewed from both perspectives: the conflict between the classic academic and societal perspective on science [Ernø-Kjølhede et al., 2001: 3-4] where we can observe how the problem is profound and requires a careful approach.

According to the article by Vick, T.E., and Robertson, M. (2018), the author Perkmann et al. (2013) suggested four central measures (FCM) that characterize the process of knowledge transfer. Motivation and barriers are one of the main FCM. The article examined existing studies on the FCM, and two different systems of knowledge production were offered as an example of barriers. Understanding perceived barriers to U-I linkages is critical because it reveals the significant issues that arise during the knowledge transfer process. Apart from barriers, assessing the outcomes of such engagement becomes challenging for both agents: academia and industry [Vick, T.E et al., 2018]. Not many studies pointed out the importance of motivation in driving U-I collaborations, nor it has been included as the reason. The understanding motivation that drives both sides to engage with each other is paramount of importance. In the research paper: Systematic literature review of UK university-industry collaboration for knowledge transfer: a future research agenda, the authors have figured out the distinctions regarding motivations and distinctions between barriers across the two perspectives for the formation of U-I connections in the UK. Those two perspectives are social-political and contextual perspectives [Vick, T.E et al., 2018: 5].

Table 1 – Contextual perspective two significant distinctions

Orientation-related	Transaction- related
Differences in incentives and orientation	Potential conflicts between university and industry over intellectual property and university regulations

Note* compiled based on the Vick, T.E., & Robertson, M. (2018)

As can be seen from the table, Bruneel, D`Este and Salter (2010) and Tartari, Salter and D`Este (2012) distinguished two major obstacles toward U-I connections in the UK. The industry says that they experience more transaction-related obstacles, whereas academics view orientation-related barriers as more challenging. Interesting to note that for academics with entrepreneurial experience and for those who have more faith in their industry partners, the orientation-related difficulties become less challenging [Vick, T.E et al., 2018: 6].

If to look upon the barriers to UI collaborations from the universities perspective, in figure below, we can observe the internal premises toward UI linkages apart from the external environment.

In general, in implementing any innovation model, the culture and values of people are the main challenges in any society. It takes time to adapt, perceive as it should be, accept the role to be taken in a new model. To help the people (managers/teachers/ industry employees) to perceive and adapt smoothly, we deem that change management strategies should be employed effectively. Moreover, knowledge transfer's different organisational forms and management styles are noteworthy to point out that managerial attitudes constituting shared values more than technical issues are more critical for UI linkages success [Razak et al., 2015: 13]. There is much research outside of the TH addressing the barriers to universities switching their role towards being an entrepreneurial university. University culture shows us how the norms and values are essential in changing and adapting a particular model. One of the critical barriers toward UI collaboration is the academic reward and evaluation system in the whole scientific system and the perception of the importance of such reward and evaluation per se. The social contribution carries more values for academia, which is counted by the number of publications and citations in the academic world. According to the research paper of SLR of UK U-I collaboration for KT, individual barriers included a lack of time and motivation, while institutional constraints included a lack of reward/incentive/investment and bureaucracy . It is worth noting that in their commercial interests, the vast majority of scientists are driven by reputational/ career benefits. [Vick, T.E et al., 2018: 6]. One can observe here the intrinsic motivation input and the expected outcome by academicians. In support of this viewpoint, two challenging issues [Saad and Zawdie, 2008] critical for triple helix innovation success should be mentioned. The first is about the various partners' engagement and commitment inside and within the three triple helix spheres:

government, industry, and academia. The second is linked to the difficulty of creating mechanisms for coordinating diverse and complicated interactions and interfaces to provide a context and conducive environment for knowledge exchange, learning, and invention. However, a considerable barrier to the TH culture development is that the bureaucratic nature of most institutions in developing nations, including companies and universities, is a significant impediment to knowledge transmission and utilization within and between organizational and institutional sectors [Saad, M., Zawdie, G., & Malairaja, C, 2008: 437]. In the Malaysian experience of triple helix research and technology, according to Saad et al., Ali (2003) describes the challenges of collaborating between universities and businesses as follows:

- Foreign investment dominance in vital industrial industries, particularly electronics.

- Deficiencies in government and industry-provided research funding;

- The venture capital business is still in its infancy.

- a scarcity of research scientists capable of delving into the depths of knowledge;

- Underdevelopment of a creative entrepreneurial culture; and misalignment of the university and industrial goals [Saad, M., Zawdie, G., & Malairaja, C, 2008: 438]. Besides the managerial issues in academia, government policies and systems are important. Here, in the same article [Saad and Zawdie, 2008: 440], Algerian universities dependency on the Ministry for Higher Education was underscored for their programs and policies.

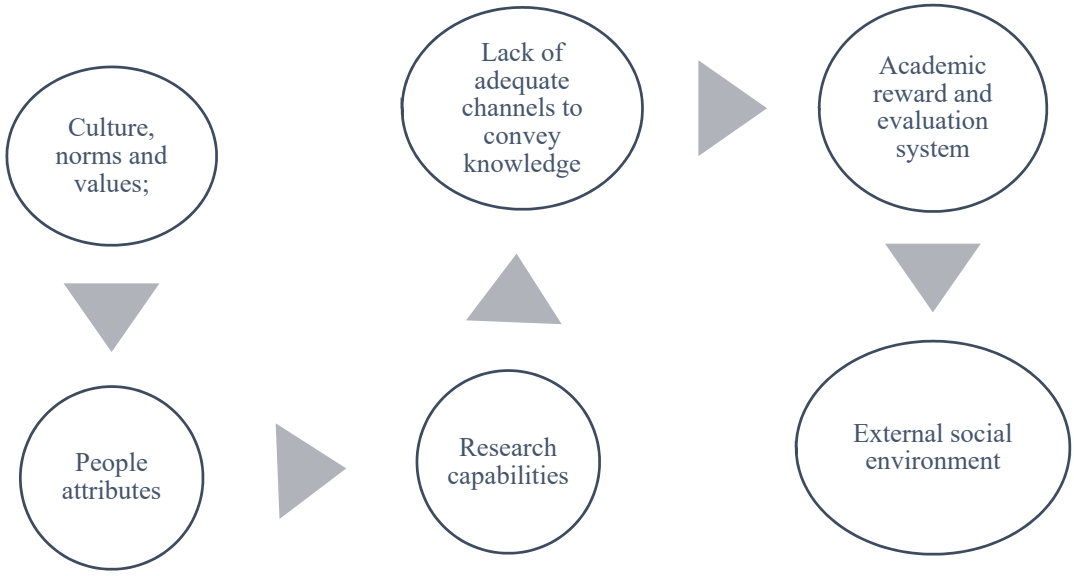

Figure 2 – Barriers to University-Industry Collaborations
Note*: compiled by the authors according to Razak et al.,2015

Academia managers and scientific workers were more inclined to fulfill their research interests and scientific curiosity than complying with the deadlines of contracts with their business partners in the TH context [Razak et al., 2015: 14]. The problem of social influences and cultural clash which occur between industry and academia obstructs such collaboration or its successful realisation. In reverse, the shared values, habits, belief, views, languages and ways of working lead to productive collaborations. In "the triple helix model for innovation: a holistic exploration of barriers and enablers" article, trustworthiness is addressed as the "starting point and a key ingredient" by Rosenberg and Nelson in 1994 as cited in the publication by Razak et al.,2015 [Razak et al., 2015: 12]. Meanwhile, in the same article, the author cited Brockhoff and Teichert (1995), mentioning the significant factor influencing the relationships between actors is the "people attributes". The subset of the peoples` values, norms, habits and attributes are motivations, outcomes of the process (in UI linkages) and academic engagement is suggested by Vick et al.,2018. In "Systematic literature review of UK university-industry collaboration for knowledge transfer: a future research agenda" the authors characterized activities, motivation, barriers to knowledge transfer and outcomes as central

measures that designate the process of knowledge conceptualization and knowledge transfer [Vick, Robertson, 2018: 1]. This systematic review focused on these central measures related to U-I links for knowledge transfer to identify what is known and unknown. By research capability and external environment in figure 2 are meant the current research results in academia and the market demand for new research from the companies.

Conclusion

This paper sought to provide a call for in-depth research in barriers and managerial challenges in academia toward the Triple Helix model implementation. We provided a thematic analysis using a systematic literature review method that many researchers in various fields have used. The discussion has provided key aspects of managerial difficulties in the universities and factors hampering the U-I collaborations. The gap existing in all THM research is the management aspects, few only covered. We also included particular case-study articles (from Algerian and Malaysian institutions) since they focused on the problems of developing a successful innovation model within the Triple Helix framework. The paper aimed to encourage and inspire such studies in Kazakhstan academia and the U-I collaboration process. We call for such a study in Kazakhstan due to the specific nature of the TH model realisation between the universities and companies in Kazakhstan. Since we are one of the post-Soviet and developing countries, it deserves particular attention and exploration via qualitative or quantitative methods to reveal the barriers and challenges occurring throughout the TH innovation model implementation. Hughes (2011) and Hughes and Kitson (2012) identified internal capabilities to manage relations and handle academic bureaucracy as a significant obstacle for industry. The bureaucracy issue is acute in developing economy. The future agenda for us is to identify the intenseness of this barrier in the context of Kazakhstan economic reality. And the research is required on in-depth analysis of both perspectives: academia and industry. Moreover, future research might also concentrate on demonstrating the results of the collaborative works between University and Industry, either in qualitative or quantitative analysis of joint generated start-ups, projects and so on. Apart from internal capabilities to manage effective change management in the university is required in this rapidly evolving environment.

An institutional strategy for developing such ties (U-I connections) put out in a strategic planning document, a development plan, or any other written stated policy is one of the most critical success elements in the management of university-industry links [Martin, 2000:35]. Probably, the control of such policies, strategic plans in the context of Kazakhstan is yet more crucial.

As a result of this limited SLR we could identify the main managerial challenges to develop the THM and the major barriers in academia and business collaborations. The main challenges we grouped into three huge categories of challenges each of them which requires special attention. When it comes to the barriers toward THM realisation between U-I agents the crucial points like the company culture and values, people attributes , reward and evaluation systems within the universities etcetera are found to be among barriers to be dealt with.

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Social aspects of increasing environmental efficiency in Kazakhstan cities

Within the framework of the environmental efficiency system, the authors consider such topical social factors for increasing environmental efficiency in Kazakhstan as the quality of environmental education, motivational mechanisms for regulating the problems of sorting secondary raw materials. It is noted that work with the population is becoming colossal in solving environmental problems. The foundations of the urban system and social management in the field of environmental development testify to the serious problem of waste recycling and disposal in Kazakhstan. The authors highlight several eco-projects that help to solve these issues, such as Kazakhstan Waste Recycle, Tazalyk and SMEs that accept recyclable materials, but the figures for unrefined waste in Kazakhstan indicate that the problem is systemic and alarming. As a solution, in addition to the applicable penalties, the authors propose the launch of multi-vector motivational programs integrated into the everyday life of citizens. Such programs are designed to be informative, educational in nature in addition to motivational; they must be scaled up and involve business representatives widely used in the fast moving consumer goods market. It is recommended to give these programs an image republican character to create resonant recognition and use. The paper analyzes the awareness, involvement of the local population in the issues of environmental recycling and waste disposal based on an online survey, and presents a consolidated program for motivating the population. The authors consider the prerequisites for the implementation of these programs, their main characteristics, goals and performance indicators.

Key words: waste sorting, waste recycle, green economy, motivation program, ecology.

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Қазақстан қалаларында қоршаған ортаның тиімділігін арттырудың әлеуметтік аспектілері

Экологиялық тиімділік жүйесі шеңберінде авторлар Қазақстандағы экологиялық тиімділікті арттырудың өзекті әлеуметтік факторларын экологиялық білім берудің сапасы, екінші шикізатты сұрыптау мәселелерін реттеудің мотивациялық тетіктері ретінде қарастырады. Экологиялық мәселелерді шешуде халықпен жұмыс ауқымды бола түсетіні атап өтілді. Қалалық жүйенің және қоршаған ортаны дамыту саласындағы әлеуметтік менеджменттің негіздері Қазақстандағы қалдықтарды қайта өңдеу және жоюдың күрделі проблемалары туралы куәландырады. Авторлар осы мәселелерді шешуге көмектесетін бірнеше экологиялық жобаларды атап көрсетеді, мысалы, Қазақстан қалдықтарын қайта өңдеу, Тазалық және қайта өңдеуге болатын материалдарды қабылдайтын ШОК, бірақ Қазақстандағы қайта өңделмеген қалдықтардың көрсеткіштері бұл мәселенің жүйелі және үрей тудыратындығын көрсетеді. Шешім ретінде қолданыстағы айыппұлдардан басқа, авторлар азаматтардың күнделікті өміріне интеграцияланған көпвекторлы мотивациялық бағдарламаларды іске қосуды ұсынады. Мұндай бағдарламалар мотивациядан басқа ақпараттық, білімдік сипатта болады; олар кеңейтілген және тұтынушылық тауарлар нарығында кең қолданылатын бизнес өкілдерін қамтуы керек. Бұл бағдарламаларға резонансты тану және пайдалану үшін имиджге республикалық сипат беру ұсынылады. Жұмыста онлайн-сауалнама негізінде қоршаған ортаны қайта өңдеу және қалдықтарды жою мәселелеріне жергілікті тұрғындардың хабардарлығы, қатысуы талданады, сонымен қатар тұрғындарды ынталандырудың шоғырландырылған бағдарламасы ұсынылған. Авторлар аталған бағдарламаларды іске асырудың алғышарттарын, олардың негізгі сипаттамаларын, мақсаттары мен нәтижелік көрсеткіштерін қарастырады.

Түйін сөздер: қалдықтарды сұрыптау, қалдықтарды қайта өңдеу, жасыл экономика, мотивациялық бағдарлама, экология.

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Социальные аспекты повышения экологической эффективности в городах Казахстана

В рамках системы экологической эффективности авторами рассматриваются такие актуальные социальные факторы повышения экологической эффективности в Казахстане, как качество экологического образования, мотивационные механизмы регулирования проблем сортировки вторичного сырья. Отмечается, что работа

с населением приобретает колоссальное значение в решении проблем экологии. Основы урбанистической системы и социального управления в области экологического развития свидетельствуют о серьезной проблеме вопросов переработки и утилизации отходов в Казахстане. Авторы выделяют несколько экопроектов, которые помогают решать данные вопросы, такие как Kazakhstan Waste Recycle, Tazalyk и предприятия МСБ, которые принимают вторсырье, однако цифры по не переработанным отходам в Казахстане говорят о том, что проблема носит системный характер и тревожную динамику. В качестве решения, помимо применяемых штрафных санкций, авторами предлагается запуск многовекторных мотивационных программ, интегрированных в повседневную жизнь граждан. Подобные программы призваны носить осведомительный, образовательный характер помимо мотивационного; они должны быть масштабированы и вовлекать представителей бизнеса, широко используемых на рынке fast moving consumer goods. Рекомендуется придать данным программам имиджевый республиканский характер для создания резонансной узнаваемости и использования. В работе проведен анализ осведомленности, вовлеченности местного населения в вопросы экологической переработки и утилизации отходов на основе онлайн-опроса, а также представлена сводная программа мотивации населения. Авторами рассматриваются предпосылки внедрения данных программ, их основные характеристики, цели и показатели эффективности.

Ключевые слова: сортировка мусора, переработка отходов, зеленая экономика, мотивационная программа, экология.

Introduction

One of the main factors of environmental pollution is the activities of cities. The growth of the population, industrial economy leads to an increase in waste, while the problems of their disposal are destructive for the global ecosystem – this is soil pollution during waste disposal, air pollution with highly toxic compounds during waste incineration, and degradation of ground and underground waters, which are enriched for account of residues of decomposing waste, etc. At the same time, the increasing trend towards urbanization certainly leads to an increasing trend of a constant increase in the mass of waste.

Disposal of waste can currently occur in the following ways:

- waste disposal;
- waste incineration;
- reuse of waste.

At the same time, of course, waste recycling is the most resource-saving way. Sorting garbage when using this method is key.

In Europe and the countries of East Asia, an efficient waste sorting system has been practiced for a long time, but for the CIS countries waste recycling is a new and not entirely studied trend.

In developed countries, the attitude to waste sorting is brought up from an early age, an appropriate culture of behavior, consumption has been developed, the infrastructure for special container systems for sorting waste is organically integrated not only into urban reality, but also in household use in the form of built-in sections. European countries occupy high positions in terms of environmental friendliness of the territory, with only 1% of non-recycled waste.

European countries have been moving towards the practice of sorting solid waste for about 30 years. The experience of countries such as Sweden and Japan demonstrates the benchmark and vector of development. So, Sweden is so successful in the field of waste recycling that it even makes money on waste disposal, importing it from other countries. In Sweden, 99% of household waste is recycled. This is one of the highest rates in the world. At the same time, almost half of the waste in the country is incinerated – but only after careful sorting. Plastics, paper, food waste are used for processing or biogas production. The distribution of waste work in Sweden is as follows:

- recyclable – 50.6%,
- burned for energy production – 48.6%,
- sent to landfills – 0.8% (Rousta K., Ekström K.M., 2013) .

Turning to the Kazakh practice, we have the following figures: the total volume of accumulated solid waste in Kazakhstan is already about 100 million tons, while an average of 5-6 million tons is generated annually. According to experts' calculations, by 2025 this figure can grow to 8 million tons per year of formation. At the same time, the bulk of this waste is disposed of at landfills without additional processing, without neutralization. The rates of accumulation of solid household waste per capita by regions vary from 80 to more than 400 kg per year (When will the "garbage" business in Kazakhstan, 2020).

There is one law on waste processing in the country – the Law "On disposal of industrial waste and other waste in the Republic of Kazakhstan". Penalties apply for non-compliance with this law. During the quarantine period, many problems became more pronounced: people began to produce more waste, while cleaning the territories was carried out in a regular mode. In this regard, the Ministry of Ecology, Geology and Natural Resources was forced to toughen fines for exceeding the standards

for emissions into the environment. On behalf of the head of state, the amount of the fine was increased to 20 MCI for individuals and up to 500 MCI for business entities (Fines for harming nature will be toughened in Kazakhstan, 2020)

In large cities of Kazakhstan, there are special bins for sorting food and solid household waste (MSW), orange containers are installed for sorting plastic, glass and iron. There are also collection points for waste paper, glass and electronic waste.

However, despite the measures taken, waste sorting in Kazakhstan is ineffective largely due to the lack of environmental education. The most pronounced manifestations of environmental ignorance are manifested as follows:

a) People do not use special waste bins for sorting garbage. not particularly aware of their operational differentiation;

b) In addition to the fact that there are not enough collection points for secondary raw materials, many townspeople do not know about their existence;

c) Local townspeople are currently at the initial stage of developing a culture of sorting garbage and for them material interest is extremely important at this stage. However, local points offer fairly low waste rates. For example, 1 kg of waste paper is estimated at 20-30 tenge (this is about 0.05-0.07 dollars per kg.), Which does not even allow to cover travel on public transport, if the collection point is far away.

Thus, we can say that the population of Kazakhstan is not yet ready to move to a new stage in the development of the ecosystem.

Materials and methods

Both qualitative and quantitative methods of analysis were used to analyze the improvement in the efficiency of the waste sorting system in Kazakhstan.

The analysis used methods such as:

• marketing research – a survey of the population of the city of Almaty was carried out;

• system analysis – a review of incentive programs in other countries was made, on the basis of which a motivational program of activities was proposed;

• comparative analysis – an analysis of the performance indicators of the waste sorting system in other countries is presented.

The online survey was conducted among Almaty residents aged 18-55 using the Google Forms platform from November 25 to December 25, 2020. The sample consisted of 940 people, the survey consisted of 6 questions, among which there were questions of both open and closed types.

The survey included questions about awareness in the use of waste sorting infrastructure, about the experience of interaction with local companies for the collection of recyclable materials and, in general, about the public's concern about environmental problems associated with increased consumption, mass of waste

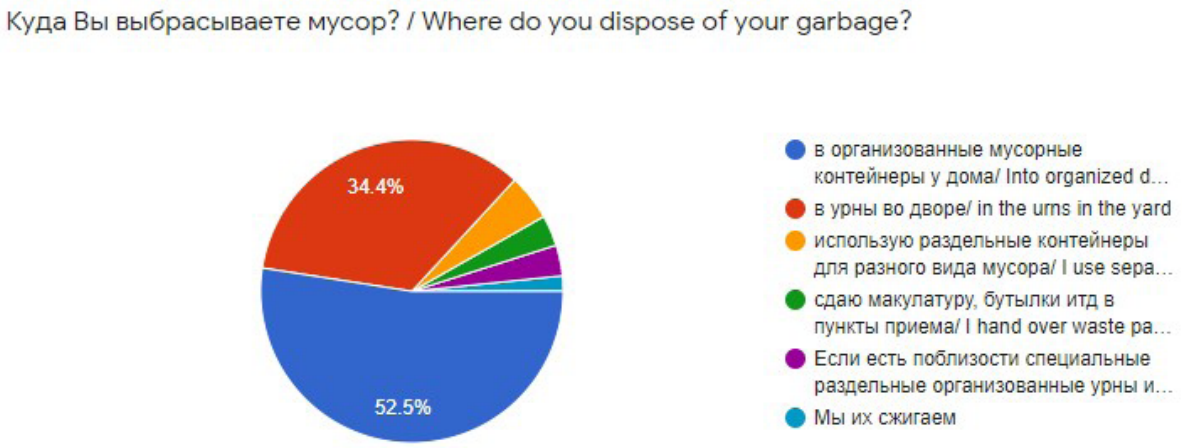

Figure 1 – Waste collection methods in Kazakhstan based on survey data (compiled by the author)

During the survey, the following results were obtained:

• 84.5% of respondents do not use the practice of separate collection and sorting of waste;

• 48.9% of respondents are not aware, do not know what types of special waste containers for what type of recyclable materials are intended;

• 56.3% of respondents have never handed over recyclable materials to specialized collection points for recyclable materials (see Figure 2).

Thus, the survey revealed extremely low indicators of environmental education in Almaty, which is one of the most developed cities in the country.

Picture 2 – Frequency of recyclable materials delivery by Kazakhstani citizens to specialized waste recycling centers (compiled by the author)

Systematic and comparative analyzes made it possible to present the processed information in the form of a consolidated table as a comprehensive program to motivate the population to separate waste collection.

Literature review

Garbage is a great resource in the wrong place lacking someone's imagination to recycle it into everyone's benefit (Hansen 2015). Waste problems attract the global attention among conservationists, scientists and common citizens.

Waste can mean many things to different people Some people, in most of them developed economies, consider garbage as an additional way to obtain new resources, energy, and income. And other people, mainly in developing countries, see garbage as an urgent problem that needs to be addressed. (Moore, 2012). The level of education and awareness of effective waste management practices is essential in this gap (Milea, 2009; O'Connell, 2011).

The next in priority of the existing reasons for the increase in waste in public places can be considered the lack of effective penalties, as well as the lack of social pressure and responsibility (Al-Khatib et al., 2009).

An irrelevant priority in solving waste sorting problems is the convenience of garbage cans – if there are none, then there is no garbage sorting, respectively (Henry et al., 2006).

The fact of the persistent habit of throwing garbage on the streets, which is generated by the lack of ecological culture in society, cannot be excluded from the reasons, which is why in such societies it is so difficult and long to change consumer behavior and remove this habit from everyday life (Yusif and Scott, 2007).

According to Tucker (Tucker, P., 2001), Barr (Barr S., 2002) and Madden et al. (Madden, T.J., 1992), behavioral aspects such as intention are critical to effective waste separation activities. Scientists also highlight factors such as motivation, cultural aspects. (Weinreich, P., 2009).

A major obstacle in the developing world is the lack of awareness of effective waste management practices. This low awareness generates a lack of interest and initiative in waste management (Bolaane, 2006). Indifference to environmental issues creates a culture of non-participation of the entire community in effective decision-making processes (Poswa, 2001).

Researchers widely recognize the need to raise public awareness of waste sorting and recycling in order to form ecological citizenship in the world (Lumbreras Martín and Fernández Garca, 2014).

As O'Connell (O'Connell, 2011) has stated, attitudes towards disposal are strongly influenced by "knowing where, when and how to dispose of." Research from more than twenty-two developing countries (Guerrero et al., 2013) shows that when citizens are motivated, aware of the benefits of recycling and how to sort waste, they participate in recycling campaigns. Social norms also play an important role in shaping behavioral characteristics when participating in processing activities. People are more likely to recycle when they regularly observe similar processes in the community, which is why it is so important to reach out to local opinion leaders to change negative environmental behavior (O'Connell, 2011).

According to EPA (EPA, 2015), waste minimization is the process of eliminating and reducing the mass of waste generated in a society, which helps eliminate the generation of harmful and waste, while supporting efforts to create a more sustainable society. Waste minimization involves recycling products and / or changing social patterns of consumption and production to prevent waste generation.

Discussion and Results

After analyzing the experience of advanced countries in teaching people to separate waste collection, the authors propose a motivation program for consideration (see Table 1).

Table 1 – The program of motivating the population of Kazakhstan for separate waste collection (compiled by the author)

Type of event	Name of event	Description	Market participants involved
Image and educational events	championships / marathons in sport garbage collection	a competition in which students, social activists, employees of oil industry enterprises and environmental organizations take part	Corporate foundations that are organizers of port marathons in cities (for example, «Almaty Marathon»)
	Learning application	Explanatory application based on frequently used as an additional section	2gis, Onay, CityBus, Kaspi.kz etc
	Outdoor advertising	Explanatory posters, billboards, posters under the auspices of state social advertising	Places of mass gathering: metro, bus stops, shopping centers, etc.
Events at Sales Points	Repair, acceptance of outdated, outdated equipment	Provision of discounts on goods on a funded system, provision of services for the repair of equipment, exchange	Market leaders in the sale of electronics and household appliances, points for repair, processing.
	Installation of devices for receiving batteries and light bulbs	Provision of discounts for goods on a funded system	Market leaders in the sale of electronics and household appliances.
Events at Sales Points	Acceptance from buyers of leftover building materials, paint	Provision of discounts for goods on a funded system	Points of organized sale of building materials
	Acceptance of old shoes in exchange for discount coupons	Cooperation with charitable organizations, second-hand organizations, orphanages, rubber waste recycling plants for the production of coatings for stadiums, courts and playgrounds, providing discounts on goods through a funded system	Shoe stores, chain stores
	Reduce the sale of plastic bags by at least 50% with the sale of reusable shopping bags	When buying goods over the indicated amount, a reusable shopping bag is a gift	Retail network

Continuation of table 1

Type of event	Name of event	Description	Market participants involved
Activities for organizing space for sorting garbage at home	Selling a convenient stylish low-cost multi-compartment waste storage system	Sale, accompanied by an active introductory advertising campaign, taking into account government support for the use of multi-section waste collection systems	Zeta, specialized points of sale by storage systems
	Built-in space in the kitchen for organizing separate waste collection	Planning, kitchen design, taking into account the built-in space for organizing separate waste collection	Furniture manufacturing, assembly companies, design schools, developers
Activities in school, preschool institutions	Introduction of the compulsory subject «Garbage processing»	Introducing children to the basics of environmental education from an early age	Kindergartens, schools, preparatory courses

These measures are proposed to be considered as a whole, since individually, each of them is only fragmentary measures that are not highly effective individually, while a set of measures can have a systemic effect.

The proposed image, educational events (championships and applications), of course, should have a resonant effect, which is valid for some time, but immediately after which specific product solutions should be proposed that encourage consumers to take immediate action, i.e. consolidate the obtained image effect in practice ... These include events in different segments of consumer markets. For each of the proposed activities in points of sale, the key motivating factor is the introduction of a discount / bonus accumulation system. To implement this system, you may need either a separately allocated bonus card linked to the application, or any valid bonus cards in specific retail chains – participants in the incentive program.

The authors propose to fix the following pilot values as the main threshold values for bonuses / points:

- for 1 kg of plastic or paper – 600 points per card
- 1 kg of glass – 150 points
- 1 kg of metal – 700 points

At the end of the reporting period, points are converted into bonuses that can be used for purchases in retail chains participating in the incentive program. When transferring to bonuses: 100 points = 10 tenge. This bonus scheme may be considered a test one and will change depending on the results of the pilot period.

According to a survey conducted by the author, more than 60% of respondents would use such a motivation system (see Fig. 3).

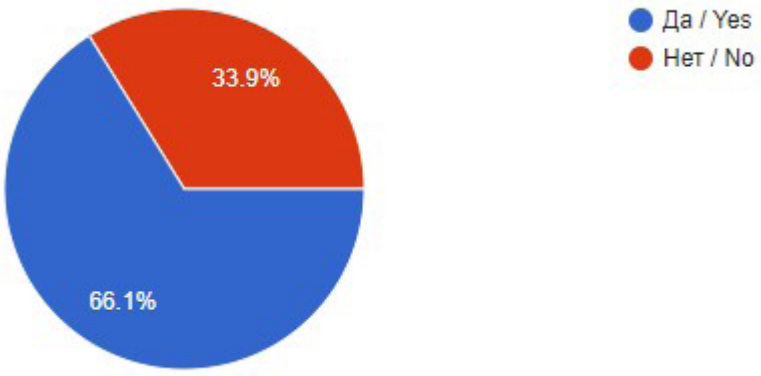

Figure 3 – Willingness of residents of Almaty to participate in the bonus campaign upon delivery of recyclable materials (compiled by the author)

Thus, we can state the fact that the local population is optimistic about motivational programs, and the initiatives already introduced can provide a good basis for progress in solving the problem of separate waste collection. But the main problems to this day remain the low awareness of citizens in the issue of environmental education. With a systematic approach to this issue, the effective involvement of market participants, the state and citizens themselves, this problem, taking into account the experience of other countries, can be solved in a faster time frame and turned into resources.

Conclusion

The current waste situation in Kazakhstan should be seen not as a problem, but as an opportunity. If a culture of waste sorting is systematically fostered in people, this will generally change the culture of society. Through integrated systemic holistic programs, a habit of separate waste collection should be formed in society. These factors are paramount, but their implementation requires patient step-by-step implementation of all the classic success factors of project management and social marketing. Of course, the state should support such projects, otherwise the full effect cannot be expected. It is necessary to conduct image and educational events, actions on a regular basis, but always with the subsequent support of proactive events involving the maximum number of business participants.

At this intermediate stage, it is necessary to encourage as much as possible, everywhere continue to introduce the practice of abandoning disposable bags in stores and switch to reusable fabric bags and bags, as well as all citizens to switch to conscious consumption with the correct presentation of opinion leaders, introducing this trend into the rank of fashion trends.

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The perspective of US foreign policy rebooting towards South America and Central Asia

In this article we analyze the US-Latin American and US- Central Asian relations in terms of policy reorientation within the contemporary foreign policy analyses (FPA), evoking the conceptual and normative appeal, as they determine an unconventional approach to FPA onto Latin America Central Asia and the US.

We research the cycle of US foreign policy towards Latin America and Central Asia with the accent on sheer policy comparison of US-Latin American and Central Asian leaders, their decision-making and implementation mechanisms.

In accordance with the methodology, by replacing the deductivism into the inductivism, this approach allow us to research more rigorous comparative policies of the US foreign policies starting from the Cold War till present days and US foreign policy starting from the collapse of USSR. Connecting with the studies of foreign policy and international relations, we examine how Latin American leaders and Central Asian made vigorous impact onto the US foreign policy that gradually influenced the US behavior and changed the hemispheric relations and polarity.

Key words: US-Latin American and US-Central Asian foreign policy, USSR, CIS, Eurasia, Central Asia, NAFTA, OAS, Eurasian Economic Union, Monroe Doctrine, BRICS, good neighbor policy.

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АҚШ-тың сыртқы саясатын Оңтүстік Америка мен Орталық Азияға бағыттау перспективасы

Бұл мақалада біз АҚШ-тың Латын Америкасы мен Орталық Азияға деген көзқарасын АҚШ-тың сыртқы саясатының саяси талдауы шеңберінде концептуалды және нормативті зерттеу моделіне сүйене отырып қайта бағдарлау саясаты тұрғысынан талдаймыз, өйткені АҚШ Латын Америкасы мен Орталық Азиядағы сыртқы саясатын талдауында дәстүрлі емес тәсілді анықтайды. Біз Латын Америкасы мен Орталық Азияға қатысты АҚШ-тың сыртқы саясатының циклын американдық, ортаазиялық және латынамерикалық көшбасшылардың сыртқы саяси мақсаттарын, олардың басқару шешімдерін жүзеге асыру механизмі мен әдістерін салыстыруға баса назар аудара отырып зерттейміз.

Зерттеу әдіснамасына сәйкес, стратегияның дедуктивті моделі индуктивизмге біртіндеп айналды және бұл тәсіл қырғи қабақ соғысты, КСРО-ның күйреуінен бастап бүгінгі күнге дейінгі АҚШ-тың сыртқы саясатының салыстырмалы саясатын тереңірек түсінуге мүмкіндік береді.

АҚШ-тың сыртқы саясатының әдістері және Латын Америкасы мен Орталық Азиямен халықаралық қатынастар туралы зерттеулеріміздің шеңберінде біз Латын Америкасы көшбасшыларының талдауын, сондай-ақ олардың АҚШ-тың сыртқы саясатына әсер ету динамикасын қарастырамыз. Латын Америкасы мен Орталық Азияға қатысты АҚШ-тың мінез-құлқындағы өзгерістер оңтүстік жарты шардың полярлық жүйесін қайта бағалауға серпін берді.

Түйін сөздер: АҚШ-тың сыртқы саясаты, Орталық Азия және Латын Америкасы, ЕАЭС, Еуразия, НАФТА, ОАГ, КСРО, Монро доктринасы, БРИКС, тату көршілік саясаты.

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Перспектива перезагрузки внешней политики США на Южную Америку и Центральную Азию

В этой статье мы анализируем отношения США к странам Латинской Америки и Центральной Азии с точки зрения ее политики переориентации в рамках политического анализа внешней политики США, основываясь на концептуальной и нормативной модели исследования, поскольку они определяют нетрадиционный подход к анализу внешней политики США в Латинской Америке и Центральной Азии. Мы исследуем цикл внешней политики США в отношении Латинской Америки и Центральной Азии с акцентом на сравнение внешнеполитических целей американских, центральноазиатских и латиноамериканских лидеров, их механизм и методы реализации управленческих решений.

В соответствии с методологией исследования, дедуктивная модель стратегии плавно перешла в индуктивизм, и этот подход позволяет нам понять более глубоко сравнительную политику внешней политики США начиная с анализа холодной войны, развала СССР и до наших дней.

В рамках исследований методов внешней политики и международных отношений США к Латинской Америке и Центральной Азии мы рассматриваем анализ латиноамериканских лидеров, а также динамику их воздействия на внешнюю политику США, которая постепенно оказала значительное влияние и изменение на поведение США в сторону Латинской Америки и Центральной Азии, тем самым дала импульс на переоценку системы полярности южного полушария.

Ключевые слова: внешняя политика США, Центральная Азия и Латинская Америки, ЕАЭС, Евразия, НАФТА, ОАГ, СССР, доктрина Монро, БРИКС, политика добрососедства.

Introduction

Major geopolitical transformations and internal rapid dynamics are currently setting the world political stage for a possible increase of great power competition either in Central Asia and Latin America between the United States of America, Russia and China.

Central Asia and Latin American –are two regions that would play an inevitable part in the US foreign policy as those macro-regions have the power to harness the world politics, security and advance Russian and China's interests graciously, which would defeat the US hegemony entirely. And in order to adapt these possible changes the US is trying to reboot its foreign policy trajectory to bring Washington's ambitions both in Central Asia and Latin American region into better alignment. There might be a question- why Latin America and Central Asia? What are the common interests between such completely different and outlying regions? The answer is that these regions have lots of things in common either in politics, economics and security that make great impact on the US sustainable prosperity and maintaining balance in the world order.

If we refer to history, Latin American region was always taken for granted, except when it reached the boiling point; Latin America from broader economic terms is a region that keeps the balance for a decent growth in the foreseeable future that gives a huge opportunity for the US trade and exports. The US has more free trade partners in this region if to compare with other countries in the world. As Latin America keeps on gradually rising in global prominence, like Brazil, Colombia, Argentina and Mexico are becoming increasingly valuable and influential strategic partners in most of the US organizations, Summits and even in UN on-the-ground efforts. And the Latin American's dominance continues to be a prominent player in setting the US commercial and trade agenda in the world.

As for Central Asia, the US still continues on being a glide path, as Central Asia is a good gateway to Afghanistan. From its strategic calculus Central Asia is a region that gradually moving by a different trajectory that step-by-step loosen its bonds with the Euro-Atlantic community and increases the impact of China's and Russian importance in Central Asia. And in the years to come Russian and China might become major economic and political powers in this region, which would mean a very hard -hitting position for the US ambitions and lead to decline the US presence in and influence over this region. Advancing the US priorities in Latin American and Central Asian regions will require significant changes in the US foreign policy. If to refer to world history, we can notice that the US foreign policy towards Central Asia and Latin America has overcome several strategic phases that completely made changes and reshaped political worldview and attitude towards these regions. Once from peripheral interest these regions turned into one that made great influence in the US political strategy and the whole ideology and geopolitical orientation.

Before evaluation of certain aspects of economic and political relations between North and South America as well as Central Asia, it may be essential to outline that the North – South relations start with the decolonization after World War II. The new states that had obtained their independences considered themselves to be totally disadvantaged within the international system. The huge gap between North and South have been widened in recent decades, with more people living in absolute poorness than ever before, the interest of the North in so-called "Third World" has been decreased drastically, and in accordance with the Organization for Economic Cooperation and Development (OECD) the country shrunk to a mere 0,22% of gross national product (GNP) by the end of 90's. At the same time some scientists dispute that globalization and liberalization gave new opportunities for the South to develop new investments, technologies as well as new expertise.

In 1949, US President Truman in his inaugural address mentioned that they would continue to give unfaltering support to the United Nations and

continues to search for ways to strengthen their authorities and increase their effectiveness in order to utilize the benefits of modern technologies for the efficient development of the South, and outlining that this concept of fair trade between the countries would have nothing in common with the old imperialism of the European powers that exploited the colonies in the interest of foreign financiers.

The rising power of the anti-colonial actions of the South, and at the same time the diminishing power of the European imperialist states led to the fact that the South had achieved a milestone strategic importance between the United States and Soviet Union in the context of the Cold War – new interests towards former colonies. The Cold War period emerges to be distinctive between the US and Latin America as the ideological considerations acquired a priority over the US political and economic policies with Latin America. From 1940's till 1960's, in the design of the US policy onto the Latin American policy, the ideology played a great role in it. Jorge I. Dominguez outlines, "The victory and consolidation of the Cuban revolutionary government changed that. In its subsequent conduct of the key aspects of its policy towards Latin America, the US government often behaved as if it were under spell of ideological demons".

The ideological concept of the US foreign policy towards Latin America reached its climax during the presidency of Wilson Woodrow (28th president of the US, 1913-1921). During his presidency the systematic interventions to Mexico, Caribbean and Central American states marked the epoch of a long-term sustained relationships between the US and Latin American relations. Even when Bill Clinton (42nd president of the US, 1993-2001) was several times criticized for "Wilsionism" that resulted into wasteful overseas overthrows, and the subjection of the US foreign policy interests towards Latin American states. For example, those ideological motivations can be found in the US military interventions in Haiti (1994), Cuba (1990's).

The first US intervention into Latin American government was in Guatemala in 1954 during the Cold War. The reason was to protect the United Fruit Co. from further expropriation of property. And it paved the way to the next successful attempts to intervene the Dominican Republic in 1965, Grenada in 1983, Peru in 1968, and Panama in 1989 in order to safe the US economic interests and make safe for capitalism.

In comparison with Central Asian region, the US foreign policy was less harsh but made some allowances in geopolitical sphere. Since 1990-1994 the Central Asia's period of independence was traced by the following geopolitical benchmarks such as western political and economic models of reform as well as political security development. The US had been one of the leading suppliers for economic, political and social aids since its sovereignty. Basically, the US foreign policy interest contributed to the following priorities, such as:

1. Expansion of presence at region so that to consolidate the global leadership.

2. Unlock of natural resources by maintaining the guaranteed access to energy resources of Caspian region.

3. Influence on political and economic potential of Central Asia so that to implement the restraint of Russia, China and Iran, which are considered to be opponents to the US.

4. Development of Eurasian strategic transport corridor on gas and oil pipelines directions. The actual political gap alliance between the US and Uzbekistan in summer 2005 made some vivid changes in the US policy in Central Asia, as it led to expulsion of American military base from Uzbekistan and contributed to the growth of dominance of Russian and Chinese positions. Within these open confrontations the US managed simultaneously undertake several specific measures that resulted in a comprehensive reassessment of the strategic goals and priorities of the regional politics. In order to rehabilitate the situation the US administration decided to make step forward and assert its positions in Kyrgyzstan first, where they continued to keep their airbase in Manas; second, they got confirmation in support of the US actions towards Afghanistan in Tajikistan, and kept the coalition right to use the airspace of the country, and third, they started carrying out negotiations with Kazakhstan to expand cooperation in energy and natural resources. As a result a new policy concept of on Central Asia was developed, and its main ideological source was based upon the work of F. Starr "A Great Central Asia Partnership for Afghanistan and its neighbors". In this work he concluded that there was a new formation of a Great Central Asia as an economic and transport center and a self-determined subject of international affairs and acts as the "back yard" of the Russian Federation. In fact the US has set a large-scale and ambitious goal-to create an alternative integration project against the ones run by the Russian Federation in Central Asian region, to limit the role of China in Central Asia and to contribute to the formation of the "South and Central Asia" macro-region, where the US would be under control over Afghanistan and cooperation with New Delhi and Islamabad, and it would make significant

and possibly predominant influence. If to compare the ambiance of US foreign policy between Central Asian and South America, we could see the slight fleur of the same mannerism, hand- "act tough but with velvet gloves". For example, declaring the intentions of the US to render its assistance in integrating the Central Asian countries with each other and with the nearest neighbors by protecting the territorial integrity of independent state against the neo- imperialistic attitude of Russia, thereby trying to break the monopoly over the Central Asian pipeline and transit routes. The US by all means emphasized on turning their slight blind eye on mechanisms of multilateral military political and economic cooperation that had been already operating in this region. The primary focus was on breaking the dependency of Central Asian countries from Russia and simultaneously preventing the region from falling into Chinese influence. Moreover, the additional challenge for the US administration was the dynamic emerging rise of Islamism in that region, as it posed threats to the security and that obviously induced the US foreign policy to reconsider its political maneuver. Therefore, during Bill Clinton administration there were some successful attempts to curtail Russian pressure in the region. For example, through Talbot Doctrine, Clinton administration managed to bypass Russia and Iran dominance in the Caspian hydrocarbons and Baku-Tbilisi-Ceyhan pipeline transit. This action finally signaled Central Asia and Caspian to be the region of the US vital interests. However, we should notice that the Central Asian region was not of high priority in Clinton's foreign policy, and we can witness it in the policy of security and stability, which were slightly murky. In comparison with the policy of G.W. Bush administration right after September 9/11. The political trajectory towards Central Asia was completely renegotiated, and this region attained a central role as its geostrategic proximity with Afghanistan. The US continued the policy of the previous president in democratization and gradually Central Asia started the process of lending their military base to the US. As it has been mentioned before Bush administration being completely plunged into global struggle with war of terrorism made some strategic mistakes in terms of sustaining its flexibility in political relations with some of the Central Asian regions. The situation was complicated by the fact that gradually the US started to miss the free resources for Central Asian policy, the power was slipping through fingers, since they were occupied with consequences with Iraq, on top of it, the global economic crises was at the back of the pack. And all these facts resulted in lack of making decent contribution towards active foreign policy in Central Asia. The war in Afghanistan was getting worse Taliban were slowly weaving a web of intrigue and disseminating their power to Pakistan. Thus, even some of the outlying tribal territories of Pakistan were destabilized and became under control of Taliban.

However, the new administration of B. Obama later had to shift from Iraq to Afghanistan, as Talibans were increasingly spreading fear to the world security. The withdrawal of troops in Iraq was in priority in his policy as it could transfer all the available military resources to Afghanistan and Pakistan. The Obama administration did not want to step on the same rake as the pervious president had done it. First, B. Obama started to force rapprochement with such global actors as Russia, China and India. And it was quite vivid, as the European partners started to notice a slight cooling in relations with them. Whereby, the new administration was showing its sincere interest in renewing sustainable relations with key global partners (non-western) by maneuvering actively in Central Asian region. And the new era of reset of relations with Russia started, and it was quite important for Central Asian states as well. The new era of New Silk Road strategy of Obama administration through C5+1 strategy was smoothly in the process of implementation.

Literature review

There are a select few resources that address the crucial role in initiating key arguments and theories of the US foreign policy concepts towards Central Asia and Latin America throughout the article and played an important role in the final conclusion reached. In the essay by S.F. Starr "In defense of Greater central Asia", it is written that Central Asia may again become a pivotal one by developing its relations with the most outstanding world actors such as Russia, US and China, further providing with the cross-sectional and descriptive study analyses on each region of Central Asia and their impact on the US foreign policy. In the article of CABAR (Central Asian Bureau for Analytical Reporting) by A. Akmatalieva, it is emphasized that in the US Central Asia policy the rehabilitation of transatlantic relations will make great affect on the joint efforts of the US and EU to expand cooperation with Central Asia and diversify the economies of this region. The US Strategy for Central Asia 2019-2025 by Bureau for South and Central Asian Affairs provides the policy objectives on supporting and strengthening the sovereignty of Central Asian region, expanding and

maintaining support for stability in Afghanistan and finally promoting C5+1 Diplomatic platform. The US policy toward Central Asia 3.0 under Carnegy Endowment for international Peace written by E. Rumer, R. Sokolsky and P. Stronski gives detailed and open analyses on rebooting the US policy in security and the attainment of critical foreign policy on domestic and geopolitical trends of Central Asia, and their integration with Russia, China, Iran and Afghanistan.

In the book "Exciting the whirlpool-US Foreign Policy toward Latin America and the Caribbean", Robert A. Pastor provides essential views for examining Washington's relationship toward Latin American region and explains the vantage analysis of the influence of the post-Cold War phase of the international relations, its comparative analysis of the US national security and foreign policy concepts, ideological elements that dominated in both Americas. In the book "Latin America confronts the US, Asymmetry and Influence", Tom Long suggests a fresh look toward US-Latin American relations through the analysis of six countries and accentuating on the way how the Latin American leaders managed to change the power asymmetries to influence the US foreign policy. In the book "Latinos: Remarking America", Marcelo Suarez Orozco, Mariela Paez, describes the process of latinization, the drastic rise of migration flow that significantly reshaped the character of the US foreign policy. The brings different points of view on analyzing the pan-ethnic latino construct and the development of the latino identity within transnational relations on the context of US foreign policy actions. In the article "BRICS: A Challenge to the US Hegemony", Muhammad Adnan provides the analysis of the connotation of BRICS and two theoretical views on Neo-realism and Institutionalism, its liberal perspective and comparative analysis for BRICS and IBSA countries. In the article "Foreign Policy Analysis in Latin American Democracies: the case for a research protocol", Dawisson Belem Lopes, Carlos Aurelio Pimenta de Faria, Manoel Santos describe an alternative theoretical path in contemporary Latin American foreign policies, give the analysis of comparative politics and consequently new general theories on Latin American policies towards the US.

Of interest, there are the studies for our further comparative analysis – International Diplomacy working paper on "The Obama Administration and Latin America: Towards a New Partnership?" Daniel P. Erikson, № 46; Latin American Commission on Drugs and Democracy protocol, Rio de Janeiro; MERIDA Initiative report on "Drugs, Guns and Friends", Committee on force relations of the US; Aspenia online international forum on "Trumps America First" approach towards Latin America, Nicole Bilotta; Americas Global role e-newspaper article on "The wisdom of trying COVID-19 Humanitarian Assistance to Policy Objectives in Venezuela", Nicola Bilotta, Dr. Christopher Sebatini; Pew research center database on: 1.US-Mexico border wall, 2.lack of confidence of Latin American people in President Trump, 3. Positive views of the US down across most Latin American countries; Global American Campaign working group conclusions on "Recommendations for the US-Latin American and Caribbean Policy".

Research methodology

In this article we used cross-case comparison and synthesized the analyses of the US foreign policy and how leaders of Central Asia and Latin America made a great impact on the US behavior and the hemispheric relations and polarity based on their conceptualizations and strategies of foreign policy. There were used three analytical stages that structure the case studies of the article, such as: problem understanding; foreign policy goals and strategies; outcomes. During the research we used case and cross case analyses with its dynamics so that to examine the US tendency for reorientation towards Central Asia and Latin America. We also provided set of cases to study the influence of Central Asia and Latin America towards the gradual change of the US foreign policy behavior, hemispheric relations and polarity in world politics arena.

Discussion and results

The US foreign policy towards Latin America had been modified and gone through many phases-starting from the "Good Neighbor Policy" by Franklin Roosevelt (32nd president of the US, 1933-1945) proposed at the Pan-American Conference in Montevideo, Uruguay, that tended to establish a cooperative relationship with Latin America; second stage was during the Cold War between 1945-1989 which was more decisive in defining the concept of the current foreign policy. The sudden emergence of new blocks –superpowers such as the US and Soviet Union resulted in new conflicts of interests for domination of the polarity over the world political scene. Latin America was forced to choose between two camps and in accordance with the neoconservative expert Norman Podhoretz (1980, The Present Danger (New York: Simon and Schuster) to choose between US and

Soviet Union lifestyle, and it was a key contributor for further facilitation of political climate over the South. It's emblematic, but the end of the Second World War led the US smoothly into a new level of economic prosperity due to not having the advantage of waging those wars in their own territory that finally in 1945 reinforced the GDP for 35% and stock private investments for 50%. And Latin America's economy operated in close collaboration and under strong control with the US during that period of time.

The Pan-American system gradually turned into the Organization of American State (OAS), and some left political activists proclaimed it as the "The United States Ministry of Latin American Colonies'. This organization turned out to be one of the Washington's instrument projects over Latin America and Caribbean states. The OAS was a certain "message" to the Soviet Union – if by all means the Soviet Union would attack against of the states of the US, it would mean that they would attack all signatory countries. A very well thought –out move. Gradually the OAS turned out to be the deployment of the world the consensus between the elites of the US and Latin America against the communism. That was a short-lived period, most of the permanent councils of the OAS rose up against the US foreign policy within the organization, and such countries were as Peru, Ecuador (1960), during Falklands war (1982) and the intervention to Panama (1989). Finally by the end of the Cold war, the OAS fell into existential crises.

When the Soviet Union was collapsed, the OAS started to modify one of its pillars and commenced on concentrating the liberal values of democracy so that to ensure its credibility in front of the Latin American states. But it did not work and did not place the OAS onto the central stage as the way it was assigned before. And Washington started to facilitate the other roadmap of the OAS restructure adjustment in monopolizing the Latin American region through International Monetary Fund (IMF), World Bank and Inter-American Development Bank (IADB). Due to the fact that Washington was mostly preoccupied with the economic reforms and investments it did not intend to be influential or arbiter in cases of political conflicts in Latin American regions. For example, its voice did not count during the conflicts between Chile and Argentina (1984) or Peru and Ecuador (1998).

With the power of the left in 2000 in Latin America, the US lost its control over the Inter-American system. The left-wing government instantly started to build its muscles and weaken the influence of the OAS, as most them thought that the OAS is the same as the "Monroe Doctrine". The left reinforced the new process of regionalization that finally led to the founding of a new organization that could unite all the Latin American states into one union and gradually separate from the OAS. This organization was called as the Union of South American states (UNASUR, 2008). It was a very risky and challenging move. It included the issues concerning the political, economic and defense lines between the countries. It instantly started to intervene into the political conflicts and crises in Bolivia (2008), between Venezuela and Colombia (2010), Ecuador (2012), and Paraguay (2012), and the OAS was totally excluded from the mediation and negotiation control.

Right after UNASUR, there came the Community of Latin American and Caribbean States (CELAC, 2010). This community was dedicated to political cooperation and became the international platform for discussion between the region's states. The Community grew globally and there were several international meetings such as CELAC-Russia, CELAC-India, CELAC-European Union, CELAC -China and etc.

In 2015 the former minister of foreign affairs of Uruguay Luis Almagro (2010-2015), the representative of the left-wing government, by the support of the left and nomination of the president of Uruguay Jose Mujica (2010-2015), he was elected as the secretary-general of the OAS. After being officially assigned Luis Almagro gave a solemn promise to continue the path of independence. But he swiftly recast himself, changed the political trajectory, and started orchestrating the OAS's key initiatives that left a complex of negative legacy effects. It was vivid Luis Almagro was thoroughly working on returning the OAS under the auspices of the US. For example, in October 2019, there was an election in Bolivia, and the current president Evo Morales won the election in the first round (47,08%), leaving his rival Carlos Mesa with 10 % less votes (36,51%). According to the constitution of Bolivia when the candidate gets more than 40% of votes, it means his wins the first round election. But the OAS's electoral observations proclaimed some uncertainty in votes and did not allow Evo Morales to stave off a second round.

What was the reaction? At that point, protests burst into cities, setting fire and turning the city into turmoil and riots. As voters divided into two groups, those who were for the election to be fraud, the other to be fair. The opposition had been radicalized and Evo Morales had to go into exile under the threat of the army. The OAS could not prove its accusation of the election fraud in accordance with to the final report of Washington Center of Economic and Policy

Research (CEPR). Some weeks later the political theater continued its performance and Jeanine Anez (ex-interim president of Bolivia, 2019-2020) de facto announced support for the re-election of Luis Almagro for OAS. The re-election of Luis Almagro undoubtedly marks the return to the "Monroe Doctrine".

Now, we can see that OAS again got its domination and started to play favorably towards the US interests. And there is a question – if there is a positive and sustainable future for the US foreign policy reorientation towards Latin America? What to expect?

The US relations with Latin America during and after the Cold War exhibited important economic and political aspects for further better facilitation of the US policies. And there were more vivid positive outcomes rather than negative. Since the end of the Cold War, the US policy in Latin America re-established around the goals for promoting human rights protection, democracy and regional security. For example, over the years the US was successful in achieving its goals: Cuba reduced its criticism towards the US and improved cooperation; Colombian peace process support resulted in reduction of terrorist violence; and the Free Trade Agreement in 2012 encouraged the economic growth for both Americas. All these facts somehow improved the image of the US policy in front of the people of Latin American region. But for a short time the music played its song and the intentions for building the bridge of mutual understanding and beneficial cooperation were swiftly abrupt.

The election of the left leader – Hugo Chavez in Venezuela (1998) indicated the onset of new era for a politically difficult decade. The left leader of Venezuela consciously started to reject the US economic and political foreign policy towards the development of economic and social prosperity in Latin American region. They thought that OAS do not meet the requirements to their interests, blocks the region's ideological diversity and weakens the commitments to defend clear standards of institution to protect its democracy and socialism. The OAS was an obstacle for regional integration, and they created its own new institution – UNASUR, where they tried to withdraw the influence of OAS totally and made the hemispheric relations tenser. This was the situation when newly elected president of the US Barack Obama inherited from his predecessor. By the end of his presidency (2017) there were few critics regarding the policy towards Latin America and he left some prospects of tuneful relations between the US and Latin America.

If we refer to the past relationships between Americas, so we can find in the history that there were few moments when the US was a real partner, those were within trade openness of the region and economic development, international market integration before the outbreak of the World War I. However, Barack Obama came closer that his previous administrations in overcoming high tensions with Latin American region. This period was proclaimed as a honeymoon, the period that helped to revive the flagging relationships that were a total disenchantment during Bush administration.

Barack Obama's foreign policy to Latin America achieved some vivid beneficially good results. The first, to broaden the foreign policy environment, for example, frequent meeting within G20 (Argentina, Brazil, Mexico, Canada), diplomatic and prudent resurrect towards Cuba and Venezuela; second, when Obama softened the edges towards Cuba within a "war and drugs" policy (2008), Merida Initiatives (guns, drugs and friends) that provided military support to Mexico and rendered assistance in establishing internal security against guerilla in Colombia; third, immigration reforms.

Overall, the US has been always alert of foreign powers that interfered the Western hemisphere, and Latin America's growing international relations made the US be alert and keep the eyes peeled. For example, the frequent meetings with the Iranian president Mahmoud Ahmadinejad (2005-2013) with Venezuelan president Hugo Chavez (1999-2013), Brazil with its deepening ties with Russia, China and India (BRICS, 2006). Those actions were step by step challenging the US potential strength to reconsider their foreign policy and establish a new mild method for remaining Latin America off-limit to those powers; because in accordance with the data of International institute for strategic studies, the sales of Russian weapon to Latin America reached the top –US 5,4 billion in 2009 and the Iranian gradual meddling into Latin-American region also triggered the Obama administration into some latent tensions between Latin America, as the US did not want to accept their declining influence in the region. For example, as soon as Hugo Chavez was officially elected as the president of Venezuela, he swiftly started to pose himself as the most severe opponent to the US power. He rejected the US' historical leadership over the region and made efforts to create a new network of alliances independent of the US. His attempts to replace the IMF and the World Bank into the Latin American Banco del Sur, then to replace the FTAA into the Bolivarian Alternative for Latin America (ALBA), and finally to establish

news station Telesur as an alternative to the US news media sources.

If we talk about Brazil, we should mention that Brazil is the world's fifth largest region with its largest population and economy, and it was also willing to reform some of the global powers in the international arena, as it also wanted to be recognized either politically or economically as a part of the new hegemon. But unlike Venezuela, Brazil chose a very careful path so that to ensure that its pursuits would not open conflicts with the US. For example, the president of Brazil Lula Dilma Rousseff (2011-2016) and G.W. Bush, from a political point view had quite warm and steady relationships, as both accepted the fact that Brazil was and would be the relevant actor and voice of the Latin American region, and it was crucial for both to be on good foot. And Obama administration continued its good neighboring policy. The US-Brazil sustainable relations helped a lot in handling the tensions in Venezuela, Honduras, Colombia and Bolivia. Those relations were posing themselves as a vital engine in building delicate diplomacy with the region. The smooth emergence of a new hegemon- Brazil into the international political arena added some new dimensions to balancing the power between the US, Latin America, Russia and China. In conclusion, one must emphasize that during the Obama administration there were lots of pressing challenges confronted and he was repairing them and recalibrated its policy towards the Latin American region. The US rendered its support to lift Cuba's suspension from the OAS and called for restoration of democracy in Honduras. Overall, Obama remains as one of the best presidents that advanced the strategy for sustainable and issue-oriented foreign policy towards Latin America.

Donald Trump's foreign policy. In 2016 Donald Trump was officially proclaimed as the president of the US (2016-2020) with his clear "America First" strategy. And with his strategy it was quite obvious what political scenario he intended to implement and that Latin American region would not be in priority. Latin America's lack of strategic importance would not change under the Trump administration. If we refer to the late 80's and to the present, so we can notice that three essential pillars, such as free trade, democracy and security, comprised the US foreign policy toward Latin America. It was strongly supported either by the Republican presidents Ronald Reagan, G.H.W. Bush, G.W.Bush or Democrats as Bill Clinton and Barack Obama.

In accordance with the data survey of a Pew Research survey in 2015 there were 45% of Latin American people that did not support the policy of the Obama administration (1), and under the Trump administration the share drastically increased up to 70% (2). Even in Brazil, where Jair Bolsonaro vigorously praised the policy of Trump, the average confidence decreased from 69% in 2013 to 28% in 2020 (3). The low percentage was the result of Trump's aggressive course against Central American immigrants, for example, the construction of the wall on the border of Mexico, thereby, slowing down the immigration to the US, the reset of free trade agreement, or alleviation of China's power in Latin American region, and finally maintaining political and economic pressure on Bolivia, Venezuela, Nicaragua and Cuba.

Moreover, the Trump administration put on pause most of the aid, for example for Honduras, El Salvador and Guatemala with the view to stopping the flow of immigrants and asylum-seekers, while the Obama administration tried to promote more economic and political support to those regions. D. Trump's foreign policy maintained very strict rules and tightened restrictions against Venezuela and vigorously supported an interim (self-proclaimed) president of Venezuela Juan Guaido in 2019. But the US Democratic Transition in Venezuela failed due to inefficient coordination of multilateral support at that time, such as rejection of support for Oslo Dialogue or International Contact Group (ICG) led by the EU.

The pressure on Cuba had totally reversed B. Obama's warm welcome to Havana. With his restriction on travel and trade between the US and Cuba led to political and economic disaster, that thereby resulted onto a great strategic mistake, as Cuba changed its vector into China and Russia.

In conclusion, analyzing the foreign policy of D. Trump towards Latin America one should notice that the Monroe Doctrine was back again and the four years of D. Trump's presidency driven by "America First" strategy and approach definitely produced a worse outcome for Latin American region.

Joe Biden's foreign policy. Almost from the first day of his presidency Joe Biden, 47th president of the US (2021 till present) showed his first tangible sign of changing the vector of the US' foreign policy towards Latin America. For example, he granted the Temporary Protected Status to Venezuelans because of the continuing humanitarian crises there. Venezuela and Cuba are still one of the complicated potential for the Biden administration to recover and restore the international cooperation with those regions due to a great mistake made by the previous president, as most the Latin American regions turn their eyes to China, Russia and Iran. Trump's popular concept for Latin America as a "Troika of tyranny" (Nicaragua,

Venezuela and Cuba) was a re-enactment to what was previously proposed by G.W. Bush as "axes of evil" (Iraq, Iran and North Korea) had significantly exacerbated the political climate between both America. But the Biden administration step by step catching up the Obama era policy towards Latin America and turning away a 180-degree the actions done by Trump. Now it is a watchful waiting moment to see what new administration is initiating to start with and what results to expect.

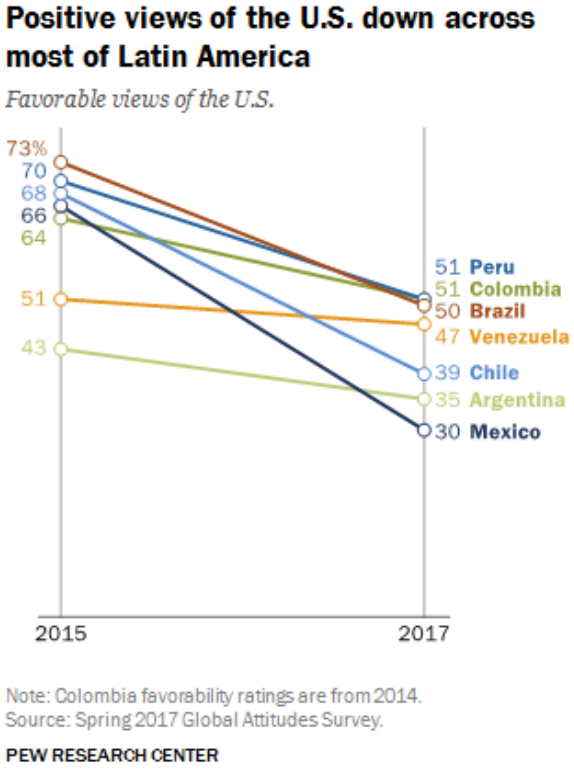

Figure 1

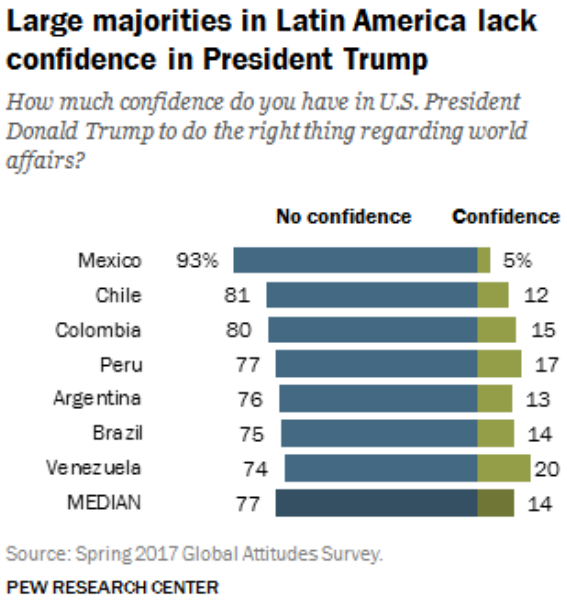

Figure 2

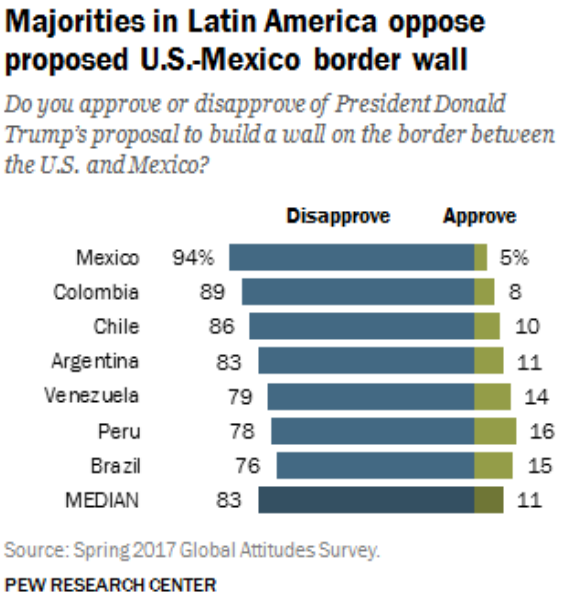

Figure 3

In regard to his strategies, some of his priorities in order to rehabilitate and recalibrate the foreign policy toward Latin America regions are: human rights in Latin America by defending the civic space and opposing the authoritarianism; playing a major role in humanitarian aid due to Covid-19 in Latin America; cooperation with Mexico in suspending a blueprint for "Remain in Mexico" and elimination humanitarian disaster caused by it; putting on pause the building the wall between the US and Mexican borders; negotiations with Venezuelan government regarding the re-establishment of humanitarian exemption which will ease Venezuela to revive the trade of crude oil, as well as the to review the Venezuelan sanctions; and re-engage the diplomacy with Cuba by reviewing the Article III of the Helms-Burton Act which was suspended in 1996 but then reactivated in 2019 by Trump.

Likewise in Latin America, Central Asia after disintegration of the USSR, the position of the US gradually became stronger in the region. After gaining the independence, the US started to implement active adjustments of relationships with Central Asia, as practically, Central Asia is an "Islamic arch" that goes through geostrategic countries as Russia, China, Afghanistan, Iran.

As it has already been mentioned the US was one among the first to welcome the sovereignty of Kazakhstan, Kyrgyzstan Turkmenistan, Tajikistan and Uzbekistan, and has contributed towards security support and economic development and their prosperity over the last recent decades. The US foreign policy has always admitted the fact that Central Asia is and will be a strategic and commercial partner, and a sustainable bridge between Europe and Asia. The primary strategic interest of the US is to make Central Asia be more prosperous, open to global markets and investments and build strong democratic institutions. And the US efforts to counter against terrorism, energy security support are basically provided the stability support of Central Asia, which resulted in enhancement of economy in the region (4).

For the last decades, the US has provided several billions of indirect assistance to support of security, economic growth and political stability through the World Bank, International Monetary Fund, European Bank of Reconstruction and Development and Asian Bank of Development so that to generate thousands of local jobs and enhancing human capacity (5).

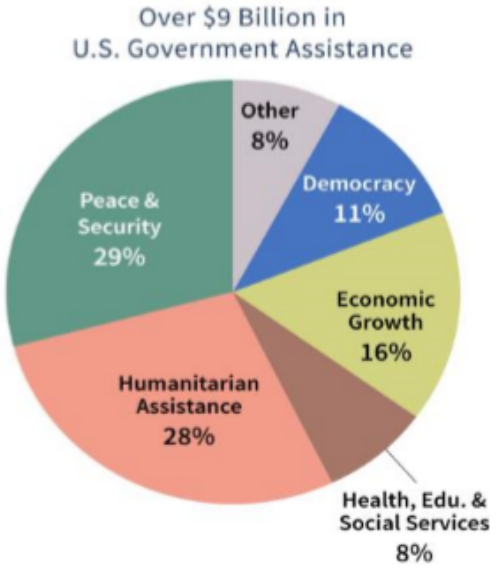

Figure 4

Figure 5

After the ratification of the US Strategy for Central Asia in 2015, the leaders in Central Asia started to make reforms in terms of intraregional connections i.e. deeper commitment in political and economic reforms through C5+1 platform. The Central Asia efforts to increase investments and attract the US business is dynamically developing and show the vivid interest to integrate not only in the region but beyond, as well as to comply with

the international norms. In accordance with these interests, the main vector of the US foreign policy is to reduce of economic and political presence of Russia in the region, and to discharge the influence from China and Iran as well, so that to create the nourishing conditions for the US to create balance and render economic and political assistance to Central Asian region.

Conclusion

It should be admitted that Latin America is and will remain the counterpart for the US region as well as Central Asia. As long as it is the world's largest economy with its most powerful military power and the source of so called "soft power". The Latin American region is and will be of considerable interest to the US, and what happens in Latin America really matters the US, it's like an invisible thin thread that connects two hemispheres tight, for example, Latin America still provides significant impact on labor market, investments and they are even able to influence on issues regarding climate change, pandemics and nuclear proliferation. The North and South America relations further will be shaped by global challenges either regional and sub-regional development and it is very difficult to describe in one simple paradigm, as they are multifaceted full of diversity and contradictions.

Latin American regions are experiencing transformations and now they are the regions that may be considered as a global interlocutor in terms of global context. The prosperity of the Latin American region is crucial to the US security stability. The era considering Latin America as the backyard or backstage of the US has been totally over. The cases of NAFTA, ALBA, MERCOSUR, UNASUR, BRICS, BRI- illustrate that Latin America to certain strategies influence the US foreign policy even thought the position of Latin American regions is much more weaker or as Tom Long noted asymmetrical relations. Even if we note the leaders of the Latin American region, we could see their constant attempt to demonstrate their ambitious political goals and partially they made the US foreign policy address the Latin American interests in the region.

For the Central Asian countries the inevitable part of the US Foreign Policy Strategy (2015) is the firm intention not to be outside the zone of strategic impact, in particular, it is spoken about the strengthening of power security of the US in delivering the power resources, as energy resources determine the value of international relations on the global and regional levels. The current security situation in central Asia is strongly defined by Western impact, which smoothly outlined two major players – US and EU through implementation of some political and military key instruments. It has been historically proven that the geostrategic position of Central Asian region was pivotal, as it is and will be a part of heartland exceptionless controlling the world order. Serving as an indispensible buffer zone for the Soviet Union, the region played a great role during the period of Cold War. After the collapse of the Soviet Union the US started to show their triumph claiming their position to be as a superpower and intensely began to implement the liberal world order in Central Asia. And the US adventure in this region started immediately with the policies of security and economic dominance. But the ill-informed implementations of the US foreign policy of all the previous presidents led Central Asian region turn into the influence of Russia, China and Iran. As we can see through SCO or Eurasian economic community. The reasons for the US failure either in Central Asia or Latin America were both political and structural, none of the foreign policies did not alienated both regions from two hegemonic actors such as Russia, China.

In this article I used cross-case comparison and synthesized the analyses of the US foreign policy and how leaders of Central Asia and Latin America made a great impact on the US behavior and change the hemispheric relations and polarity, moreover, most of the new policy goals are now adopted towards foreign policy towards Central Asia and Latin America. However, through comparison, we may examine that the weaker state is the more influence it can be in domestic and international political arenas, that finally structure a new hemisphere which advisable not be a stumbling block but rather a testing or laboratory bloc for developing successful economic patterns for the prosperity of global trading system between South and Central Asia and North and South Americas and remain the WTO (World Trade Organization) open, and to nurture trust and mutual understanding between confronted parties. The current US foreign policy in regards to the analyses done we can see that the goal of the policy is not just an improvement of quality life for Central Asian and Latin American people but to narrow the gaps that separates rich and poor people within the nations. If all the regions' leaders act valiantly, not for personal gain but greater good they can establish a sustainable model where all the industrialized and developing countries would try to emulate the greater ones.

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The logistics sector in Kazakstan: a swot analysis

Logistics plays a significant role in the change and enhancement of economic measures as well as to the growth of business around the world. The framework is important for incorporation of Kazakhstan's economy into the global transport economy. The favorable geographical location of Kazakhstan between Europe and Asia defines its major transit transport capacity and provides an excellent opportunity to serve as a transcontinental Eurasian bridge, providing Asian countries with a single land transport link to Europe and Russia. Kazakhstan needs to make every effort to develop an effective and technologically upgraded transport system to promote the accelerated delivery to the foreign market of domestic exports of goods. The globalization of international economic correlative enforce new stipulation on the effectiveness of transport and logistics substructure and determines the need to improve transport technologies and provide appropriate logistics services. This article aimed at testing the logistics sector in the Republic of Kazakhstan. With the purpose of accomplish this goal, this study carried out a qualitative analysis based on the lens from theory with reports, articles and information about the logistics sector. Research findings were derived from swot analysis that shows the main problems and perspectives of the logistics sector. The article ends with suggestions and recommendations to the logistic sector.

Key words: logistics, transport, literature review, economy, Swot analysis.

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Қазақстандағы логистика секторы: свот талдау

Логистика – экономикалық көрсеткіштерді өзгертуде және жақсартуда, сондай-ақ бүкіл әлем бойынша бизнесті дамытуда маңызды рөл атқаратын құралдардың бірі. Қазақстан экономикасының әлемдік экономикаға интеграциялануында көлік шаруашылығы маңызды рөл атқаратын жүйесі. Қазақстанның Еуропа мен Азия арасындағы тиімді географиялық жағдайы оның транзиттік тасымалдар саласындағы елеулі көліктік әлеуетін алдын ала айқындайды және Азия елдеріне Еуропа мен Ресеймен бірыңғай жерүсті көлік қатынасын қамтамасыз ететін Еуразиялық трансконтиненталдық көпір ретінде әрекет етуге тамаша мүмкіндік береді. Қазақстан отандық тауарларды жедел жеткізуге ықпал ететін тиімді және технологиялық жағынан жаңартылған көлік жүйесін құру үшін барлық күш-жігерін жұмсау қажет. Халықаралық экономикалық қатынастардың жаһандануы көлік-логистикалық инфрақұрылымның тиімділігіне жаңа талаптар қояды және көлік технологияларын жетілдіру мен тиісті логистикалық қызметтерді көрсету қажеттілігін анықтайды. Бұл мақала Қазақстан Республикасындағы логистика саласын талдауға бағытталған. Осы мақсатқа жету үшін бұл зерттеу теория мен логистикалық қызмет саласы туралы есептерге, мақалаларға және ақпаратқа негізделген сапалы талдау жүргізді. Зерттеудің нәтижелері логистикалық сектордың күшті, әлсіз жақтарын, мүмкіндіктері мен қауіптерін анықтайтын свот-талдау болып табылады. Мақала логистика саласы бойынша ұсыныстармен аяқталады.

Түйін сөздер: логистика, көлік, әдеби шолу, экономика, свот талдау.

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Логистический сектор Казахстана: swot-анализ

Логистика – один из инструментов, который играет важную роль в изменении и улучшении экономических показателей, а также в развитии бизнеса во всем мире. В интеграции экономики Казахстана в мировое хозяйство важную роль играет транспортная система. Выгодное географическое положение Казахстана между Европой

и Азией предопределяет ее значительный транспортный потенциал в области транзитных перевозок и дает прекрасную возможность выступить в качестве Евразийского трансконтинентального моста, обеспечивающего азиатским странам единое наземное транспортное сообщение с Европой и Россией. Казахстану необходимо создать эффективную и технологически обновленную транспортную систему, способствующую своевременной поставке отечественной продукции на зарубежные рынки. Глобализация международных экономических отношений предъявляет новые требования к эффективности транспортно-логистической инфраструктуры и определяет необходимость совершенствования транспортных технологий и предоставления соответствующих логистических услуг. Данная статья направлена на анализ логистического сектора в Республике Казахстан. Для достижения этой цели в данном исследовании был проведен качественный анализ, основанный на теории и на отчетах, статьях и информации о сфере логистических услуг. Результаты этого исследования представляют собой swot-анализ, выявивший проблемные вопросы и перспективные направления для сектора логистики. Статья заканчивается предложениями и рекомендациями для логистической отрасли.

Ключевые слова: логистика, транспорт, обзор литературы, экономика, Swot-анализ.

Introduction

Logistics plays a significant role in the change and enhancement of economic measures as well as to the growth of business around the world. The sector of logistics provides vital macro donations to national economy by creating employment, national income and foreign investment influx (Sezer & Abasiz, 2017; van Heeswijk, Mes, Schutten, & Zijm, 2020).

In the new period of the technological cycle and changes in global trends, modern society is facing fundamental changes in all areas of activity. The transport and logistics sector, thanks to its unique capabilities, has significantly increased the capabilities of its market, found new development prospects and explanation to many problems (Tijan, Aksentijević, Ivanić, & Jardas, 2019; van Heeswijk et al., 2020; Vivaldini, Pires, & Souza, 2012).

The world countries would like to integrate more actively for establishing a strong cooperation that helps to develop an effective transporting system. Such economic cooperation among countries fuel their bilateral interest (Orji, Kusi-Sarpong, Huang, & Vazquez-Brust, 2020; Sharapiyeva, Duissekul, Gulmira, & Zhanna, 2019).

Integrated transport and logistics infrastructure with the most unified elements. Such transit and logistics infrastructure must event the requirements of immense far and near and an acceptable level of organization and maintenance of supply channels.

The aim of this study is to analyze and discuss based on literature review the prospects and problems of transport and logistics services market development.

Methods and Material

The literature review is essential for all types of academic work (Webster & Watson, 2002). Moreover, it is with the literature review process that the knowledge base of theories and concepts about research in any area is developed. This article is a literature review about transport and logistics facilities in the Republic of Kazakhstan. In order to conduct this research, scientific works, scientific bibliographies of a theoretical and empirical nature were studied.

Literature Review

The transport and logistics service development is connected with logistics development, defined by phases and ways in which logistics approaches are applied. The evolution of logistics systems includes the following stages of development (Ballou, 2006):

– fragmentation (1920-1950);
– formation (1960-ies);
– development (1970s);
– integration (1980-1990).

The logistics development is interpreted from the point of view of consumption outsourcing, taking into account the dynamics of the development of operators of logistics services (Park,2013). Figure 1 shows the dynamics of increasing railway lines all over the world.

The industry has a variety of business models to choose from, but they are likely to overlap, and individual types are likely to operate on more than one model. In this note, we will look at logistics service providers (LSP), carriers, and courier / superexpress / parcel (CEP) companies. Yes postal operators are seen as majestic players in the context of logistics and CEP. Not so much the business models, but also the efficiency and difference are fundamentally different. Unlike other industries, the benefits in logistics are relatively small. Nevertheless, the EBIT margin is naturally swinging from -1% to 8%. While as whom carriers get close with a small profit, from time to time even if penniless, CEP's big brews become the most profitable group, reaching double-digit profits from time to time.

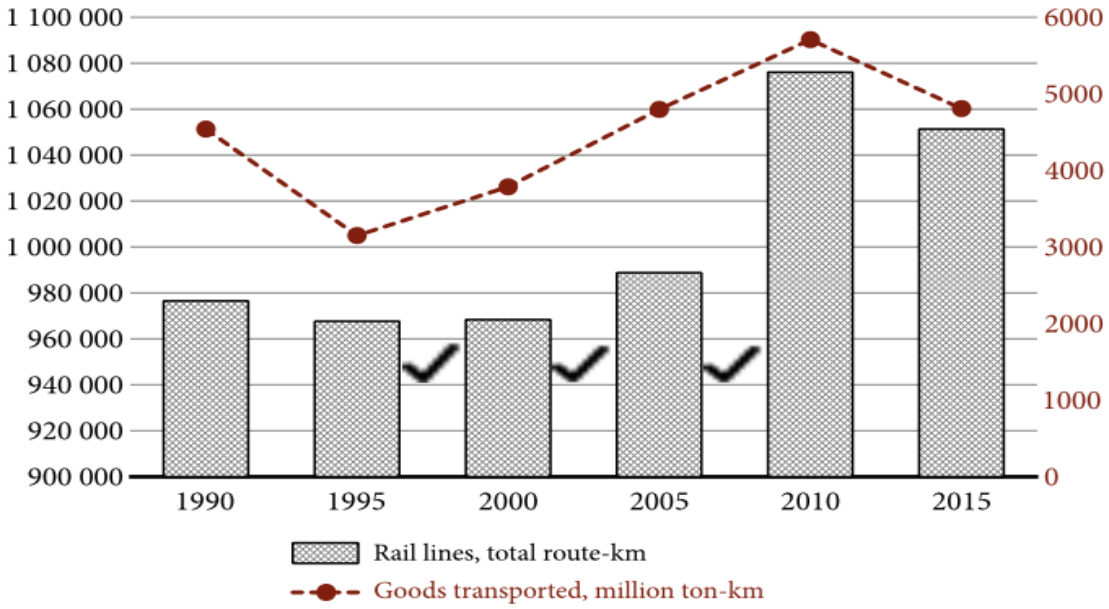

Figure 1 – Changes in the overall length of railway lines
and the worldwide amount of goods carried by rail between 2014 and 2019

The B2B and B2C parts are connected by customers in the logistics sector. Most of the corporate Bazaar can be combined with the B2B section, while the share of LSP and operators requires the largest portion of the industry's earnings. CEP transmits a smaller but rapidly progressing segment; and approximately thirty percent of CEP earnings can be directly attributed to the B2C section (Miščević, Tijan, Žgaljić, & Jardas, 2018).

Table 1 – Segmentation of customers and business models of the industry

Segment			Client
B2B	LSP	Freight forwarders, third-party logistics service providers	Freight forwarders, third-party logistics service providers
	carrier	Manufacturers, wholesalers and retailers	Manufacturers, wholesalers and retailers
	CEP	Cargo transportation, rail transportation, sea transportation and air transportation companies	Cargo transportation, rail transportation, sea transportation and air transportation companies
B2C	CEP	Logistics service provider	Logistics service provider

Constantly and indirectly, the role of items used in logistics infrastructure and during transporting affect creation of a universal transport and logistics services basket. The direct impact is reflected in the formation of new business efficiency segments in the field of motor transport and logistics, while the indirect impact is reflected in stimulating the growth of different configurations of entrepreneurship in different world forces (Yuen & Thai, 2017).

The requirements for the growth of entrepreneurship are focused on the continuity of the spectrum of services and the implementation of the organization's existing logistics methods. This evidence allows the multilateral evaluation of transport and logistics agreements for entrepreneurship growth to be carried out and can be used to perform research on the relationship. The review of the information given on the conditions of doing business in various countries provides the starting point for the decision to find out that they are paired with signs of the state of the infrastructure. The decision should emphasize that the state of the transport and logistics system

and the transport and logistics services sector is primarily a glorious moment and a guiding force in the major powers of the world for the growth of entrepreneurship. Despite the noble dynamics, in order to satisfy the universal demand for the transportation of goods, the current rate of growth of transport and logistics infrastructure is small. In the long run, the market for integrated logistics solutions is likely to grow, driven by brazhek's desire to outsource non-core functions to third parties (Erfurth & Bendul, 2017; López Navarro, 2013).

In 2010, the average length of railway lines and the amount of freight carried by this form of transport started to decrease. These patterns can be explained by a decline in traffic volumes in European countries and the United States, as well as by a rise in demand (Douet & Cappuccilli, 2011).

Logistics in Kazakhstan

The logistics market in Kazakhstan is highly competitive. The market has both major global players (DHL) and major local players with rich experience and reputation (Kazpost, Alem Tat, etc.). There are different kind of companies from Kazakhstan, some of them focus on low prices, and others companies that focus on a wide range of additional services and short delivery times. Thus, almost all the traditional niches of this market are filled. Companies are working to optimize their service portfolio, develop new areas, and reduce costs. Those, actively trying to beat the competition (Porter, 2005). Figure 2 presents a chart with the volume of postal and courier services in the last fourteen years.

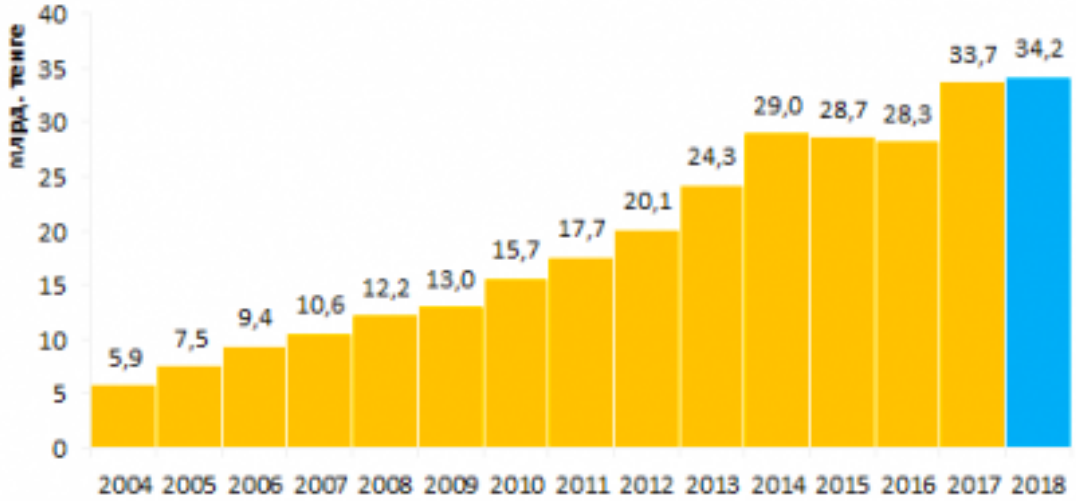

Figure 2 – Postal and postal service volumes in the Republic of Kazakhstan.

Logistics plays a majestic role in the country's growth within a large ideal economy. The creation of logistics is expected by almost many states to be one of the key points of stimulating the growth of the state economy. In turn, logistics can be an almost infinitely profitable sector. The excellent push of road logistics is estimated at 2.7 trillion us dollars, or about 7% of the world's GDP. The portion of road transport logistics in the educated countries accounts for 13-14% of GDP. As such, this lever appears to be a majestic source of state revenue.

Taking into account the share of GDP, Kazakhstan's leadership has repeatedly stressed that the production of road logistics is one of the most significant problems At the 25th World Foreign Investors' Full Conference, held under the auspices of the President, it was noted that Kazakhstan is preparing to become the largest temporary and logistics center in the area of Churkestan, emerging as a bridge between Europe and Asia.

For the years 2015-2019, the National Infrastructure Development Program Code 'Nurly Zhol' indicates that the construction of the Single National Economic Bazaar must, in fact, be introduced by areas of the State in order to build a more efficient infrastructure based on the Hub Concept to ensure Kazakhstan's long-term economic growth. The development of transport and logistics infrastructure by 'spoke' concept is one of the primary problems of the software code.

The Kazakhstan 2050 strategy focuses on the fact that the production of industrial road transport and logistics goods outside Kazakhstan's borders is one of the major monolithic developments in transport and logistics services. It is important to organize corporate enterprises in the region and in all parts of the world and to organize road transport and logistics centers in the primary temporary centers of the world.

Results

In order to present a reflection of logistics sector in Kazakhstan, Table 2 presents a SWOT analysis.

Table 2 – SWOT analysis of the logistics sector in Kazakhstan

Strength	Weakness
Strength/Strengths 1. The location of the government of the power and the commercial to improve road logistics 2. a Solemn question on Kazakhstan's raw materials and products for outdoor and indoor bazaars asks for optimization of road transport costs. 3. The recipe for external values of the EAIS customs clearance of goods will cause an increase in cargo flows and the development of road transport and warehouse logistics 4. the passion of the countries of China, Kyrgyzstan, Tajikistan and Uzbekistan in developing land corridors through Kazakhstan to assist the needs of developing logistics. 5. The supply of products for the intermodal transport asked the use of logistics 6. The existence of independent economic zones, which should improve the logistics 7. It is necessary to establish progressive transportation and logistics centers	1. Low level of logistics services 2. The shortage of end grids is deprived of work after the borders of Kazakhstan, which increases the costs for logistics of cargo finishing. 3. The disorder of logistics management 4. missing road transport warning between areas in the West-East direction, which increases the cost of logistics. 5. Low level of logistics usage for export, imported from other countries and temporary operations. 6. The lack of providers and third-party logistics providers in a large country, only distant, as in the regions 7. Low level of commercial interest in the development of public-private partnership in logistics
Opportunity	**Threat**
1. establishment of a National program code For developing logistics services in Kazakhstan. 2. The bonds establish a three-tier transportation and logistics centers 3. Increase the practice of creating transport and logistics centers beyond the borders of the country to reduce logistics costs (Seo, Dinwoodie, & Roe, 2015) 4. Actions in the area to attract export flows from Japan and the Republic of the Country of morning freshness through the terminal in Lianyungang 5. Foreign logistics operators' chain. 6/ Efforts are being made to develop transit air transport and establish a transit hub in Astana and Almaty. 7. introduce a special course «logistics» in universities.	1. An oversight of economic resources in order to create a vast network of transport and logistics centers and terminals, as in the country of Kazakhstan, similarly abroad. 2. short-term internal reserves for extracting loans in the field of logistics 3. Noble profitable bids for external economic resources 4. lack of interest of its own commercial in public-private partnerships in the field of logistics (Santén, 2017) 5. The probability of transporting goods between China and the EU inspection in Kazakhstan. 6. The location of the Russian Federation to improve personal logistics for the export-import of products with the use of domestic logistics operators logistics operators

Based on the SWOT analysis, based on strengths and weaknesses, threats and opportunities, as can be seen in Table 2, it can be understood that the development of a highly efficient transport and logistics system in Kazakhstan is dictated by the development of China's Western and Central Provinces, which have good rail transport opportunities through Kazakhstan.

As follows from the European experience, it is appropriate to organize a line of international logistics centers (dry ports) in Kazakhstan, and motor transport and logistics centers in places where temporary cargo flows occur and intersect. These hubs must be connected to Astana and transport and logistics centers by road, rail, and flight routes. In addition to radial routes, road transport and logistics centers must be connected by paths of regional and state significance.

Such dry ports are built in the west in the ports of Kuryk and Aktau and in the middle in Astana, focusing on the experiment of creating a dry port in the Khorgos FEZ – Oriental Gates. Such a system

will make it easier for internal logistics to develop and will increase exports. Ame! Ant. As a source in the Western, and similarly in the Eastern directions, import and transit stock. The internal transport and logistics network should be improved in addition to creating large international logistics centers. In the large towns transport and logistics centers should be built.

In the future, the capabilities of TLC will be merged in the field of «spokes» technology with the Central hub in Astana. The establishment and restoration of the 'Nurly Zhol' software code, which is costly between the main and regional TLCs, is scheduled for the purpose of unification until 2020. Regional TLCs will create a logistics infrastructure in which, distributed among smaller logistics centers created for storage, finishing and consolidation of products, one or another product will have every opportunity to exist.

Based on previous analysis about logistics in *Kazakhstan, we would recommend suggestions for the improvement and* development of the transport and logistics market.

- By establishing a well-functioning organization and controlling customs and technical procedures, find a way to coordinate the easy movement of products;
- Rationalize the samples available and the tariff policy
- Attracting and creating favorable conditions for major investors;
- Promotion of the legal structure for the transport of goods to the international transport of containers;
- Choose a balanced option for placing transport and logistics ensembles, taking into account the possibilities of developing the area and international transport corridors;
- Organize an enabling environment for the effective integration of the organization's transport and logistics services to international markets for road transport services.

Conclusion

This article aimed at analyzing the logistics sector in Kazakhstan. This study carried out a qualitative analysis based on the lens from theory with reports, articles and information about the logistics sector.

Based on our research, the internet not only brings a different image to all elements of the marketing suite, but also offers a new approach to potential customers in a very interesting, creative and cost-effective way.

Following facts can be identified:

- provide and create state support for the creation of an optimal and improved logistics system infrastructure;
- develop and improve logistics infrastructure in the country's regions;
- ensure efficient and optimal functioning of customs logistics;
- to reduce logistics costs in the supply chain;
- open courses in logistics at universities for the General mass of people;
-provide state funding to incorporate the transport and logistics infrastructure of Kazakhstan in the Euro-Asian transport and logistics system;
- to extend and develop the practice of the establishment of transport and logistics centers in the countries of origin of the main cargo flows;
- provide conditions to boost the competitiveness of the transportation and logistics system of the country;
- describe the company responsible for the production of logistics;
- We are persuaded, summing up the findings of the report, that the services market, as well as all types of activities at present, needs to use the latest formats of global trends.

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Simulation model of oil products transshipment in a seaport

The paper considers the problem of finding an optimal strategy for ordering railway tank cars for the export of oil products from the seaport terminal. Since the arrival of the ordered wagons is a random process that substantially impacts the costs of the cargo owner, it was decided to use the simulation modeling method to solve the problem. The paper provides an overview of methods and specific examples of simulation modeling for solving related problems in transport logistics. Particular attention is paid to the experience of using spreadsheets in the practice of simulation modeling. It is noted that a spreadsheet as a modeling tool has certain advantages over special packages for simulation modeling. The paper substantiates the decision to use the VBA language in the MS Excel environment to develop a model for the transshipment of oil products at the terminal in the seaport. The following details describe the stage of conceptual modeling, the stage of data preparation using distributions of random variables, and conducting experiments with the model. Five possible scenarios were investigated, which differ in the boundary conditions of the processes of the arrival of empty cars at the terminal. Based on the results of the study of these scenarios using statistical modeling methods, the requirements were developed that the cargo owner must impose on the railway in order to minimize the costs arising both from the delay of the vessel in the port and the idle time of wagons on the terminal territory.

Key words: Oil Products Transshipment, Marine Oil Terminal, Simulation, Spreadsheet.

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Теңіз портында мұнай өнімдерін ауыстырып тиеудің имитациялық моделі

Жұмыста теңіз портындағы терминалдан мұнай өнімдерін шығару үшін теміржол вагон-цистерналарына тапсырыс берудің оңтайлы стратегиясын іздеу міндеті қарастырылады. Тапсырыс берілген вагондарды қабылдау жүк иесінің шығындарына қатты әсер ететін кездейсоқ процесс болғандықтан, аталған мәселені шешу үшін имитациялық модельдеу әдісін қолдану туралы шешім қабылданды. Жұмыста көліктік логистиканың туыстық міндеттерін шешу үшін имитациялық модельдеуді қолданудың әдістері мен нақты мысалдарына шолу жасалады. Имитациялық модельдеу тәжірибесінде электрондық кестелерді қолдану тәжірибесіне ерекше назар аударылады. Электрондық кестелер модельдеу құралы ретінде арнайы имитациялық модельдеу пакеттерімен салыстырғанда белгілі бір артықшылықтарға ие екендігі атап өтіледі. Жұмыста теңіз портындағы терминалда мұнай өнімдерін ауыстырып тиеу моделін жасау үшін MS Excel ортасында VBA бағдарламалау тілін қолдану туралы шешім негізделеді. Ары қарай тұжырымдамалық модельдеу кезеңі, кездейсоқ шамалардың үлестірілуін қолдана отырып мәліметтерді дайындау кезеңі және модельмен эксперименттер жүргізу кезеңі толығымен сипатталады. Терминалға шекаралық шарттарымен ерекшеленетін бос вагондардың түсу процестерінің бес мүмкін сценарийі зерттелді. Осы сценарийлерді статистикалық модельдеу әдістерімен зерттеу нәтижелері негізінде жүк иесі кеменің портта кідіруінен, сондай-ақ терминалдың аумағында вагондардың тұрып қалуынан туындайтын шығындарды азайту мақсатында темір жолға көрсетуге тиіс талаптар әзірленді.

Түйін сөздер: мұнай өнімдерін ауыстырып тиеу, теңіз мұнай терминалы, имитациялық модельдеу, электрондық кестелер.

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Имитационная модель перевалки нефтепродуктов в морском порту

В работе рассматривается задача поиска оптимальной стратегии заказа железнодорожных вагонов-цистерн для вывоза нефтепродуктов из терминала в морском порту. Так как поступление заказанных вагонов является случайным процессом, оказывающим сильное влияние на затраты владельца груза, было принято решение о применении метода имитационного моделирования для решения поставленной задачи. В работе приводится обзор методов и конкретных примеров применения имитационного моделирования для решения

родственных задач транспортной логистики. Особое внимание уделяется опыту применения электронных таблиц в практике имитационного моделирования. Отмечается, что электронные таблицы, как инструмент для моделирования, обладают определёнными преимуществами по сравнению со специальными пакетами имитационного моделирования. В работе обосновывается решение о применении языка программирования VBA в среде MS Excel для разработки модели перевалки нефтепродуктов на терминале в морском порту. Далее подробно описываются этап концептуального моделирования, этап подготовки данных с использованием распределений случайных величин и этап проведения экспериментов с моделью. Были исследованы пять возможных сценариев, которые отличаются граничными условиями процессов поступления порожних вагонов на терминал. На основании результатов исследования этих сценариев методами статистического моделирования были разработаны требования, которые владелец груза должен предъявлять железной дороге с целью минимизации затрат, возникающих как из-за задержки судна в порту, так и простоя вагонов на территории терминала.

Ключевые слова: перевалка нефтепродуктов, морской нефтяной терминал, имитационное моделирование, электронные таблицы.

Introduction

The object of research in this work is the transshipment process of oil products at the seaport. The product is delivered to the port by tank ships and departs from the port by rail loaded into the tank cars. Intermediate storage of the product at the terminal is carried out using storage tanks. From the point of view of modern logistics, such an object is at the lowest level of the hierarchy, all other levels of which can be represented as follows:

- supply chain,
- mixed, intermodal, and multimodal transportation,
- points of cargo transshipment,
- seaport terminals,
- sea terminals for transshipment of liquid cargo.

The natural desire to find the most favorable conditions for the operation of a particular terminal, subject to specific conditions and constraints of both technical and economic nature, led to the decision to use simulation modeling. Approximate deterministic calculations using the process parameters' average values do not give results sufficient for making justified decisions since the actual process is non-stationary. Besides, the dynamics of the process are strongly influenced by random factors.

Simulation modeling has long been considered the most effective tool for investigating processes at all the above supply chain hierarchy levels. In the late 90s, LLamasoft specialists introduced the concept of the Four Step Approach, the essence of which is the combination of simulation and optimization technologies to solve strategic problems of supply chain planning (Hicks, 1999). The basic principles of this approach are used by LLamasoft in the Supply Chain Guru (Chwif et al., 2002). Today this approach has been further developed within the most advanced supply chain modeling package, anyLogistix (anyLogistix, 2021). The vast majority of supply chain simulation models are developed within the framework of the discrete event paradigm. However, there are also regular works that describe models based on the principles of system dynamics. The background and experience of this highly abstract supply chain modeling practice are detailed in (Campuzano et al., 2011). An example of a study of a specific multimodal transport system can be seen in (Pérez-Lespier, 2013). In recent years, the agent approach has also been applied to modeling supply chains since participants in the supply chain can often be represented as agents with their own individual goals and rules (Borshchev, 2013).

Current practice and prospects for the application of simulation modeling in the Ports and Maritime Industry are described by (Zarzuelo et al., 2019). The authors note, in particular, that Flexsim/ FlexTerm, Simio, ARENA, PortOPS, CHESSCON, Enterprise Dynamics, and ProModel packages are most often used to create such models. Cargo transshipment processes are most often modeled for ports where container terminals operate (Roşca et al., 2013; Lee et al., 2014). The experience of modeling the processes of oil transportation through seaports is reported in (Carotenuto et al., 2014). The authors of (Widjaja et al., 2019) use simulation modeling to identify the advantages and disadvantages of investment options in various types of oil terminal infrastructure in the port.

Summarizing the review, it should be pointed out that each project related to the application of simulation modeling involves the development of a new specific model, which is specifically designed to study only one particular object. Universal simulation models do not exist and impossible in principle, just as there is no universal photograph of a man or a woman: all photographs are absolutely individual. In the following section the procedure for deciding on a method for modeling processes will be considered in a situation where the model developer knows

well the logic and statistics of the functioning of a real system, but has no experience with commercial modeling packages. The main part of this work contains a description of the methods for preparing experiments with the developed model and analyzing the results of these experiments.

Material and Methods

Reasoning behind the selection of the modeling method

In the case where simulation modeling is applied to support a large and expensive project related, for example, to the reconstruction of an oil terminal or the analysis of a complex supply network, the project manager will turn to specialists who have a positive experience in developing such models. Professionals are known to use the generic modeling packages noted above (Zarzuelo et al., 2019) most often. Typically, these packages are an expensive commodity. In addition, even after learning the principles of working with the package, a novice user will not be able to develop models at a professional level for several months or even years. In the case of planning a relatively small simulation project, it makes no sense for the client to turn to a professional, since he or she will not agree to work for a small fee, and the client will not want to pay a hefty fee for a small project.

An alternative to commercial modeling packages is the use of MS Excel spreadsheets. This method of developing models has long been discussed by experts (Seila, 2006). There is a well-known group of commercial products that use MS Excel as a basis and are designed for risk assessment using the Monte Carlo method (Schriber, 2009). The most common packages are @RISK, Crystal Ball, Risk Analyzer and ModelRisk. There are works that use spreadsheets to model supply chains (Sezen et al., 2007; George et al., 2014).

The fundamental question is whether the VBA programming language is used when developing a model in an MS Excel environment. Working with analytical models using the Monte Carlo method, one can often use only formulas, since these models are static, that is, they do not reflect the development of the process in time. Models of some simple inventory management systems in the form of dynamic models can also be created without the use of VBA. The evolution of the process in time in such models is displayed in the form of a table, in which each row corresponds to one step Δt of the model time. In the case of using the VBA language, almost all restrictions on the complexity of the model are removed, but the model in this case does not qualify as "spreadsheet simulation", since the spreadsheet itself is used only as worksheets for data input and output.

The following section describes the experience of creating a simulation model, in which exactly the last of the above methods of applying a spreadsheet is used. The model of the transshipment process of oil products at the seaport terminal is implemented using the VBA language in the MS Excel environment. In the table showing the dynamics of the modeled process, each row corresponds to one day of the real process, and this row shows data on the state of all elements of the modeled system at the end of the current day.

Results and Discussion

Conceptual model of the transshipment process of oil products at the port

Exactly once a month a tank ship comes to the port with 20,000 tons of product on board. The ultimate goal of transshipment is to ship the entire product volume using rail tank cars. One wagon has a capacity of 65 tons, so 308 wagons are required to ship the entire volume of the product. In practice, in this port, on average, 308 wagons are loaded. If it is possible to form a complete railway train, then it consists of 50 wagons, which can accommodate 3250 tons of product. If on some day it is not possible to form a full railway train, then 5-20 wagons can be sent on that day. A special feature of the oil terminal is the presence of storage tanks, into which the product is loaded when there are no empty wagons. The temporary storage of the product is carried out in these tanks, after which the product is loaded into the wagons. Figure 1 shows a material flow diagram corresponding to the process described above.

More complex is the process diagram demonstrated in Figure 2, which shows six operations (processes) and four storages. The first gateway of the "parallel" type indicates that the vessel can be unloaded both in the direction "tank ship → tank cars" and "tank ship → storage tanks". Simultaneously, the main direction of transshipment of the product is the direction "tank ship → tank cars", and the speed of transportation of the product from the vessel is about 200 tons per hour. At this speed, the ship is unloaded in 100 hours, that is, in 4.17 days of continuous operation. The second and third gateways of the "parallel" type indicate that in the presence of empty wagons, transshipment can be carried out both in the direction of "tank ship → tank cars" and "storage tanks → tank cars".

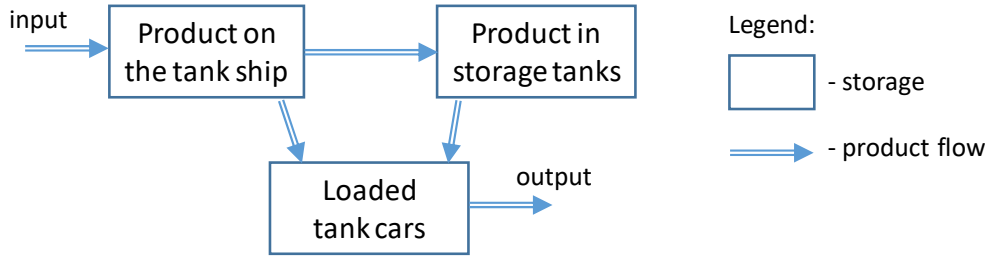

Figure 1 – Material flow diagram

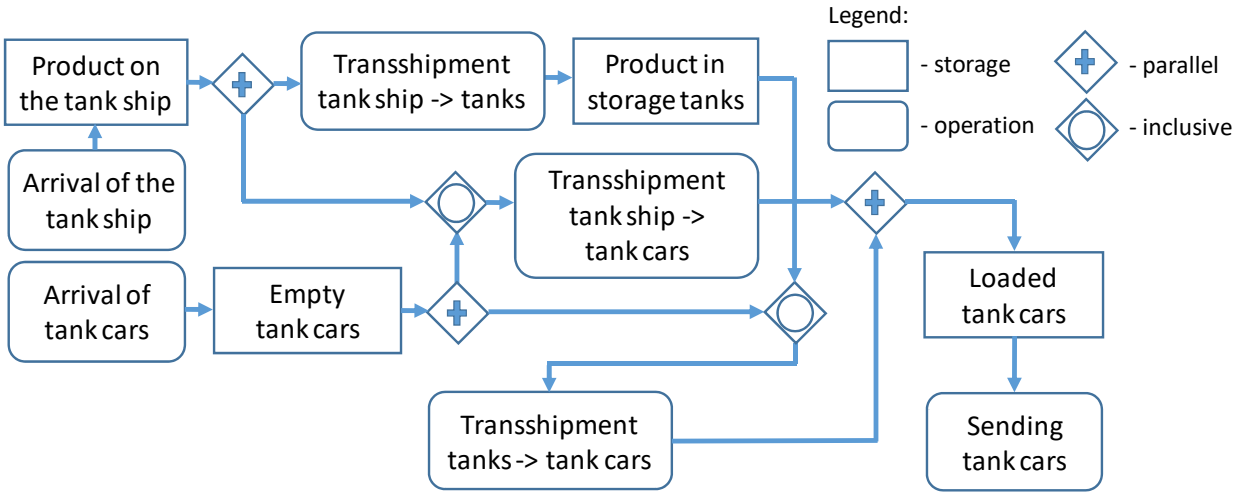

Figure 2 – Process flow diagram

The main problems in the terminal's operation are related to the process of receiving empty wagons. If there are few such wagons during the unloading time of the vessel, then there will be an excess idle time of the vessel. The standard anchorage time of the vessel is 5 days, and for each day in excess of the standard day, the owner of the cargo must pay 20,000 euro. With a large number of wagons that are awaiting the arrival of the ship or cannot be dispatched from the terminal for other reasons, the fee for the time spent by the wagons on the terminal territory increases. If the duration of the arrival process of all 308 cars exceeds 30 days, costs will rise due to the excess time of using the storage tanks.

Additional features of the processes of arrival and departure of wagons are as follows:

- empty wagons arrive at the terminal in a random manner in groups of 5-20 wagons;
- the first 200 wagons, i. e. 13,000 tons of product, are usually shipped using four trains of 50 wagons, and the remaining 108 wagons in groups of 5-20 wagons per day;
- no more than one train with a product quantity of 3250 tons is loaded per day;
- if continuous loading of the first four trains is not ensured, then a situation may arise when, due to the lack of free capacity in the tanks, the process of unloading the vessel is interrupted.

The cargo owner knows the scheduled date of arrival of the vessel. Proceeding from this, he or she orders from the railway the first day of the arrival of empty wagons. At the same time, the cargo owner tries to take into account the risks associated with the uncertainty of the process of receiving empty wagons. The ideal option for him is when at least 50 wagons per day will be available in the first four days of unloading the ship, but he or she cannot order wagons "much in advance" because of the increased payment for the time spent by the wagons at the terminal.

The main goal of building a simulation model is to give the cargo owner the opportunity to estimate the costs arising from the implementation of various hypotheses describing the random processes of

the arrival of empty wagons on the territory of the terminal. It is also assumed that, on the basis of such estimates, he or she will be able to form requirements for the railway, containing quite definite restrictions on the random process of the arrival of cars at the terminal.

Description of the arrival process of tank cars using randomized parameters

Figure 3 shows a graphical model of the process of arriving empty cars at the terminal, during the development of which it was assumed that the user could set the minimum and maximum values for three random parameters that determine the process of arriving empty wagons:

- the time that will elapse from the arrival of the first batch of wagons until the arrival of the vessel;
- the duration of the arrival process of the first 200 wagons;
- the duration of the arrival process of the remaining 108 wagons.

The lines at levels 1 and 2 demonstrate two options for the start of the arrival of the first 200 wagons, which are especially important for the cargo owner. For each of these options, two options for the end of the arrival of wagons are marked, assuming that the arrival of 200 wagons can last 10 or 12 days. Four lines numbered from 3 to 6 show the options for the arrival of the remaining 108 cars, while they start at four points on the time axis, which correspond to the moments of the end of the arrival of the first 200 cars. It is assumed that the arrival of 108 wagons can take from 12 to 14 days. Thus, Figure 3 as an example shows two options for the start of the arrival of wagons 10 and 7 days before the arrival of the vessel and eight options for the possible end of the arrival of all 308 wagons. All this information taken together is one of the possible scenarios for the arrival of empty cars at the terminal. The developed simulation model offers the user a means to describe and investigate such scenarios.

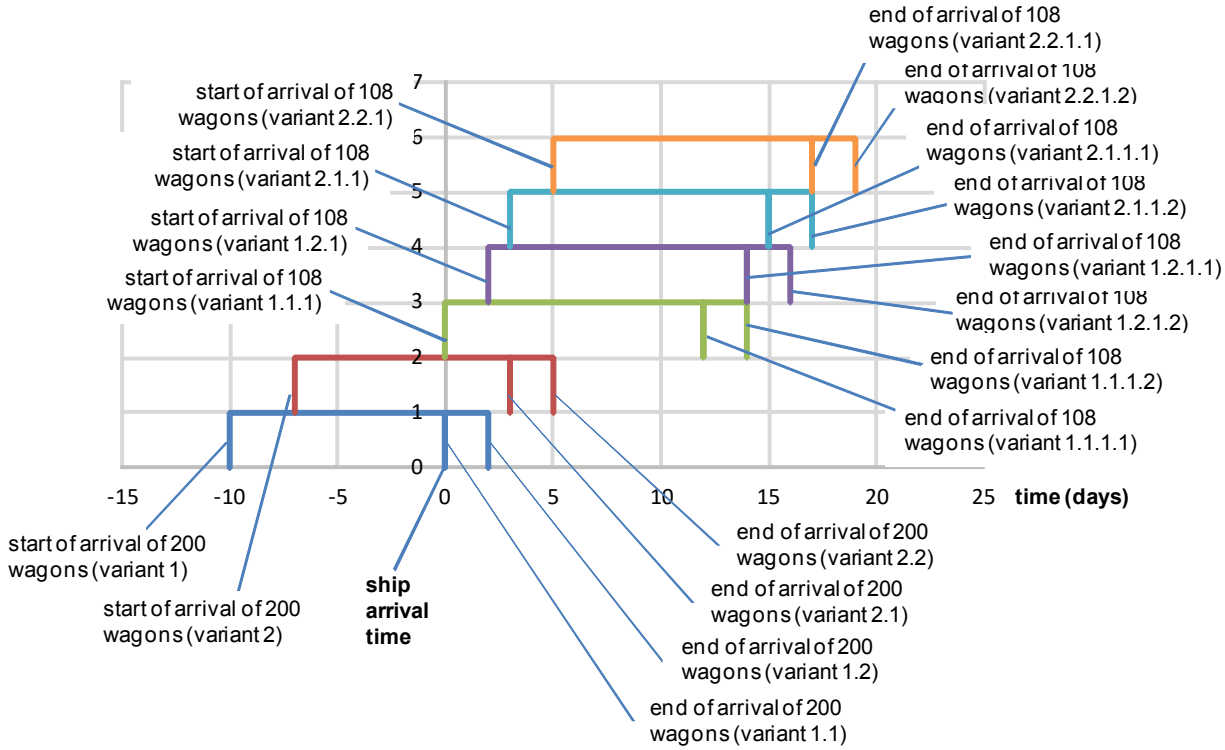

Figure 3 – A scenario of the empty tank cars arrival process at the terminal

In the developed model, all moments of time and duration of processes are played out as random variables with given distribution laws. The time points shown in Figure 3 are examples of input data that are used as boundary values when assigning distribution laws for the above three random input parameters of the model.

When choosing a distribution law, the user is offered graphs of the distribution density of distribution laws well known from probability theory

(see Figure 4). The numerical values of the argument in these graphs do not matter, since they only illustrate the shape of the distribution density. A feature of the method for describing a specific distribution is the refusal to specify the usual distribution parameters, for example, the mathematical expectation and standard deviation for a normal distribution. When describing each random input parameter of the model, the user sets three values:

- *bottom* – the minimum value of the parameter (lower limit);
- *upper* – the maximum value of the parameter (upper bound);
- *distr* – number of the distribution law (number from 1 to 7; number 1 means using a constant).

For example, in case *bottom* – 7, *upper* – 10 and *distr* = 2, the generator will produce uniformly distributed integers in the range [7; 10]. In the case of *bottom* – 10, *upper* – 14 and *distr* – 3, the integers will correspond approximately to a normal distribution with mean equal to 12.

This method of setting random parameters of the model is a direct support for the user, whose task is to study how the mode of arrival of cars at the terminal affects the indicators of costs during product transshipment. Also, when formulating the requirements for the railway, the terms “no earlier than” and “no later than” should be used, which correspond to the boundary values of the specified time intervals. Figure 5 shows an example of a table for inputting initial data, in which the numerical values of the parameters correspond to the scenario of the arrival of cars shown in Figure 3.

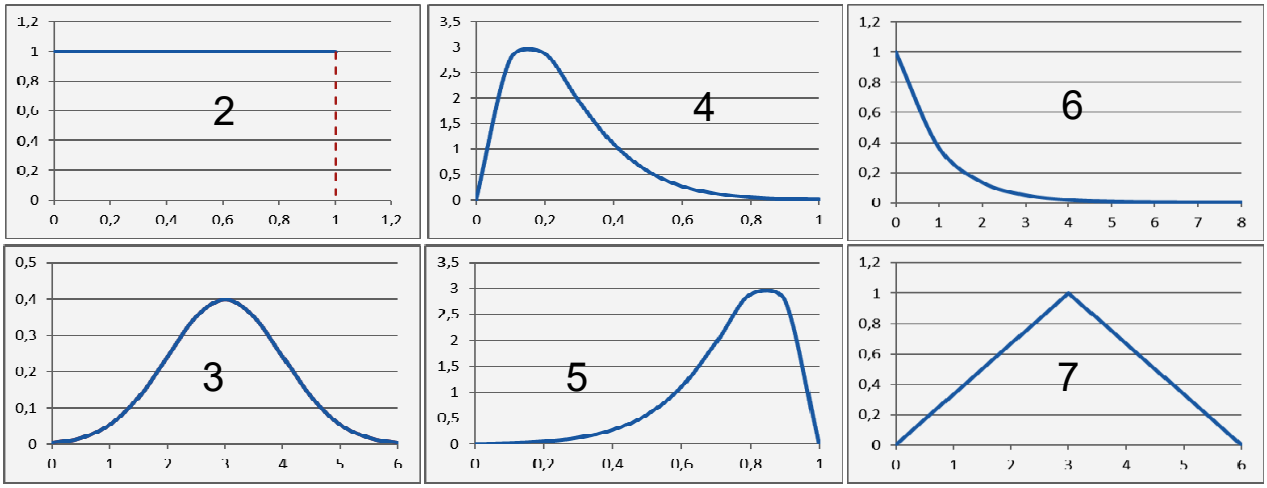

Figure 4 – Distribution laws used when entering initial data

Random parameters

Parameter number	Parameter	Unit of measure-ments	Bottom bound	Upper bound	Distribution law type
1	time from the arrival of the 1st batch of wagons to the arrival of the ship	days	7	10	2
2	duration of the arrival process of the first 200 wagons	days	10	12	2
3	duration of the arrival process of the remaining 108 wagons	days	10	14	2

Figure 5 – Table for entering the initial data of the process scenario

Analysis of the primary simulation results

The primary simulation results are the data that the model shows at the end of one run. In the model under consideration, the run corresponds to the process of unloading one vessel. During the run, all events and processes that are described in the above conceptual model are modeled:

- the accumulation of empty wagons before the arrival of the vessel and the arrival of the remaining wagons after the arrival of the vessel;
- arrival of the vessel;
- unloading of the vessel and transshipment of the product in the directions "tank ship → tank cars" and "tank ship → storage tanks";
- transshipment of the product in the direction of "storage tanks → tank cars";
- formation and dispatch of complete trains of 50 cars and groups of 5-20 cars.

The model uses a fixed time step $\Delta t = 1$ day. The basic principle of the model is that for each time step, the values of the internal variables of the model are calculated, each of which corresponds to a column in the table shown in Figure 6. Each row of the table corresponds to one day of the terminal's operation, while the data in a row of the table reflects a situation that piled up at the terminal at the end of the simulated day.

Model run

Day number	Wagons arrived per day	Wagons arrived total	Wagons sent per day	Wagons sent total	Remaining wagons at the terminal	Product quantity on the vessel (tons)	Product quantity in storage tanks (tons)	Product quantity in wagons (tons)	Product quantity sent per day (tons)	Product quantity sent total (tons)
1	25	25	0	0	25	0	0	0	0	0
2	19	44	0	0	44	0	0	0	0	0
3	17	61	0	0	61	0	0	0	0	0
4	19	80	0	0	80	0	0	0	0	0
5	13	93	0	0	93	0	0	0	0	0
6	21	114	0	0	114	0	0	0	0	0
7	18	132	0	0	132	0	0	0	0	0
8	22	154	0	0	154	20020	0	0	0	0
9	26	180	50	50	130	15220	0	4800	3250	3250
10	16	196	50	100	96	10420	0	9600	3250	6500
11	4	200	50	150	50	5620	1400	13000	3250	9750
12	8	208	50	200	8	820	5680	13520	3250	13000
13	6	214	14	214	0	0	6110	13910	910	13910
14	10	224	10	224	0	0	5460	14560	650	14560
15	7	231	7	231	0	0	5005	15015	455	15015
16	11	242	11	242	0	0	4290	15730	715	15730
17	8	250	8	250	0	0	3770	16250	520	16250
18	14	264	14	264	0	0	2860	17160	910	17160
19	10	274	10	274	0	0	2210	17810	650	17810
20	7	281	7	281	0	0	1755	18265	455	18265
21	12	293	12	293	0	0	975	19045	780	19045
22	13	306	13	306	0	0	130	19890	845	19890
23	2	308	2	308	0	0	0	20020	130	20020

Figure 6 – Primary model run results

Figures 6 and 7 show the results of one of the random runs of the model. The terminal operation lasted 23 days. Figures 7a and 7b show that the first 25 wagons arrived at the terminal 7 days before the arrival of the ship. The ship arrived on day = 8, since it was on this day that 20,020 tons of product on the ship appeared in the table. On the day of the ship's arrival, the number of wagons was 154. On day = 9, the unloading of the ship and the dispatch of wagons began. On days with numbers 9, 10, 11 and 12, 50 wagons were sent from the terminal. In recent days, starting from day = 14, the schedules of arriving and departing cars merge, since as many cars are sent per day as were received. For this reason, Figure 7b shows the number of wagons for this time period as 0, as this chart shows the number of wagons remaining in the terminal at the end of the day. Figure 7c shows the dynamics of product inventories on board and in tanks. It can be seen that the amount of product in the tanks peaked at 6,110 tons in day = 13. The "Product sent" graph shows the total quantity of product sent from the terminal area. The main sign of the error-free operation of the model is the fact that this quantity reaches the value of 20,020 tons, that

is, the amount that was delivered to the terminal on the ship. This check is one of the points of the model verification procedure.

Based on the data demonstrated in Figure 6, all the cost indicators described in the conceptual model are calculated at the end of each simulation run. The most important indicators are the payment for the excess delay of the vessel in the port and for the time spent by the wagons on the territory of the terminal. Since the excess vessel delay is an exceedingly rare event in all considered scenarios, during the experiments with the model, only the probability of this event was estimated. In the following, the application of the statistical modeling method to study the second of the two main indicators is described: payments for the time spent by cars on the territory of the terminal.

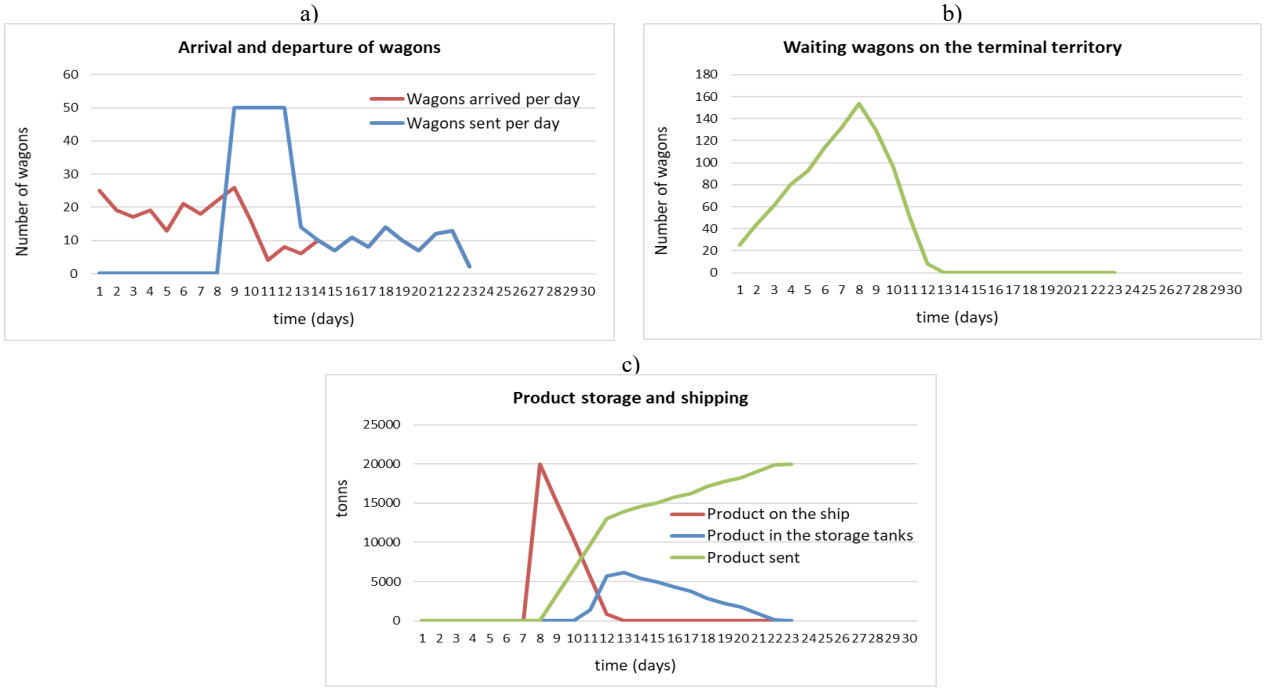

Figure 7 – Process diagrams in a single scenario model

Analysis of the results of statistical modeling of five scenarios

The scenario described in Figure 3 is referred to as Scenario 1. The results of one run of this scenario are shown in Figure 6. Since each implementation of the scenario shown in Figure 6 is a non-stationary random process with a limited duration, to obtain stable statistical results, run each the script was repeated 100 times. Figure 8 shows a histogram of the distribution of the "Tank cars demurrage fees" indicator for Scenario 1, obtained from 100 model runs. This histogram corresponds to a mean of €13,126 and a standard deviation of €2,281. From the data of the histogram, it follows that the possible values of the indicator lie in the range from €8,000 to €19,000.

The developed model was applied to study five scenarios, the initial data of which are shown in Figure 9. In accordance with the table shown in Figure 5, the boundaries of variation of three model parameters are introduced for each scenario. In the described experiment, only a uniform distribution law was applied for all three parameters, therefore the "Distribution law type" column is not shown in the table in Figure 9.

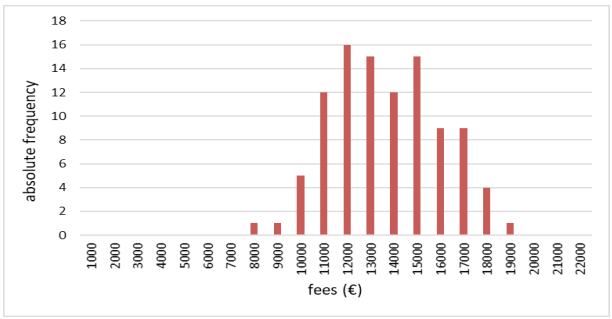

Figure 8 – Histogram of the distribution of the "Tank cars demurrage fees" indicator

Parameter number	Unit of measure-ments	Scenario 1		Scenario 2		Scenario 3		Scenario 4		Scenario 5	
		Bottom bound	Upper bound	Bottom bound	Upper bound	Bottom bound	Upper bound	Bottom bound	Upper bound	Bottom bound	Upper bound
1	days	7	10	5	8	6	9	5	8	3	6
2	days	10	12	10	12	10	12	10	12	10	12
3	days	10	14	10	14	10	14	8	12	10	14

Figure 9 – Simulation experiment plan

Each of the scenarios shown in Figure 9 was simulated 100 times. Figure 10 shows the statistical characteristics of the simulation results, for the graphical presentation of which a Box Plot is used.

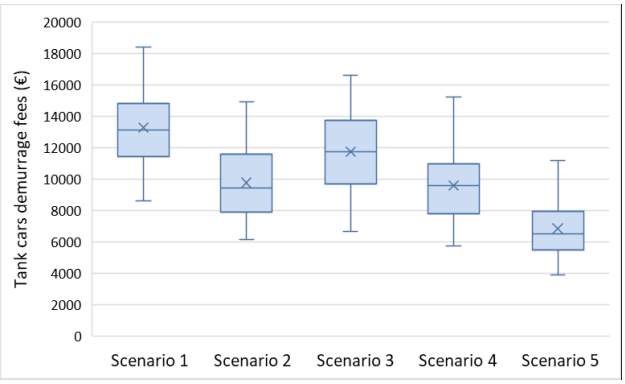

Figure 10 – Results of modeling five scenarios of the wagons arrival process

The data of the diagram shown in Figure 10 indicates that if the conditions of Scenario 5 are met for the process of receiving empty wagons, the smallest amount of costs such as "Tank cars demurrage fees" should be expected. The probability of an excess of the vessel's delay in this scenario is zero. This means that the owner of the cargo must formulate the following requirements addressed to the partner on the railway:

- the first batch of wagons should start arriving at the terminal not earlier than 6, and not later than 3 days before the arrival of the vessel;
- the duration of the process of arrival of the first 200 wagons should be within the range of 10 to 12 days;
- the duration of the remaining 108 wagons' arrival process should be within the range of 10 to 14 days.

The assumption remains that the number of tank cars arriving at the terminal will be a random variable during the day. It is also known that the railway will not be able to withstand any exact schedule for the arrival of wagons; therefore, it makes no sense to calculate such a schedule in a deterministic form. However, the risk of additional costs for the cargo owner will be significantly reduced if the railway meets the non-stringent boundary conditions formulated above.

Conclusions

In this study, all stages of a simulation study are presented, in which statistical modeling methods are applied. The stage of conceptual modeling, the stage of data preparation using distributions of random variables, and conducting experiments with the model are described in detail. The main result of this research is not the numerical results of modeling, which turned out to be very useful for the cargo owner, but the proof of the possibility of effectively using the VBA language in MS Excel as a tool for developing models.

This stage of the model development is practically not described in this paper since its content is elementary programming, in which the "If...Then...Else" statement is the "most difficult". The author expresses confidence that such models can be reproduced by any specialist who knows the technology and economics of the system under study, has logical thinking and can write macros for MS Excel. Of course, the modeler must clearly understand the difference between continuous process models that use the Δt step to display time in the model and discrete event simulation (DES) models. In cases where it is necessary to develop a detailed process model using DES principles, the customer should find the opportunity to use one of the commercial simulation packages. In cases where the accuracy is sufficient to ensure that adequate results are obtained for each day of the process under study, the VBA language in MS Excel is a full-fledged alternative in relation to professional simulation tools.

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