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TRANSPORT AND LOGISTICS

МИНИСТЕРСТВО ТРУДА И СОЦИАЛЬНОЙ ЗАЩИТЫ НАСЕЛЕНИЯ РЕСПУБЛИКИ КАЗАХСТАН

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РАЗВИТИЕ ТРУДОВЫХ НАВЫКОВ И СТИМУЛИРОВАНИЕ РАБОЧИХ МЕСТ

CONTENTS

1. LIST OF ABBREVIATIONS

TLC – transport and logistics complex.

TCS – transport control system.

STP – scientific and technical progress.

WTO – world trade organization.

AI – artificial intelligence.

IoT – the Internet of things.

ITS – intelligent transport system.

ITR – engineering and technical employee.

TLC – transport and logistics complex.

VR/AR / MR – virtual / augmented / mixed reality.

GDP – gross domestic product.

R & D – research and development.

UN – United Nations

COVID-19 – coronavirus infection that caused pandemia in 2020

WEF – world economic forum.

OS – operating system.

USA – United States of America.

USSR – Union of Soviet Socialist Republics.

RK – Republic of Kazakhstan.

CS MNE RK – Committee on Statistics of the Ministry of national economy of the Republic of Kazakhstan.

MIIR RK – Ministry of industry and infrastructure development of the Republic of Kazakhstan.

PS – professional standard.

NCE «Atameken» – national chamber of entrepreneurs of the Republic of Kazakhstan «Atameken».

NQF – national qualifications framework.

Transforming professions Transport and logistics complex

Disappearing professions Transport and logistics complex

New professions Transport and logistics complex

PREFACE

2.


METRO

PREFACE

Dear reader!

The last 2 decades of the XX-th and the first 20 years of the XXI century have radically changed the world. In the more than 40 years since the fall of the Berlin wall, the configurations of all spheres of human life, society, business, and government have undergone a profound transformation.

A new paradigm of international trade has been established, migration has become more active, and cargo turnover, vehicle fleet, and capacity of the global transport and logistics infrastructure have increased significantly. The emergence and consolidation of new players in the global market, such as Japan, China, Singapore, Taiwan, Hong Kong, and other developed and developing countries, whose production and business activity levels have reached unprecedented levels, has shifted the center of gravity of world trade, transportation, and industry to East and Southeast Asia.

An excess of cheap labor, and over time, an increase in the share of qualified personnel in these regions, provoked offshoring. Major Western industrial concerns are moving production across the Pacific ocean and across Eurasia, in pursuit of scaling and optimization.

As a result, the cargo flow vector turned around, and the trade turnover reached unprecedented volumes and growth rates. Although there were significant downturns during the crisis periods, the global market increased even more traffic volumes as they were overcome.

In 2019-2020, against the background of stagnation caused by trade wars and the COVID-19 pandemic, which led to an all - out recession, the market situation deteriorated sharply, but not many people share doubts that in 5-10 years the situation will stabilize and return to the trajectory of stable moderate or active growth.

The second important trend in recent decades has been to improve people's well - being and quality of life. In the mass consciousness, the culture of consumption has become fixed, which is a deep incentive for economic growth, a catalyst for production, and an engine of progress. Without a stable and constantly growing market, it would not be possible to expand business activity on a global scale.

TLC did not stay away. It developed as a result of the growth of production and consumption, and at the same time gave new impetus to this process.

In turn, it is the growth of production through the creation of long-term jobs that stimulates the growth of people's well - being. As a result, the market has become a closed logical sequence of interdependent components.

For example, due to the growth of personal income, increased availability of vehicles and the growing need for mobility, the number of car owners has increased dramatically. The car has ceased to be a luxury, having turned into an everyday tool, a basic means of transportation. Of course, the elite segment remained, as elsewhere, but in the context of mass consumption, such a metamorphosis occurred everywhere. At the same time, motorization has significantly increased business

opportunities, reduced time costs, and made it possible to locate production facilities in remote locations without paying attention to transport accessibility for employees. One of the key causes and, at the same time, consequences of these transformations was the STP, which grew exponentially in the studied time range.

The so-called Fourth industrial revolution has a powerful impact on the restructuring of the labor market. These changes will be particularly pronounced in the transport and logistics sector, as it is subject to the full range of natural, man - made, socio-economic and political trends. It is difficult to overestimate the importance of this industry, but at the same time its dependence on many external factors is also very high. But at the same time, TLC is also one of the most dynamic areas capable of rapid adaptation to heterogeneous perturbations and post - crisis regeneration. One of the main reasons is the fundamental role it plays. Just as the banking sector is called the circulatory system of the economy, so TLC can rightfully be considered the circulatory system of the state and the whole world. Consequently, long-term downturns in this industry lead to disastrous consequences for everyone. This is why TLC will be a true pioneer, one of the first and key recipients of the upcoming technological reequipment. The absorption of innovations produced by the fourth industrial revolution in the transport and logistics system will be rapid and almost unstoppable.

TLC is generally one of the industries most sensitive to exogenous shocks. For instance, according to the WTO, sectors like container transporting and aviation were the ones to suffer most from the crisis induced by the COVID-2019 pandemic.

The previous victim of industrial revolutions was manual labor, which was subjected to progressive and comprehensive mechanization. Now it's the turn of mental work. In the future, machines will think and make decisions for us.

Of course, these will be simple solutions at first. However, with the development of technologies such as AI and hybrid intelligence, machine vision, IoT, virtual and augmented reality, its, etc., the degree of machine intervention in processes that require human participation and the level of its involvement will consistently increase.

We live in an amazing time of change, we are going through a very deep transformation of the socio-cultural paradigm of our civilization, in an era of daily micro-breaks in scientific and technological development. The fourth industrial revolution dictates a new agenda for society and the labor market.

Its configuration is formed under the influence of many factors. The population and the average life expectancy of people are increasing and, as a result, the period of their working capacity and economic activity is increasing, mobility is increasing, and access to education is expanding.

According to UN forecasts, by 2030, the world population will grow from the current 7.7 billion people to 8.5 billion. And in Kazakhstan, the number of citizens will reach 24 million people against 18.6 million in 2019. Projecting the current level of economic activity on the prospective mass of the population of our country, taking into account the growth rate of life expectancy and the increase in retirement age, the share of our economically active compatriots at the turn of the 2030s will exceed 70% of the population – 14.4 million able-bodied citizens against the current 9.2 million.

On the other hand, in addition to demographic and socio - economic factors, technological trends affect the dynamics of the labor market. In particular - automation, robotics and digitalization. These processes lead to the release of a huge mass of labor. According to the most optimistic estimates, by 2030, the functionality of 60% of professions will be automated. And this applies to all sectors of the economy.

In other words, three heterogeneous forces have a compressive effect on the labor market in the social and technological aspects: the arrival of new masses of workers, the increase in the length of stay of the active masses, and the technological re-equipment that releases these masses. The last two factors constrain the ability of the labor market to achieve stable growth, and the first one, which is key from a socio-political point of view, needs it. This situation, if ignored, will sooner or later reach a phase where the labor market will not be able to absorb the ever - increasing flow of new employees.

There is no guarantee that by going to College or University, you will get a job of your dream. Already in Kazakhstan, 60% of University graduates work outside of their specialty. What will happen tomorrow? How to choose a profession that will be loved by us and in demand in the market? After all, this is the most important choice in life.

We need a universal tool that will allow us to look into the future and understand, which way to go. Do your kids play a lot of video games and you think it's bad? This is no longer the case. Gamification of production is becoming one of the key trends in technological re-equipment of transport and logistics enterprises and allows you to use the skills developed through computer games.

Is the child interested in

constructors? And how to develop this interest so that in the future it will become a required professional skill? Which area should I choose and which direction should I move in? It is quite possible that thanks to their skills, they can build complex multimodal transport and logistics systems and nodes, or create virtual copies of them and manage them.

For our children, who are now 3-5-10 years old, the Atlas will be especially useful in the future as a guide in the difficult process of choosing a profession. And if the approximate area of study is determined by the time of school completion, then the choice of a specific specialization in this area is not so simple. The situation is even more difficult for those who are already working, but risk facing cuts due to the transformation of the labor market. Automation and robotization displace manual labor from TLC. Digitalization de-actualizes many professions due to the introduction of different types of smart systems.

Smart sensors can track the status of any units and devices, thus optimizing the functionality of a large number of specialists in the transport and logistics industry.

Of course, many will say that innovations require huge investments, a long period of preparation and implementation, and their feasibility, taking into account the social and financial - economic point of view in General, can be subjected to objective criticism.

Why should a business spend much-needed funds for other purposes on technological replacement of those functions that are still managed by an ordinary person, whose expenses are not comparable to the cost of innovations? Moreover, Kazakhstan lags behind developed countries, and it will take several decades until advanced scientific and technological achievements appear on our market and are ready for implementation in

production processes.

This is a realistic, pragmatic point of view that has a clear basis. Nevertheless, the rearmament caused by the fourth industrial revolution on a global scale cannot be stopped. And it means that we will have to adapt to it, otherwise we will simply not be able to compete with others. As noted by Martin Ford, a well - known futurist and programmer: «there will come a time when technologies will reach a point in their development where low wages will no longer be able to compete with the advantages of further automatization» .

Cheap labor that performs routine operations will give way to robots. As a result, 9 out of 10 employees at this level will face the threat of layoffs, and the remaining one will have to retrain and become an operator of new systems. Working processes will be automated using new technologies. Means of transport they will switch to new mechanisms and physical principles of operation. Digitalization, based on AI and big data analysis, will gradually cover an increasingly wide range of functions previously performed by qualified personnel, who will inevitably have to learn new skills and even areas of activity.

How soon and where will all these changes take place?

What professions will be relevant in 10-15 years?

What skills and competencies will be needed?

Where can they study in Kazakhstan?

How do I stay permanently competitive?

We will try to answer these and many other questions in this Atlas.

[1] Martin Ford: «Robots are coming: the development of technology and the future without work» (ISBN: 978-5-00139-127-2)

ABOUT THE ATLAS NEW PROFESSION.

3.

ATLAS OF NEW PROFESSIONS AND COMPETENCIES OF KAZAKHSTAN

MMC

Complex of interrelated industries and stages of the production process from raw material extraction to production of finished products - ferrous and nonferrous metals and their alloys.

Energy

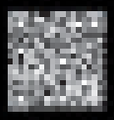
The sector of economy engaged in generation, transformation, distribution and use of resources of all types.

Oil and gas

Economic sector. Engaged in extraction, processing, storage and sale of natural minerals - oil and related petroleum products.

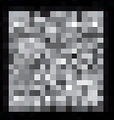
Mechanical Engineering

The sector of economy that designs, manufactures, maintains, disposes of all kinds of machines, technological equipment and their parts.



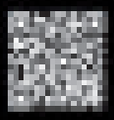
Agriculture

Economic sector aimed at production, storage and processing of food (food products) and raw materials for a number of industries



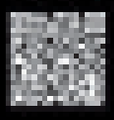
IT

Sector of economy aimed at finding, collecting, storing, processing, transmitting and providing useful information through technical means



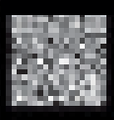
Transportation and Logistics

The economy sector carrying passengers, as well as the management system for the purpose of optimization



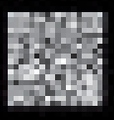
Tourism

An industry that organizes trips (travels) to another country or area other than its place of residence to learn about the lifestyle, gastronomy, nature, etc.



Construction

The sector of economy that designs, creates (erects) buildings, structures, as well as performs their capital and current repair.



ABOUT THE ATLAS NEW PROFESSION.

The world is experiencing another industrial revolution. The pace of change set by this process is extremely high, and the speed of innovation increases exponentially. More than 100 years were spent on the spread of spinning machines during the First industrial revolution, which led to the industrialization of society.

Electrification during the Second revolution took more than 40 years. And the Internet is already in the framework of the third revolution covered the planet in less than 10 years. Today many cutting-edge technology solutions and its developments, such as mobile apps, are distributed through digital channels in just several months.

States that fail to follow the path of advanced development will remain outside the process of economic intensification and innovative growth, which means that they will not be able to successfully compete in the global market. As a result, they will face a socio-economic crisis, a decline in living standards, and a permanent growing lag behind advanced, technologically developed countries.

The Founder and the President of the World economic forum, Klaus Schwab, in his book "Technologies of the Fourth industrial revolution" notes that some developing countries are virtually excluded from the process of shaping the impact of new technologies and knowledge on their societies and are not affected by the new industrial revolution. Since States with developed economies are pioneers of NTP, the balance between technology, society, and economies can easily shift in their direction. If nothing is done, the future for developing countries will be shaped haphazardly rather than purposefully, and technologies will limit rather than expand opportunities.

We still have a reserve of 10-15 years to get in line with the leaders of this race. If we do not use this time wisely, we risk missing a single chance to make a breakthrough from the XX century to the XXI. The starting push should be the training of future personnel, without which it is impossible to implement the latest achievements of STP quickly and on a large scale. By training specialists post - factum, we will not keep up with the pace of change, which means we need to train them with a long-range view, not looking around us, but looking far ahead. Think not tactically, but strategically. Solve problems not today, but the day after tomorrow.

It is critically important not just to increase the pace of educational and innovative development, but to give them such an impetus that will allow us to make a leap immediately in a decade, bypassing the intermediate phases. If this is not done, we will, of course, continue our technological evolution, but we will remain outside the global technological revolution.

As a result, we will follow in the Wake of the world's scientific and

technological leaders, gradually increasing the gap between them.

There are many problems in the transport and logistics industry right now. Insufficient and inefficient investment, low wages and lack of qualified specialists, administrative barriers, poor quality of service and weak infrastructure development, as well as many other problems hinder the development of TLC. Of course, these problems need to be solved. But if we focus exclusively on them, we will lose precious time. In popular parlance, we won't have time to jump into the last car of the ever - accelerating STP.

This Atlas is a navigator to specialties and competencies of the future labor market, a guide to presently non-existing types of professional activity brought by the fourth industrial revolution.

Of course, the generator of these professions will primarily be technology leaders - states and companies that directly conduct R&D in promising areas of TLC development: ITS, AI and machine vision. They allow intensifying the improvement of unmanned and autonomous vehicles, virtual and augmented reality, digital twins, additive technologies, alternative and eco-friendly transport, etc.

But Kazakhstan should not and cannot accept the role of a recipient or a trivial replicator of innovative specializations. We need to start training specialists of the future in the next 5-10 years in order to catch up with technically developed states in the next 15 years. This is where the Atlas of new professions will help us.

It consists of logically linked sections used to create lists of new, changing and disappearing TLC professions. Each of them will allow you to open a part of the veil of the future over the labor market of this industry.

The section "Transport and logistics complex of Kazakhstan" tells about the current state of this sphere. It is based on the analysis of statistical data and is necessary in order to understand what is happening in the studied sector now.

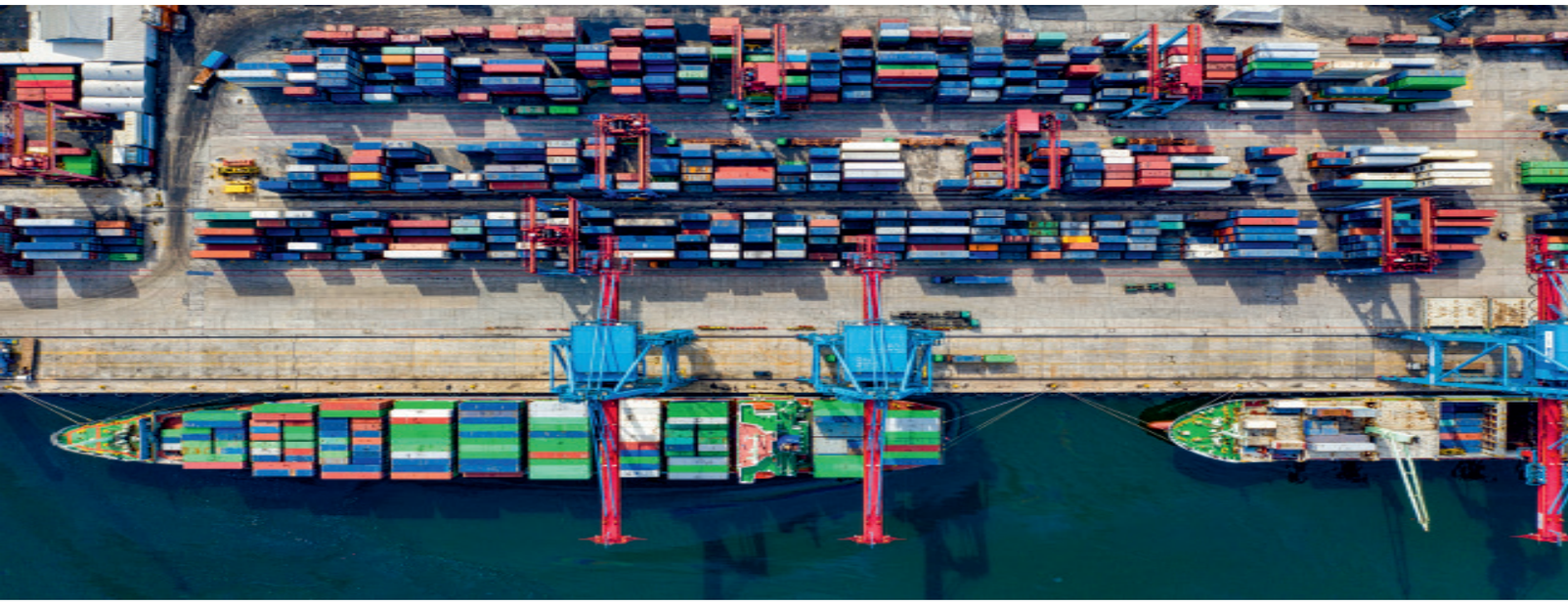
The section "Innovations in TLC: the future of transportation" reveals the form and essence of the technological, economic and socio - cultural trends observed today and expected in the future that arise within the framework of the Fourth industrial revolution, change or will change the paradigm of modern society and societies of the future. The section presents in logical sequence the results of joint work of experts in the transport and logistics industry, who predicted the main trends in the development of their field and identified the most important technologies that will affect the future of the labor market and the TLC as a whole.

This is a key section to forming a clear and objective view of the future of TLC.

In Kazakhstan. Based on this analysis, as well as on the analysis of expert assessments of various industry trends, expectations, prospective risks, opportunities and other elements, the image of the future is determined - a collective concept portrait of TLC Kazakhstan after 2035. Based on this approach, specific areas of technological development are determined, and, consequently, the necessary professional specializations are identified.

for practice in the section "future transport and logistics sector of Kazakhstan", which is divided into 3 categories: new, transforming and emerging professions. This section provides a clear understanding of which specializations will lose their relevance, which will change under the influence of STP, and which will appear in the next 10-15 years.

It is important to understand that, no matter how futuristic these



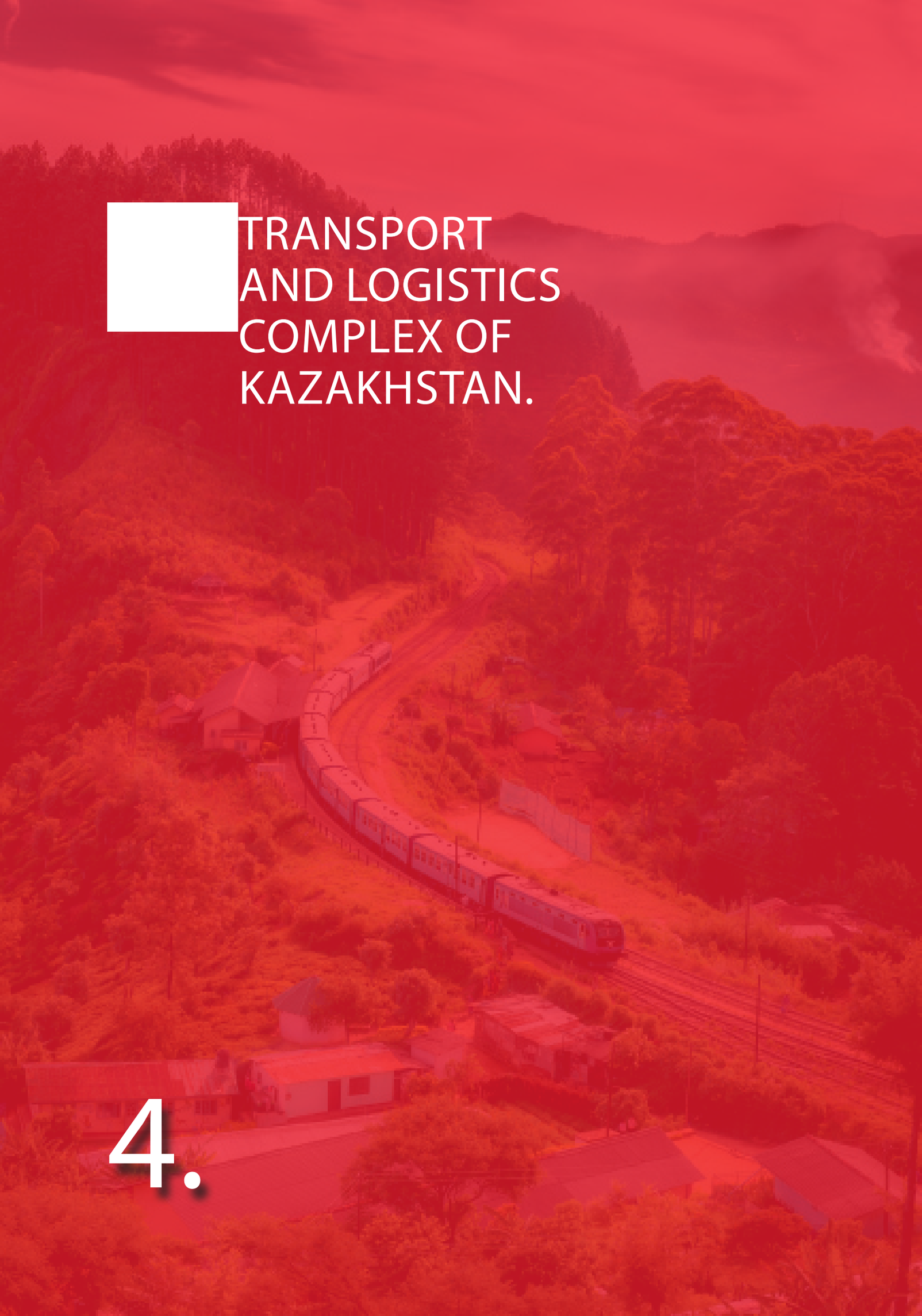
They are provided in the section "Future professions of the transport-logistical complex"

Vali, this is a given that we will face in the future. And you need to prepare for it in advance.

One of the steps on this path is to determine the competencies and skills of a specialist at the turn of the 2030s. They are described in the section "competencies of future professionals" and are structured by category.

Finally, the section "Localization of new professions" is intended

Pro-fessions may seem, no matter how skeptical or sneering you may feel-to contribute to the system of training of Kazakhstan and TLC personnel in the search and selection of the most suitable educational organizations, on the basis of which it will soon be possible to train specialists of the future. The most likely employers are also indicated there – large business structures that will be innovative leaders, which means that they will need qualified personnel. Atlas is an applied tool for preparing for the future. It cannot be ignored, because the future has already arrived.



TRANSPORT AND LOGISTICS COMPLEX OF KAZAKHSTAN.

4.

TRANSPORT AND LOGISTICS COMPLEX OF KAZAKHSTAN.

The transport and logistics industry of Kazakhstan demonstrates accelerated growth, due to both natural conditions and the factor of implementing a broad package of state support measures.

KC MNE RKincludes railway, automobile, inland water, air, and pipeline modes of transport in the TLC. Along with them, it is advisable to refer to TLC all types of storage, as well as logistics hubs, for example, the country's rapidly developing industry of transport and logistics centers that provide a full range of services in the field of cargo transportation and storage.

In 2019, work on the implementation of the state program of infrastructure development "Nurly Zhol" for 2015 - 2019 was completed. Over

the period from 2014 to 2018, the gross output of transport services increased by 63.5% and amounted to 7.5 trillion tenge. the Total contribution of TLC to the GDP of Kazakhstan was 7.2% .

According to the operational data of the Ministry of national ECONOMY of Kazakhstan, growth to 8.1 trillion tenge was also observed during 2019.

The volume of cargo and passenger transportation is growing consistently. Thus, in 2014-18, the volume of cargo transported increased by 13.1% from 3.6 billion tons to 4.1 billion tons. In turn, passenger traffic increased by 8.1% from 21.3 billion people to 23 billion people. The volume of passenger and cargo turnover is growing accordingly.

Cars remain the leading mode of transport. In 2018, they accounted for 83.4% of the gross volume of cargo transported, as well as 99.8% of all passengers.

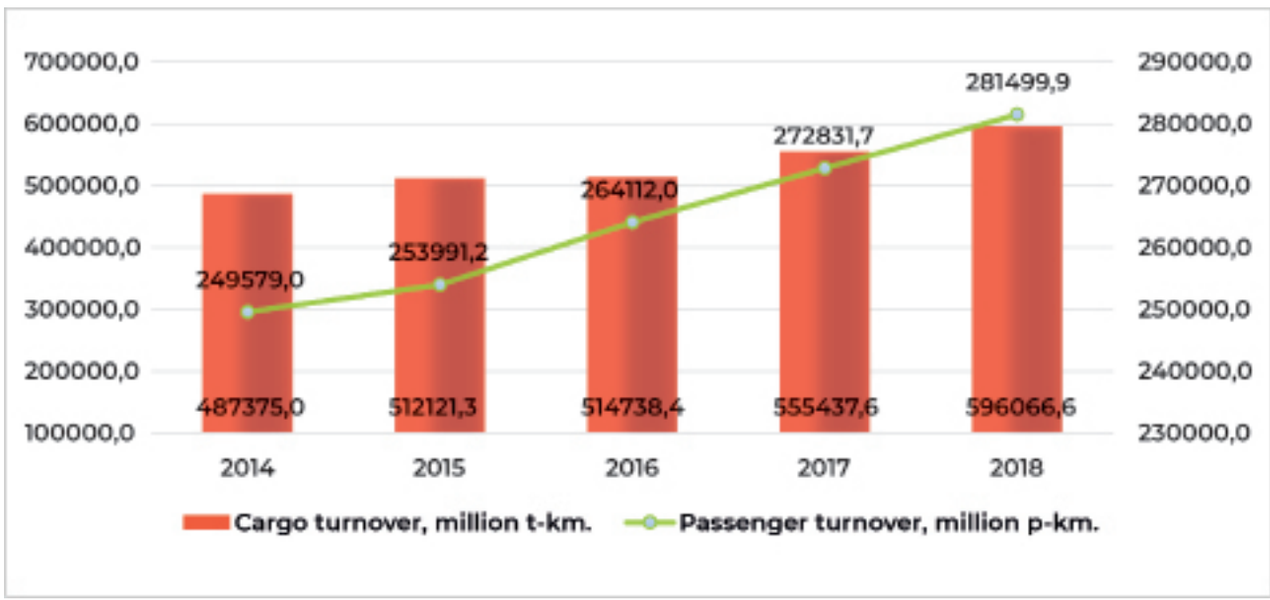
The increase in TLC indicators is also reflected in the growth in the number of companies specializing in transportation. Between 2014 and 2018, their number increased by 21.9% from 1,644 to 2005.

Against the background of a progressive increase in both the number of enterprises in the industry and the volume of services provided, the profitability of TLC is growing significantly. Thus, the net profit of the transport sector from 2014 to 2018 increased by almost 70% from 1.5 trillion rubles. up to 2.6 trillion tenge.

However, investment activity in the

Figure 4.1.

Dynamics of cargo and passenger turnover.



[2] Statistical collection of the CC MNE RK «Transport in the Republic of Kazakhstan» 2014-2018 rr.: https://www.stat.gov.kz/edition/publication/month

Figure 4.2.
Transport sector enterprises by type (%).

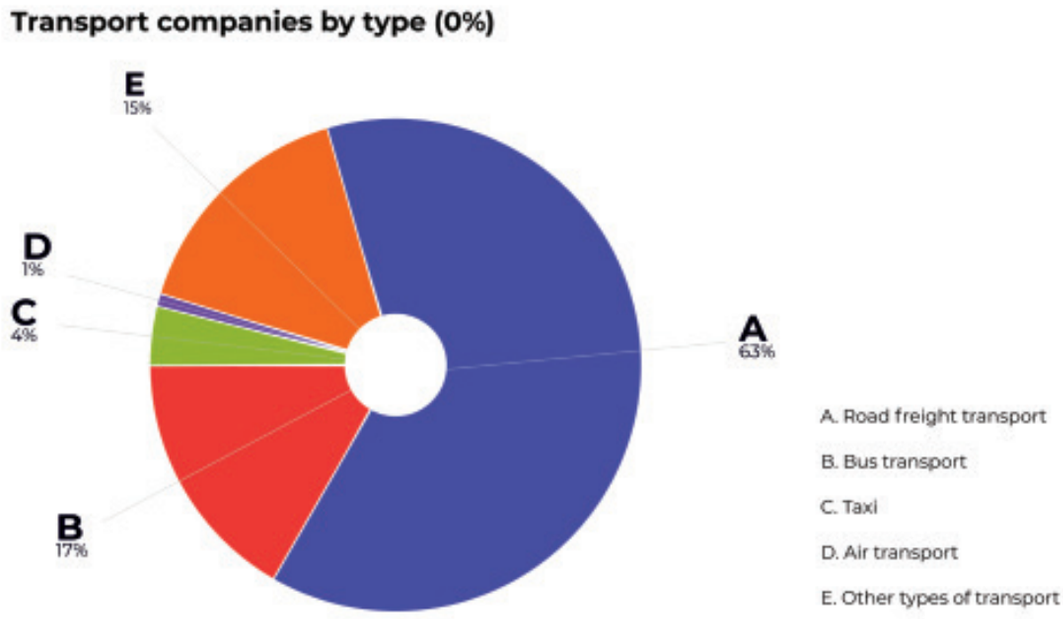
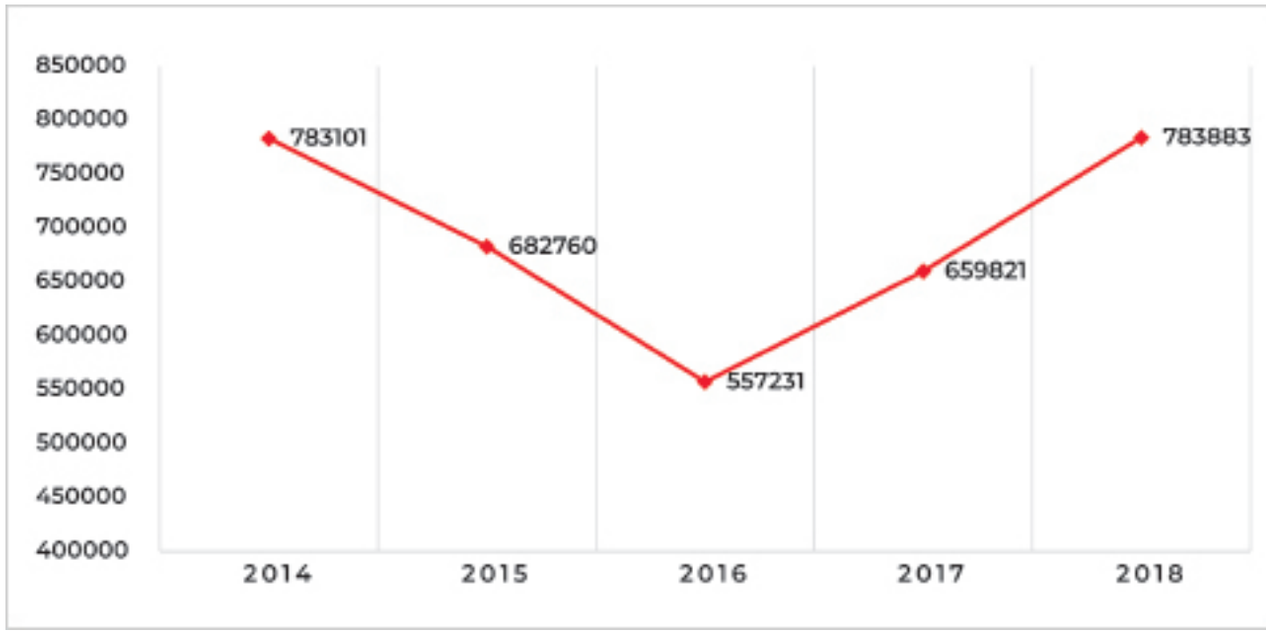


Figure 4.3.
Dynamics of investments in fixed assets of TLC (tenge).



transport and logistics sector has shown mixed dynamics in recent years.

Thus, in 2015-2017, compared to 2014, there was a decrease in the volume of investment in fixed assets from all sources. In 2018, the indicator recovered to the values of 2014.

The largest amount of investment is in the warehousing sector. In 2018, this segment of TLC attracted 333.4 billion rubles. Tg of capital investment. The decline in investment activity in pipeline transportation should be noted. If in 2014-2017, an average of 347.4 billion rubles were invested in the sector. in 2018, the total volume of investments amounted to only 181.3 billion tenge,

Along with an increase in the number of enterprises employed in the transport and logistics industry, the number of employees is gradually increasing. In the time frame under review, it increased by 13.7% from 256.6 thousand people to 291.7 thousand people.

The majority of employees are employed in land transport and pipeline transport – 51.1%, as well as in the warehousing sector and auxiliary transport activities - 45%.

It is necessary to pay attention to the

Figure 4.4.
The structure of investments in the fixed capital of TLC as of 2018 (%).

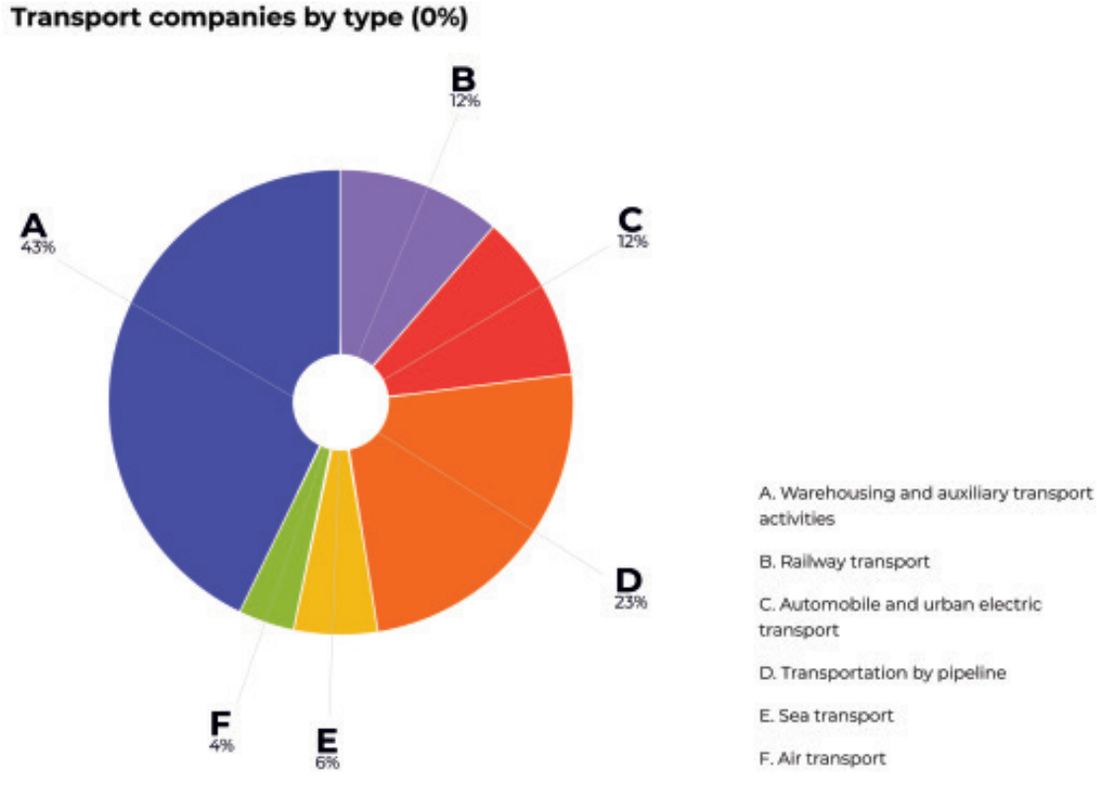


Figure 4.5.

Dynamics of the specific weight of young people among TLC workers (thousand people,%).

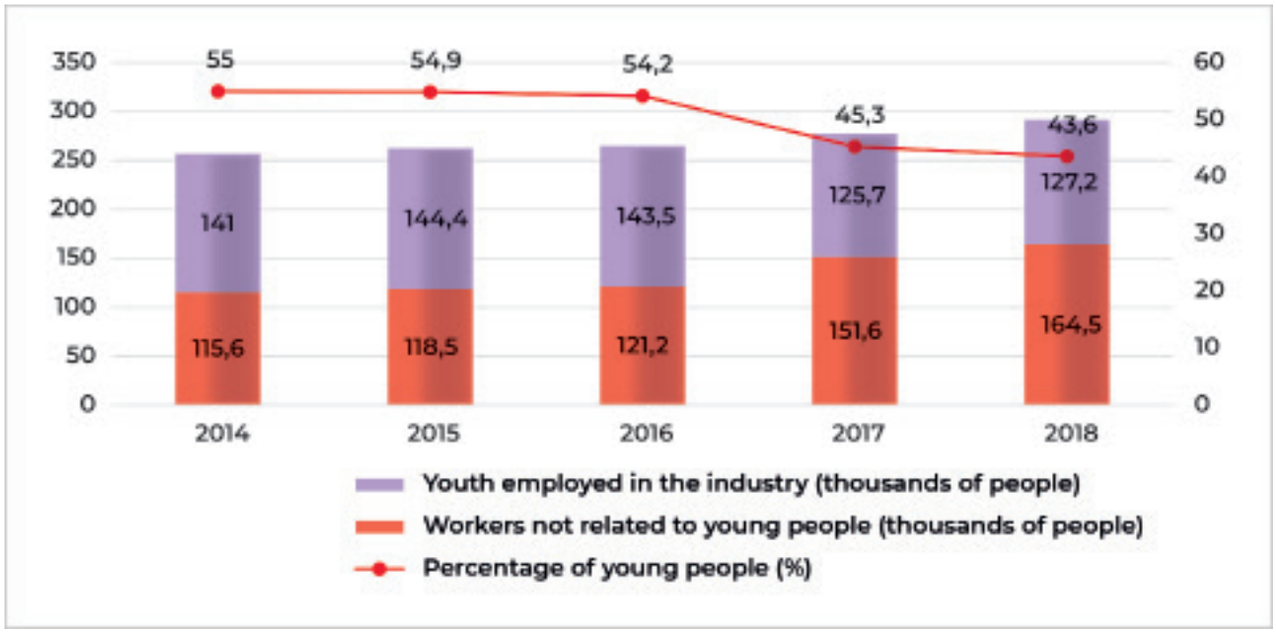
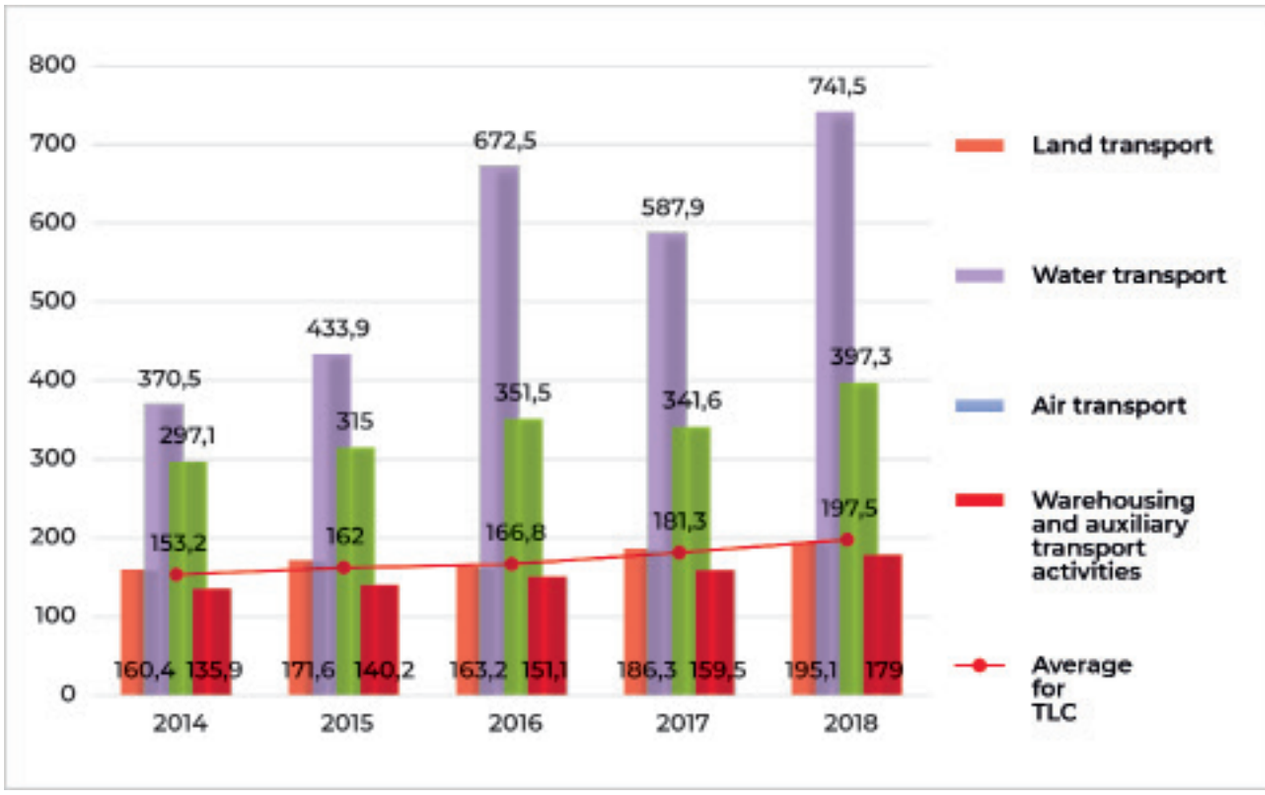


Figure 4.6.
Average per capita wages of TLC employees (thousand tenge).



fact that against the background of an increase in the number of people employed in the transport and logistics sector, the share of young workers is gradually decreasing. So, if in 2014 they accounted for 55% of workers in this industry, in 2018 this figure was already 43.6%.

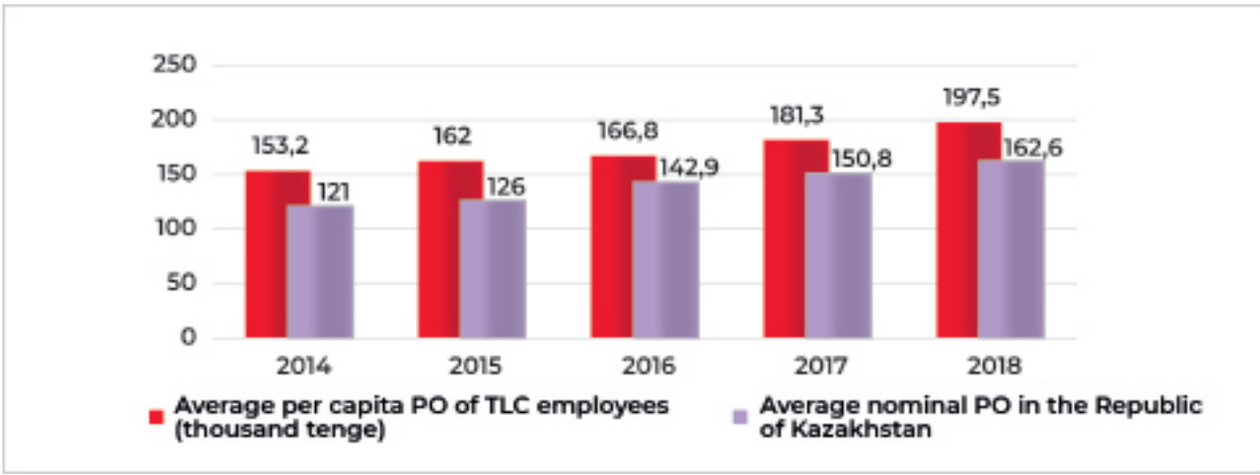
The average salary in the region increased from 153.2 thousand tenge in 2014 to 197.5 thousand tenge in 2018, i.e. by 28.9%. In terms of wages, as of 2018, the highest level is recorded in the water transport segment – 741.5 thousand tenge, the lowest-in the warehousing sector – 179 thousand tenge. at the same time, water transport remains the smallest segment of TLC. The list number of employees of this type of transport is only 1.9 thousand people.

However, despite the General excess of the average salary level in the country as a whole, the dynamics of income growth of employees in the transport and logistics industry is 5.5 percentage points lower than the growth rate of the average nominal salary in the country. So, for the same period, it amounted to 121 thousand tenge and 162.6 thousand tenge, respectively.

If this rate continues, the TLC will soon be different from other sectors of the economy in terms of income, which will lead to an outflow of qualified personnel. Given that the salaries of the most numerous segments of the transport and logistics sector do not significantly exceed the average nominal wages in the country, the probability that highly profession-

Figure 4.7.

Dynamics of average per capita wages in the industry and the country (thousand tenge).



al specialists will leave Kazakhstan's TLC increases.

The development of transport services is one of the key components of stimulating the growth of Kazakhstan's competitiveness. The strategic development plan of the Republic of Kazakhstan until 2025 (hereinafter referred to as the Strategy) provides for the creation of a modern logistics hub that will effectively use the country's transit and transport potential.[3]

The program is focused on introducing advanced technologies, building a highly efficient service infrastructure, and expanding Kazakhstan's access to the world's hub transport and logistics centers.

As part of the Strategy, some important initiatives have been put forward for the development of TLC. These include improving the quality of roads and developing roadside services, as well as increasing the capacity of international transport corridors.

As noted in the Strategy, Kazakhstan will increase funding for the maintenance, repair and reconstruction of roads, expand the coverage of road repairs, introduce new forms of contracts for the maintenance of roads without defects, develop clear criteria and indicators for assessing the quality of road infrastructure, approve the layout of promising service facilities along highways of international and national significance, and so on.

In addition, the Strategy provides for the reduction of administrative barriers, simplification of procedures for issuing various types of permits, and other steps to facilitate regulatory control.

[3] Strategic Development Plan of the Republic of Kazakhstan until 2025: https://online.zakon.kz/document/?doc_id=38490966&doc_id2=38490966#pos=29;-120&pos2=1069;-86

Thus, Kazakhstan is taking concrete practical steps to develop TLC. However, the analysis shows that the issue of high - quality personnel support for the industry remains insufficiently disclosed.

Given that the main specialties in TLC are represented by technical personnel, whose training is mainly conducted by private structures (for example, drivers are trained in driving schools), the saturation of the transport and logistics sphere with highly professional personnel it seems to be a difficult task to implement. Large carriers need highly specialized specialists, and the specifics of such sectors as air and water transport require specialized training.

In this regard, Kazakhstan needs to deeply study the prospective structure of the personnel structure of the industry, taking into account current and potential trends, socio-economic and technological trends. The feasibility of this measure is dictated by the fact that the industry as a whole remains Autonomous in terms of staffing and does not attract highly professional employees (with the exception of air, water transport and pipeline systems).

5. OPINIONS OF INDUSTRY EXPERTS

VASILY KOROLEV

General Director of LLP «Freight Company «TransAl», Director of the Project Department Logistics Center at TransAl Freight Company LLP, Honorary Professor Kazakh-German University.

The main trend that I see now is a long-awaited connection between transport and logistics. Previously, it was more of a conflict relationship, but now they are finally on the path of cooperation.

Previously, transport completely dominated and acted as a customer of logistics cooperation that was not ready for such cooperation, although, in fact, it should be the opposite. The next trend is a new interaction between transport and logistics in the countries of Central Asia, where the experience of Kazakhstan shows a high technological advancement of Kazakhstan in comparison with other countries-mi of Central Asia. If this is correctly used by our partners as a lesson for our country, we can expect accelerated development and implementation of a transparent and understandable technological corridor, in which TLC can earn the money it expects. So far, everything is based on unilateral and little-agreed decisions and often hostile relations with TLC itself.

On the one hand, we have a need for new knowledge, and on the other hand, we see barriers and conflicts in order for these knowledge, skills, and competencies to be applied in the industry.

If we talk about popular professions, I can call the following:

- Logistics it operators, logistics
- solution developers and technologists,
- coordinators,
- suppliers of all types, and
- we need specialists who are engaged in integration at all levels.

If possible, I would call these specialists integrators. For example, people who would analyze the market frontally, work with customers and say what, where and to whom to give and how to transport. And logistics integrators, who would also analyze the market, but would improve the processes of packaging, processing, and so on. These are purely logistics professions.

We need aggregators, now they are former dispatchers or people working on the information platform. The role of coordinators will also increase. You will also need specialists in the field of re-engineering and optimization in all types and levels of logistics, for example, a transport optimizer, a financial and economic optimizer, a specialist in technological, price, customs and warehouse optimization, and so on. There are no such specialists now.

The industry needs personnel. We'd like to see all Universities with the logistic profile of training has been implemented training and production enterprises as professional training, working on the prin - ciples and technological Bureau, and even 3PL 4PL enterprises

which in cooperation with practitioners and teacher - mi students would not be in the role of observers, but as participants, the type of how such enterprises in medical schools, where while a student studying under the supervision of eminent professors.

We would like the state to support this initiative within the framework of tax preferences and benefits for obtaining funding, as well as to protect the status of a mentor for practitioners from the business sector, who are not easily invited to the UNIVERSITY for such necessary work.

YERKHAT ISKALIEV

Chairman
of the Transport Logistics
Subcommittee
NCE «Atameken» ,
member of the Presidium
Transport Workers ' Union
Kazakhstan «Kazlogistics»

The COVID-19 pandemic, which has engulfed the entire world, has affected not only the lives of hundreds of people, but also the situation in local and global markets. A significant reduction in production capacity due to the closure of borders between countries and the introduction of self - isolation has made major changes in the logistics industry.

I would like to focus on the main trends in the industry that we are currently following.

Namely, we are seeing changes in the non-commercial sphere, and consumer demands have changed. There is a certain individualization and departure from the mass.

At the same time, the issue of speed and continuity of transport is becoming more and more important. Every year, the competitiveness of transport companies in the market is growing, as the client is primarily based on their individual preferences, pays special attention to time and convenience. As a result, brands with the last mile appeared.

ANOTHER BIG TREND IS DRIVERLESS TRANSPORT MANAGEMENT. THE COLD CHAIN WAS RUNNING. THIS TYPE OF UNINTERRUPTED DELIVERY IS A WHOLE SCIENCE. WE HAVE A SHORTAGE OF SPECIALISTS IN THIS AREA.

There are several main reasons for the weak development of the industry. First of all, as you know, Kazakhstan has no access to the sea, so we are at the bottom of the world rankings. Secondly, there is a lot of wear and tear on both road

transport and motor transport. And third, our country itself generates little cargo. Domestic transportation is almost unprofitable due to the long length of routes, the complexity of the location, the small population, etc.

We need to introduce containment, supply management, develop soft infrastructure, and automation, all of which should take place within the framework of digitalization. In General, I would like to emphasize that logistics is not transport, transport is just a logistics tool. The main thing in the industry is personnel. As in many sectors of the economy, knowledge and human resources are unfortunately outdated.

Universities need to update the teaching methodology and update the curriculum base. The knowledge that human resources provide must meet today's challenges.

THERE SHOULD BE A DIRECT LINK BETWEEN GLOBAL PLAYERS, INDUSTRIAL ENTERPRISES AND UNIVERSITIES. SINCE THE DEMAND FOR PERSONNEL WILL ONLY GROW.

We need to apply pragmatism. There are many areas in the country that need to be updated with personnel and knowledge, for example, the Caspian sea and Khorgos.

I consider it necessary to widely apply foreign experience. First of all, you need to start with the introduction of new standards. As long as we have old standards, everything will be outdated. Such tools will help raise the international transit potential of Kazakhstan. To do this, we need to look as widely as possible at the experience of foreign colleagues, and not just rely on Russian standards.

Of course, new professions related to automation will appear in the transport and logistics industry. Since there is a shortage of technical specialists in the country. For example, in medicine, there is no equipment, the doctor uses it at a minimum, because he is not a technician and does not know all the possibilities of this device. Money is spent huge on equipment, and the benefits from it are only 10% out of 100 possible.

According to my forecasts, in 2050, the automation of the logistics industry in the country will completely switch to artificial intelligence. The experience of Japan is a similar example.

Hitachi has implemented an artificial intelligence program that manages storage facilities and personnel based on set parameters. Such robot managers can track the production process in real time.

In addition, artificial intelligence finds ways to improve the efficiency of the staff. Of course, striving for such achievements is one of the priority tasks facing us.

EDUARD KAPLAN

Director of the company «Transsistemu»

If we consider the transport and logistics complex (TLC) at the macro level, the edge-the task of further improving the methodology of state transport planning is not relevant. At the micro level, we can identify problematic issues related to the introduction of modern logistics technologies (3/4 PL providers, Supply Chain Management, and others), digitalization, the creation of integrated information and logistics IT platforms, and improving the level of staff qualification. It is generally assumed that the second set of tasks in a market economy should be solved by the participants of the transport services market themselves (cargo owners, carriers, logistics operators). At the same time, the state, in our opinion, should also take an active part in organizing these processes.

Kazakhstan is actually becoming a transport and logistics hub on the Eurasian continent. A decade ago, many people did not believe in the practical implementation of the idea of creating a new China - Europe land bridge. After all, the traditional sea route through the Suez canal has long been proven, reliable and most economical in terms of delivery cost, while the theoretical increase in the speed of delivery by land has not been confirmed in practice.

However, through the efforts of the participants of the project, primarily Kazakhstan and China, it was possible to organize regular movement of high - speed container trains on routes connecting China and Europe, which is shown by the annual growth in the volume of such traffic.

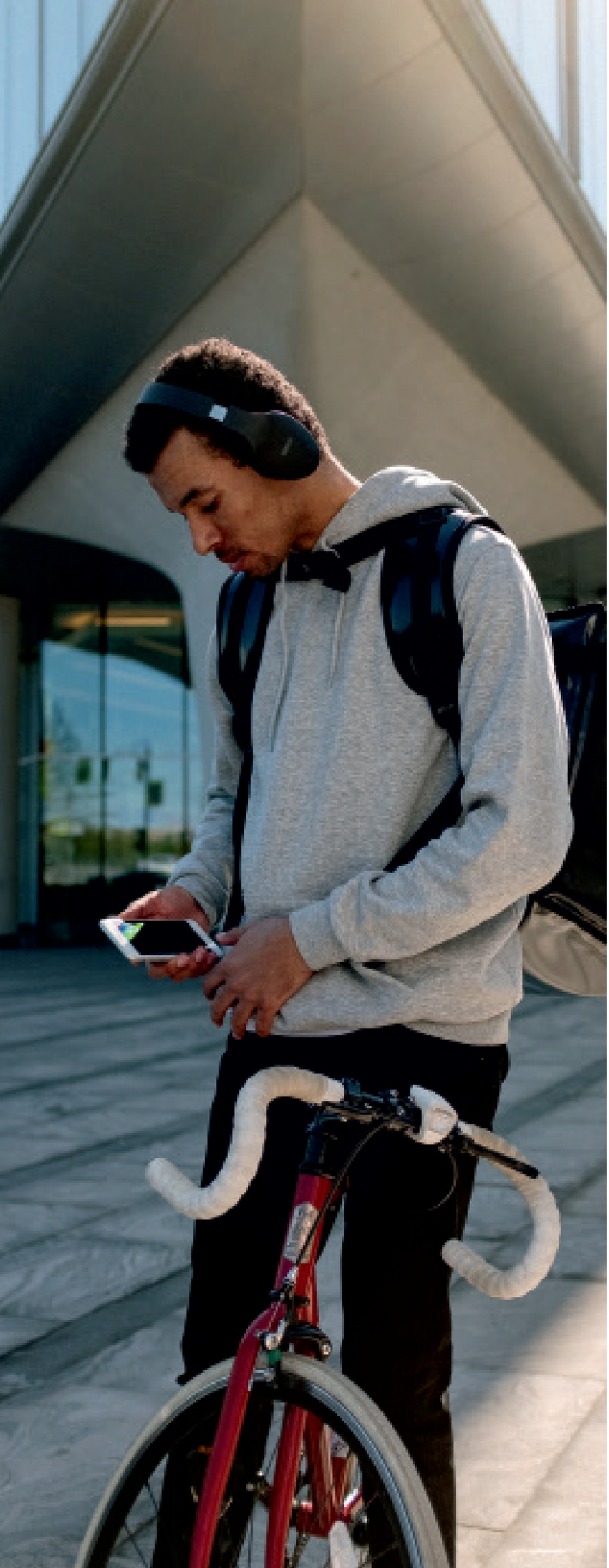
At the same time, it is important to understand that Kazakhstan faces another task of national importance, namely, the development of export-import and domestic cargo transportation, reducing transport costs in the cost of finished products, and improving the quality of transport and logistics services for cargo owners. Its solution has large reserves, as evidenced by the indicators of the LPI index, which are evaluated by experts of the world Bank. According to the results of 2018, Kazakhstan ranked 71st in the world, with the indicator "quality and competence of logistics services» - 90th place. These data once again emphasize the urgency of the task, especially since Kazakhstan is far from the open seas and oceans, and as a result, the transport component in the cost of production is a significant share, about 20-25% (in countries located in close proximity to the open seas, the transport component is at the level of 10%). It is obvious that these priorities should be adequately reflected in the state transport policy and program documents of the strategic development of the national TLC.

In our opinion, the strengthening of the country's transport and logistics potential is influenced not only by the implementation of large investment projects,but also by small, "point - based" projects to expand the "bottlenecks" of the transport infrastructure. This is especially true for railway transport, where there is a lag in the development of the infrastructure of some public stations, as well as the intra - factory transport infrastructure of cargo carriers.

For this reason, the downtime of long - distance railcars during loading and unloading is calculated not in hours, as stipulated by the regulatory documents, but in days. Such inefficient use of rolling stock leads to this is especially critical during the heating season (autumn-winter), when individual thermal power plants are on the verge of stopping due to delayed delivery of coal. Thus, the problem of shortage of cars should be solved not only by purchasing them, but also by increasing the efficiency of their operation, which depends on the implementation of "point" projects for the development of transport infrastructure, as well as on the introduction of modern logistics technologies.

Based on these considerations, it can be seen that the development of "light" assets in the industry (qualified personnel,

In these conditions, transport and logistics companies should take the initiative and become integrators of all other participants in the transportation process, create integrated logistics teams, and optimize logistics chains, starting from loading cars and ending with their unloading.



modern logistics technologies) is becoming an increasingly important direction, and if this direction is not successfully implemented, the efficiency of using "heavy" assets (rolling stock, transport infrastructure) can sharply decrease.

We should also highlight the issue of training in the field of transport and logistics, which is often quite formal and requires further improvement. Another problematic aspect - harmonized development of transport legislation that is adequate to modern market conditions. It is generally assumed that the country's transport and logistics complex should develop at a faster pace than other sectors of the economy. This principle is also relevant for Kazakhstan and is reflected in the program and strategic documents, while in practice it is not always fully implemented.

THIS PROBLEM IS BECOMING EVEN MORE CRITICAL IN THE CONTEXT OF A PANDEMIC AND AN AGGRAVATION OF COMPETITION IN THE WORLD MARKETS. IN THIS REGARD, IT IS EXTREMELY NECESSARY FOR KAZAKHSTAN TO IMPLEMENT A LARGE-SCALE BREAKTHROUGH IN THE DEVELOPMENT OF THE TRANSPORT AND LOGISTICS COMPLEX, WHILE PLACING THE MAIN EMPHASIS ON THE INTRODUCTION OF INNOVATIVE TECHNOLOGIES AND PROFESSIONAL DEVELOPMENT OF PERSONNEL

BATYR HAITBAEV

Head of the company
MSC Central Asia

The main trend that we are currently seeing is the containerization of cargo. The change in the industry should be systemic, affecting the entire economy of Kazakhstan.

Pricing is an important issue. our policy should be more loyal to our customers, so that it is not profitable for them to look for an alternative to transportation from our competitors. As a transit state, we must develop transit transport first and not forget about our exports and imports. You can't just change the price, you need to optimize the railway itself first. Koronavirus has shown that we do not produce goods with high added value, we mainly export materials. Every time they talk about it, when the price of oil falls, then it normalizes, and everything is forgotten.

High-quality personnel is just a disaster. Everyone is "howling" because it is impossible to find qualified personnel. Of course, there are problems in education, but there are also problems in the generation.

I see that people over the age of 32 have a desire to work, and they understand the meaning of the phrase " you can't pull a fish out of a pond without effort." All those who are younger, come so beautiful, charming and immediately want a salary of 2-3 thousand dollars, but they can't give anything yet. And now we are often in the selection of young personnel.

We do not look at knowledge, the main thing is that there is a desire to work, to grow, to develop, and we train already at the enterprise. We can't introduce anything new without qualified personnel.

For me, the future of TLC is in the it sphere. In the future, if someone needs to transport something, they will simply specify the cargo code, container type, and so on, select the app from the containers that will be in the right place at the right time, you load it, send it online, get data about its movements and other necessary information. If I had an unlimited amount of free money, I would invest it in our railway, in distribution hubs, and, of course, develop the production of goods with increased added value.

ELENA MEZENTSEVA

Deputy Director
for Operational Affairs
«IPL Kazakhstan»LLP

The main trend that we are currently seeing is a negative perception of the role of freight forwarders as intermediary and excessive, which leads to an increase in the cost of logistics. The same applies to customs brokers. I can clearly see this negative trend. In General, logistics is very expensive, because we have long distances between the main production centers and regional centers.

Education in the field of logistics has now become better. Everyone rushed to study logistics, and each UNIVERSITY began to train logisticians in its own way. We must first train logistics teachers, because now logistics is read by former economists, doctors of science, teachers with a degree. Practitioners, they are often not settled down, but they can pass on their valuable accumulated experience to students. And now we have pure theorists coming out of Universities.

AIZHAN BEYSEEVA

Head of Transport and Logistics in Central Asia, USAID Project on Competitiveness, Trade and Job Creation (CTJ)

At the moment, we see a trend that is in the air and it is necessary to develop it. This was especially evident due to the emerging pandemic. This is the cold supply chain in Kazakhstan, and this is why temperature warehouses, and consolidation with farmers. I would like to have a separate line for perishable products. If we talk about problems, the main one is crossing the border, working with state agencies. Of course, government agencies are working on it, and every time the business gets involved, some changes are introduced. This is especially evident in comparison with other Central Asian countries. There are also problems with the lack of competence of personnel at various levels. This can be seen in graduates of colleges and Universities. In this regard, we have a staff turnover in the industry, which also needs to be eliminated. There are things that can't be passed on to robots in the future. For example, working with clients, drawing up a contract taking into account the needs and mentality of the customer. Therefore, specialists who have a lot of experience and can pass on this knowledge will always be in demand.

Kazakhstan's TLC has a very large potential, we can be a leader, we can provide services that are not available to our neighbors. For example, if we take the supply chain, we will see good, "delicious" products that are competitive in the markets of Kazakhstan and Uzbekistan. Next, we need to use our infrastructure, we already have class a warehouses, and we are constantly working to improve the potential of our employees. TLCs need to be further developed so that they are not empty and we have a full range of services all year round, especially border TLCs. TLC is always open to new technologies, but we need to take into account many factors so that this is not just mindless copying, so that everything is considered-but also suitable for our realities. In General, any change in the industry should start with changes in the educational system. You don't have to go to America to become a specialist, and I think this will come to us in the next 10-15 years.

VLADIMIR KHAN

Managing Director
DHL FREIGHT KZ LLP
«DHL Logistics (Kazakhstan)»

Trends in digitalization and automation are currently being observed in the industry. In the future, I see minimal participation of clients in logistics, everything will be automated as much as possible. There are customers who send their products to thousands of points at the same time, and this cannot be done without automation.

There is also a very large bias towards bulk cargo without large wholesale customers, and digitalization and automation are the most important factors in such processes. In Kazakhstan, these processes are currently poorly developed.

If we develop our transit potential, our companies will become holding companies and accumulate profits from all nearby countries. I know companies that have their head office in Belarus and branches in 12-15 countries. If we have a million cars in Kazakhstan, this is 1.5 million people will work only as drivers, plus mechanics are still needed to service these cars, employees of the sales Department, service STATIONS, gas stations, and so on. We have huge prospects: we have cheaper fuel, lower wages for drivers, and moreover, we have a huge population that is ready to work. In this way, we can serve transport flows between China and Russia, Central Asia and Russia, and between Europe and China. You need to invest in transit warehouses, container hubs, car and car fleets.

If we talk about disappearing professions, I think that by 2050 drivers will disappear if we have drones. Freight forwarders can also benefit, to some extent, through automation. In General, the most promising area is information technology and everything related to information technology and logistics. In the future, there will be a minimization of human participation, everything will be automated and robotic.

6. TRENDS IN TRANSPORT AND LOGISTICS: IMPACT OF NEW TECHNOLOGIES, GREENING, AND CHANGES IN CONSUMER PREFERENCES

TRENDS IN TRANSPORT AND LOGISTICS: IMPACT OF NEW TECHNOLOGIES, GREENING, AND CHANGES IN CONSUMER PREFERENCES

NTP has become a driver for the development of all sectors of the economy, including the transport and logistics sector. The introduction of advanced technological innovations that solve the problems of automation and digitalization of work processes is already a key guarantee of accelerated development, and in the future, with an increase in the pace, width and depth of their penetration, innovations will become the main factor of success in any field.

In addition, the contour of consumer requests associated with a number of socio - economic, natural and technological trends is significantly changing. People are increasingly focusing on the environmental friendliness of products and services offered, convenience and minimization of time costs, quality of service, etc. The market is forced to adapt to growing demands, form new packages of offers, and take into account regulatory aspects. As a result, the configuration of the mass consumption image is significantly transformed.

The analysis revealed a number of major industry trends that will be relevant over the next 10-15 years. Together, they will determine the vectors of TLC development in General and specific technologies in particular. Structured, they are grouped within a number of Megatrends that are typical for the whole world.

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TRENDS

01 DIGITALIZATION OF TLC ENTERPRISES

02 AUTOMATION AND ROBOTICS TECHNOLOGICAL PROCESSES

03 TRANSFORMATION OF CONSUMER PREFERENCES AND STRENGTHENING OF REQUIREMENTS FOR THE QUALITY AND COMFORT OF LIFE

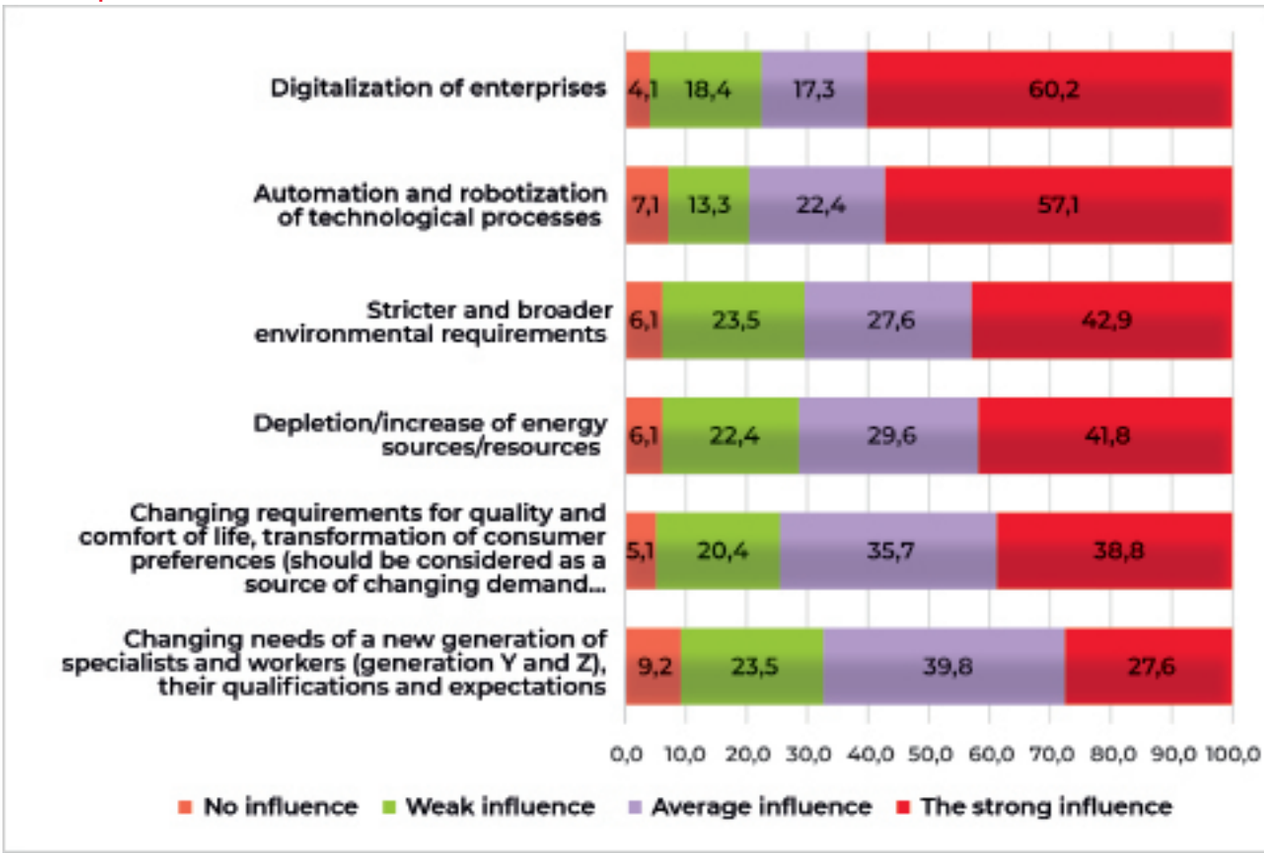
04 TIGHTENING AND EXPANDING ENVIRONMENTAL REQUIREMENTS

05 DEPLETION/ INCREASE OF ENERGY SOURCES/RESOURCES

06 CHANGING THE NEEDS OF A NEW GENERATION OF EMPLOYEES

Figure 6.1.

Estimates of the degree of influence of megatrends on the development of TLC (%).



Manual human labor has permeated and still permeates the entire TLC. However, in the time horizon of 10-15 years, the achievements of NTP will radically change this industry, primarily in the context of mechanical manual work and routine mental work, starting from the functionality of storekeepers and accountants, ending with drivers of trucks and trains.

Changes in the needs and expectations of young professionals and metamorphoses in consumer preferences have the least impact on the dynamics of TLC transformation.

The market of transport and logistics services directly depends on a variety of purely socio-economic factors.-economic factors, such as business and consumer activity, the volume of tourist trips, the purchasing power of the population, etc.

And its stable development, as well as transformation as an instrument and a consequence, are determined by external market conditions. If the market background is negative, as it was in 2020 due to the COVID-19 pandemic, TLC revenues fall, and most significantly in comparison with other industries. This means that the volume of investment in the sector is also shrinking, which primarily affects modernization initiatives. Nevertheless, despite the unfavorable exter-

nal economic environment, the world's largest transport and logistics companies in their various sectors continue to focus on deep structural technical re-equipment.

Changes in production processes due to the introduction of new software are predicted against the background of the development of basic technologies (Artificial intelligence, Internet of things, blockchain and big data analysis, etc.), as well as increased competition and the need to constantly improve business efficiency.

THE EXPERT COMMUNITY POINTS TO A CRITICAL SHORTAGE OF SPECIALISTS WITH IN-DEPTH DIGITAL SKILLS, WHICH SIGNIFICANTLY HINDERS THE DIGITALIZATION OF THE KAZAKH TLC.

The main drivers of digitalization are the behavior of consumers, who are increasingly focused on online communication with customers, and the availability of technologies that cover an increasing number of both service providers and recipients, as well as the overall economic effect.

In addition, the impact of digitalization on improving traffic safety, traffic optimization, improving service quality, and other factors contribute to the acceleration of innovation in this direction throughout the TLC.

In turn, digitalization is closely intertwined with automation and robotization of production processes. The introduction of new equipment is widespread

and replaces the manual labor of ordinary workers.

The introduction of robots into production processes has a particular impact on the development of TLC. Robotization involves the use of devices that can replace people in manual manipulations and operations of an iterative routine type. In TLC, it affects postal services, courier and Express deliveries, warehouses, online Commerce, freight forwarding, and so on.At the same time, the level of technology development already allows us to build their interaction to ensure effective traffic management. Moreover, unmanned vehicles are gradually replacing even highly qualified specialists.

One of the most striking examples of the use of robots is Autonomous unmanned vehicles that operate on the basis of AI and machine vision. They do not need remote control and operate independently.

Changes in processes due to-problems with robotics and automation will be caused by the development of technologies in transport engineering, primarily in the segment of unmanned and remote - controlled transport, service support, storage mechanisms,as well as high volatility of prices for traditional fuel, the development of electric mobility technologies, and increasing relevance and attention to environmental issues. At the same time, changes in labor legislation adopted in connection with the release of labor will also have an impact on business processes in TLC, since it will be necessary to ensure a soft and smooth flow of the working masses both within the industry and in other sectors of the economy.

The third important factor in the transformation of the industry is the tightening of environmental requirements and regulations. Greening affects all spheres of human activity and, above all, their movement. In recent decades, this process has been one of the most important factors that have a direct impact on changes in many sectors of the economy, as well as society as a whole.

The transport sector produces the main part of the emissions of harmful substances into the environment. For example, in the Russian Federation, road transport accounts for about 90% of all emissions entering the atmosphere. The development of alternative and eco-transport, as well as" green " logistics, is a natural consequence of increasing the interest of States and society in reducing environmental pollution.

Electric vehicles, hybrids, hydrogen - and biofuel-powered vehicles, and other types of" green " transport are gaining popularity all over the world, but above all in developed countries, where along with them a whole culture of ecologization of TLC is spreading, including incentives for the operation of alternative transport.

The trend of greening is closely linked to the depletion of traditional natural resources and the development of new energy technologies. The search for new types of fuel with a minimum volume of produced emissions while maximizing the efficiency is one of the key areas of transport engineering both in the segment of land and in the sectors of air and water transport.

An ecosystem for providing alternative and eco - transport is already actively developing, based on expanding the supply infrastructure: gas stations, service STATIONS, storage docks, etc.

Changes in consumer preferences dictate a completely new format for TLC. Research by PwC suggests that over the next 4 years, changes in customer behavior will lead to breakthrough changes in their business.

The transformation of the dynamics of domestic markets will be closely linked to the development of the electronic Commerce market by large businesses, while companies engaged in this segment will actively invest in logistics, i.e. online trade will interact more closely with TLC as it expands and spreads.

CEP solutions for e-Commerce (courier, Express delivery) and solutions based on the principles of the shared consumption economy will be developed.In the long term, in an effort to close the value chain, companies engaged in online Commerce will start investing in logistics. Already today, this trend is observed among the largest players in this market. As an example, the Russian company Wildberries can be applied to Kazakhstan.

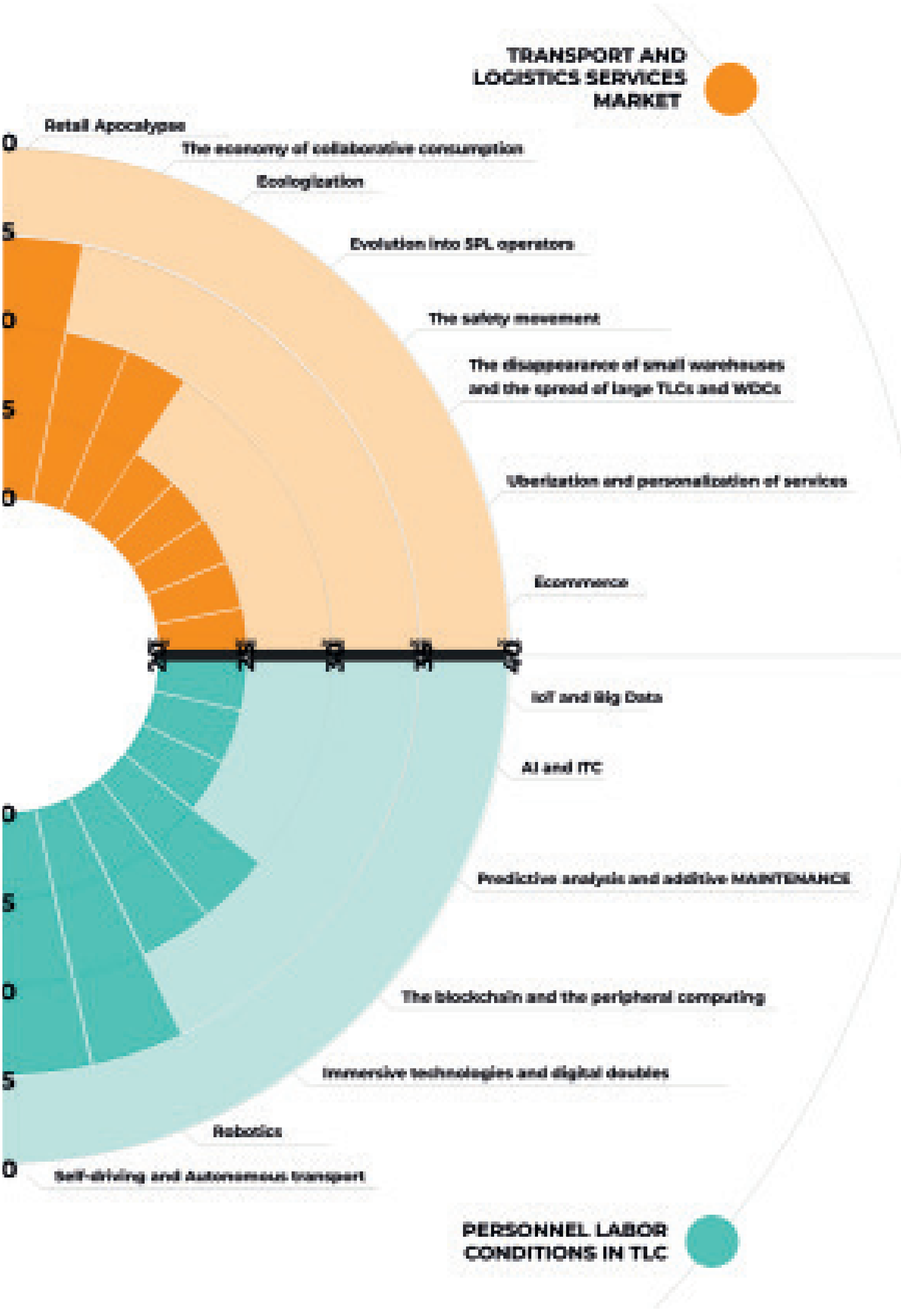
Especially important industry trends in this process are the popularization of the economy of shared consumption and uberization.

The entry into the labor market of a young generation of workers who are used to living and working online and profess their own interests and worldview will also significantly transform TLC.

First of all, in the context of training, as well as the practical implementation of the functionality. New employees will work closely with it, try to work remotely and on a flexible schedule, which, in General, should suit TL companies that can significantly reduce the cost of offices, computer and office equipment, and tangible assets.

PROMISING INDUSTRY PROJECTS OF TLC IN KAZAKHSTAN

TECHNOLOGICAL EVOLUTION OF TLC


TRANSPORT AND LOGISTICS SERVICES MARKET
Retail Apocalypse
The economy of collaborative consumption
Ecologication
Evolution into 5PL operators
The safety movement
The disappearance of small warehouses and the spread of large TLCs and WDCs
Uberization and personalization of services
Ecommerce
IoT and Big Data
AI and ITC
Predictive analysis and additive MAINTENANCE
The blockchain and the peripheral computing
Immersive technologies and digital doubles
Robotics
Self-driving and Autonomous transport
PERSONNEL LABOR CONDITIONS IN TLC

6.1.
THE DIGITALIZATION OF ENTERPRISES AS AN INCENTIVE FOR TLC GROWTH: ITS, E-COMMERCE AND « SMART LOGISTICS»

Re-equipment in the field of SOFTWARE is becoming increasingly important for the transport and logistics sector. Digitalization helps to reduce time and financial costs, improve security, optimize staff, reduce the number of errors related to the human factor, improve control and coordination of work, rationalize processes, and so on.

EXAMPLES

C. H. RobinsonWorldwide, the largest cargo broker in North America, announced in early 2020 that it will double its spending on technology to $ 1 billion to expand and develop its services and resist competition from digital startups.

In October 2019, Deutsche Post DHL Group announced that it plans to invest $ 2.2 billion in digital initiatives through 2025.For example, the introduction of the Internet of things, cloud technologies, and blockchain makes it possible in many ways

Automate warehouse operations, document management, forwarding and monitoring examples of mutual settlements with contractors, the process of product identification, improve the transparency of transportation, freight and delivery, inventory and other key operations.

EXAMPLES

One of the world's largest transport giants, Maersk, is actively working on developing its own blockchain platform together with IBM.

Skycell has developed cargo containers for the transport of medical goods that require strict compliance with temperature regimes. Inside the container are smart IOT sensors connected to the blockchain in the cloud. This allows permanent monitoring of the cargo condition.

Distributed projects based on cloud solutions «Softwareasa Service», based on the blockchain. Key task: collecting and checking the history of origin of goods. Such solutions are used by Martine Jarlgaard, the Grass Roots Farmers Cooperative, the Organic Association, Pole and Line, Co-op, and many other organizations and product manufacturers around the world.

The mediledger application uses a blockchain to manage the supply chains of medical products according to EPCIS standards, which provides for mandatory verification of the authenticity of each individual package, its history, data about the manufacturer, intermediaries, stages and locations of transportation, etc.By 2023, all American pharmaceutical companies will adopt this standard.

Intelligent transport systems, distributed registries, digital twins and other technological innovations based on AI, new models of computer calculations, virtual reality, IoT, etc., cause the activation of capital investments of TLC enterprises in digital equipment.

The first area of digitalization within the TLC is traffic flow management, in the context of which the key digital solution is its based on AI. Its allows you to quickly manage street traffic and public transport based on the needs of citizens, current traffic and load, collect payment for travel, manage cargo transportation, provide big data analysis for regulating transport flows, manage Parking spaces, and so on.

EXAMPLES

Japan was one of the first countries to start developing its own products. Given the extreme traffic congestion in this small but densely populated country, digital solutions have been given special attention in traffic management. Since 1995, traffic management systems have been developed and integrated in the largest megacities and agglomerations Of the land of the rising sun. Traffic detectors, smart sensors and cameras, smart traffic lights, GPS navigation systems, and big data processing servers are now closed based on distributed and cloud computing systems, and are controlled by AI algorithms that coordinates and distributes traffic in real time, processing up to 50 TB of data every second.

Given the increase in the source - term stuffing of cars and, moreover, a growing trend on the use of unmanned and remotely controlled vehicles and expansion of infrastructure IoT, interaction between a technology that gives practical- the ability of its to directly coordinate each individual traffic object. All this together will significantly increase the safety of road traffic.

Intelligent dispatching, which operates on the basis of advanced intelligent transport systems, makes it possible to increase the volume of transfers, increase their speed and improve the quality of multimodal transport logistics, as well as eliminate the human factor.

The second important segment is electronic Commerce. The modern consumer makes more and more purchases on-

line. The COVID-19 pandemic has further exacerbated the offline trading crisis. Many experts call the current situation the retail Apocalypse. The classic supply chain is changing from manufacturer to consumer. Both brands and manufacturers seek to reach consumers directly via the Internet and their own retail stores. All this increases competition and changes the balance of power in the market.

EXAMPLES

In 2019 5700 stores were predicted to close,but only at the end of the first quarter has already closed 4800. The pace of store closures is seriously outpacing the pace of new openings.

The biggest liquidation in history could be the closure of the Payless chain, which has 2,500 stores.

The share of consumers who participate in the following algo - rhythm is growing: «I'll watch it online, touch it, compare it online, buy it on Ali.» However, the «come-touch» element of the chain may disappear in the future due to the introduction of augmented reality tools and new shopping interfaces that make it possible, for example, to try on clothes in a digital version without coming to the store.

As a result, logistics for large shopping centers and retail in General will no longer be necessary due to their gradual disappearance.

The new format will be dictated to the market by online retailers who will use their own marketplaces that are scattered everywhere, which means that they will create their own logistics centers that everyone else will have to integrate into.

An important consequence of this process will be the disappearance of small warehouses and the expansion of giant orcs and cross-docking warehouses.

In the warehouse environment, digitization tools are also actively used. First of all, these are so - called digital twins based on immersive technologies. Digital warehouses are the future of warehouse activity, as it is becoming impossible for a person to manage the huge spaces of the ORC. A virtual copy of the warehouses allow you to quickly and remotely manipulate all the functions.

Warehouses and businesses can use this technology to create accurate 3D models of their centers and experiment with layout changes or the introduction of new equipment to see their impact without risk.

EXAMPLES

Gazmpromneft company first presented its first digital warehouse at the Yuzhno-Priobskoye field in 2020. In addition to fully automated mechanical operations and Elevator storage technology, the warehouse is fully digitized. A virtual copy of it was created, based on augmented reality technologies. With the help of 3D glasses, the operator can read all information about any product and the state of storage capacity utilization.

The potential use cases for digital twins in logistics are huge. In the shipping sector, they can be used to collect product and packaging data, as well as to use this information to identify potential shortages and recurring trends to improve future operations.

In addition, logistics centers can create digital counterparts and use them to test various scenarios and improve efficiency. In addition to this, delivery networks can use this technology to provide real-time information that will reduce delivery times

delivery and will help Autonomous vehicles on their routes.

Another key area of digitalization, coupled with automation, is the simplification and optimization of customs and inspection procedures. the main tool is biometric monitoring, which includes facial recognition technology, status sensors, sensors for remote scanning of clothing and cargo, and other systems. In the segment of air-conditioned passenger

transportations, this trend is the key to increasing capacity and reducing waiting times. It is easy and convenient for passengers to pass the pre-flight control once, without excessive screening procedures.

EXAMPLES

System asitas 2017 was founded in the city Boston (USA) and is used for monitoring the departure zone. The system allows passengers to pass border control «in one shot» without unnecessary registration and inspection procedures.

In logistics management, TMS is at the forefront, which allows you to integrate and automate logistics processes, thereby reducing transportation costs and time costs. Large logistics companies have previously used ERP systems, but their functionality is often insufficient for full - fledged supply chain management. TMS is one of the key stages in the evolution of multi-profile 4PL companies into 5PL operators-digital logistics organizations.

EXAMPLES

The Artlogic system is one of the most popular in Russia.Its services are used by such major suppliers as Johnson & Johnson, Bacardi, Nalco, etc.

Acceleration, expansion and deepening of the TLC digitalization process is an inevitable technological trend. Its pace may occasionally be restrained by crisis recessions in the economy caused by various reasons, but it will not be possible to completely stop or reverse this trend.

6.2.

AUTOMATION AND ROBOTIZATION AS THE DICTATES OF TIME: UNMANNED AND AUTONOMOUS TRANSPORT, ROBOTS AND NEW TOOLS OF THE TRANSPORT INDUSTRY-TLC.

Innovations in the field of new equipment and hardware complexes are the second key driver of TLC development in modern and prospective conditions. The spread of robots, smart sensor infrastructure within It, unmanned and Autonomous transport, additive technologies, and other advanced technological advances open up limitless horizons for the transport and logistics industry.

Self - driving and self - driving vehicles will occupy an increasingly large niche in the transport market. First of all, in the segment of cargo transportation, and in all sectors of TLC, including air and water transport.

AI and machine vision, as well as the acceleration of data exchange and interaction of various aggregates, make it possible to move freely on the scale of any traffic and in any conditions.

The use of drones also simplifies many warehouse and logistics operations. For the latter, they begin to play a special role in the "last mile section".

According to Gartner analysts, by 2023 the total number of self-driving cars in the world will exceed 745.5 thousand units. This is 5.4 times more than in 2018 and 2.2 times more than in the past.

A significant factor in delaying the spread of these types of transport is the lag in regulatory policy. As of November 2019, no country in the world has adopted the necessary regulations regulating this area.

So, in December 2019, the authorities of the state of California (USA) issued a permit for the use of free cargo transport weighing up to 4.5 tons on public roads.

Meanwhile, driverless and Autonomous transport is developing in all segments of the TLC, and not only in the automotive industry. This makes the issue of creating the necessary regulatory framework extremely relevant on a global scale.

Unfortunately, some progress has already been made in this direction.

EXAMPLES

In September 2018, an unmanned freight train consisting of three locomotives and 30 loaded cars was tested in the United States. The new York Air Brake LLC train traveled almost 80 km.

VKNR the opening of the world's first unmanned railway is being prepared for the 2022 Winter Olympics.

The autopilot in the aircraft is gradually giving way to an AI that can fully desactualizada the profession of pilots and practitioners. European aircraft manufacturer Airbus in June this year held a new stage of testing the system of automatic visual taxiing, take-off and landing. The Airbus A350, equipped with a special system, made 6 flights. One of them was performed by the liner completely independently, including undocking, taxiing along the airport tracks, takeoff and landing. The flight also took place in autopilot mode.

The defense advanced development Agency (DARPA) of the us Department of defense at the beginning of the year announced the development of a Robo-TA ship - a completely unmanned vessel. And in 2019, a prototype of the ACTUV project's sea Hunter surface robot, which was designed to detect and monitor submarines, made the first fully Autonomous transition from the port of San Diego in California to pearl Harbor in Hawaii and back. Although such developments are still typical only for the defense industry, in the future they will easily spread in civil shipping.

However, the most developed sector was, remains and will be in the future 10-15 years, the road transport sector. R & d in this direction is carried out by all major automotive companies: Tesla Motors, Volkswagen, Ford, General Motors, Toyota, Renault, Mitsubishi, etc.

Moreover, the market is also developing in the passenger transport sector-approx. In may 2019, UBS analysts predicted that taxi fares could fall by 80% due to the introduction of driverless transportation. The rate of use of the driverless taxi fleet during a 24-hour shift will reach about 50%, which is more than twice as high as the same indicator in the Uber or Lyft systems.

According to various estimates, the market volume of sales of driverless taxis will reach 2 trillion us dollars due to the production of cars and their spare parts, the construction of underground stations, as well as the necessary it funds.

The introduction of robots into production processes has a significant impact on the development of TLC. Robotization involves the use of devices that can replace people in manual manipulations and operations of an iterative routine type.

In TLC, it affects postal services, courier and Express deliveries, warehouses, online Commerce, freight forwarding, and so on.

EXAMPLES

Amazon is investing heavily in warehouse and transportation robotics the Company has already made great strides with the development of Prime Air, an unmanned aerial vehicle service that it is building to create a fleet of fully electric drones that can fly up to 15 miles and deliver packages weighing less than five pounds to customers in less than 30 minutes.

The baggage sorting, loading and unloading system is fully automated in the terminal no3aeroportahitrouvlondon (great Britain). Bags and spaces of containers and Luggage compartments are scanned by robots for optimal space loading. The system consists of 48 km of conveyors that transport up to 185 thousand bags every day. According to expert estimates, robotisation has reduced the time spent on preparing Luggage for flight by 1.5 hours.

At Narita international airport(Japan), the Panasonic HOSPI courier robot transports passengers ' Luggage from the moment they arrive at the terminal until they are loaded into the aircraft's baggage compartments.

Robots with RFID identifiers and sets of antenna detectors are actively used in the warehouses of British F&F stores to inventorize goods and equip warehouses with RFID tags.

AmazonRobotics, a research division of Amazon's Pani company, develops and distributes various types of robots for automating warehouse operations. For example, Fanuc m-2000iA manipulators, Kiva pallet transport robots, Scout delivery robots, and so on.

In General, RPA as one of the technological bases of TLC transformation has unlimited prospects.

In the distant future, human involvement in transport management, warehouse operations, and supply chain coordination will be reduced to zero.

The third important component of the automation and Robotization trend is new forms maintenance service. First of all, these are predictive maintenance AND additive technologies.

PREDICTIVE MAINTENANCE WILL BE USED FOR PREDICTING UPCOMING BREAKDOWNS, THE IMPACT OF CERTAIN WORK PROCESSES ON THE STATE OF EQUIPMENT, AND TIMELY NOTIFICATION OF EXPECTED MAINTENANCE.

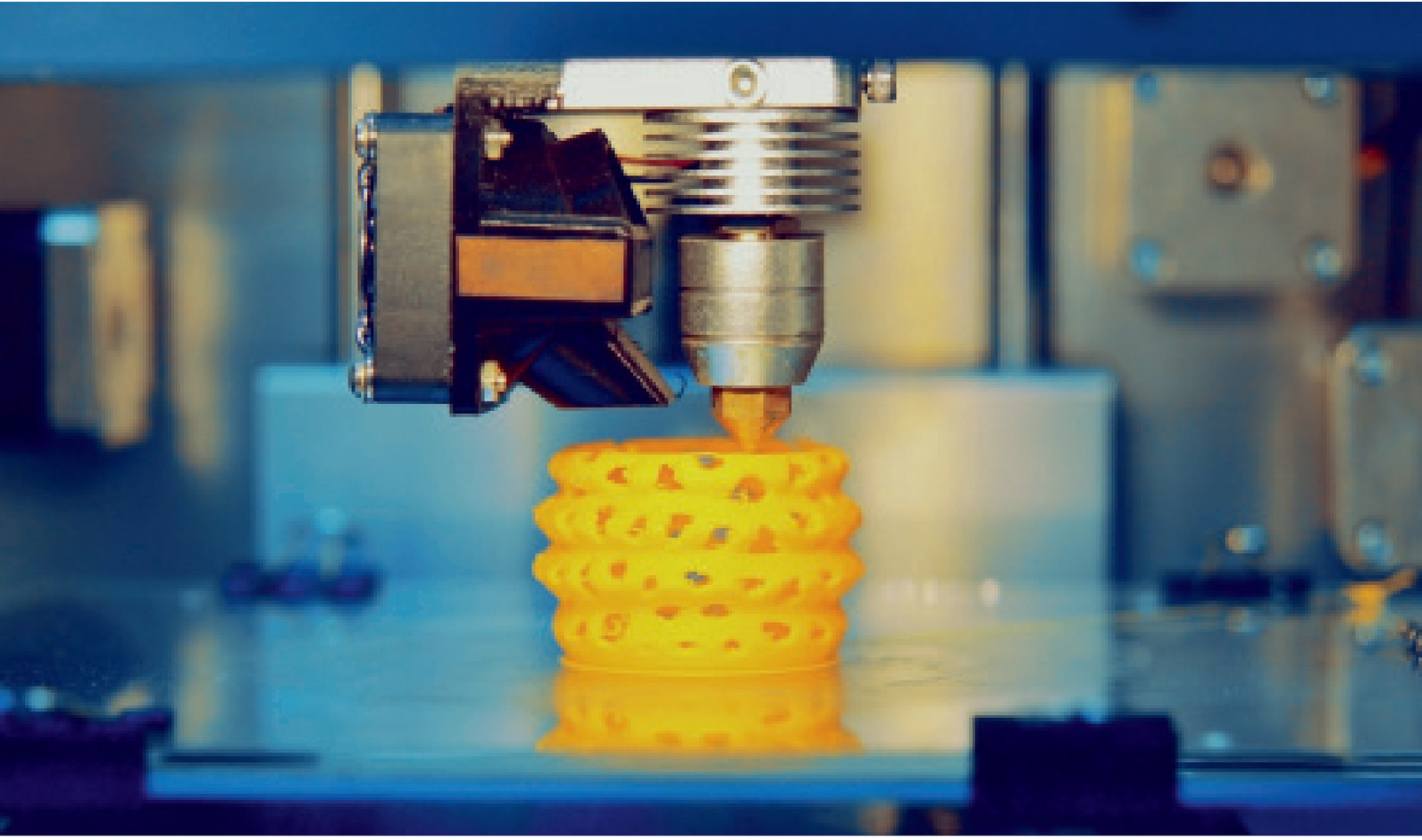
This will allow for systematic cost savings and reduce downtime of equipment and fixed assets in connection with the repair, it will increase the quality of services by increasing the predictability of cargo delivery time, and will have a positive impact on staff, since the prevention of equipment failures increases work safety, resulting in increased labor productivity.

Tools for predicting and diagnosing problems are a key MAINTENANCE tool that allows you to predict possible failures in advance thanks to sensors that constantly monitor the technical condition of a particular unit inside vehicles.

The potential of additive technologies in MAINTENANCE processes is also quite extensive. The ability to write any part in the future will reduce the time to a minimum. Now companies do not need to wait long for delivery of spare parts and materials for transport or warehouses.

Additive technologies allow you to save time and money on replacing damaged parts, and predictive analysis sensors can detect breakdowns and even predict them, which makes it possible to change parts before they fail, and therefore not waste time and money due to idle vehicles or robots waiting for repairs.

ERNST & YOUNG ESTIMATES THAT BY 2030, 3D PRINTING TECHNOLOGIES WILL BEGIN TO DISPLACE MASS PRODUCTION OF PARTS AND EVEN ENTIRE UNITS FROM THE MARKET. AT THE END OF 2019, THIS INTERNATIONAL AUDIT COMPANY PUBLISHED A STUDY THAT SHOWS AN INCREASE IN THE AVERAGE PENETRATION RATE OF THIS TECHNOLOGY WORLDWIDE FROM 24% TO 65%. HOWEVER, IN CHINA, SOUTH KOREA, JAPAN AND OTHER ASIAN COUNTRIES, THIS FIGURE VARIES ABOUT 80%, IN CANADA – 77%.



EXAMPLES

Bombardier, a machine-building company that manufactures equipment for the railway industry, announced in may 2019 the launch of a project to install the F900 3D printer manufactured by Stratasys at its plant in Hennigsdorf, Germany. the goal Is to accelerate and personalize the production of parts, reduce the cost of storage and increase the flexibility of manufacturing spare parts, tools and parts for rolling stock (passenger trains and trams).

The British company ParkerHannifin is actively developing the segment of commercial use of additive technologies in the pipe - wire transport system. In Milton Keynes (great Britain), a sector has been created aimed at the production of spare parts of any configuration complexity through additive technologies.

Automation and robotization of various TLC segments, which significantly optimize financial and time costs, will become one of the main guidelines for the development of the industry.

Robotic railway communications, unmanned ships, unmanned and Autonomous transport, warehouse robots, and other NTP achievements make TLC one of the most high - tech sectors of the economy.

6.3.

TRANSFORMATION OF CONSUMER PREFERENCES AS A CHALLENGE TO THE TLC CONFIGURATION: ECONOMY OF SHARED CONSUMPTION, UBERIZATION AND PERSONALIZATION OF SERVICES

The consumer of the XXI century is becoming more and more flexible and demanding. A lot of information about any product, service, or manufacturer is publicly available, which makes it harder for suppliers to compete. Moreover, the availability of many alternative options also poses new challenges for transport and logistics companies.

On the other hand, humanity continues to be a consumer society. Requests and the interests of the majority vary within the limits of satisfaction of personal or microsocial needs, and with the maximization of personal comfort. On the other hand, there is still some transformation of values. First of all, this applies to young people who now have open access to education and technology, have a broad Outlook, and virtually unlimited opportunities for movement. All this encourages a shift in mass psychology. The youth sees problems and is actively involved in their solution. As a result, a new type of society is being formed.

Socio-economic development and STP have led to an increase in the standard of living of the majority of the world's population. Human needs are no longer limited to a standard set that satisfies basic instincts. We have become selective, discriminating, and picky. More and more decisions are made based on their impact on the dynamics of the com - Fort and the convenience of our lives. Our preferences are becoming more complex, modified, and more sophisticated. In the period of the pandemic in the fashion industry, these applications began to be traced especially clearly. For example, we don't want to waste time now and the strength to go to the supermarket. After all, we can deliver everything. Moreover, we will get comprehensive information about products online, be able to pay for them, share our opinion about them, and so on.

The popularization of the sharing economy leads to fundamental changes in the business models of transport and logistics companies. Sharing in the logistics sector makes it possible to reduce transport and warehousing costs, optimize staff and save time at various stages of transportation.

For customers, this is an opportunity to significantly reduce

the time of delivery, as well as its cost,in which up to 40% is formed due to transportation costs. Their optimization through sharing will significantly reduce transportation prices. In addition, the trend of uberization reduces the number of intermediaries, which also helps to reduce the cost of transport services.

EXAMPLES

Google is actively working to spread the sharing ideology, which is why the corresponding SOFTWARE and applications are being developed. According to the company's version, driverless vehicles will not be idle 90% of the time waiting for the owner, but will be rented out until they have no need for a car using a regular smartphone. The company also hopes that they will be able to overcome the principle of «driving who owns» and for people-driven cars.

At the moment, only the main schemes for using sharing in the LOGI - stick are actively practiced: leasing out its own assets when the company itself is a direct participant, as well as providing resources for the development of forms of joint use. However, sharing can affect not only tangible assets, but even employees. Large logistics operators can provide qualified personnel for joint use. This type of sharing is especially relevant in the b2c segment for last-mile delivery.

EXAMPLES of successful start-UPS for the implementation of crowd deliverers (professional courier services) are the American Postmates and the Russian Bringo.

Experts from Transmetrics, a leading provider OF predictive optimization solutions for the logistics industry, believe that new systems often driven by startups that include elements of the sharing economy are rapidly gaining popularity.

Without having to have extensive experience with assets, startups tend to focus on the «easy-to-asset» parts of the value chain, such as turning into digital freight forwarders.

With more flexible operations, they can offer more flexible prices and offer quotes faster, while providing transparency.

This also applies to Uber, which launched its Uber Freight feature in the US in 2017, and expanded to Europe and Canada in 2019, aiming for a more efficient global market freight traffic. Uber Freight, according to Uber, is one of Its most promising businesses.

Personalization of transport and logistics services plays an important role. The needs

of each client are taken into account, and a personal package of services is formed for each client based on their preferences.

Moreover, the popularization of Uber-type services leads to the elimination of intermediaries from the market. For example, in the same air transport, digital solutions now allow direct access to the services of any carrier.

Uberization has caused an even greater transformation in the segment of passenger cars and cargo transportation. The services of the same taxi companies, operators who received calls and co-ordinated drivers were no longer needed. The consumer is not interested in spending too much time searching for and selecting a vehicle. Using the app on your smartphone, you can easily select the appropriate vehicle based on your own preferences and capabilities.

case: Yandex-taxi is one of the most striking examples of modernization in the Kazakhstan market of automobile passenger transportation. It provides the ability to search for a vehicle operatively, select the driver and vehicle level, have evaluation options, pay without a charge, and so on.

Uberization eliminated the problem of downtime. Now drivers spend 90% of their time on «busy» trips. The increased load has significantly reduced the cost of transportation. However, the extent to which this technology is applicable to the cargo transportation segment is still unknown, due to the fact that the load on this market is significantly lower than in the passenger segment, and the time spent is usually much higher.

The deep transformation of the mass consumer portrait determines the technological transformation of TLC. First of all, this concerns the personalization of digital services, the dissemination of ideas of the economy of shared consumption, interest in the environmental friendliness of products and services, as well as the availability of TL services against the background of fierce competition.

6.4.
NEW FUELS AND GREENING AS A REQUIREMENT FOR TLC: ALTERNATIVE AND ECO-TRANSPORT

Stricter environmental requirements and a global policy of significantly reducing CO2 emissions are a powerful incentive for the transformation of TLC. As mentioned above, about 90% of all emissions into the atmosphere come from the transport sector, primarily from road transport.

R & D in the field of obtaining new types of cheap and environmentally friendly fuel with high efficiency is one of the key areas of research in transport machinery and energy.

Given the growing concern that States and society in General are showing with regard to environmental issues, the mass popularization of alternative and eco-transport, as well as» green « logistics in the future leaves no doubt.

The new eco-culture that is being formed in the mass consciousness will lead to to a deep transformation of the TLC, which is also spurred by state measures in the form of both restrictions and measures to stimulate the transition to environmentally friendly transport.

EXAMPLES

Interest in alternative types of transport is stimulated by both subsidies and the creation of appropriate infrastructure. For example, the Finnish government plans to dramatically increase the number of gas stations in the coming years. There are only a few hundred of them now. According to the plan of the Cabinet of Ministers, in three years there will be 2 thousand of them, and by 2030 it will be 25 thousand.

There are restrictions on the use of old vehicles. Since July 1, 2016, cars manufactured before 1997, as well as motorcycles and scooters manufactured before 2000, cannot be used in the French capital on weekdays. The ban is valid from 8 am to 8 PM.

At the same time, many major retailers and TL companies publicly declare their commitment to environmental values and increase R & d in this direction.

EXAMPLES

Amazon has recently announced its «climate Commitment», which plans to achieve the goals of the Paris agreements 10 years earlier. By doing so, the company hopes to encourage the integration of other businesses and aim to become a zero - carbon company in all its operations by 2040 and promote renewable energy sources. To do this, Amazon has signed a contract to launch the Rivian electric vehicle for the supply of 100,000 electric vans.

Early 2020 more than 60 commercial groups, including MSCs, have launched an initiative aimed at using ships and marine fuels with zero carbon emissions on the high seas by 2030.

The key direction in the field of greening transport is the distribution of alternative and environmentally friendly vehicles. Some developments in this area have already entered the market, and some are undergoing testing or experimental testing and prototyping.

However, it is already clear that the alternative and ecotransport will dictate the conditions for the transport and logistics services market in the next 10 years. First of all, these are electric vehicles that run on electric traction.

The efficiency of traction motors is several times higher than that of internal combustion engines – 90-95%. For comparison, the most efficient internal combustion engine has an efficiency of 42%.

ELECTRIC VEHICLES ARE LESS EXPENSIVE TO MAINTAIN, MORE EFFICIENT IN TERMS OF AERODYNAMICS, AND MORE ECONOMICAL.

AT THE SAME TIME, IT WILL TAKE SOME TIME TO FULLY DEPLOY THE INFRASTRUCTURE FOR THIS TYPE OF TRANSPORT.

HOWEVER, A TIME HORIZON OF 10-15 YEARS IS MORE THAN ENOUGH TO MEET THIS CONDITION.

IN ADDITION, R & D IN THE FIELD OF ALTERNATIVE FUELS IS CURRENTLY BEING ACTIVELY CONDUCTED. IN PARTICULAR, SOLAR ENERGY, HYDROGEN AND BIOFUELS.

EXAMPLES

TeslaModel, the flagship of Tesla, is actively developing the tour infrastructure, offering significant privileges and technical support to various countries. The family of vehicles of this type includes both personal automobile transport and models for the cargo transportation market. At the same time, the infrastructure for their provision and MAINTENANCE involves the creation of a network of charging stations and a smaller number of MAINTENANCE stations that can be based on traditional service STATIONS, provided that the necessary equipment is available. As of the 3rd quarter of 2020, more than 205 thousand units were sold worldwide. electric vehicles of these types.

The eco-friendly Cargohopper truck, which is widely used in the Netherlands, runs entirely on solar energy. Its load capacity is about 2.5 tons. Vehicles that are 1.25 meters wide and 16 meters long can travel on roads that are inaccessible to regular cargo vans. At the same time, such a solar - powered eco-truck can transport the volume of cargo that fits in five trucks at a time.

In early July 2020, HyundaiMotor announced the launch of sales of the world's first mass-produced heavy truck powered by hydrogen fuel cells. The first 10 Hyundai XCIENT Fuel Cell vehicles have already been delivered to Switzerland.

In 2019, the UK introduced a prototype of Its own hydroflex hydrogen train. One of the four-car cars was equipped with a 100 KW fuel cell, Li-ion batteries, and 20 kilograms of compressed hydrogen. According to the design engineers, the train is powered most of the way from the contact network, and when this is not possible, it uses hydrogen reserves.

Another promising vector for the development of alternative transport is Maglev, or Maglev trains. Despite the high cost of building suitable infrastructure and trains themselves, in the long term, this innovation can become a locomotive for the greening of railway transport. The idea of this technology is quite old, but only now in the context of rapid NTP and increasing availability of some of the materials underlying composite machinery, this type of railway transport is gaining market interest. Technical features of vehicles significantly increase the safety of this type of transport, its speed, power, potential load and minimize the harm caused to the environment.

EXAMPLES

China is now actively engaged in the construction of paths for maglevs. China Railway Group engineers are developing models of trains and tracks that can accelerate up to 1000 km / s.the first section of the road has already been completed in Hubei province, and testing will begin next year.

The world record for Maglev acceleration set in Japan is 603 km/h.A special branch of the Maglev technology is the so - called Hyper - loops, which are high - speed railway tracks that maglevs will travel on in a vacuum.

R & D in this direction is still underway, but experimental developments are very promising and in the future 10-15 years may enter the global market of TL services.

When solving problems of safety with depressurization, dependence on external magnetic resonance effects, as well as the high cost of infrastructure, this technology can become an alternative to traditional Railways.

EXAMPLES

Hyper loop test sites are built in Hawthorne and Las Vegas (USA). A landfill is under construction in Toulouse (France).

Of course, some developments may seem like a product of the distant future. However, it is a given that transport technologies do not stand still. Their development is in many ways ahead of other industries.

Against the background of hypothetical ideas about a personal air car, teleports and other futuristic results of the NTP, domestic experts consider the development of these types of alternative transport to be an objective reality.

6.5.
A NEW GENERATION OF EMPLOYEES-AN OPPORTUNITY OR A THREAT?

People of the XXI century will live in a new digital reality. The level of its interaction with a variety of it is constantly growing. The number of gadgets that modern youth use every day and the amount of time they devote to technology is steadily growing.

Generations Y and Z are a completely new mass socio-cultural and socio-economic paradigm. For those born after 1995, the world looks different, they perceive it differently. What matters to them is not the brand, title, or high - profile story, but the culture and experience built around it.Today's youth represent a completely new formation, a special category of people who were "born and live" with a button on their finger. They are constantly online. There are no stable, solid, long-term trends in their life. Fashion changes every day.

Young people need a rationale for any theory, proposal, or initiative. Age ceases to be an authority for them. They have their own opinions and ideas about the world. And even if they may not enter into a polemic, they will leave their opinion unchanged.

Young people do not want to work hard and for a long time to build their lives. They need success here and now. the main value is satisfaction of current needs. Modern youth does not like to make plans for the distant future.

This is the portrait of the main Pro-layer of employees of any organization in the next 10-15 years. Their age in the 2030s will vary in the range of 34-48 years, and this will be the most active part of the world's population. These are technical people who are completely loaded online. This means that their technology needs will only grow.

Their competencies will be diverse, but entirely based on on technological development. In their work, they rely entirely on technical tools. Traditional formal education takes a back seat for them. The priority is self-development, and remote, which does not require special organizational efforts, and is as digitized and accessible as possible.

TLC has long been characterized by a trend of outflow of qualified personnel. At the same time, the influx of fresh young personnel has decreased to minimal values. This is due to low wages in the industry, the lack of clear prospects and the weak prestige of this area.

It should be noted that most Kazakhstani experts consider the level of competence of our «Millennials» to be extremely low, and requests are irrelevant to potential returns. In

> Generations Y and Z in the next 15 years will be the engines of progress, socio-economic development, and- economic, cultural, scientific and technical development. And they will determine the reality of the market. This is a mobile, flexible, socially active layer of society that is inextricably linked to it. And its impact on the development of all sectors of the economy and the labor market is difficult to overestimate.

other words, a young employee wants to get the maximum income, but their real capabilities are not adequate to the requested conditions.

As a result, there is an unavoidable business problem that hinders the creation of an effective team of young employees. On the one hand, business needs fresh blood, people who own modern technologies and are digitally savvy.

On the other hand, young people who meet these criteria ignore TLC due to its low profitability. As a result, low - skilled workers enter the industry, and businesses have to invest in their training.

The second industry trend, partly caused by the need for rapid training and retraining of staff, including low - skilled workers, as well as increased engagement and the fight against turnover, is the gamification of training and management.

Gamification involves the introduction of game elements in business processes and the process of training personnel.

Simulation of work situations, player ratings, the use of various popular scenarios in processes, and the game approach, which is very popular among young people and intuitive to them, allow gamification to significantly increase HR indicators.

EXAMPLES

The logistics division of Ulmart has dramatically increased the involvement of young employees aged 20 to 30 years and their productivity indicators thanks to Star wars - themed gamification.

The use of immersive technologies in gamification processes will further increase the capabilities of this approach. For example, employees-players will be able to collect various items in the virtual twin warehouse, receiving bonuses for them. At the same time, the collection will be carried out along the most optimized route, which will help to increase the efficiency of the employee.

Another important trend is the shift to remote management. This is where robotics, virtualization, and driverless transport will come to the fore.

TL companies will not need to maintain a large staff of drivers, warehouse workers, etc. Several operators can manage the fleet from a small control center or even at home.

Entering the labor market of a new generation of personnel becomes an opportunity for TLC to attract employees of a new formation that is closely connected with digital reality. Given the pace at which digitalization and automation are currently moving, such people can become guides and catalysts in the process of technological modernization of the transport and logistics industry.

By building the necessary comfortable ecosystem of work, leisure, training, and social interaction within the company for them, creating an environment suitable for their worldview that takes into account various non - material needs, employers will be able to attract and retain such employees, which means that they will successfully transform.

The range of solutions required for smooth absorption of these changes is quite wide, but differentiated. If the digitalization factor can only rely on digital solutions that will have a very strong effect on the development of the industry, then there is a larger set of solutions for other transformation factors.

Thus, changes in processes due to the introduction of new software PACKAGES will be based on such already existing technologies and trends as its, blockchain (DLT - technology of distributed registries), AI-based solutions, immersive technologies, IoT, etc.4PL is gradually evolving into 5PL. Digital solutions are becoming increasingly important in both internal and external processes and interactions.

In turn, automation and robotization will be based on the use of drones and Autonomous vehicles, robots of various profiles, infrastructure for predictive state analysis, additive technologies, etc.

Under the influence of stricter environmental regulations and the popularity of eco-culture, various types of alternative and environmentally friendly transport will be actively developed, such as electric cars and hybrids, hydrogen and biofuels vehicles, and in the long term, such complex technologies as maglevs and Hyper-loops.

The transformation of the global market, an increasing bias towards e-Commerce, the growing popularity of the economy of joint consumption and the need for personalization of services, uberization and an emphasis on personal comfort dictate new conditions of existence for the transport and logistics industry, which can become both a threat and an opportunity for a breakthrough leap in development.

Against this background, one of the key components is quality staffing. In the next 10-15 years, the main backbone of any company will be «Millennials, guided by different principles, stereo types and ideas than the old generations.

However, they also bring with them a digital transformation, a new model of socio - economic relations, and a new mental and cultural reality. Therefore, those companies that can smoothly absorb, retain and effectively use this pool of young employees will be the growth leaders in the new digital paradigm of global competition.

A LOOK INTO THE FUTURE OF THE TRANSPORT AND LOGISTICS INDUSTRY IN KAZAKHSTAN: EXPERT ASSESSMENTS.

7.

A LOOK INTO THE FUTURE OF THE TRANSPORT AND LOGISTICS INDUSTRY IN KAZAKHSTAN: EXPERT ASSESSMENTS.

Technical re-equipment, emphasis on eco-optimization and implementation of advanced it solutions will significantly change the configuration of the transport and logistics system in Kazakhstan. What future awaits it in the next 10-15 years? Can we integrate modern technical innovations quickly and smoothly? What problems and risks do we face? What opportunities open up?

In the previous sections, we have considered many different socio-economic and technological trends. We have studied a number of modern and promising innovations that can fundamentally transform the market of transport and logistics services, accelerate and improve them.

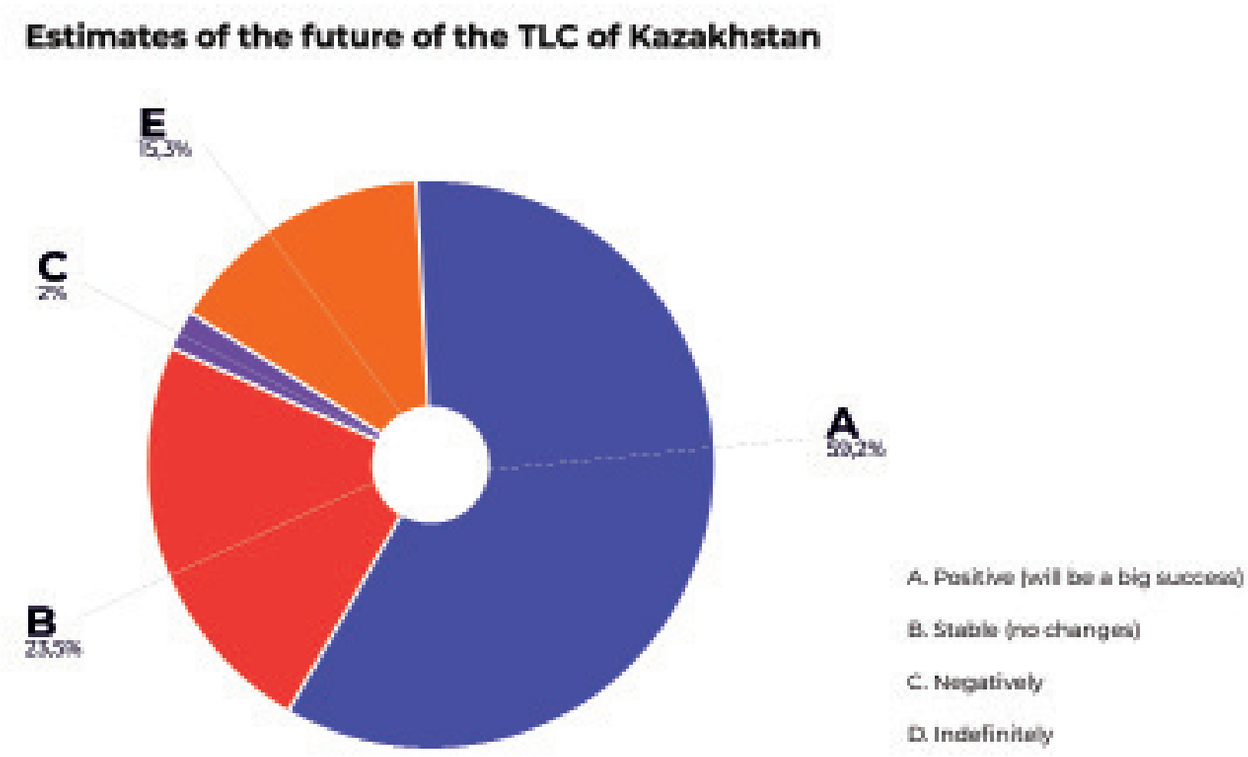
However, a large - scale expert survey was conducted in order to detail the prospects for Kazakh-Estonian realities.

Through the prism of the opinions of industry professionals, logisticians, representatives of the aviation industry, railway, sea and river transportation-for example, major multimodal 4PL companies have formulated some key forecasts regarding the future of Kazakhstan's TLC.

FORECAST №1

THE TRANSPORT AND LOGISTICS SECTOR WILL DEVELOP SUCCESSFULLY,
AND IT IS READY FOR FUTURE SOCIO-ECONOMIC AND TECHNOLOGICAL TRANSFORMATIONS

Figure 7.1.



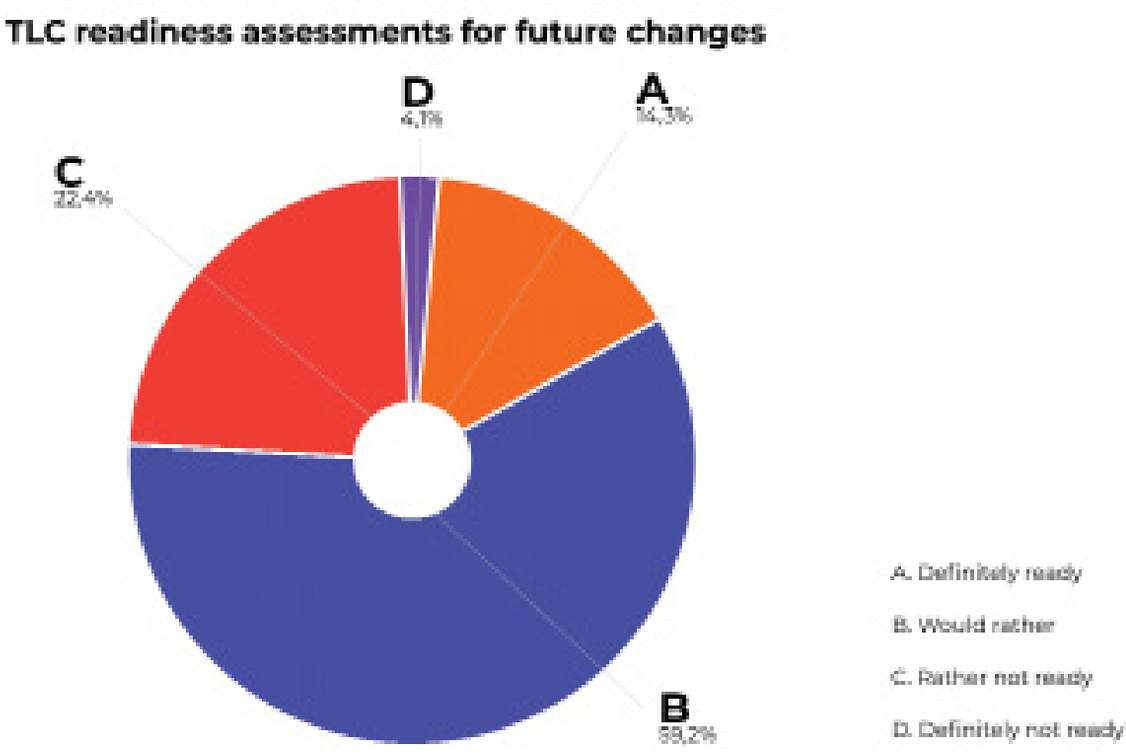
The vast majority of experts believe that Kazakhstan's TLC has broad prospects. Only 2% of respondents doubt its future.

At the same time, the share of those who could not give a single - digit estimate is quite high – 15.3%, most of whom (13.1 percentage points) are representatives of the passenger transport sector. Their pessimism can be attributed to a sharp decline in the profitability of this area of transport services due to the COVID-19 pandemic.

The expert community is equally optimistic about TLC's readiness for the upcoming changes in both production processes and consumer behavior, as well as in the context of political and technological factors. More than 73% of respondents confirmed the readiness of the transport and logistics industry of our country to the expected changes. However, more than a quarter of respondents (26.5%) gave a negative assessment. At the same time, many of the doubters are managers of large logistics companies, which often demonstrate inertia and indifference to innovation due to the cost of technological re - equipment of the entire transport fleet and logistics infrastructure, as well as complex administrative and bureaucratic procedures necessary for their initiation.

Small and more flexible market entities for transport and logistics services are more dynamic and active in terms of introducing technical innovations that allow optimizing processes and costs.

Figure 7.2.



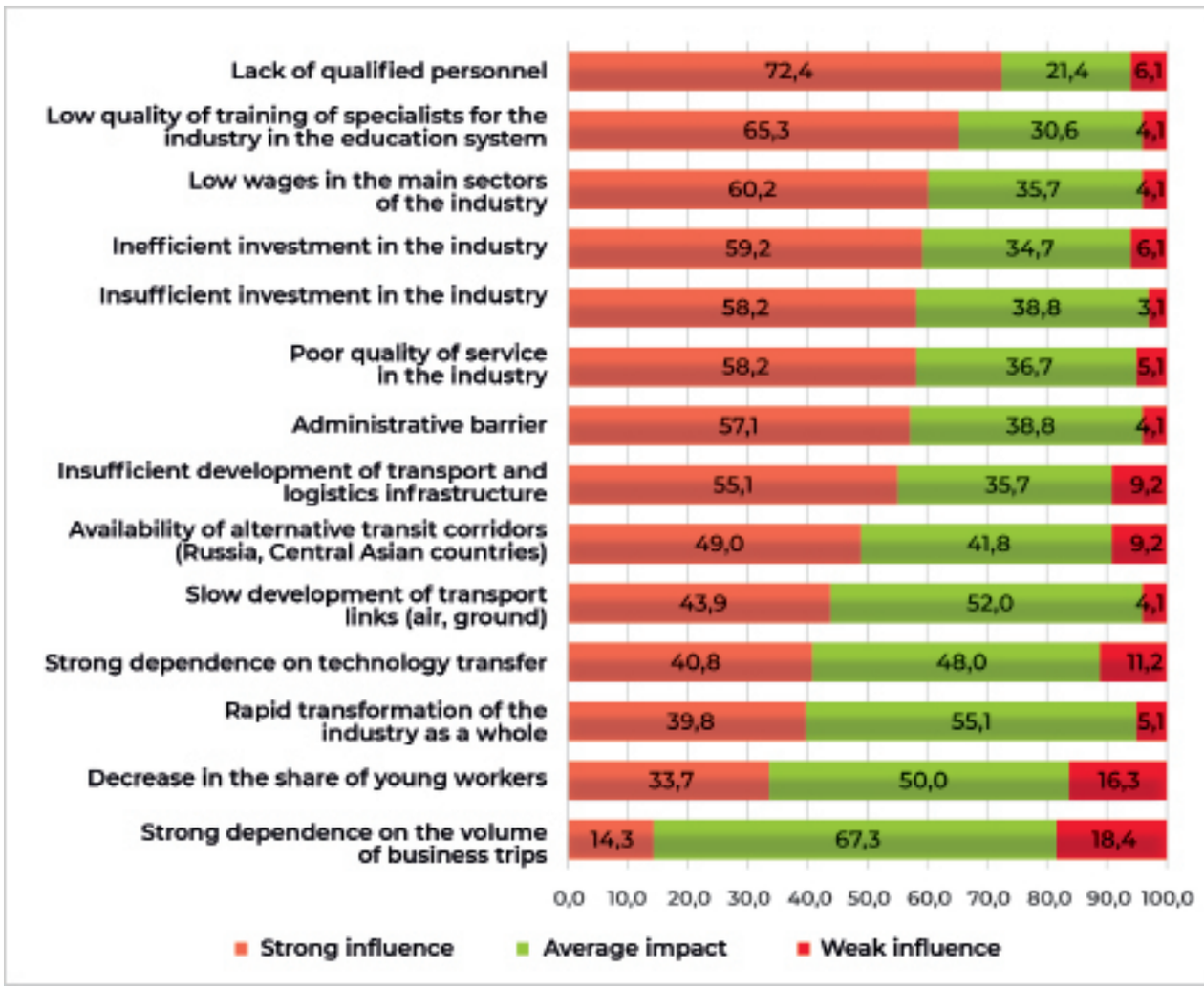
FORECAST №2

THE SHORTAGE OF QUALIFIED PERSONNEL IS NOW
THE MOST ACUTE INDUSTRY PROBLEM.
IT WILL ALSO BE ONE OF THE KEY RISKS OF THE FUTURE.

Along with the lack of human resources and the low quality of their training in educational institutions, the main problems of TLC in Kazakhstan are low wages, insufficient and inefficient investment, as well as a weak level of service.

In addition, according to the expert community, such factors as a strong dependence on the volume of business trips, high rates of industry transformation, slow development of transport links, as well as a decrease in the share of young workers are important.

Figure 7.3.
Estimates of the impact of industry problems on its development (%)



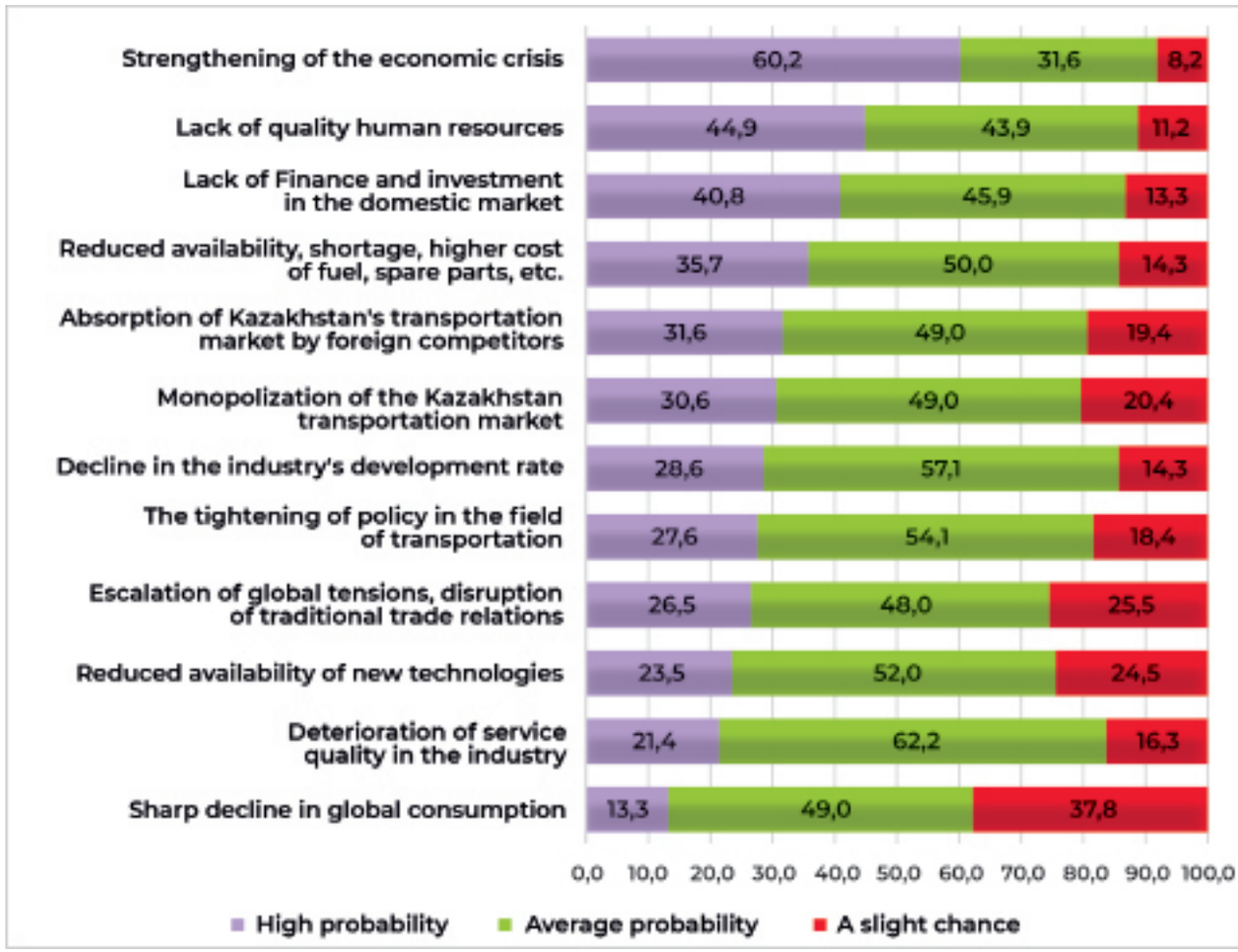
FORECAST №3

THE MOST LIKELY FUTURE RISKS FOR TLC ARE AN INCREASED ECONOMIC CRISIS, STAFF SHORTAGES, AND INSUFFICIENT FUNDING.

Almost 90% of experts believe that the problem of lack of qualified specialists in the future 10-15 years will not be solved and it will remain a key constraint on the development of TLC. However, the leading risk, the occurrence of which will have the greatest impact on the industry, is recognized as the strengthening of the economic crisis.

In turn, the least likely risks are a sharp decline in the global level of consumption, an escalation of global tensions that can lead to a break in traditional trade relations, a decrease in the availability of new technologies, as well as the monopolization of the transport market and its capture by foreign competitors.

Figure 7.5.
Estimates of the probability of the implementation of risks in the future (%)

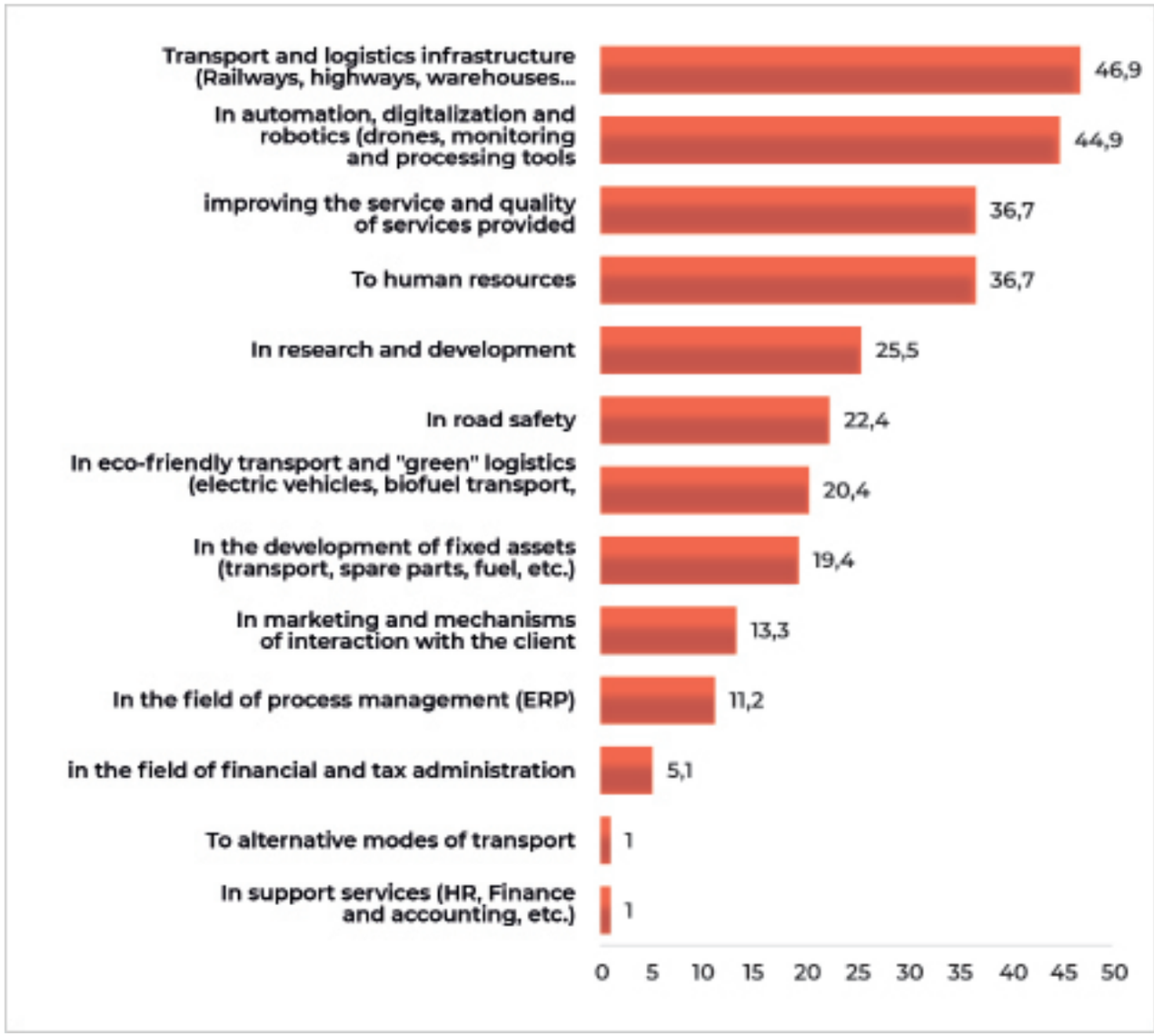


FORECAST №4

THE MAIN INVESTMENTS WILL BE DIRECTED TO IN IMPROVING TRANSPORT AND LOGISTICS INFRASTRUCTURE, AUTOMATION, DIGITALIZATION AND ROBOTICS, AS WELL AS IN STAFFING AND IMPROVING THE QUALITY OF SERVICES PROVIDED.R.

Development of alternative transport in Kazakhstan will be slow. The business does not consider it a profitable investment object even in the remote assessment of the probability of risk realization in the future (%)

Figure 7.6.
Estimates of investment directions (%)



Less than 1% of experts believe that the alternative transport segment will be a priority vector of investment for transport and logistics companies. This is due to the high cost, long payback period, and significant risks of implementing such projects.

For example, such types of transport as maglevs and hyperpaths in the context of cargo and passenger transport may remain unclaimed even if the appropriate infrastructure is created for them. On the other hand, in the consumer segment, the popularization of personal alternative modes of transport will increase against the background of changing consumer preferences and the trend of ecologization. It is noteworthy that eco-friendly transport is also not a subject of interest for Kazakhstan's TL business. Only 20.4% of experts noted this area as a priority investment object.

FORECAST №5

THE RESULT OF INVESTING IN AUTOMATION, ROBOTICS AND DIGITALIZATION WILL BE A TECHNOLOGICAL BREAKTHROUGH IN THE ORGANIZATION AND REGULATION OF TRANSPORT FLOWS, WAREHOUSING AND STORAGE OF GOODS, TRANSPORT AND LOGISTICS INFRASTRUCTURE, AS WELL AS IN THE MANAGEMENT OF WORK PROCESSES AND LOGISTICS CHAINS.

At the same time, unmanned transportation, primarily cargo transportation, will gradually develop, new types of fuel and personal transport will spread, and a technical leap in the field of eco - transport and «green» logistics is also possible. The expert community least expects a breakthrough in sea and river transport and administrative issues. 32.7% of respondents considered that there is little likelihood of technical re - equipment in these areas.

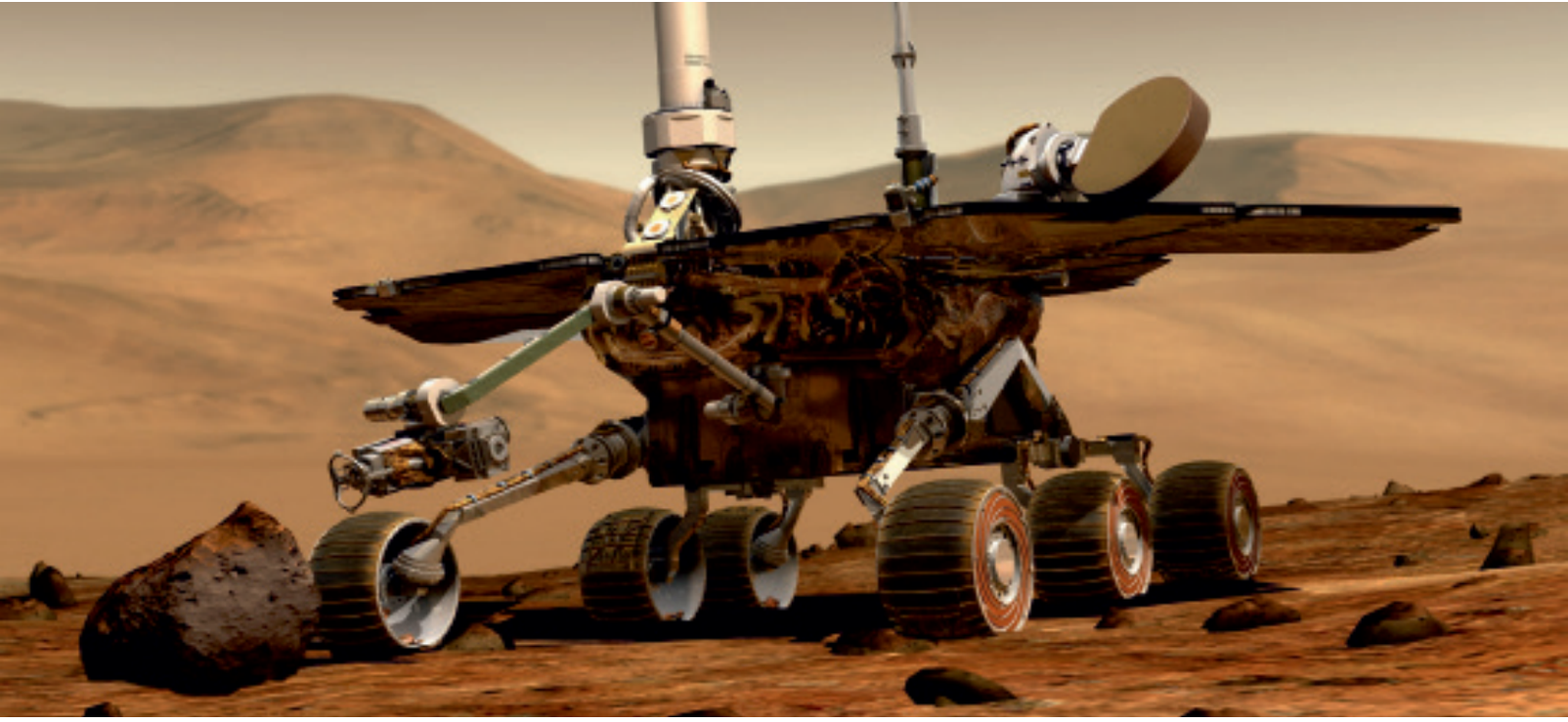
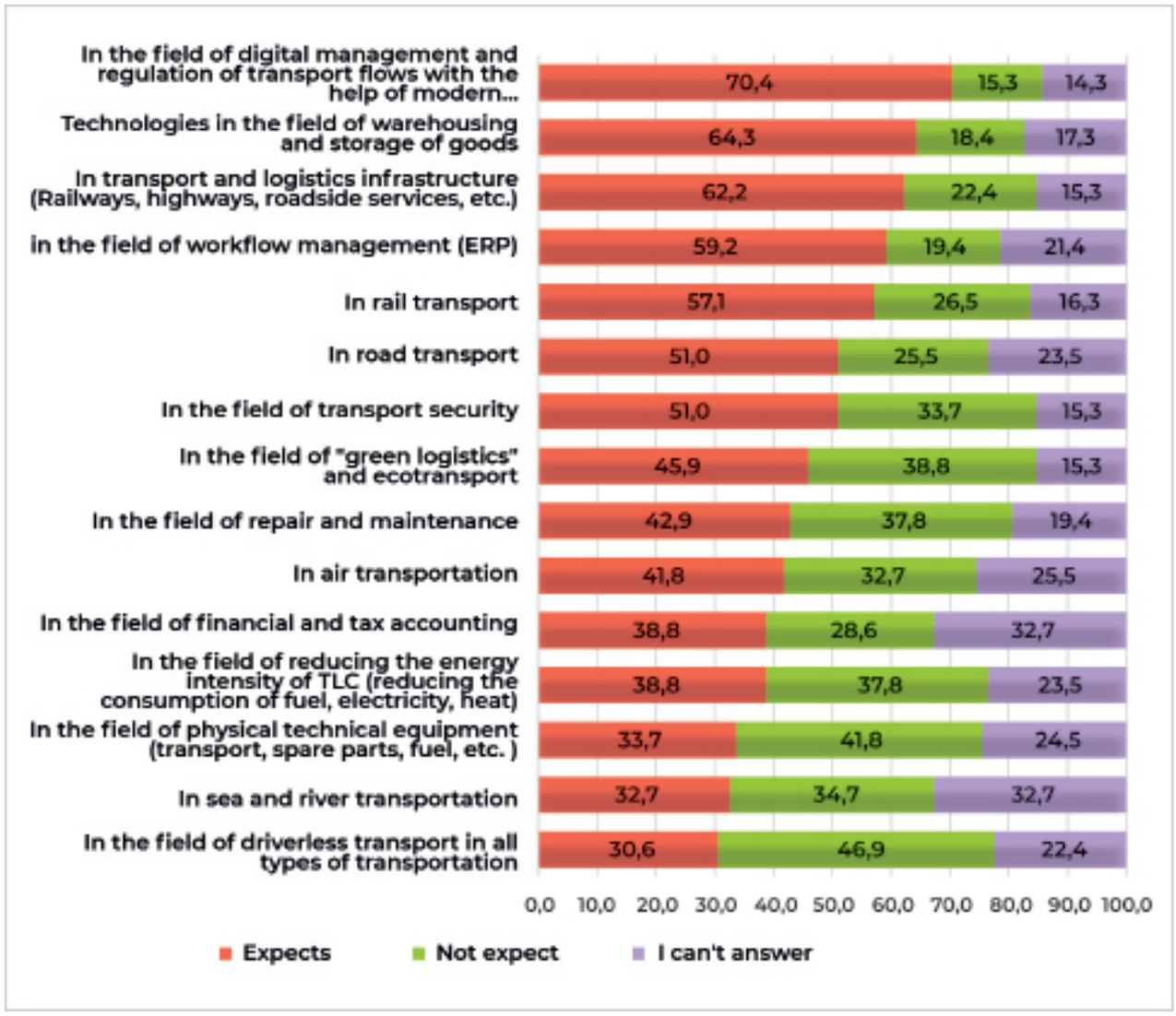


Figure 7.7.

Respondents 'answers to the question:» is a technological breakthrough expected in the following areas of Kazakhstan's TLC?»



FORECAST №6

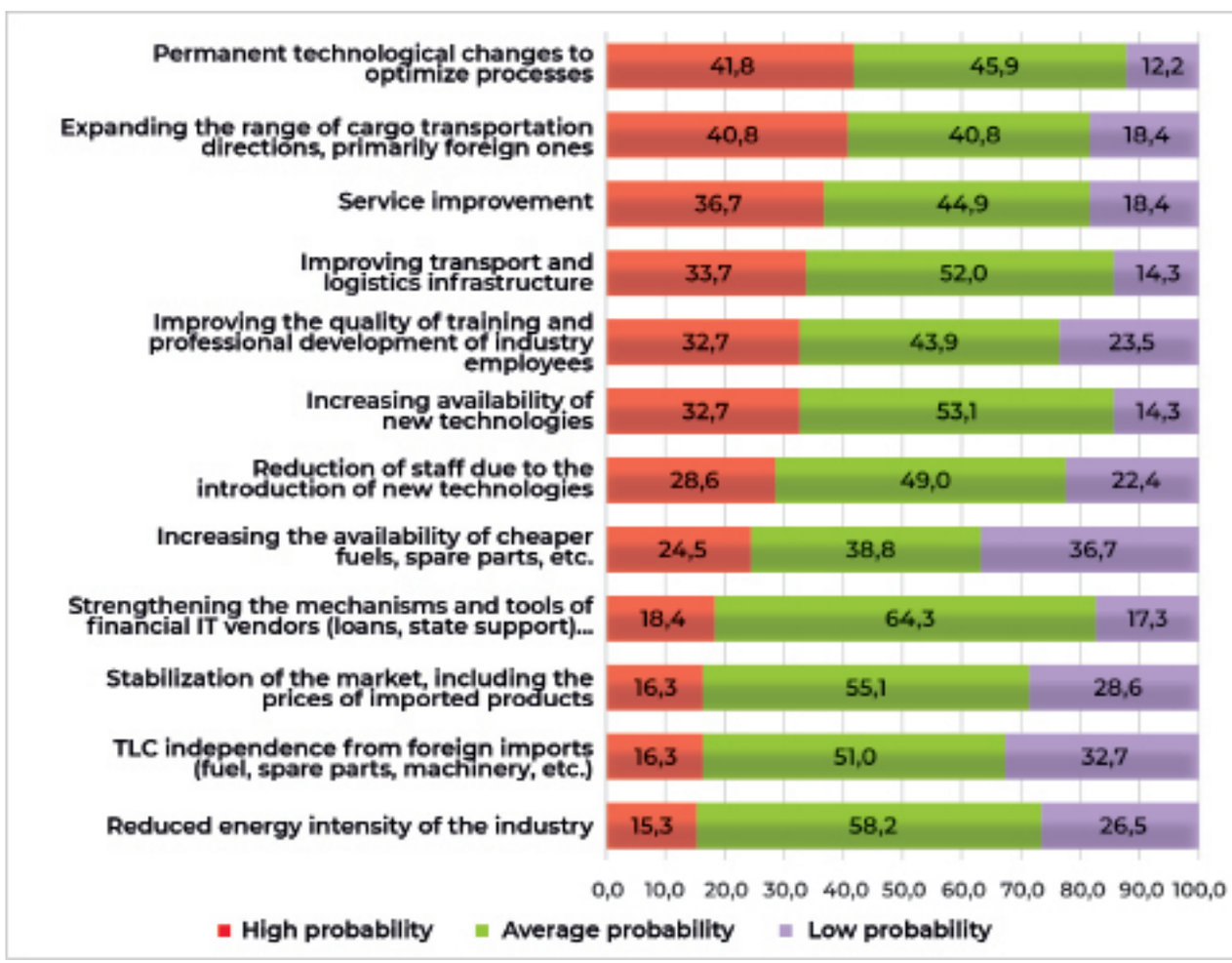
A KEY OPPORTUNITY FOR BUSINESSES ENGAGED IN TRANSPORT AND LOGISTICS WILL BE TECHNOLOGICAL RE-EQUIPMENT, WHICH WILL SIGNIFICANTLY INCREASE THEIR MARKET POTENTIAL AND THE VOLUME OF SERVICES PROVIDED WITH A PARALLEL DECREASE IN COSTS.

In addition, experts highly assess the likelihood of expanding the range of cargo transit routes as a result of the implementation of the Belt and road initiative and new trade corridors.

36.7% of respondents believe that with the help of new technologies, as a result of changing consumer preferences and market configuration, the business can significantly improve the quality of service.

First of all, this will affect the field of e-Commerce and delivery on the last mile sections.

Figure 7.8.
Estimates of the probability of new opportunities for TLC (%)

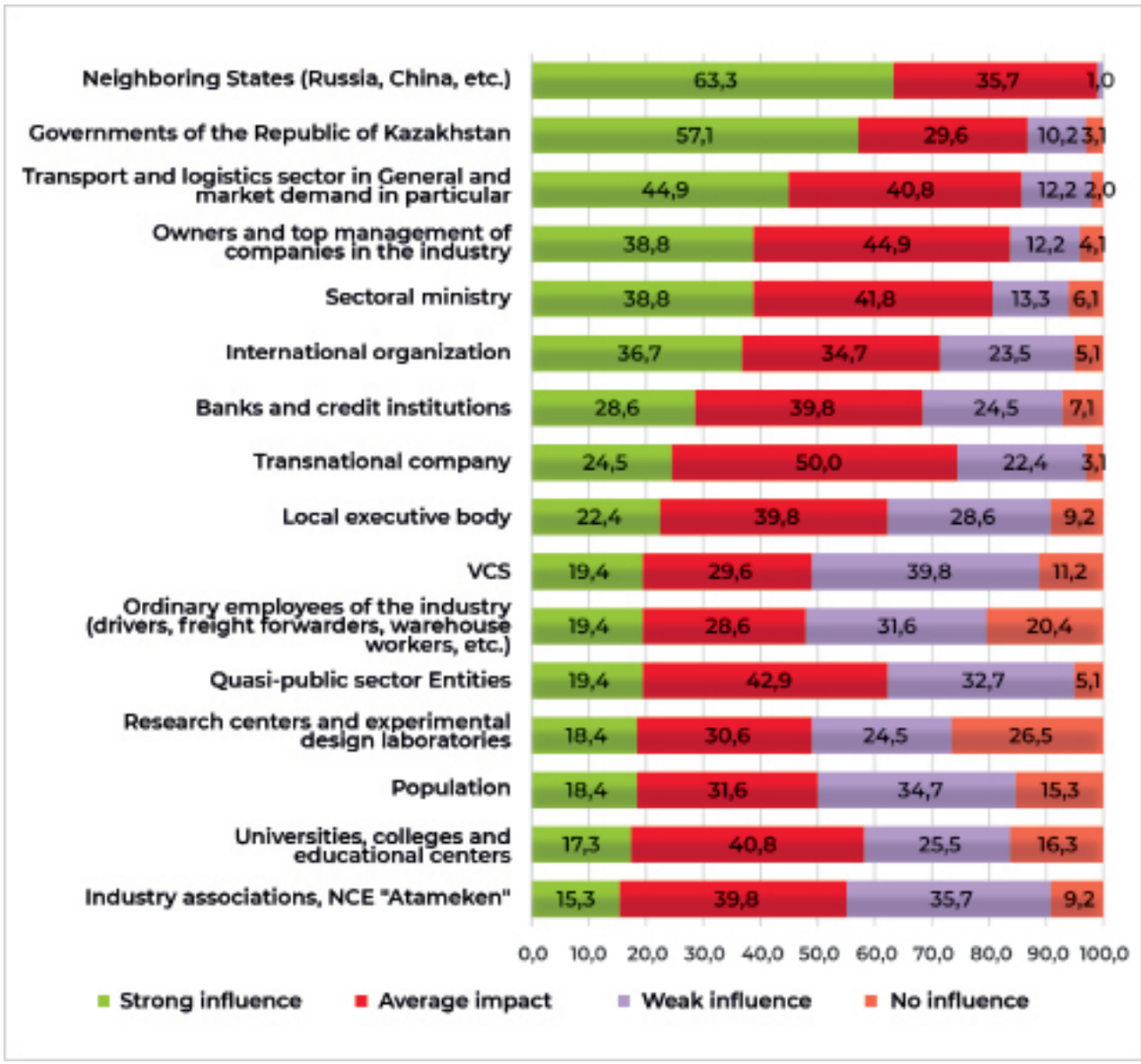


FORECAST №7

NEIGHBORING STATES WILL HAVE THE GREATEST IMPACT ON THE DEVELOPMENT OF TLC DUE TO THEIR KEY IMPORTANCE FOR REALIZING THE TRANSIT POTENTIAL OF KAZAKHSTAN.

In addition, the government of the Republic of Kazakhstan will play an important role, which is expected to reduce administrative barriers, simplify customs and inspection procedures, and generally ease the bureaucratic burden. 57.1% of respondents believe that

Figure 7.9.
Assessment of the level of influence of various subjects on the development of TLC KAZAKHSTAN in the future (%)



public policy will have a decisive impact on the pace and direction of TLC development.

Along with these subjects, market realities, which will be determined by business, as well as the degree of development of domestic and transit transport, are of key importance.

In this aspect, a major role is assigned to improving the service and developing the transport and logistics infrastructure. At the same time, the role of the population as a basic consumer, according to the expert community, will be low.

The least influential subjects will be educational institutions and industry associations.

Only 17.3% and 15.3% of respondents, respectively, considered that these structures will have a significant impact on the industry.

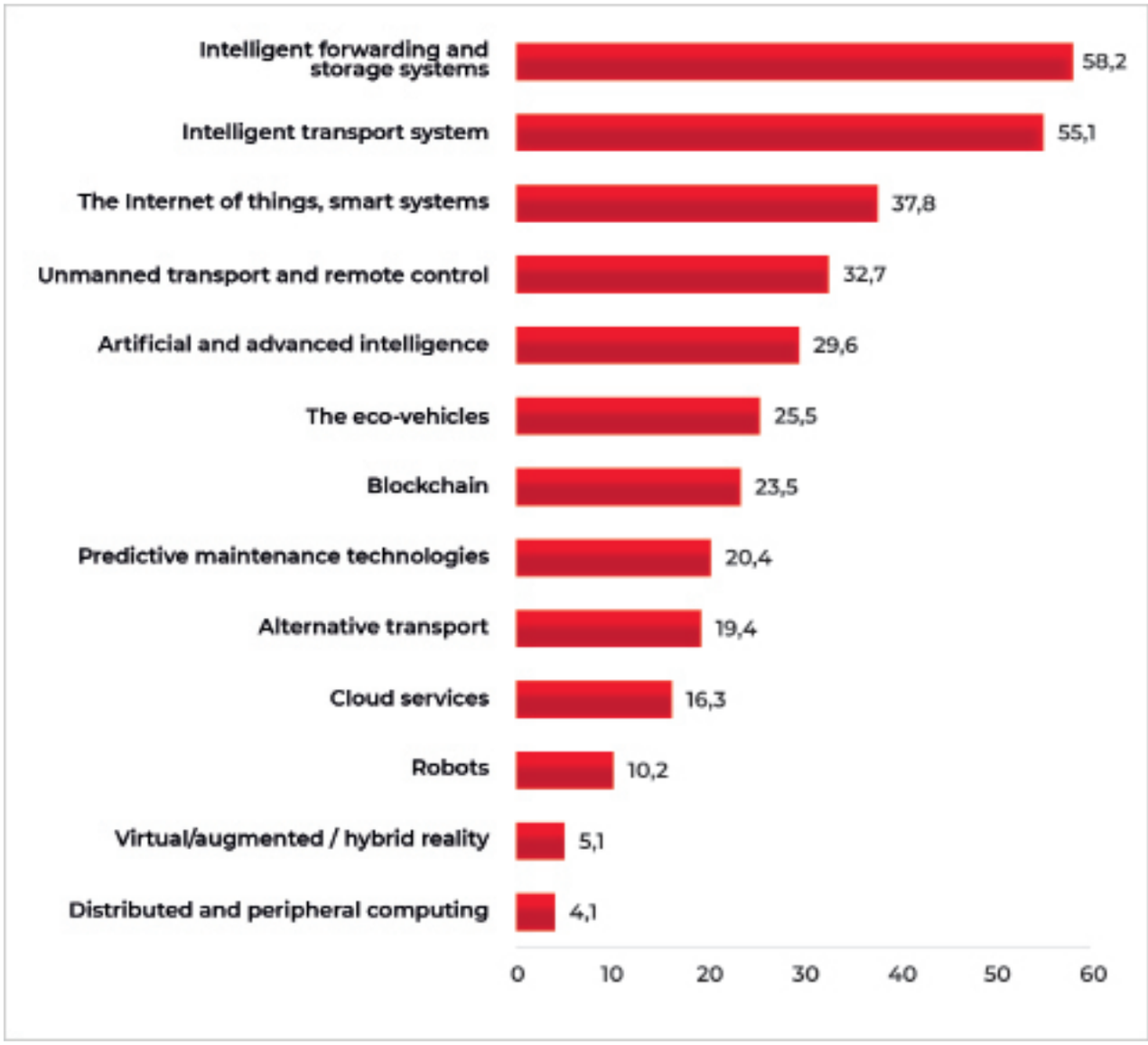
FORECAST №8

TECHNOLOGIES SUCH AS ITS, INTELLIGENT FORWARDING AND WAREHOUSING SYSTEMS, AND IOT WILL HAVE THE GREATEST IMPACT ON THE TRANSFORMATION OF TLC AND DRIVERLESS TRANSPORT.

Innovations related to road transport primarily affect cargo transportation. In the long term, passenger transport will also switch to Autonomous management, but people will still be present for security reasons. Intelligent systems that can process large amounts of data and provide rapid coordination and management of traffic, storage spaces, and delivery chains will play a key role.

According to the industry community, distributed re - esters and peripheral computing systems

Figure 7.10.
Estimates of the impact of advanced technologies on the development of TLC (%)



will have the least impact, however, it should be noted that the prospects for these technologies in TLC remain undervalued.

FORECAST №9

THE TLC OF KAZAKHSTAN WILL DEVELOP SUCCESSFULLY IN THE FUTURE, AND THE FOCUS OF THIS PROCESS WILL BE ON PEOPLE AND THEIR SAFETY.

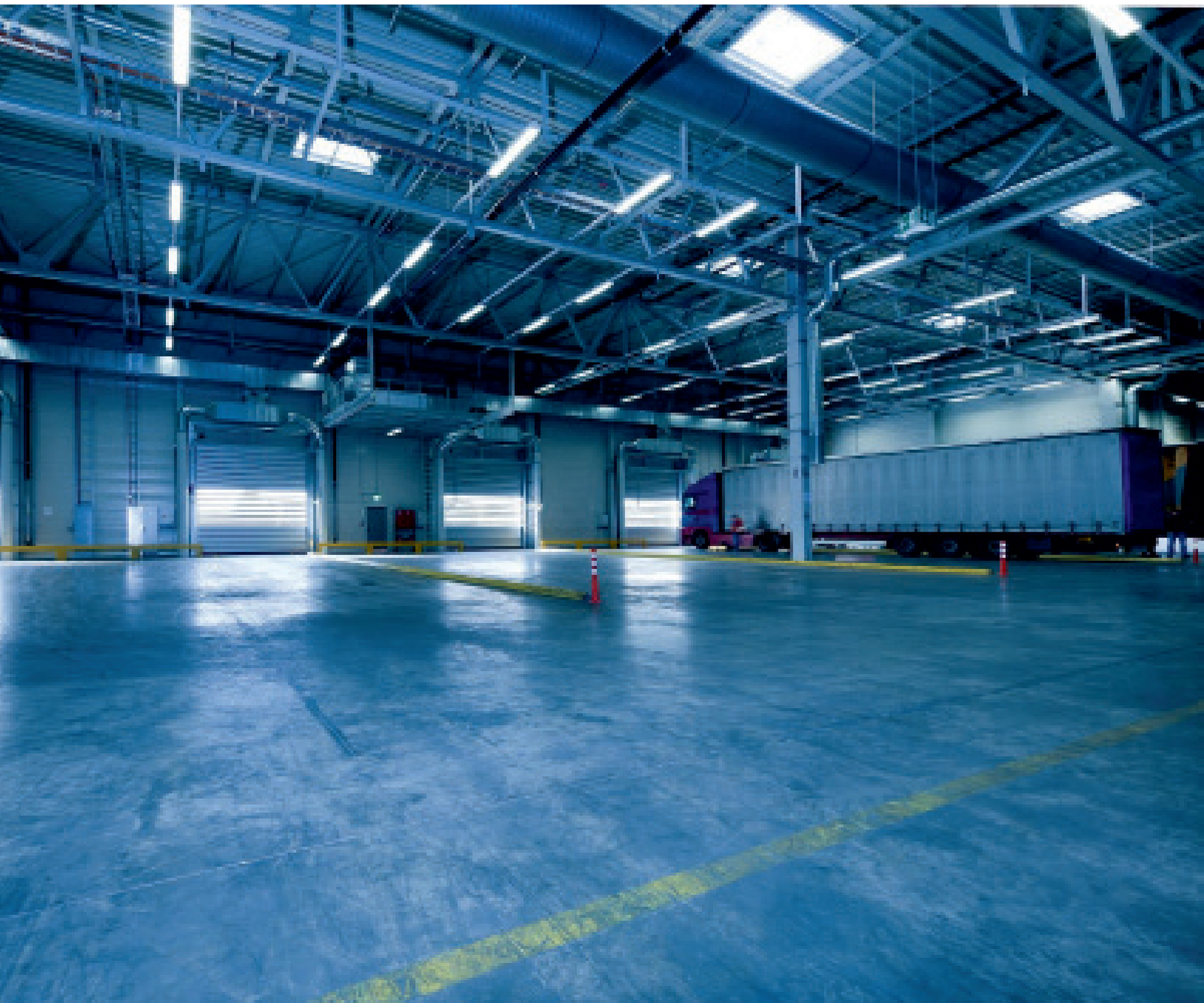
Kazakhstan's transport and logistics sector will be characterized by the following priorities:

development, movement forward-22.4%;

human safety of life-inactivity-8.2%;

technological progress, stability and new opportunities – 7.1%.

The associations with the word future indicated by experts allow us to hope for the successful development of the transport and logistics industry, provided that modern problems are eliminated and promising risks are prevent-

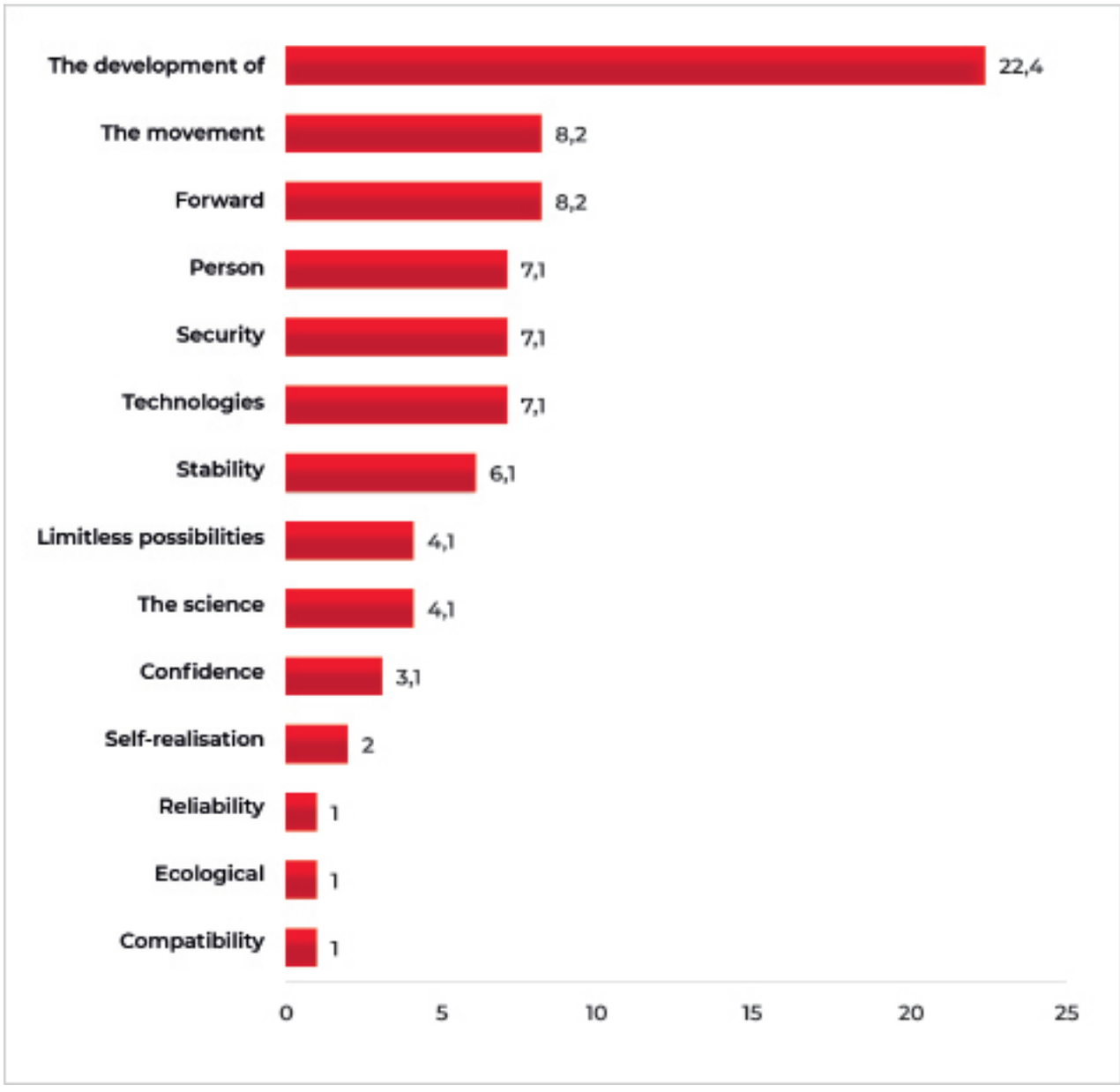


ed. At the same time, it is especially important to keep up with the NTP, quickly and smoothly introduce new technologies, and take into account all possible socio-economic and political factors.

The TRANS-border nature of TLCs necessitates taking into account many unforeseen situations that may arise as a result of decisions taken by other States and changes in the global geopolitical situation.

At the same time, a key component of progressive development should be a focus on the end user. Customer focus and personalization of transport and logistics services will become the cornerstones of TLC in the future.

Figure 7.11.
Experts ' determination of the associative image of the future (%)



8. IMAGE OF THE FUTURE AND FORECASTS OF DEVELOPMENT OF THE TRANSPORT AND LOGISTICS COMPLEX OF KAZAKHSTAN.

IMAGE OF THE FUTURE AND FORECASTS OF DEVELOPMENT OF THE TRANSPORT AND LOGISTICS COMPLEX OF KAZAKHSTAN.

What will the transport and logistics industry of Kazakhstan look like in 15 years? What technological innovations will appear on our market, and which will not be able to adapt to our conditions due to social, economic, cultural and political features?

It is not possible to give specific answers to these questions. There can be no unambiguous invariant due to the huge number of factors, risks, opportunities and conditions that determine the vectors and rates of TLC development. However, it is quite possible to approximate forecast - scenario variations to the most likely versions formulated based on foresight research.

Most experts, as mentioned above, generally positively assess the prospects of the transport and logistics sector of our country. They point to opportunities for business development and improving the quality of service with the help of advanced technologies, primarily in the field of it, as well as the need to personalize customer service.

It is important to take into account the specifics of the services provided, clearly delineating the horizons and depth of transformation of various subgroups of the industry under study, such as, for example, passenger and cargo transportation, the logistics sector and the sphere of traffic management. Each TLC segment has its own special conditions that require careful study of its features and characteristics.

For example, an unmanned transport port will be actively used in cargo transportation, but its use in passenger transport will be significantly limited. Sea and river transport, as well as aviation, will need human involvement for a long time, while land transport, such as rail and road transport, may be automated in 15 years.

However, one thing is certain. If we don't get on the rails of technological re - equipment in the coming years and change the business configuration of TLC

to meet current trends, then in the future, we will become an economic outsider, unable to meet the global needs for transport and logistics services.

At the same time, it is pointless to count on a comprehensive broad - scale technological leap, since, as noted above, Kazakhstan needs to overcome many different obstacles and solve a wide range of problems. That nevertheless, innovations are necessary, and they help to overcome these difficulties in many ways, but at the same time they dictate a completely new paradigm of the transport and logistics services market, both internal and external. Therefore, the technical update process should be approached carefully, carefully weighing the risks and thinking through the prospects. Not to undertake extremely risky pompous projects based on image assumptions, but to analyze their profitability in detail, not to plunge into the total implementation of advanced technologies, but on the basis of pedantic assessments of their capabilities and adaptability to our realities, to organize their subsequent dosed integration in accordance with objective needs.

As a result, it is necessary to approach the preparation of future personnel carefully, without disturbing the balance between the pace and number of specialists and the actual needs of the labor market.

Thus, the TLC of Kazakhstan needs to increase its innovation activity and accelerate its development, but move along well-thought-out vectors, without launching into rampant modernization. To do this, we have created a clear and most likely image of the future of the industry in the time horizon of 15 years, based on the expert opinions set out in the course of the survey. Based on it, possible scenarios for the development of TLC in the future were identified.

AT THE TURN OF THE 2030S:

TLC of Kazakhstan will actively implement advanced technologies based on AI, the Internet of things, and intelligent control and dispatching systems that analyze large amounts of data. As a result of large-scale digitalization and automation, traffic coordination will improve, traffic safety will increase, and traffic speed will increase.

More and more functionality in the field of transportation falls on robotic AI, which gradually displaces people from both mechanical processes and managerial decision-making.

Ground transport, including rail transport, will be integrated into a single digital data exchange system that will allow organizing complex traffic coordination, optimizing logistics chains, monitoring the situation in multimodal transport hubs, and so on. In the future, this system will include air, sea and river transport, which will create a common platform for organizing transport traffic and simplify the process of building logistics. Digital logistics maps, which are virtual counterparts of the country's transport systems that display the current situation in real time, will allow you to track the status of any transport, regardless of its location, remotely visualize the vehicle, assess its condition, and check the safety of the transport by means of special machine vision sensors and immersive technologies.

In the freight transport segment, remote - controlled and Autonomous modes of transport are increasingly used. Truck drivers, train drivers, aircraft pilots, and ship commanders will learn how to remotely control their vehicles using immersive technologies, as well as using neural interfaces, tactile contact modulation, and AI integration that allow pilots and drivers to "become the machine it-

self". xpanded (hybrid) intelligence, automated monitoring and control systems, IoT data and predictive analysis of the state of aggregates will allow minimizing the crews of large vehicles. In addition, due to optimization of residential and domestic premises on ships, their tonnage will increase.

Different levels of autonomy will allow you to vary the degree of human involvement, however remote the prospect of a fully Autonomous vehicle desactualizado human management. The personnel will only remotely perform monitoring functions and operational interception of control in the event of force majeure situations.

Transport is gradually switching to environmentally friendly fuels (biofuels, water fuel, electric traction, etc.). the transport sector's CO2 Emissions are reduced to minimum values.

Infrastructure is being built for innovative railway transportation, such as Maglev trains and hyperpaths. The launch of a full - scale alternative railway transport system is expected after 2040. At the same time, maglevs will be actively used in transit cargo transportation, and their networks will be connected to a single backbone module operating within the framework of the "one belt and one road"project. Hyperpaths will connect the main population centers of the country, shortening the duration of the trip. For example, a trip between the capital and Almaty will take about an hour. Key transport Magi-strals are hybridized by means of convergence of traditional and prospective transport. A regular automobile road will be adjacent to high-speed railway lines and routes for alternative and driverless transport.New types of aircraft that reach supersonic and hypersonic speeds are emerging in the aviation industry.

Intelligent dispatching, which operates on the basis of advanced its, makes it possible to increase the volume of transportation, increase their speed and improve the quality of multimodal transport logistics, as well as eliminate the human factor in the process of traffic coordination. Big data analysis is becoming a key tool for monitoring and forecasting traffic and deterministic tracking of cargo and passenger flows.

Aircraft are becoming more and more spacious due to the use of composite materials and nanotechnology.In order to ensure the safety of air transport, a single blockchain platform has been created that aggregates real - time data on the flights of all controlled and unmanned aerial vehicles. Neural networks analyze large amounts of data and transmit them to an intelligent Autonomous dispatching system that coordinates traffic

in the air. Operators of intelligent dispatching will track its functioning through scalable digital counterparts.

In all segments of passenger transport, ground handling procedures are simplified and automated. Bureaucratic, customs and inspection procedures in transport hubs are optimized and deformed using modern technologies. In particular, biometric registration and monitoring of passenger traffic are becoming the main means of increasing the capacity of railway stations, sea and air ports. The passenger passes the check once, and within a few minutes, after which no additional daily checks are required. Clothing and footwear scanners, facial recognition technology, and biometric sensors will track passengers right up to their boarding without creating any inconvenience.

The popularization of personal Autonomous vehicles, which function thanks to AI and machine vision technologies, will increase road safety, since the human factor, which is now the cause of 90% of accidents, will be eliminated.

Each car will be equipped with IoT sensors, peripheral computing devices and connected to a common network that functions on the basis of distributed registries, in particular, the blockchain platform. This allows unmanned ground vehicles to interact with each other, track and predict the course and possible trajectories of neighboring cars in the flow, plot a route taking into account the load and traffic changes in real time, making decisions instantly thanks to PV and AI, as well as coordination with its. As a result, the speed, comfort and safety of driving in private vehicles will reach an unprecedented level.

At the same time, with cheaper technologies, the availability of such vehicles will grow and over time they will cover a large part of the population. In the future, in order to ensure the safety of road traffic, regulations will be issued that regulate the replacement of manually operated vehicles with unmanned and Autonomous vehicles.

Those who wish to drive a car in person will be able to do so after passing a biometric assessment of their physical and cognitive state. To do this, the cars will be equipped with special sensors-analyzers that will be programmed to prevent the driver from driving if he is intoxicated, under the influence of narcotic or psychotropic drugs, nervous, angry or tired.

Vehicle maintenance is based on predictive analysis of their condition. Sensors permanently monitor the status of all units and devices, signaling upcoming malfunctions in advance, which minimizes downtime due to repairs.

Additive technologies eliminate the expectation of spare parts deliveries that can be printed directly in the repair shops.

Uberization is intensifying, which now also provides air and sea freight services through applications and web services. The market for transport and logistics services has become as client-oriented as possible. A personalized approach to each service recipient allowed us to increase the volume and quality of services provided.

Digitalization leads to the transformation of 4PL companies into 5PL. Familiar transport organizations are evolving in an it company with a logistics focus. Their services are based on automated routing functions, coordination of delivery chains, digital and virtual tracking, automatic selection of storage points, etc.

There will be a revolution in the warehousing segment. Kazakhstan — the largest regional and important international transport hub, which includes an extensive structure of fully automated and robotic TLCs, the interaction between which is fully digitized.

Small warehouses and transshipment points disappear. Major transport and logistics hubs and cross-docking warehouses will come to the fore, Orcs from which delivery is carried out either directly to customers or to small distribution centers. This process will be stimulated by the e-Commerce boom.

Suppliers will be interested in maximizing the optimization of logistics chains and improving quality in the last mile sections by using robotic and unmanned equipment.

The new format will be dictated to the market by online retailers who will use their own marketplaces that are scattered everywhere, which means that they will create their own logistics centers that everyone else will have to integrate into.

Storage spaces will be fully digitized and managed by operators using virtual twins. At the same time, robots are actively used that perform most of the functions of current warehouse workers, including sorters, receivers, loaders, etc.

Accounting for goods will also be fully digitized, and blockchain technology allows you to automate warehouse operations, document management, forwarding and monitoring of transportation, mutual settlements with contractors, the process of identifying the authenticity of products, and other key operations.

Employees of large orcs are highly qualified multi-functional specialists, savvy in it. They work closely with AI and widely used technology improve the physical and cognitive capabilities of humans (exoskeletons, neurointerfaces, hybrid intelligence, etc.).

The infrastructure is created "ze - Lena" logistics, consisting of highways, built of ecological materials, gas stations with new kinds of fuel, best - hodnik warehouse space, sensors, emissions, etc.

As a result of the transformation of consumer preferences, personal alternative transport is rapidly spreading. In large Metropolitan areas, infrastructure is developed for people who travel on it. Separate roads are being built, traffic regulations have been developed that regulate their movement, gas stations and charging stations, mobile repair and Parking docks have been installed.

The economy of joint consumption is expanding. Go - appear childbirth community of car owners who give environmentally friendly Avtonom - tion rent of transport, thus excluding simple, freeing up Parking spaces, while minimizing emissions - сыCO2ит.d.

Training of specialists of the sector to be gamified, and immersive technologies in the training process of water, air and railway transport will allow a significant - but to enhance their primary skills.

The image of the future TLC of Kazakhstan described above seems overly positive. This inevitably raises the question of the probability of its implementation. Taking into account the socio-economic, cultural and political peculiarities of Kazakhstan, the development of the domestic transport and logistics sector is likely to go unevenly and unevenly. Therefore, potential scenarios for its development were developed for clarification.

8.1.
SCENARIO FORECASTS OF KAZAKHSTAN'S TLC DEVELOPMENT IN THE TIME RANGE OF 10-15 YEARS.

BASELINE SCENARIO:

The transport and logistics industry is developing moderately. At the turn of the 2030s, as a result of the implementation of infrastructure projects and the growth of transit traffic, the sector's share in the country's GDP will reach 12%.

Kazakhstan is becoming an important regional logistics hub that carries out multi-vector transit transportation. Technical innovations are being introduced in TLC with restraint. Key innovators are large transport and logistics companies that use intelligent management, forwarding, storage and monitoring systems.

Multi-modal transport tracking has been digitized using IoT sensors and immersive technologies.

Transport maintenance is partly carried out using predictive analysis tools and additive technologies. However, most of the repairs are still made by people.

Large cities are actively developing its. Biometric passenger traffic monitoring technologies have been installed at key transport hubs. Customs and inspection procedures are automated. Processes related to the maintenance of the transport fleet, handling of cargo and baggage are automated.

Large orcs have become the main support points of the logistics system. A partial robotization of warehouses was carried out. Digital doubles allow you to optimize the administrative and managerial structure of warehouses, but a significant part of the functionality that is performed manually (sorting, placement, etc.) continues to be implemented by people.

A significant share of ground cargo transportation is automated through the introduction of unmanned vehicles that operate both independently and remotely operated by operators.

Air, sea and river transport are regulated by intelligent dispatching systems. However, vehicles are managed by optimized crews. In aviation, the pilot is still present in the cockpit. The key members of the ship's crews remain on Board.

Personal alternative transport is being popularized, but the scale of its use remains small.

Personal vehicles are still operated manually, but a significant part of them work on environmentally friendly fuels.

The professional background of the industry is being transformed at a moderate pace.

Most of all, large companies that are interested in attracting highly qualified specialists with a wide range of it skills invest in personnel training.

POSITIVE SCENARIO:

TLC is developing rapidly. The industry's share in GDP will reach the corridor of 14-15% of GDP. Kazakhstan has evolved into one of the key continental transport and logistics hubs.

A universal transport and logistics system consisting of hybrid highways, closely interacting TL nodes, multi - modal orcs, and high-quality transport infrastructure has been created.

Non-lot equipment is widely used in all types of cargo transportation. Passenger transport is also partially automated, but human participation remains an essential element of ensuring safety in this segment.

All types of vehicles are gradually switching to environmentally friendly fuels. To facilitate this process, the appropriate service infrastructure has been deployed and established throughout the country in the form of charging and refueling stations.

Its fully coordinates the traffic of all types of transport. Neural networks permanently analyze a huge array of data about it due to the ubiquitous ecosystem of smart sensors of various orientations.

Digital counterparts of all types of vehicles, TL nodes, and TL infrastructure in General can optimize the process of monitoring their status, significantly improve the management and quality of services provided.

The infrastructure of alternative modes of transport is gradually developing. In particular, the Maglev network is being developed. Between the major cities begins construction of tunnels for the Hyper - loop.

Personal automobile transport is completely eco-friendly. The share of self - driving personal vehicles is increasing. However, they can be operated manually if the driver meets the requirements for physical and cognitive health.

Warehouse facilities are fully robotic. They are controlled remotely using digital twins. Some of the remaining work - ship warehouses use of exoskeletons and neural interfaces.

Vehicle maintenance is fully automated and automated. Supervision is carried out by individual operators at repair and service stations, whose work is reduced to towards digital regulation. Large-scale application of additive technologies makes

it possible to exclude the import of most spare parts for vehicles and infrastructure.

Bureaucratic procedures have been simplified and formalized. Biometric control systems and advanced technologies for passenger and cargo inspection and monitoring are installed in all TL nodes, which allows optimizing customs algorithms and security measures.

The professional background of the industry has completely changed. Most functions are automated and robotic.

TLC staff consists of highly qualified specialists who work closely with it.

NEGATIVE SCENARIO:

Kazakhstan's TLC remains technologically and infrastructurally backward. The industry's share in GDP is less than 10%. Market activity is declining due to unfavorable external economic conditions.

Technological renewal of TLC is progressing slowly and is mainly associated with digitalization of logistics services. The pace of automation and robotization of the entire range of functions in the field of transportation and warehousing is extremely low.

The process of introducing self-driving and Autonomous transport is an isolated one, based on image assumptions, and not on practical grounds.

Its coordinates and regulates heterogeneous traffic without total system integration. Only some key cities have developed an ecosystem of intelligent transport and logistics management. The main part of the vehicle remains non-energy, operating on hydrocarbon-derived fuels. At the same time, the volume of CO2 emissions is reduced slightly. Large orcs are becoming the basis of logistics, but they are still pre - owned by manual labor.

The weak development of the service in Russia, which does not take into account consumer preferences and real market demands, including foreign customers and suppliers, causes its low profitability.

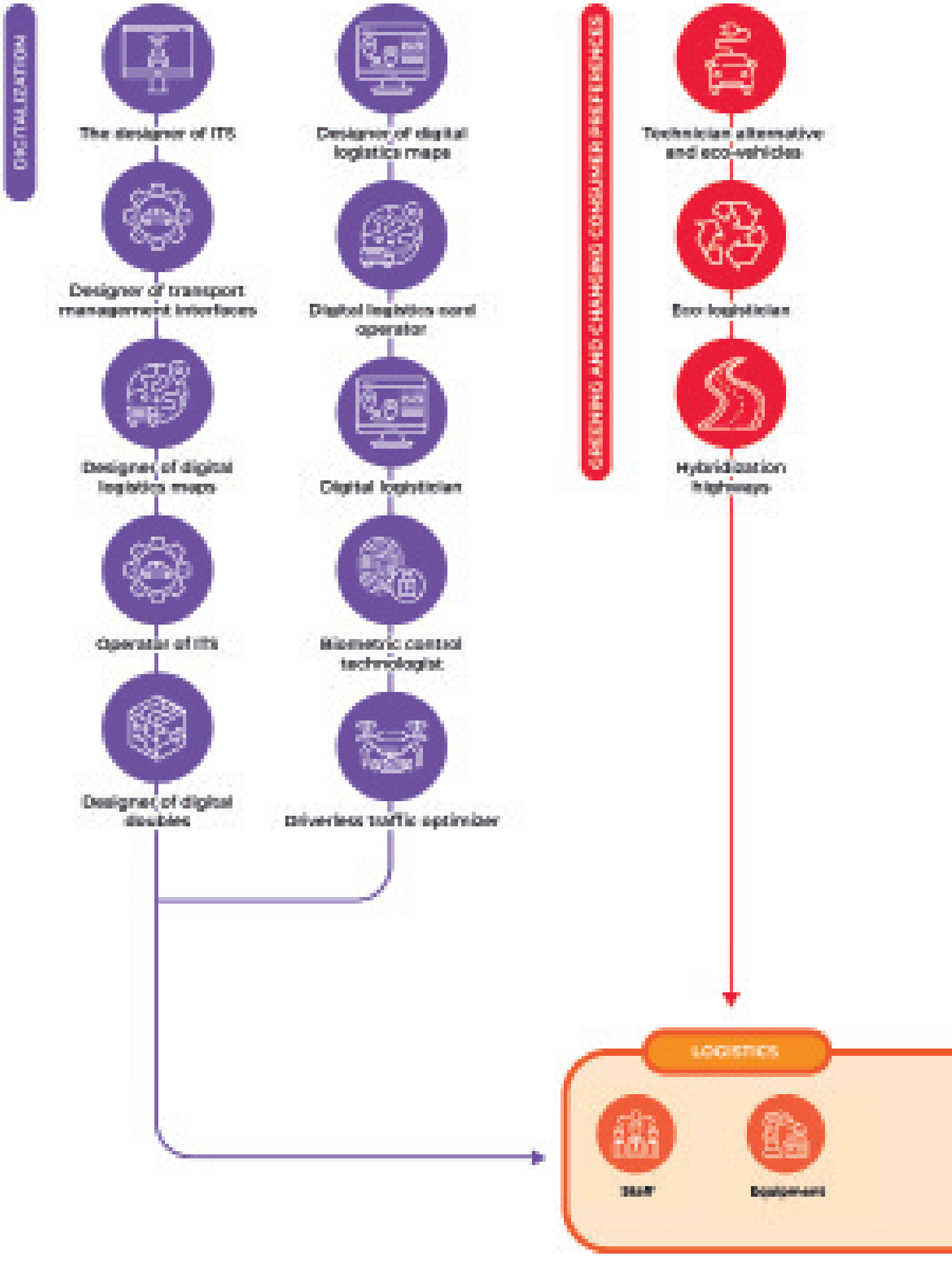
The professional background of the industry is almost static. Staff deficits remain one of the main problems of TLC, which is experiencing an acute shortage of funding and facing pessimistic forecasts.

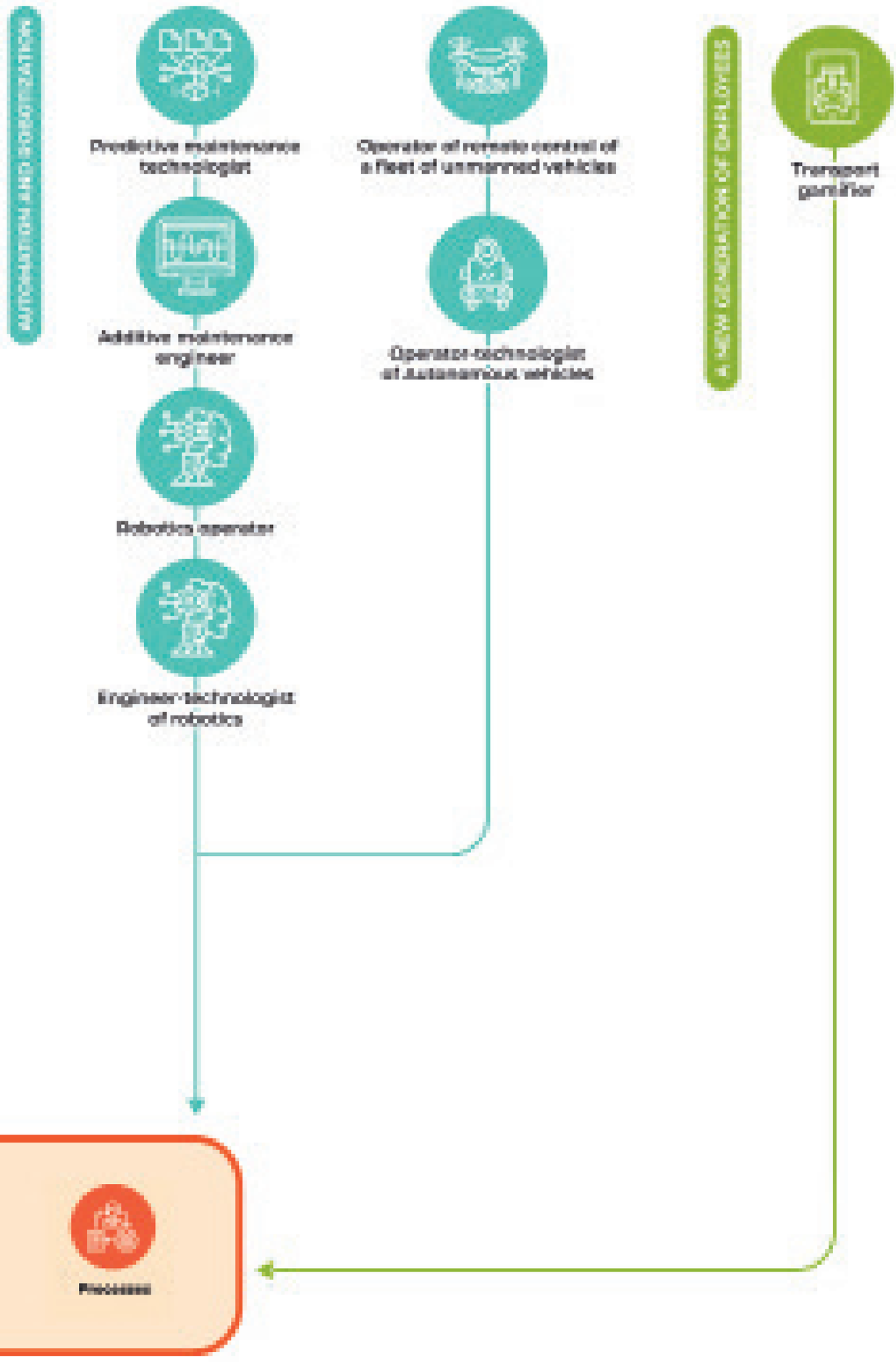
A NEW PROFESSIONS OF TLC

9.

A NEW PROFESSIONS OF TLC

9.1.


DIGITALISATION
The designer of ITS
Designer of transport management interfaces
Designer of digital logistics maps
Operator of ITS
Designer of digital doubles
Designer of digital logistics maps
Digital logistician
Biometric control technologist
Driverless traffic optimiser
GREENING AND CHANGING CONSUMER PREFERENCES
Technician alternative and eco-vehicles
Eco-logistician
Hybridisation highways
LOGISTICS
Staff
Equipment


AUTOMATION AND ROBOTIZATION
Predictive maintenance technologist
Additive maintenance engineer
Robotics operator
Engineer-technologist of robotics
Operator of remote control of a fleet of unmanned vehicles
Operator-technologist of autonomous vehicles
A NEW GENERATION OF EMPLOYEES
Transport gamifier
Processes

9.1.
A NEW PROFESSIONS OF TLC

New professions mean specializations that will appear on the labor market of the transport and logistics industry in the next 10-15 years.

Their appearance will be due to the introduction of new technologies, the expansion and transformation of consumer demands, as well as the strengthening of environmental requirements. Some of these professions already exist in the world, but are not common in Kazakhstan, and some have yet to emerge in the Wake of the Fourth industrial revolution.

However, one thing is certain - it is necessary to start preparing for their appearance in advance.

1. DIGITALIZATION OF TLC

1

DESIGNER
TRANSPORT MANAGEMENT INTERFACES

The specialist develops projects for remote control interfaces for vehicles of any type that function through immersive technologies, machine vision, and AI. Works closely with the transport gamifier and operators of various modes of transport, as well as their real operators (drivers, pilots, navigators, etc.), who are involved as consultants and testers.

appearance HORIZON **2025**

TRENDS

digitalization

NOVELTY of the profession

strengthening of the trend of transition to remote control, which requires the development and adaptation of various means of remote coordination and control of vehicles of various types and profiles.

KEY competence

Computer science.

Software and software engineering.

Machine and deep learning.

Organization of transportation, traffic and operation of transport..

PROFESSIONAL SKILLS, abilities and personal characteristics

Multilingual and multicultural.

Client orientation.

Ability to handle stress.

Ability to learn quickly and re-learn.

Logical, analytical, and systems thinking.

Development and implementation of innovations.

Work in conditions of uncertainty.

2

THE DESIGNER OF ITS (CONTROL SYSTEMS TRANS - TAILORS THREADS, MIND - LOGISTICS, FOR THE B - OF WERE, MONITORING AND ANALYSIS IN REAL TIME, ETC.)

Specialist, modeling diagrams and installation plans, deployment and expansion of smart commuting, momonitoring and analysis of real-time traffic, smart dispatching stand - alone transport and logistics in a large governmental settlements, key transportation nodes and hybrid lines.

appearance HORIZON

required now

TRENDS

digitalization

NOVELTY of the profession

the growing load on the transport infrastructure requires improvement and complication of traffic coordination and general management systems.

KEY competence

Computer science.

Software and software engineering.

Information and cyber-physical systems.

Machine and deep learning.

Organization of transportation, traffic and operation of transport.

PROFESSIONAL SKILLS, abilities and personal characteristics

Situational adaptability.

Ability to learn quickly and re-learn.

Ability to handle stress. Client orientation.

Analytical, logical, system, and critical thinking.

Process management

Project management.

Development and implementation of innovations.

Work in conditions of uncertainty.

Big Data processing and analysis

3

ITS OPERATOR

The specialist monitors and manages its operations from the operations center. In the future, after deep integration of its with a universal AI that can manage traffic flows and coordinate the operation of transport infrastructure, the operator's functionality will be reduced to simple manipulations related to setting non - standard tasks and monitoring the operation of systems.

appearance HORIZON

required now

TRENDS

digitalization

NOVELTY of the profession

human participation in traffic management in the initial stages is necessary as an active observer and emergency coordinator.

KEY competence

Computer science,

Information and biophysical systems,

Organization of transportation, movement and operation of transport, logistics.

PROFESSIONAL SKILLS, abilities and personal characteristics

Situational adaptability,

Ability to quickly learn and retrain, stress tolerance,

Customer focus,

Big Data processing and analysis,

Analytical, logical, system, critical thinking,

Process management,

Project management,

Working under uncertainty.

4

DESIGNER
DIGITAL DOUBLES

Designs and develops virtual models of transport and logistics facilities (highways, airports, warehouses, orcs , etc.) together with it specialists to facilitate, speed up, and improve their management efficiency. The specialist creates a full-fledged digital copy of the object that can be easily scaled, immersive visualization, and any manipulations, which will allow you to make accurate decisions in the process of planning and designing any configuration changes.

appearance HORIZON

after 2030 г.

NOVELTY of the profession

increase, integration increase, integration and complexity of various transport and logistics infrastructure facilities necessitate the development of advanced tools for their operational management in a digital format that allows them to maintain and increase their efficiency

KEY competence

Computer science,

information and cyber-physical systems,

programming and software engineering,

organization of transportation, traffic and operation of transport, logistics,

transport construction,

Data science.

TRENDS

digitalization

PROFESSIONAL SKILLS, abilities and personal characteristics

Situational adaptability,

the ability to quickly learn and re-learn,

stress tolerance,

customer orientation,

processing and analysis of Big Data,

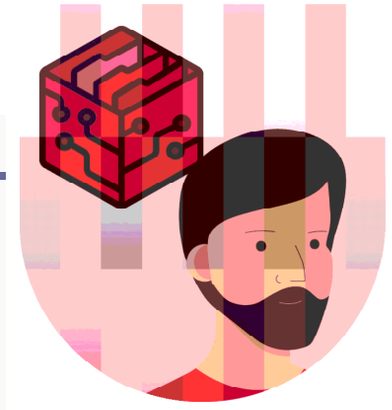
analytical, logical,

system thinking,

process management,

project management, working in conditions of uncertainty.

5



OPERATOR
DIGITAL DOUBLES

The specialist performs operational modeling, monitoring and current management of digital duplicates of transport and logistics facilities.

appearance HORIZON

after 2030 г.

NOVELTY of the profession

various coordination and regulatory functions in the field of digital twin management will require human involvement as a task manager and moderator.

KEY competence

Computer science,

information and

biophysical systems,

programming and software engineering,

organization of transportation, movement and operation of transport, logistics,

transport construction,

Data science.

TRENDS

innovation, digitalization and automation

PROFESSIONAL SKILLS, abilities and personal characteristics

Situational adaptability,

the ability to quickly learn and retrain,

stress tolerance,

customer orientation,

processing and analysis of Big Data,

analytical, logical, system thinking,

process management,

project management,

working in conditions of uncertainty.

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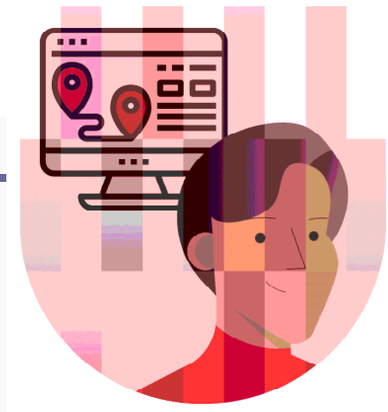

DESIGNER
DIGITAL LOGISTICS CARDS

Integrates an array of digital twins of various transport and logistics facilities into a single virtual matrix, which will allow you to quickly scale and effectively manage large transport and logistics hubs and highways at the national and international level. The specialist creates and develops immersive models of transport and logistics systems of cities, regions, and interregional communications, and then integrates them with similar models of neighboring countries.

appearance HORIZON

after 2030 г.

NOVELTY of the profession

The convergence of digital twins of different profiles and types will require the creation of effective tools for their digital integration into a single platform that allows for the coordination of transport flows at the international level.

KEY competence

Computer science,

software and software engineering,

information and cyber-physical systems,

organization of transportation, traffic and operation of transport, logistics,

transport construction.

TRENDS

digitalization

PROFESSIONAL SKILLS, abilities and personal characteristics

Situational adaptability,

ability to learn quickly,

stress tolerance,

multilingualism and multiculturalism,

customer orientation,

analytical, logical, system, critical, visionary thinking,

Big Data processing and analysis,

logistics and process management, project management,

development and implementation of innovations, working in conditions of uncertainty.

7

OPERATOR
DIGITAL LOGISTICS CARDS

The specialist performs operational modeling, monitoring and current management of logistics maps, regulating transport flows at the international level in cooperation with specialists from other countries.

appearance HORIZON

after 2035 г.

NOVELTY of the profession

solving the problems of international coordination of transport flows and management of regional and global logistics chains will require the participation of a person as an operational moderator.

TRENDS

digitalization

KEY competence

Computer science,

software and software engineering,

information and cyber-physical systems,

organization of transportation, movement and operation of transport, logistics.

PROFESSIONAL SKILLS, abilities and personal characteristics

development and implementation of innovations, working in conditions of uncertainty.

Situational adaptability,

ability to learn quickly,

stress tolerance,

multilingualism and multiculturalism,

customer orientation,

analytical, logical, system, critical, visionary thinking,

Big Data processing and analysis,

logistics and process management, project management,

8

DIGITAL LOGISTICIAN

A specialist who relies on advanced it (cloud computing, blockchain, immersive technologies, AI, Internet of things, etc.) to build logical chains. For example, through blockchain operations, it organizes inventory and tracking of goods, verification of authenticity and quality of goods, coordination of delivery, automation of the billing and payment process, warehouse manipulation, digitalization of documentation, and other operations.

appearance HORIZON

after 2025 г.

NOVELTY of the profession

solving traditional logistics tasks and rationalizing logistics chains with the help of modern digital technologies.

KEY competence

Computer science,

information and cyber-physical systems,

software and software engineering,

organization of transportation, traffic and operation of transport, logistics.

TRENDS

digitalization

PROFESSIONAL SKILLS, abilities and personal characteristics

Situational adaptability,

ability to learn quickly,

stress tolerance,

multilingualism and multiculturalism,

customer orientation,

analytical, logical, system, critical, visionary thinking,

Big Data processing and analysis, logistics and process management, project management,

development and implementation of innovations, working in conditions of uncertainty.

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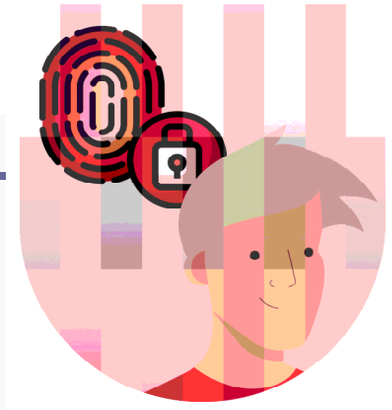


TECHNOLOGIST
BIOMETRIC CONTROL

The company is engaged in the implementation and maintenance of biometric passenger traffic control systems. Monitors the status of systems, rechecking data in case of violations on the part of passengers, detection of offenders, wanted and missing.

appearance
HORIZON

after 2025 г.

TRENDS

digitalization

NOVELTY
of the profession

the need to increase the capacity of passenger transport infrastructure, as well as to improve its safety, determines the constant development of inspection and control facilities that require human supervision.

KEY
competence

Life safety and environmental protection, computer science,

information and cyberphysical systems.

PROFESSIONAL SKILLS,
abilities and personal characteristics

Situational adaptability,

ability to learn quickly,

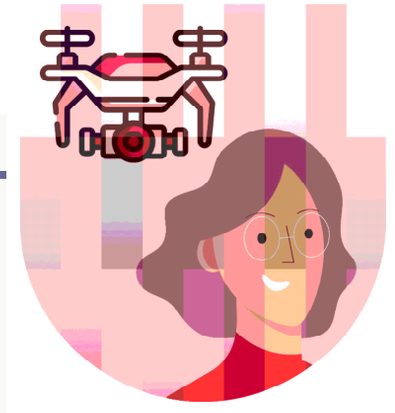
stress tolerance,

analytical, logical and critical thinking,

processing and analysis of Big Data, knowledge in the field of cyber defense,

working in conditions of uncertainty.

10



OPTIMIZER
FREE TRAFFIC

Our specialist uses its to coordinate the flows of unmanned vehicles, monitor their interaction, analyze the load on the transport infrastructure, and regulate traffic.

appearance HORIZON

after 2030 г.

NOVELTY of the profession

the expansion of the operation of unmanned vehicles will lead to the need to rationalize their traffic, which will require the participation of a person as a key regulator.

KEY competence

logistics,

ecology,

life safety and environmental protection,

computer science,

information and cyberphysical systems.

TRENDS

digitalization

PROFESSIONAL SKILLS, abilities and personal characteristics

Situational adaptability,

ability to learn quickly,

stress tolerance,

analytical, logical, system, critical thinking,

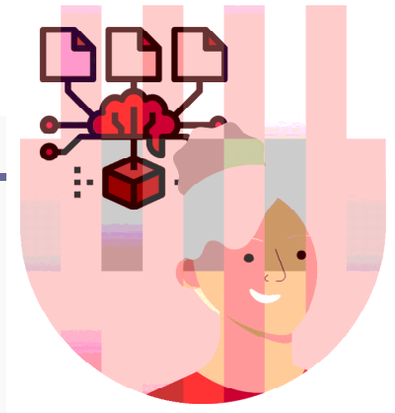
Big Data processing and analysis,

logistics and process management,

working in conditions of uncertainty.

2. AUTOMATION AND TLC ROBOTIZATION

11



TECHNOLOGIST
PREDICTIVE MAINTENANCE

Installs and configures predictive monitoring, analysis and maintenance systems for various types of transport, intelligent transport systems, warehouse equipment, etc. Monitors the operation of sensors, monitoring and operational management systems, and inter - device communication.

appearance HORIZON

after 2025 г.

NOVELTY of the profession

solving maintenance tasks for predictive maintenance infrastructure, including installation, configuration, repair and replacement of sensors and monitoring systems.

KEY competence

Computer science,

information and biophysical systems,

software and software engineering,

organization of transportation, movement and operation of transport,

technologies of production and repair of rolling stock.

TRENDS

automation and robotization

PROFESSIONAL SKILLS, abilities and personal characteristics

ability to learn quickly,

Situational adaptability,

stress tolerance,

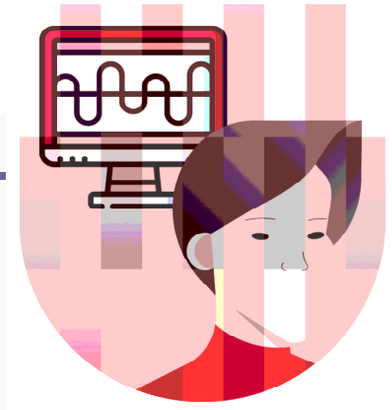
analytical and logical thinking,

maintenance and repair of mobile equipment,

processing and analysis of Big Data,

comprehensive and modular maintenance of smart equipment.

12



ENGINEER
ADDITIVE MAINTENANCE

Organizes the production of spare parts

for vehicles and storage devices during their MAINTENANCE by means of 3D printing, taking into account their configuration and performance characteristics.

appearance HORIZON

after 2025 г.

NOVELTY of the profession

popularization of additive technologies as tools for accelerating and improving the efficiency of maintenance will require mastering the skills of working with various 3D printing devices and their maintenance.

KEY competence

Software and software engineering,

organization of transportation, movement and operation of transport,

technologies of production and repair of rolling stock.

TRENDS

automation and robotization

PROFESSIONAL SKILLS, abilities and personal characteristics

Situational adaptability,

rapid learning,

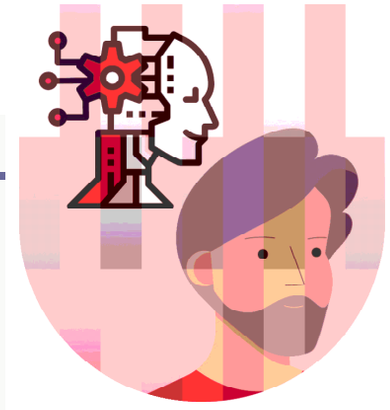
stress tolerance,

analytical and logical thinking,

maintenance and repair of mobile equipment, processing and analysis of Big Data,

complex and modular maintenance of smart equipment.

13



OPERATOR
ROBOTICS

Our specialist provides remote control of robotics (loader robots, tanker robots, sorting robots, etc.).

appearance HORIZON

after 2030 г.

NOVELTY of the profession

expanding the use of a variety of robotics in the maintenance of transport infrastructure and warehouses requires training of specialists who have the skills to control robots.

KEY competence

Computer science,

robotics,

automation and management,

software and software engineering.

TRENDS

automation and robotization

PROFESSIONAL SKILLS, abilities and personal characteristics

Situational adaptability,

the ability to quickly learn and retrain,

analytical, logical and system thinking,

processing and analysis of Big Data,

complex and modular maintenance of smart equipment.

14

ENGINEER-TECHNOLOGIST
ROBOTICS

The specialist provides routine maintenance of robotics, configuration and primary service at the enterprises. Performs minor repairs, replacement of consumable spare parts. In case of detection of serious breakdowns that require intervention in the PAC and automation, organizes repairs together with the equipment supplier.

appearance HORIZON

after 2030 г.

NOVELTY of the profession

the expansion of the use of various robotics in the maintenance of transport infrastructure and warehouses requires the development of skills in the maintenance and repair of robots.

KEY competence

Computer science,

robotics,

automation and management,

engineering,

robotics.

TRENDS

automation and robotization

PROFESSIONAL SKILLS, abilities and personal characteristics

Situational adaptability,

ability to quickly learn and retrain,

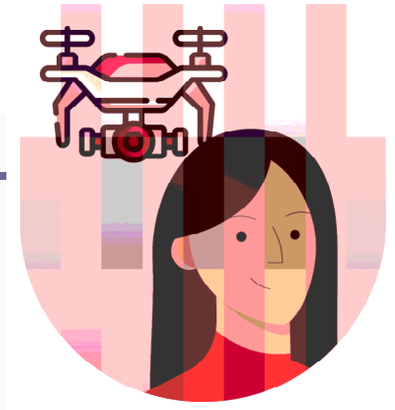
analytical, logical and system thinking,

Big Data processing and analysis,

programming.

complex and modular maintenance of smart equipment.

15



OPERATOR

OPERATOR REMOTE CONTROL OF A FLEET OF UNMANNED VEHICLES

A specialist who will use immersive technologies of augmented and augmented reality, as well as remote control interfaces to remotely manipulate unmanned vehicles of various types, including land and sea transport, storage equipment, aircraft, loading devices, etc.

appearance HORIZON

after 2025 г.

NOVELTY of the profession

the popularization of a variety of unmanned vehicles leads to the need to train specialists who can control a wide range of drones.

KEY competence

Organization of transport, traffic and operation of transport,

automation and control,

radio engineering, electrical engineering, and telecommunications.

TRENDS

automation and robotization

PROFESSIONAL SKILLS, abilities and personal characteristics

Situational adaptability,

ability to quickly learn and retrain,

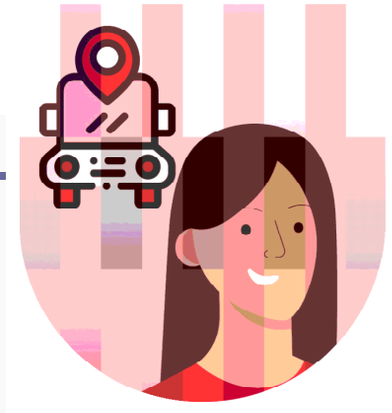
stress tolerance,

analytical, logical and system thinking,

process management,

working in conditions of uncertainty.

16



OPERATOR-TECHNOLOGIST
AUTONOMOUS VEHICLES

It coordinates a swarm of drones that function autonomously thanks to AI and machine vision. In fact, a specialist of this type is only needed for setting tasks, as well as intercepting control in the event of a neural network failure.

appearance HORIZON

after 2030 г.

NOVELTY of the profession

autonomous vehicles will need primary coordination and emergency management, which will require human involvement.

KEY competence

Computer science,

information and biophysical systems,

software and software engineering,

machine and deep learning,

system and network administration,

robotics,

organization of transportation, movement and operation of transport, logistics.

TRENDS

automation and robotization

PROFESSIONAL SKILLS, abilities and personal characteristics

Situational adaptability,

ability to quickly learn and retrain,

stress tolerance,

analytical, logical and system thinking,

process management,

working in conditions of uncertainty.

3. GREENING AND CHANGING CONSUMER PREFERENCES

17

ETHNIC
ALTERNATIVE AND ECO-VEHICLES

Is engaged in the MAINTENANCE of various types of alternative and environmentally friendly transport, including electric vehicles, biofuel transport, etc., as well as the installation of advanced SOFTWARE.

appearance HORIZON

after 2025 г.

NOVELTY of the profession

popularization of ecotransport and various types of alternative vehicles will require training of specialists who have the skills to maintain and repair them.

KEY competence

Computer science,

organization of transportation, traffic and operation of transport,

technologies for production and repair of rolling stock,

physics,

chemistry.

TRENDS

greening, changing consumer preferences, automation and robotization.

PROFESSIONAL SKILLS, abilities and personal characteristics

Situational adaptability,

ability to learn quickly,

stress tolerance

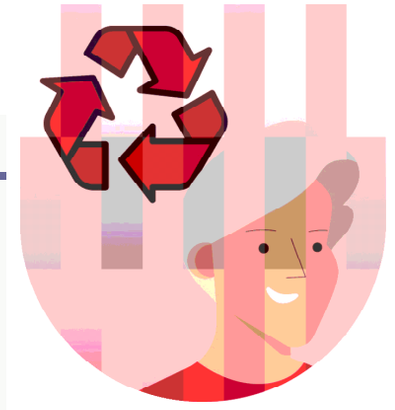
analytical and logical thinking,

maintenance and repair of mobile equipment,

processing and analysis of Big Data,

complex and modular maintenance of smart equipment

18



ECO-LOGISTICIAN

A specialist in the field of «green» logistics, who forms and manages supply chains that take into account environmental standards and minimize the negative impact on the environment (emissions to the atmosphere, water, soil, waste, etc.), develops a strategy for implementing eco - technologies and recycling in production processes and fixed assets of TL companies.

appearance HORIZON

after 2025 г.

NOVELTY of the profession

the widespread consistent tightening of environmental regulations makes it necessary to revise traditional approaches to logistics, taking into account the trend of greening.

KEY competence

Organization of transportation, traffic and operation of transport,

logistics,

ecology,

life safety and environmental protection.

TRENDS

greening, changing consumer preferences

PROFESSIONAL SKILLS, abilities and personal characteristics

logistics and process management

customer focus,

working in uncertainty,

critical, analytical and systems thinking,

multilingualism and multiculturalism.

19

HYBRIDIZER

HIGHWAYS

Is engaged in the design of hybrid transport highways, including smart highways, Railways, alternative transport routes, mixed reality routes, as well as the design of their infrastructure.

appearance
HORIZON

after 2030 г.

NOVELTY
of the profession

expanding the range and increasing the variety of types of vehicles and their management mechanisms will require the modernization of the existing transport and logistics infrastructure, which is impossible without human participation.

TRENDS

greening, changing consumer preferences, digitalization, automation and robotization

KEY
competence

Construction of automobile and railway lines,

transport construction,

life safety and environmental protection,

engineering and engineering,

organization of transportation, traffic and operation of transport, logistics,

information and cyber-physical systems,

computer science.

PROFESSIONAL SKILLS,
abilities and personal characteristics

Situational adaptability,

rapid learning ability,

stress tolerance,

analytical, logical, system, visionary, critical thinking,

Big Data processing and analysis,

integrated and modular maintenance of smart equipment,

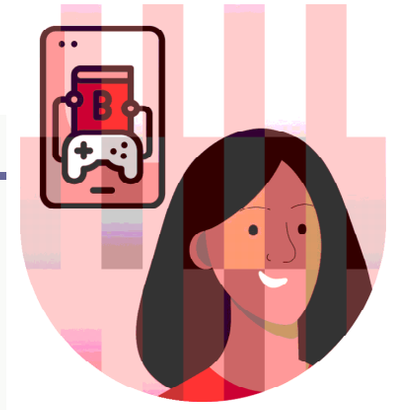
logistics and process management,

project management,

work in uncertainty, development and implementation of innovations.

4. NEW GENERATION OF WORKERSTRANSPORT

20



TRANSPORT

GAMIFIER

Creates and develops training systems for driving vehicles and robotic vehicles, as well as building logistics chains based on game - based approaches using advanced technologies, such as virtual or augmented reality.

appearance HORIZON

after 2025 г.

NOVELTY of the profession

The popularization of new types of vehicles and the trend to simplify and speed up training will lead to the emergence of services in the field of gamification.

KEY competence

Computer science,

software and software engineering,

radio, electrical and telecommunications equipment,

automation and management,

logistics,

organization of transportation, traffic and operation of transport.

TRENDS

changing the demands and expectations of a new generation of employees

PROFESSIONAL SKILLS, abilities and personal characteristics

Situational adaptability,

ability to learn quickly

stress tolerance,

customer orientation

multilingualism and multiculturalism,

analytical, logical, systems, visionary, critical thinking,

logistics and process management,

project management,

working under uncertainty, development and innovation.

TRANSFORMING PROFESSIONS OF TLC

9.2.

9.2.
TRANSFORMING PROFESSIONS OF TLC

Technological re-equipment is a long - term sequential process. Many of the tasks currently performed by industry employees can be automated, but will also require the participation of a human as a controlling operator.

In such cases, the functionality of these specialists will not disappear immediately, but will be transformed into a higher-level set of tasks related to managing certain processes.

Routine operations will be transferred to AI and various innovations, while the specialists themselves will be able to focus on intellectual and creative tasks and overall coordination. At the same time, as technologies develop and develop new areas, all transformative processes in the distant future will also disappear.

01 2030

FLIGHT ENGINEER(FLIGHT MECHANIC), MECHANICAL ENGINEERS FOR TRANSPORT, TRANSPORT REPAIR MASTERS

TECHNIQUES FOR THE PREDICTIVE

TRIGGER

automation, digitalization and robotization of transport.

Traditional scientific and technical maintenance will gradually give way to robotic maintenance. Forecasting and detection of breakdowns and defects will be performed by predictive analysis sensors of the state of the units, after which the data will be automatically transmitted to the repair services, which together with robots will perform MAINTENANCE of vehicles. Moreover, repairers will not even need to have special knowledge and skills. Immersive technologies and gamification will help them carry out repairs on the go by indicating and demonstrating what repair actions need to be performed in each individual case. However, in the long term, specialists and technicians of various profiles will gradually lose their relevance.

02 2030

DIVING SPECIALIST

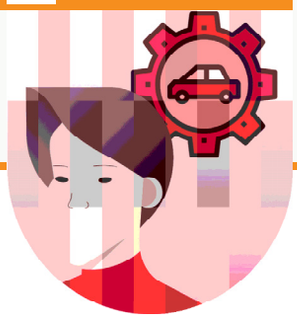
UNDERWATER DRONE OPERATOR

Underwater work will be performed by robotics, namely, drones equipped with special manipulators, which will be controlled remotely.

TRIGGER

automation, digitalization and robotization of transport.

03 2030



TRAFFIC STATISTICS OFFICER

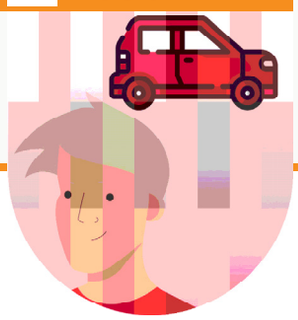
ITS ANALYST

The collection and processing and primary analysis of traffic data will be carried out by automated analysis systems integrated in its. The its analyst will only track the incoming information, give the system introductory settings and target designations, for example, conduct an operational assessment, predict the load on hybrid highways in conditions of emergency evacuation of cities, and then evaluate the system's performance.

TRIGGER

automation, digitalization and robotization of transport.

04 2030



EXPEDITION

FREIGHT FORWARDER OPERATOR OF AN INTELLIGENT TRANSPORT

TRIGGER

automation, digitalization and robotization of transport.

Routing processes, means of transport identification, documentation and physical support can be fully automated and digitalized. In the future, freight forwarders will not need to accompany transportation in person. All operations can be performed for them by the intelligent expedition system, and specialists, if it is necessary to establish contact with contractors, can do it remotely using visualization tools and immersive technologies for.

05 2030

TRAIN OPERATOR

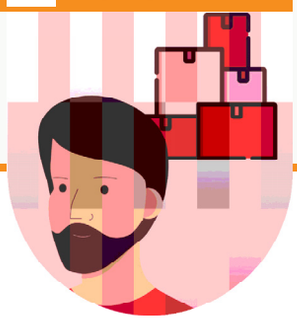
ROLLING STOCK DRIVERS REMOTE

TRIGGER

automation, digitalization and robotization of transport.

Autonomous trains equipped with intelligent navigation systems, AI, machine vision, IoT sensors, and remote coordination tools will transform the driver's profession. Specialists will provide remote control of trains in cases when Autonomous systems fail. With the development of technology, the profession will also completely lose its relevance.

06 2025



TRIGGER

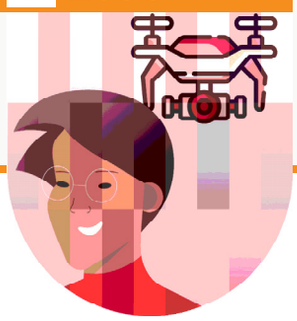
automation, digitalization and robotization of transport.

STOREKEEPER

THE PROVIDER OF THE DIGITAL WAREHOUSE

Modern storekeepers are being transformed into specialists in virtual warehouse management. Augmented and augmented reality technologies will allow them to manage warehouse spaces and goods remotely, and appropriate manipulators and robots will provide relocation and storage. Documentation support will be fully digitized and automated. The operator will manage a virtual copy of warehouses, and all its manipulations will be performed in real time and space by smart warehouse equipment.

07 2030



TRIGGER

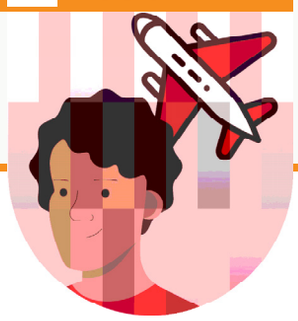
automation, digitalization and robotization of transport.

DRIVER

DRIVER OPERATORS OF REMOTE CONTROL OF THE FLEET OF UNMANNED VEHICLES

The proliferation of driverless cars is leading to the gradual de - actualization of the driver's profession in the business sector, which is much more profitable to use remote-controlled cars. In this regard, drivers are initially transformed into remote control operators, and in modern times, after the development of Autonomous transport, they will disappear altogether.

08 2030



TRIGGER

automation, digitalization and robotization of transport.

PILOT

PILOT OPERATOR OF REMOTE CONTROL OF AIRCRAFT/ EMERGENCY PILOT

Autopilot is already able to provide control of aircraft without human intervention at all stages of pre-flight preparation, take-off, flight and landing. Further development of technologies will first lead to a modification of the specialization of pilots who will be able to provide remote control of aircraft using special immersive neural interfaces in emergency and non-standard situations. At the same time, the pilot does not even need to be physically in the cockpit of the aircraft. In the distant future, the need for pilots will also gradually disappear.

09 2025

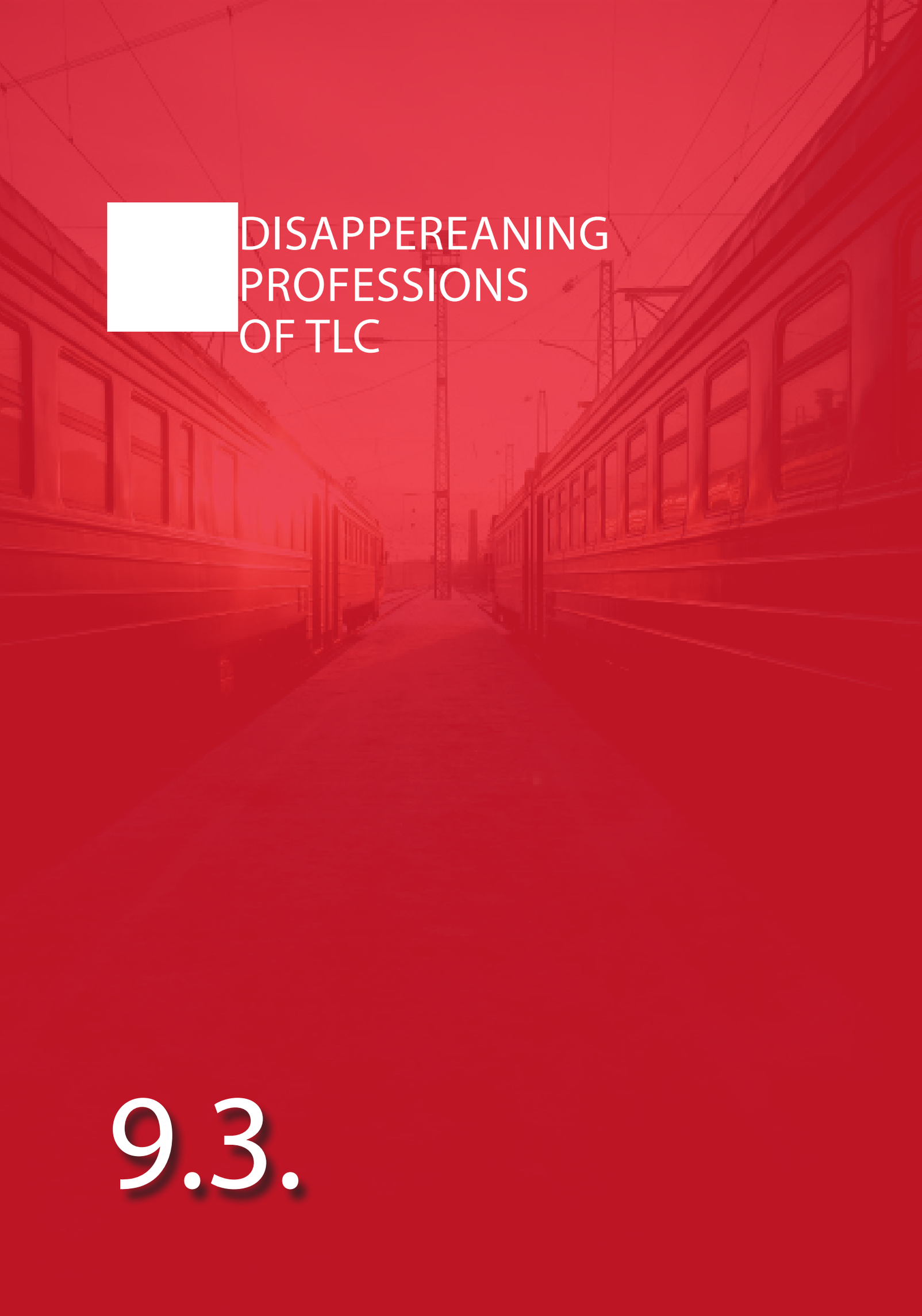
TRIGGER

automation, digitalization and robotization of transport.

DISPATCHER

DISPATCHER THE OPERATOR OF THE INTELLIGENT DISPATCHING

Traditional traffic controllers that provide efficient communication and coordination of transport flows (railway, sea, air, etc.) will gradually give way to its, which, based on big data provided by IoT sensors, unmanned vehicles, AI and machine vision cameras that will be equipped with transport infrastructure,will be able to organize transport traffic and regulate traffic almost autonomously. Over time, the functionality of the human dispatching will be fully deactualization.



DISAPPEREANING PROFESSIONS OF TLC

9.3.

9.3.
DISAPPEREANING PROFESSIONS OF TLC

Automation, digitalization and robotization of many work processes in the transport and logistics sector leads to the deactualization of a significant segment of the working functionality of industry employees.

Of course, this does not mean that their functionality will be fully assigned to automated systems. But the number of specialists performing these functions will be consistently reduced.

Based on the NPC, experts identified classes that are in the horizon of the next 10-15 years they will be most at risk of replacement and, as a result, further disappearance.

2030

1

MOVERS,
WAREHOUSE WORKERS

Manual labor will be gradually replaced by robots, which will first replace movers in large trade and logistics centers, orcs and warehouses, and then, as the cost and availability of robotic equipment increases, at small infrastructure and service facilities.

2025

2

ACCOUNTANTS
(WAREHOUSE, LOADING/UNLOADING, ETC.)

the functionality of accountants will be fully automated thanks to advanced SOFTWARE, in particular, DLT solutions. Monitoring the availability of a particular product, inventory, registration and document management will be fully digitized, and data entry and updating will be carried out by an AI operating on the basis of information provided by various monitoring sensors of the IoT network.

2030

3

HELMSMEN AND NAVIGATORS

AI and machine vision, as well as large data analysis that allows you to quickly navigate navigation routes, deactualize the data of specialization. Automated ship management, including remote control and, in the long term, even Autonomous navigation, will displace helmsmen and navigators from the bridges of sea and river transport over the next 10-15 years.

2025

4

SUMMONER
LOCOMOTIVE AND TRAIN CREW

tasks for notifying and calling locomotive and train crews to the place of work according to the orders, orders of duty officers or contractors will be automated and performed by predictive analysis devices and its, which will fully coordinate the work of service services.

2025

5

SORTER
THE LUGGAGE

The functionality of this specialist is already being Robotized at airports in developed countries and some major air hubs. In the near future, baggage sorting and placement will be performed by manipulators, and eventually by Autonomous mobile robots that can work without human intervention.

2025

6

STOKER
OF LOCOMOTIVES IN THE DEPOT

Regulation of boilers, refueling of « cold «and maintenance of» hot « locomotives, maintenance of furnaces in good condition, and other tasks performed by stokers are no longer relevant due to the decommissioning of steam locomotives.

2025

7

CARGO AND BAGGAGE ACCEPTOR,
CARGO RECEIVER, WEIGHER, CONTROLLER FOR LOADING AND UNLOADING GOODS

Receiving, weighing, loading, issuing and documenting operations related to cargo and baggage will be fully automated and carried out using robots, conveyors, Autonomous mobile devices and smart systems.

2025

8

PORTER
(LUGGAGE, WAREHOUSES, ETC.)

the functions of transporting Luggage and cargo will be automated. Sorting and distribution will be carried out by Autonomous mobile manipulators, and their transportation-by unmanned transport.

2030

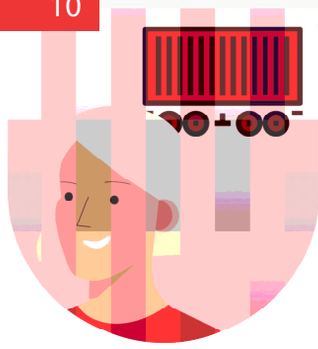
9

RECEIVER
CAR AND RAILWAY SCALES

Weighing stations will be fully automated, and human participation will be minimized by Autonomous scales-platforms that are manipulated by intelligent transport infrastructure management systems.

2025

10



CAR SPEED
CONTROLLER

intelligent control systems will Regulate the speed of cars or groups of cars (detachments) by braking them with mechanical means, car decelerators or brake shoes during the process of disbanding from sorting slides and exhaust tracks.- infrastructure through sensors and controllers connected in the IoT.

2025

11

CALL CENTER
OPERATOR

Operators of technical support services, customer consulting, and other specialists involved in communication with various contractors will be squeezed by AI. Their profile implies a limited set of practical situations that can be fully studied by AI, and, consequently, solved by it.

2025

12

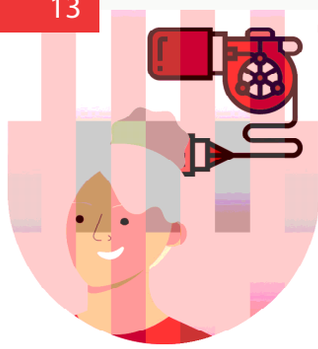
CONDUCTORS
(TRAINS, BUSES, TRAMS, ETC.), TICKET CONTROL AT STATIONS, PLATFORMS, ETC.

the Tasks performed by these specialists are already being replaced everywhere by various electronic payment acceptance systems.

2030

13

DRIVERS
OF MOTORIZED EQUIPMENT

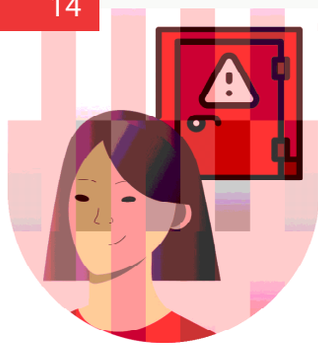


the Functionality will be performed by automatic devices and robots that will not even need remote control.

2025

14

BUNKERING MACHINE



Automation of bunkering processes and monitoring them using IoT sensors deactualizes the functions of bunkering operators in the near future. Initially, bunkering companies will remotely monitor the operation of bunker filling systems, aspiration devices, lifting and transport mechanisms, pneumatic transport and other mechanisms through intelligent monitoring networks, but in the future they will completely disappear.

2025

15

LIGHTHOUSE KEEPER

With the introduction of AI, machine vision, and intelligent navigation systems, there will be no need to coordinate navigation in coastal areas by means of lighthouses.

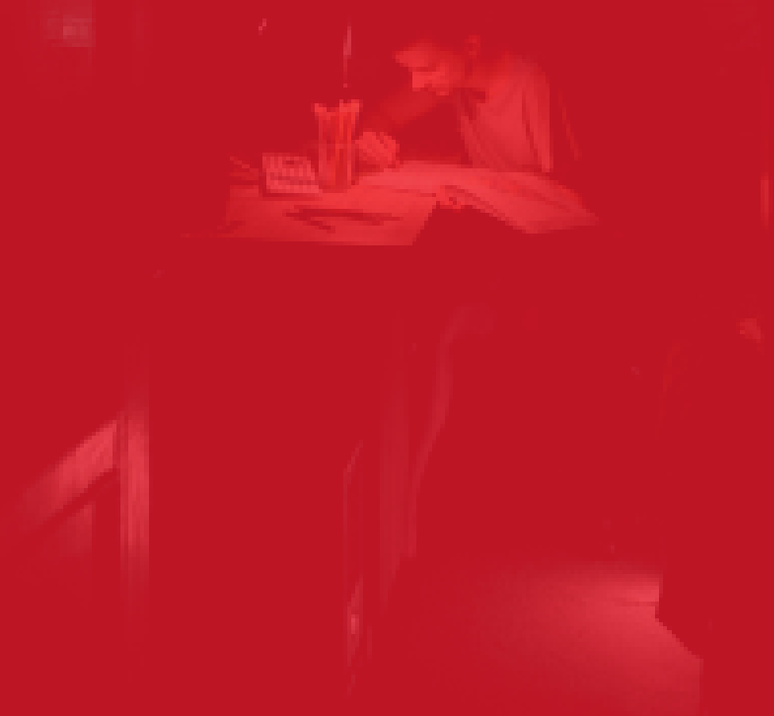
2030

16

CUSTOMS AGENT,
PASSENGER REGISTRATION AGENT, CUSTOMS CLEARANCE AGENT, PASSPORT CONTROL SPECIALIST

The introduction of biometric control systems and intelligent monitoring of passengers and cargo will allow automating the functions performed by these specialists.

10. COMPETENCIES OF FUTURE TLC PROFESSIONS



COMPETENCIES OF FUTURE TLC PROFESSIONS

As industry experts have repeatedly noted, TLC is experiencing an acute shortage of qualified personnel. First of all, there is a lack of specialists who possess modern digital technologies, which hinders the modernization of the sphere. In addition, in recent years, there has been a decline in the share of young workers, due to the low prestige of the industry and unattractive wages.

As a result, the transport and logistics industry faces the need to create an effective training system that takes into account the current and future needs of the market, both in terms of the volume of training and directions.

A key factor in the success of creating a new paradigm of education will be forecasting and taking into account future required competencies, as well as the transition to a model of continuous learning, which implies the constant development of new skills, both at the professional level and at the supra - professional level. And in this context on the so - called soft skills come to the fore.

According to the expert community, the professional background of Kazakhstan's TLC has undergone significant changes in recent years. 20.4% of the experts we surveyed stated that the qualifications of employees in the industry have worsened. 33.7% pointed to different dynamics, indicating that the level of qualification of some specialists has improved, and some has worsened. The overall positive dynamics was noted by 23.5% of respondents, and the stability of professional training of industry personnel was emphasized by 22.4% of respondents.

Figure 19.

The percentage of respondents ' answers to the question «How has the level of professional qualification of industry specialists changed in recent years» (%)

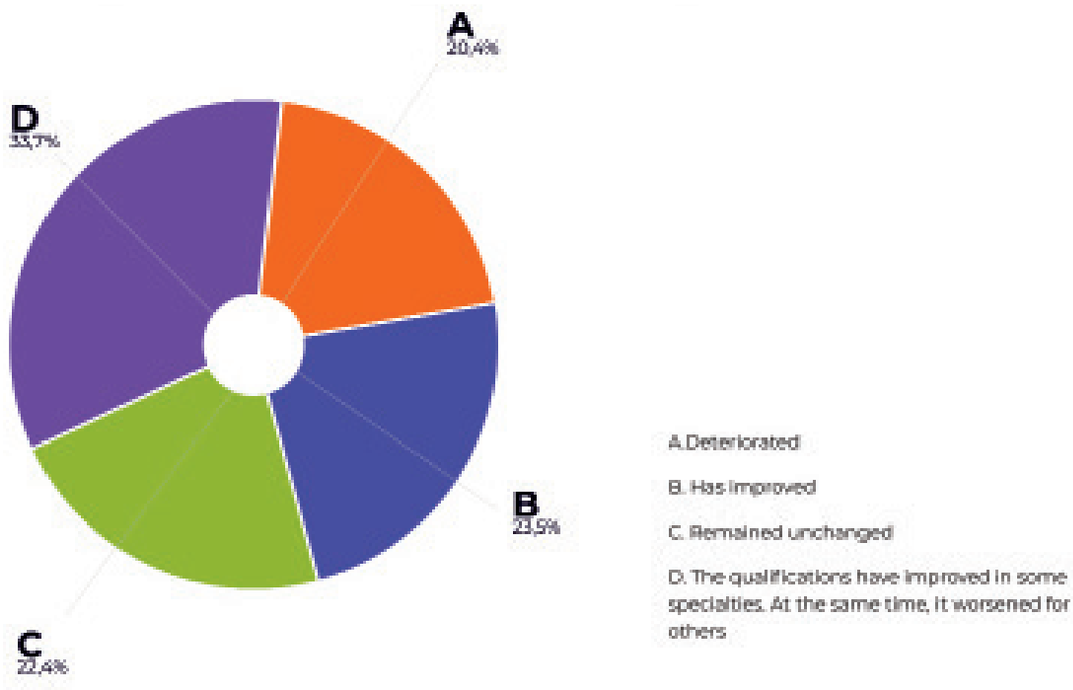
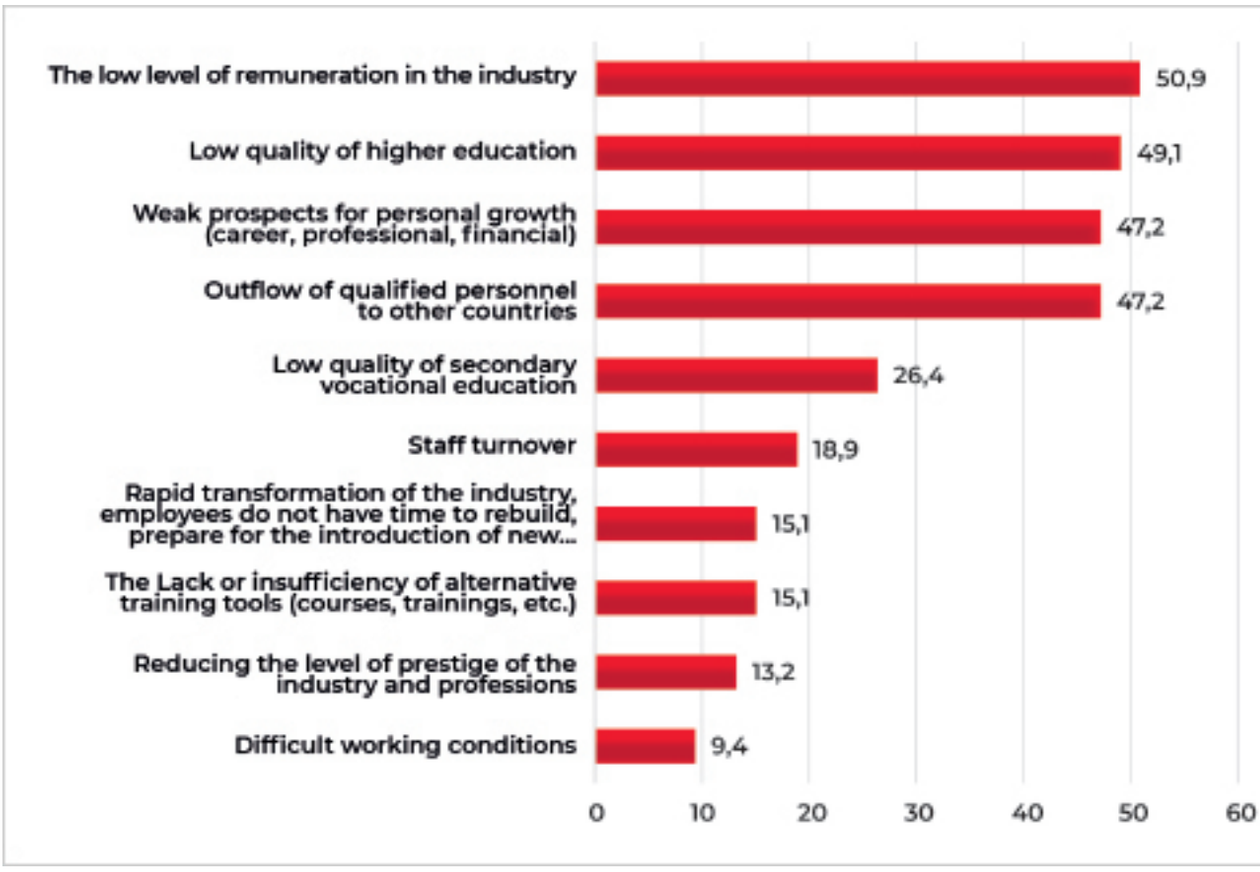


Figure 20.

Distribution of answers to the question: «What reasons caused the deterioration of the professional qualifications of IT industry personnel?»



Experts believe that the level of training of employees reduced Xia, the main factors distinguish the low level of wages in industry, low quality education, poor opportunities for personal growth of employees, as well as the outflow of qualified personnel.

According to the study, companies that strive for innovation face the greatest shortage of personnel. The lack of specialists with digital skills, advanced equipment and management tools affects the pace of industry modernization. In addition, it delays the development of digitalization of services and transition to the online format of interaction with both the external circuit, i.e. clients and counter-agents, and internal business processes.

At the same time, the expert community indicates that in the future, a harmonious combination of hard and soft skills will be a key factor in the employee's success. At the same time, the most important of them were skills such as the ability to quickly adapt, to quickly learn and retrain, analytical and logical thinking, processing and analyzing big data, programming, as well as maintenance and repair of mobile equipment.

The depth and speed of techno-

logical upgrading determine the need for continuous learning, of mastering new skills and knowledge. Although at the moment the pace of innovative development of TLC remains moderate, in the future it will significantly accelerate, which means that the need for professional retraining will also increase.

Similar processes occur in all sectors and lead to a change in the model of education and vocational training. If earlier the main scheme was the so-called industrial model, which is characterized by the algorithm "school-College-UNIVERSITY-higher school", now the paradigm is changing towards the model of continuing education.

Distinctive features the old model:	The distinctive features of the new model will be:
1. getting an education in your youth; 1. one education for life; 1. long-term training in the received specialty from three to five years, depending on the level of education; 1. fundamental theoretical training; 1. after receiving an education, professional development takes place at will, it is not necessary, exceptions are established by law; 1. the training system is localized in the educational institution. 1. The new model of education has not yet been formed, and different authors describe it in different ways.	Continuing education of mixed age groups: 1. It will become the norm to get a new profession in adulthood*. New teaching methods will be created that take into account the age characteristics of students: weakening of memory, a higher level of responsibility and perseverance. 2. The appearance of various educational programs in terms of duration, from ultra-short (10-15 hours) to ultra-long. 3. Globalization of the educational space: (On the one hand, residents of the regions will have more opportunities to access high-quality education. Moving to the capital or highly developed countries will no longer be the only opportunity to get a specific education, for example, in biology, astrophysics, etc. There will be more equal opportunities). 4. The emergence of educational ecosystems and unified thematic educational platforms in the country (a single medical, engineering and other platforms that unite classical universities).

The result of the paradigm shift will be a complete transition to a new qualification model, which it involves continuous training, innovation, and re-profiling of industry specialists. If previously they could be narrowly specialized employees, in the future they will be required to have a wide range of competencies.

As shown by research and best practices of TL largest international companies, RA - bottacelli the industry to hand - out preference to the specialists, savvy in the figure, of hearing the stories in it, able to adjust quickly and adapt to the ever-changing Ob - ing conditions and specific situations, ready and willing to learn and develop, manage processes, not to obey to them, customer-oriented and stress-resistant specialists. Below we will look at a detailed set of skills and competencies that will be in demand in the labor market of the transport and logistics industry.

As we all know, all professions are based on a certain range of competencies and skills that form a professional portrait of a specialist.

In the twenty-first century, various General skills related to interaction with data, technology, and people are becoming one of the basic competencies, such as specialized and additional education.

Business in the transport and logistics sector involves constant contact with people and equipment. Therefore, convergence of both basic competencies and professional skills becomes extremely important.

This Atlas has identified the key competencies that will be needed by specialists in the transport and logistics industry of the future, which were divided into the following 4 categories:

- social and personal characteristics;
- thinking skills (thinking styles);
- technical skills;
- functional competencies.

1 THINKING SKILLS (STYLES OF THINKING)

In improving the mind - nomic burden associated with the necessity of processing the huge amount of data, complexity of infrastructure, supply chains, growth of market activity, chaotic - STI moves and other trends TLC modernity, the cutting edge come cognitive skills of workers, both managerial and administrative, engineering and work - what are staff.

In addition, more and more functionality falls on the "shoulders" of AI, which is actively expanding the depth and scale of its penetration into all spheres of activity. Robotization reduces human participation in mechanical processes, and AI in mental processes. In other words, it becomes a direct competitor to human mental functions.

Despite the fact that while his capabilities are significantly limited, in the future he will be able to perform almost completely specific to a person's mental operations, including creative ones.

This is why it becomes extremely important for future specialists to develop their cognitive skills. And if analytical, systematic and logical thinking are the first links in the chain of absorption by artificial intelligence, then such ways of thought movement as creativity, meaning generation, critical and visionary thinking will long be the prerogative of a person.

Nevertheless, as practice shows, it is analytical and logical thinking that will be the key requirements for the employee of the transport and logistics industry of the future. This is due to the need to build complex logistics systems and manage heavy traffic, both in cities and in cities, both on the ground and in the air.

2 SOCIAL AND PERSONAL CHARACTERISTICS

The second important component of a professional portrait of an industry employee in the future will be their personal abilities, as well as their ability to interact with the outside world. Competition, selectivity and customer personalities, constant change of environment, diffusion of technologies and work formats-all this gives a person's personal skills critical importance.

If earlier it could be closed around the implementation of narrow - profile functionality, being confident in its demand, now it is vital to constantly develop.

In this context, personal properties are particularly important.

These characteristics include such important features of employees as the ability to quickly learn and retrain, situational adaptability, stress tolerance, and so on. These are key skills that will ensure constant demand and stability.

The new format of business structures assumes the presence of multiple and highly active communications that run in completely different planes. Employees will need to be able to navigate these realities and easily find a common language with the many people involved and stakeholders. Therefore, such skills as teamwork, multilingualism and multiculturalism, customer orientation, inter - industry communication and other abilities are an important vector of social and personal growth of TLC employees.

3 TECHNICAL SKILLS

Interaction with modern technologies is one of the key competencies of the future. STP and innovation have elevated the ability to handle technical innovations to the rank of an absolute basic requirement, without which it will be simply impossible to find a job in the future. New digital reality, AI, Big Data, IoT, robots, drones, additive technologies, and other scientific achievements have penetrated all branches of the economy and spheres of human life.

If an employee does not know how to operate them, it is impossible to call them qualified. If he cannot use them effectively, he will never be considered highly qualified.

Digitalization, which experts consider to be the main industry trend, leads to the generation of huge amounts of data that opens up broad development horizons for TLC.

People who can use them rationally to make decisions and conduct business, maximize efficiency and direct them in the right direction will always be in demand in the market.

The most important technical skills include such skills as maintenance and repair of mobile equipment, processing and analysis of Big Data, programming, maintenance of smart equipment, as well as the development and support of cyber defense systems.

4 FUNCTIONAL COMPETENCIES (CORPORATE SKILLS)

In the XX century, large corporations entered the international market. The activity of any company is focused on subsequent scaling. Without it, it is impossible to survive in modern realities.As a result, the work of any individual employee becomes not a separate important component in the production chain, as it was in the industrial era, but a dynamic link in a complex communication system that involves close contact with other links.

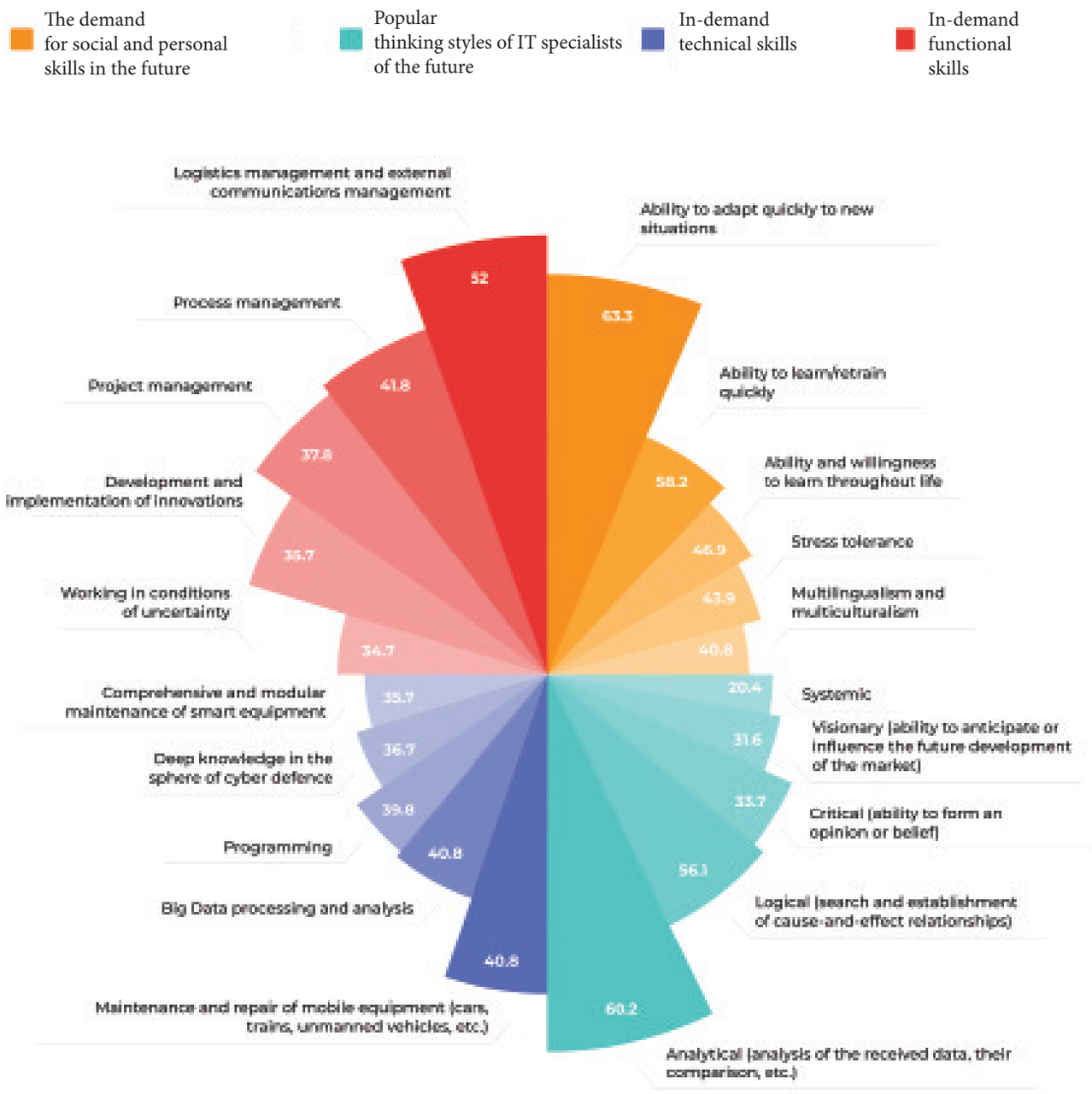
> The consolidation of organizations has led to a complete transformation and the creation of intra-corporate cultures and procedural ecosystems based on complex models of vertical and horizontal interaction.

In the twenty-first century, this format is evolving into digital platforms and hyperstructured business models that presuppose a multi-profile of any company.

For example, now the usual TL company is being transformed into a TL-oriented it company that provides a variety of services.

Of course, the new format implies the need for certain corporate functional competencies, such as logistics management and management of external communications, process management, project management, development and implementation of innovations, lean manufacturing, ownership of Agile methods, etc.

Employees who perfectly possess a wide range of functional competencies will become the locomotive of TLC development, its main management link.


The demand for social and personal skills in the future
Popular thinking styles of IT specialists of the future
In-demand technical skills
In-demand functional skills
Logistics management and external communications management
52
Process management
41.8
Project management
37.8
Development and implementation of innovations
35.7
Working in conditions of uncertainty
34.7
Comprehensive and modular maintenance of smart equipment
35.7
Deep knowledge in the sphere of cyber defence
36.7
Programming
39.8
Big Data processing and analysis
40.8
Maintenance and repair of mobile equipment (cars, trains, unmanned vehicles, etc.)
40.8
Ability to adapt quickly to new situations
63.3
Ability to learn/retrain quickly
58.2
Ability and willingness to learn throughout life
46.9
Stress tolerance
43.9
Multilingualism and multiculturalism
40.8
Systemic
20.4
Visionary (ability to anticipate or influence the future development of the market)
31.6
Critical (ability to form an opinion or belief)
33.7
Logical (search and establishment of cause-and-effect relationships)
56.1
Analytical (analysis of the received data, their comparison, etc.)
60.2

1. SOCIAL AND PERSONAL CHARACTERISTICS

Characteristics what personal traits will determine the success and effectiveness of an employee in the transport and logistics industry in the future? According to industry experts, situational adaptability, the ability to quickly learn and retrain, stress tolerance, multiculturalism and multiculturalism, as well as customer focus will be most important.

1
SITUATIONAL ADAPTABILITY

63.3% of respondents believe that the ability to quickly navigate and adapt to constantly changing conditions and situations will be one of the most demanded characteristics of TLC employees.

Decision-making in TLC is increasingly dependent on data. At the same time, the situation at both the micro -, meso - and macro levels is constantly changing. Previously, there was a relatively small transport load, low customer activity, comparatively low volumes of cargo and passenger traffic, as well as the standardization of equipment

if the supply chains were stable, then the situation has changed radically.

Continuous conjunctural metamorphoses associated with socio - economic, political, natural and technological factors make it necessary to develop the ability to adapt quickly. This was especially evident during the COVID-19 pandemic.

2.
THE ABILITY TO QUICKLY LEARN AND RETRAIN

58.2% of experts consider this skill to be an important com-

ponent of the professional portrait of an industry employee in the future, due to the pace and scale of penetration of new technologies.

Knowledge and skills owned by each, tend rapidly desactualizado - up. They are becoming obsolete against the background of STP and the diffusion of technology into the economy and everyday life.

Therefore, the key to the demand for a specialist in the market will be the ability to quickly train a systematic nature.

The transition to a continuing education model underscores the importance of this ability. People who expect that their profession will be unchanged and permanently necessary do not have a complete picture of what is happening and may be left out in the future.

Continuous improvement of their skills in the same direction is no longer a guarantee of demand, due to the fact that as a result of digitalization, automation and robotization, its functionality may simply become unnecessary.

At the same time, the tools used by specialists are constantly expanding, which is also a catalyst for the learning process. After all, if you ignore new trends,

if you do not follow technological innovations and innovations introduced in the industry, there is a high risk of being left without a job, since all companies will strive for constant technological renewal, which is the key to survival.

3.
STRESS TOLERANCE

43.9% of respondents indicate the importance of this personal characteristic in the future. A high workload, a wide range of functions, the need for constant training, interaction with many people, frequent occurrence of unexpected situations, and other factors exert significant emotional pressure on employees.

Employers will pay special attention to the psychoemotional characteristics of employees. Resistance to mental overload will become one of the defining conditions for employment and career advancement.

The employee should be well aware of where the line of positive and stable perception runs, and what stress factors can cause a negative reaction. His future will depend on how he copes with the psycho - emotional load.

4.
MULTILINGUALISM
AND MULTICULTURALISM

40.8% of industry experts identify these social and personal characteristics as important features of a professional in the field of transport and logistics.

Globalization, open borders and open markets, the Internet and social networks, and the development of the CU have created favorable conditions for international interaction between

individuals and entire sectors of the economy.

As a result, the ability to build bridges, communicate and build mutually beneficial relationships with contractors and clients anywhere in the world comes to the fore.

Language skills and knowledge of the socio-cultural characteristics of regions, countries and peoples will be one of the basic soft skills of transport and logistics specialists in the future.

5.
ORIENTATION
TO THE CUSTOMER

40.8% of the experts surveyed indicate that customer orientation will be a necessary personal trait an industry employee in the future. The ability to find a common language with clients both in the business segment and among mass consumers will be the key to successful professional growth of a specialist working in TLC. Taking into account the absolute dependence of the industry on customers, the skills of effective contact with them, creating favorable and comfortable conditions for them, will be one of the determining factors when making a decision about hiring.

Customer orientation as a skill of social orientation should be formed on the basis of mental attitudes. A person will have to learn

2. IN-DEMAND THINKING SKILLS (STYLE OF THINKING)LOGICAL AND PROJECT THINKING.

The ability to analyze large amounts of data and think critically, as well as to look far ahead in various areas, according to the industry expert community, will be the most popular cognitive skills of the transport and logistics worker in the future.

1.
ANALYTICAL AND LOGICAL THINKING

The vast majority of respondents believe that an analytical mindset and the ability to think logically will be the main requirement for a specialist who wants to work in TLC. This is due to the increase in functionality, the need to work with a large amount of information, as well as solve complex problems. Logical thinking allows you to identify hidden cause-and-effect relationships, which means that you can find the root of problems and predict possible scenarios for the development of a particular situation. In turn, analytical thinking contributes to competent structuring and systematization

and identification of the most important aspects in the process of solving those or other problems. In the area of transport systems and supply chain management, these skills will be key.

Big data analysis will become one of the most widely demanded technical skills in the future. Although the main burden will fall on AI, making the final decision will remain the prerogative of the human, which means that the ability to study, think logically, compare and highlight the main things will be extremely important personal skills.

2.
CRITICAL THINKING

33.7% of experts believe that the ability to critically look at any information, situations, opinions, opportunities and threats will be one of the key thinking skills in the future.

Critical thinking presupposes checking any information received from outside. Modern it has entangled us in a dense web of information of every possible kind. We know a little about everything. But at the same time, the ability to perceive information adequately, pass it through the prism of sober assessments and analysis is not typical for everyone.

In TLC, the ability to think critically will be especially important against the background of increasing digitalization, as well as the growth of cross - functional and cross - industry interaction.

3.
VISIONARY THINKING

Perspicacity and the ability to look far ahead, given the current situation and possible scenarios for its development in the future, 31.6% of respondents also stand out as leaders of future thinking styles.

Indeed, the speed and depth of NTP penetration change the reality almost every day. Now it is important to forecast not a few steps ahead, but many, and work ahead of the curve to keep up with the intensive dynamics of development.

However, you must be extremely careful with this skill. It should be accompanied by a clear - sighted

assessment of the situation and opportunities, as well as a rational approach to implementation.

4.
SYSTEMS THINKING

20.4% of respondents consider this type of thinking to be one of the most popular for the TLC of the future.

Taking into account the complexity and multi - vector nature of transport and logistics systems, the need to take into account many factors and constantly changing conditions, as well as add details to the overall picture, based on which to make decisions, the ability to think systematically, you can say «top-down», will be one of the defining skills of the professional portrait of the future employee.

3. IN-DEMAND TECHNICAL SKILLS.

Of course, the main selection criterion and the condition for professional growth of a TLC employee will be technical savvy. Moreover, both in working with physical units, including vehicles, robots, and unmanned vehicles, and with digital technologies. Maintenance and repair of mobile equipment, working with big data, programming, cyber defense and complex maintenance of smart equipment will be the main competencies in the industry.

1.
MAINTENANCE AND REPAIR OF MOBILE EQUIPMENT

Of course, the main condition for most employees in the industry is the ability to handle vehicles, manage them, and repair them.

40.8% of respondents believe that this will be the most popular skill in the future. It is necessary to take into account the potential wide range of vehicles that will appear in the horizon of the next 10-15 years. At the same time, employees will need to

constantly improve and expand their competencies, learn to use various vehicles. To assist them in the maintenance and repair of the system will be predictive state analysis, additive technology and robots.

Therefore, a qualified specialist in the future will have to own these advanced technologies.

2.
BIG DATA PROCESSING AND ANALYSIS

The ability to work with large volumes of data is also considered as important as the management and maintenance of a team of 40.8% of experts. Digitalization will lead to the dictation of data, which will constantly generate a huge and ever-growing stream of raw and unstructured information. With the help of various tools and systems, such as its, peripheral computing, and blockchain, future specialists will be able to efficiently process, analyze, and use these data sets to make decisions.

The main area of work in this area will be the management of super-aggregated digital infrastructures, which is impossible without the skill of working with big data.

3.
PROGRAMMING

39.8% of experts believe that the ability to program will be critical for a highly qualified employee of the industry. Although not in complex languages that are only available to professional it professionals, and not supermassive programs with a wide range of functionality. But the ability to write minimal code to start a business process will be extremely important.

For example, the SQL language will be important for analyzing Big Data and managing complex databases that will be distributed everywhere and will become the basis of its, digital doubles, and virtual logistics maps.

4.
DEEP KNOWLEDGE OF CYBER DEFENSE

36.7% of respondents believe that this competence will be one of the main technical skills of the future specialist.

It is difficult to overestimate the role of TLC in ensuring the life of States and economies. The blood supply system of countries and regions will depend on computers, AI, and big data in the future. This means that it will be subject to cyber threats.

Given the importance of human safety on the road, the transport of dangerous goods, or the economy as a whole, which is directly dependent on transport, the need to establish and maintain reliable cyber defense systems cannot be denied.

Despite the fact that cyber defense seems to be an exclusive field of activity for it specialists, highly qualified TLC employees responsible for managing highly complex systems will be required

to possess the necessary set of competencies in this area in order to be the first line of defense.

5.
COMPREHENSIVE AND MODULAR MAINTENANCE OF SMART EQUIPMENT

This skill is considered necessary by 35.7% of experts. Given that modern equipment is becoming more and more complex, and its internal functioning involves the close interaction of many automatic mechanisms, human intervention in fine-tuning and sensitive circuits should be minimized. Therefore, promising smart equipment will consist of many separate but interconnected modules, each of which can be repaired or replaced without the risk of damaging the other components.

In this regard, the ability to handle such highly sensitive equipment will become one of the most important areas of activity of service and repair services. By the way, technologies such as predictive analysis, IAT sensors and AI will provide them with significant assistance.

4. FUNCTIONAL COMPETENCIES

Given the complexity of administrative and bureaucratic systems, it will be important for the employee of the future to be able to build logistics chains and external communications, manage projects and innovations, and work in conditions of uncertainty.

1. LOGISTICS MANAGEMENT AND EXTERNAL COMMUNICATIONS MANAGEMENT

52% of experts point to the high demand for these competencies among industry employees. The ability to build optimal logistics chains, as well as establish interaction with a variety of counter - agents and clients, will be the main corporate skills of specialists of the future. To do this, they will need to think systematically and communicate effectively.

2. PROCESS MANAGEMENT

This competence is considered important by 41.8% of respondents. «Manual control» and operational regulation of any process will become one of the main responsibilities of a highly qualified employee in the field of transport and logistics.

Navigating unexpected situations, setting up and coordinating supply chain management processes, business processes during transportation, as well as administration and procedural support will be key components of TL companies ' production processes.

3. PROJECT MANAGEMENT

37.8% of experts consider this competence to be in demand in the future.

Focus on results, the ability to build an effective system and algorithm for implementing an

idea, accurately select funds and time, manage circumstances and processes will be the key elements of a professional portrait in the future. The technological transformation of the industry will be based on a project-based approach, which is why the expert community believes that transport specialists with developed project management skills will be the drivers of modernization. TL-companies.

4.
DEVELOPMENT AND IMPLEMENTATION OF INNOVATIONS

35.7% of respondents indicate that the initiation and implementation of technological and business innovations will be important for the future of the specialty.

They should be open to innovations, be able to imple-

ment them harmoniously and smoothly in business processes, and administer the process, even if they do not have narrow - profile skills in a particular area. The demand for this competence indicates that digitalization, automation and automation of TLC will become constant trends.

5.
WORKING UNDER UNCERTAINTY

34.7% of experts believe that in the future it will be critically important to be able to work in a constant way changing conditions. Uncertainty in the market configuration, relationships with multiple contractors and clients, and business processes subject to force majeure have been and will continue to be distinctive features of the transport and logistics sector.

Management and specialists who are used to working in such conditions, do not lose their self-possession, and are able to think clearly in difficult situations and make well-balanced decisions dictated by rational motives, which will always be in demand in the market.

Thus, from the point of view of employers in the future, a valuable and effective employee, permanently in demand on the market in the coming 10-15 years, will be visionary specialists who can think logically and systematically, have an analytical mindset, and are able to critically perceive and filter incoming information.

Their distinctive features will be a broad technological competence, both in the field of working with physical aggregates, as well as with digital infrastructure and cyber defense tools. They learn quickly and easily, do not get lost in non - standard situations, are resistant to psychoemotional overload, are client-oriented and multicultural.

They have developed skills in project management, building external communications and logistics chains. They are able to manage complex systems and are open to innovation.Proficiency in the above-mentioned competencies in the future-go is the key to successful work in TLC in 10-15 years. As we can see, in many ways hard skills are inferior to soft ones.

The ability to build communication, flexibly approach work processes, speed and smoothness of adaptation to rapidly changing conditions, self-development, together with fundamental technical knowledge are the key characteristics of an employee in this industry in the future.

WHERE TO LEARN NEW PROFESSIONS IN KAZAKHSTAN?

11.

WHERE TO LEARN NEW PROFESSIONS IN KAZAKHSTAN?

So, we have identified a list of new professions that will appear in the near 10-15 years. We have formed a set of competencies and skills necessary for mastering these professions. And if soft skills need to be developed throughout life, starting from school or even kindergarten, then basic competencies require professional training and mastering certain specializations in various fields.

For example, a digital logistician must not only understand logistics, but also have a professional knowledge of advanced it, for which he must be trained in programming and software engineering, computer science, big data management, interaction with various computer equipment and intelligent cyber - physical systems.

The specialist of the future cannot be narrowly focused. They must have a much broader range of skills and abilities than modern workers. At the same time, its competence should be constantly developed and expanded. A static, progress-indifferent specialist who does not master new specializations and technologies will inevitably face the threat of losing his job.

Where can we learn the necessary skills now or in the near future?

What educational institutions can provide the necessary basis and help in creating a professional portrait that meets the future needs of the labor market in our time?

The answer to these questions is the Map of localization of new professions presented below, which is a division of higher education Institutions by special areas that allow them to train certain specialists.

As part of localization, it is proposed to consider the potential of 16 most suitable Universities from the rating of educational programs of Universities compiled by NCE "Atameken" (table 1). These Universities were selected because they have a basic specialization "organization of transportation, movement and operation of transport", as well as additional faculties that allow you to train specialists of the future. Universities with a rating below 2.955 were not considered.

Table 11.1.

Рейтинг ВУЗов для локализации новых профессий транспортно-логистической отрасли РК*.

	Universities	Ranking	Number of new professions
1	Kostanay Engineering and Economic University named after M. Dulatov	3.73	12
2	Kazakh Academy of Transport And Communications. Tynyshpaeva	3.69	15
3	Zhezkazgan University named after O. A. Baikonurov	3.58	1
4	Kazakh Agrotechnical University named after S. Seifullin	3.43	11
5	Karaganda State Technical University	3.29	17
6	“Astana” university	3.26	12
7	University " Almaty»	3.24	0
8	D. Serikbayev East Kazakhstan State Technical University	3.19	16
9	Ekibastuz Engineering and Technical Institute. academician K. Satpayev	3.12	2
10	West Kazakhstan University of Innovation and Technology	3.09	12
11	Baishev University	3.081	3
12	Karaganda State University named after E. A. Buketov	3.080	6
13	S. Toraighyrov Pavlodar State University	3.07	16
14	Kazakh Transport University	2.991	2
15	Abay Myrzakhmetov Kokshetau University	2.989	3
16	l. N. Gumilyov eurasian national university	2.96	11

SOURCE: ranking of Universities compiled by NCE «Atameken».

[1] https://atameken.kz/uploads/content/files/ (2).pdf

	Universities	Ranking
17	Eurasian Technological University named after M. Auezov	2.955
18	State University named after Shakarim Semey	2.951
19	Aktobe Regional State University named after K. Zhubanov	2.92
20	South Kazakhstan State University	2.78
21	Humanitarian and Technical Institute " Akmeshit»	2.75
22	Kazakh Humanitarian and Legal Innovation University	2.724
23	Taraz state university named after M. H. Dulati	2.721
24	Kazakh automobile and road academy named after L. B. Goncharov	2.70
25	Civil aviation academy	2.68
26	Kazakh national agrarian university	2.52
27	Kainar academy	2.35
28	Bolashak university Kyzylorda	2.33
29	Kyzylorda state university named after Korkyt ATA	2.30
30	Satbayev University	1.99
31	West Kazakhstan agrarian and technical university named after Zhangir Khan	1.17
32	Central Asian university	1.14

Table 11.2. shows 20 new professions in the transport and logistics industry, as well as educational specializations, on the basis of which it is possible to expand the localization of new professions. localization is an activity aimed at developing educational and methodological materials and special training practices for teaching knowledge, skills and competencies for new tasks of the industry on the basis of specific universities. Taking into account the cross-cutting nature of the professions of the future, 2-3 basic specializations were identified, on the basis of which a list of the most suitable universities was compiled. With an increase in the number of specializations, this list was reduced to the minimum values.

Table 11.2.

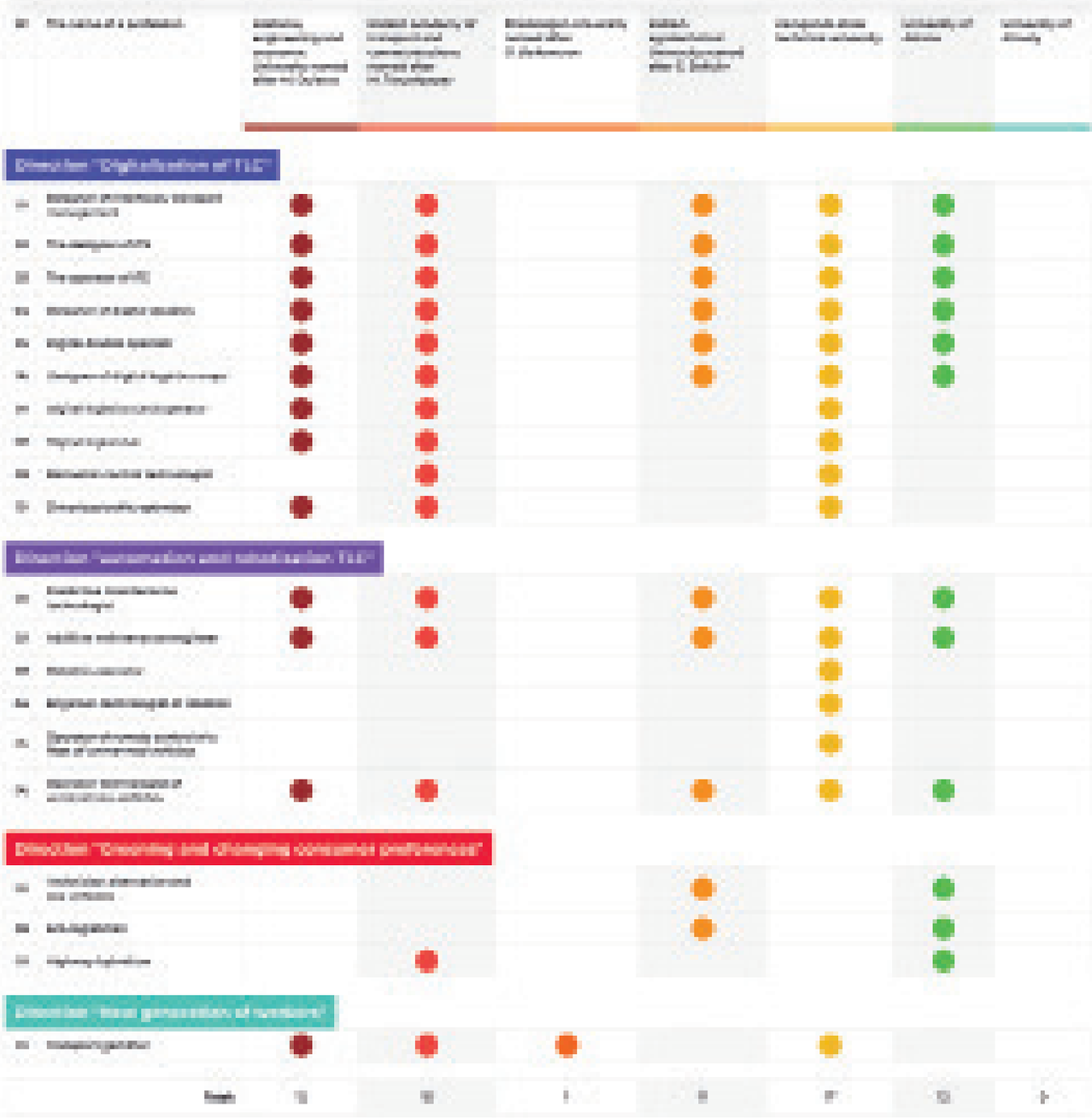
List of faculties required for localization of new professions in the tourism industry of the Republic of Kazakhstan.

	Profession	List of faculties and departments required for localization of new professions in the industry
1	DIGITALIZATION OF TLC	
1	Designer of transport management interfaces	5B090100 - Organization of transportation, traffic and operation of transport 5B070400-Computer equipment and software
2	ITS Designer	5B090100 - Organization of transportation, traffic and operation of transport 5B070400-Computer equipment and software
3	ITS operator	5B090100 - Organization of transportation, traffic and operation of transport 5B070400-Computer equipment and software
4	Designer of digital twins	5B090100 - Organization of transportation, traffic and operation of transport 5B070400-Computer equipment and software
5	Operator of digital twins	5B090100 - Organization of transportation, traffic and operation of transport 5B070400-Computer equipment and software
6	Designer of digital logistics cards	5B090100 - Organization of transportation, traffic and operation of transport 5b070300-information systems

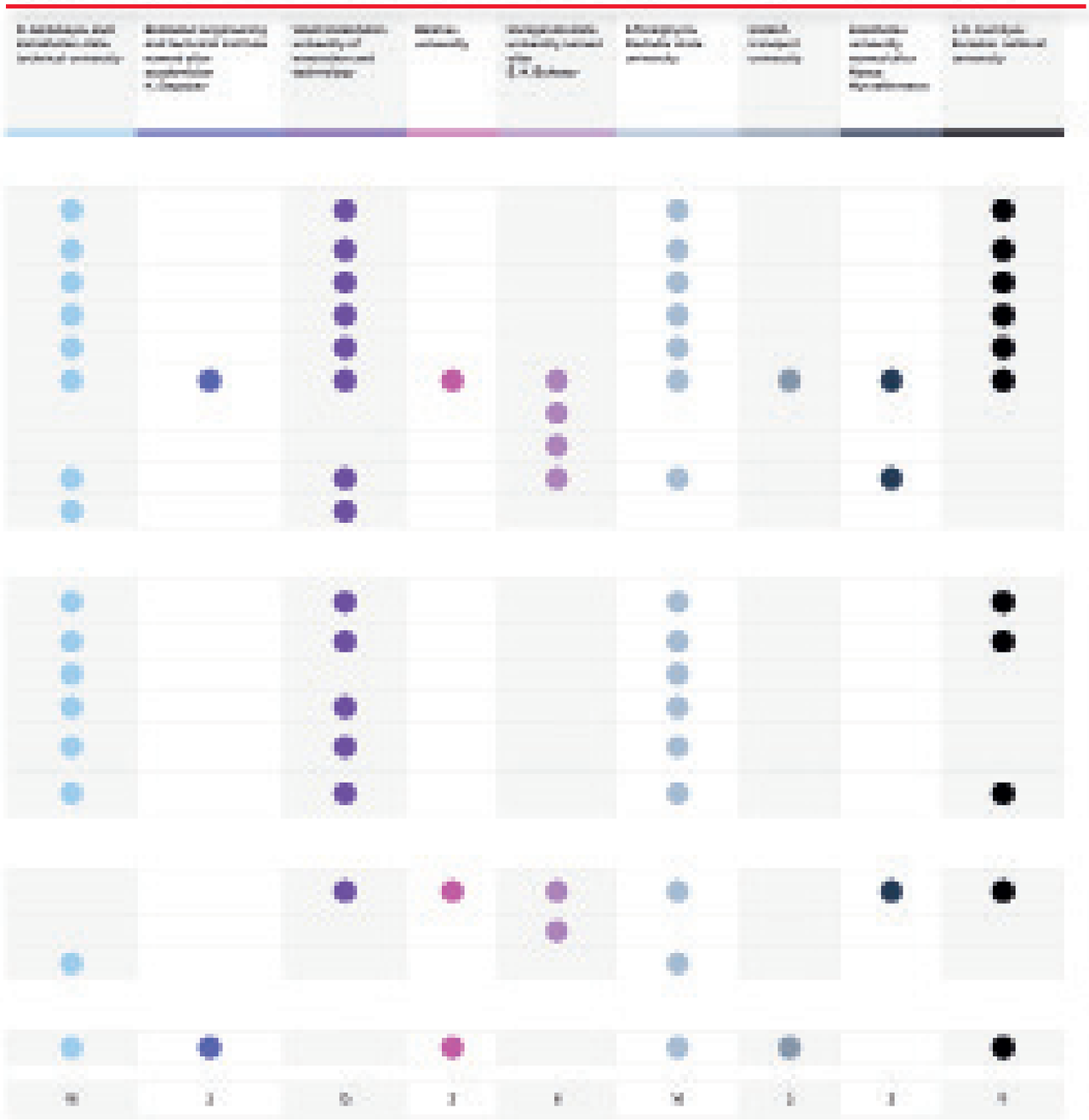
	Profession	List of faculties and departments required for localization of new professions in the industry
7	Digital Logistics Card Operator	5B090900-Logistics (by industry) 5B070400-Computer Engineering and Software
8	Digital logistician	5B090900-Logistics (by industry) 5B070400-Computer Engineering and Software
9	Biometric control technologist	5B073100-Life safety and environmental protection 5B070300-Information systems
10	Driverless Traffic Optimizer	5B090100 - Organization of transportation, traffic and operation of transport 5B073100-Life safety and environmental protection 5B070300-Information systems
2	AUTOMATION AND ROBOTIZATION OF TLC	
11	Predictive Maintenance Technologist	5B090100 - Organization of transportation, traffic and operation of transport 5B070400-Computer equipment and software
12	Additive Maintenance Engineer	5B090100 - Organization of transportation, traffic and operation of transport 5B070400-Computer equipment and software 5B071600-Instrument making
13	Robotics operator	5B071600-Instrument making 5B070400-Computer equipment and software
14	Robotics Engineer-Technologist	5B071600-Instrument making 5B070400-Computer equipment and software

	Profession	List of faculties and departments required for localization of new professions in the industry
15	Operator of remote control of the fleet of unmanned vehicles	5B071600-Instrument making 5B070400-Computer equipment and software
16	Operator of remote control of the fleet of unmanned vehicles	5B071600-Instrument making 5B070400-Computer equipment and software
3	GREENING AND CHANGING CONSUMER PREFERENCES	
17	Alternative and ecotransport techniques	5B090100 - Organization of transportation, traffic and operation of transport 5B060800-Ecology
18	Eco-logistician	5B090900-Logistics (by industry) 5B060800-Ecology
19	Highway hybridizer	5B074500-Transport construction 5B073100-Life safety and environmental protection
4	A NEW GENERATION OF EMPLOYEES	
20	Transport Gamifier	5B090100 - Organization of transportation, traffic and operation of transport 5B070200-automation and control

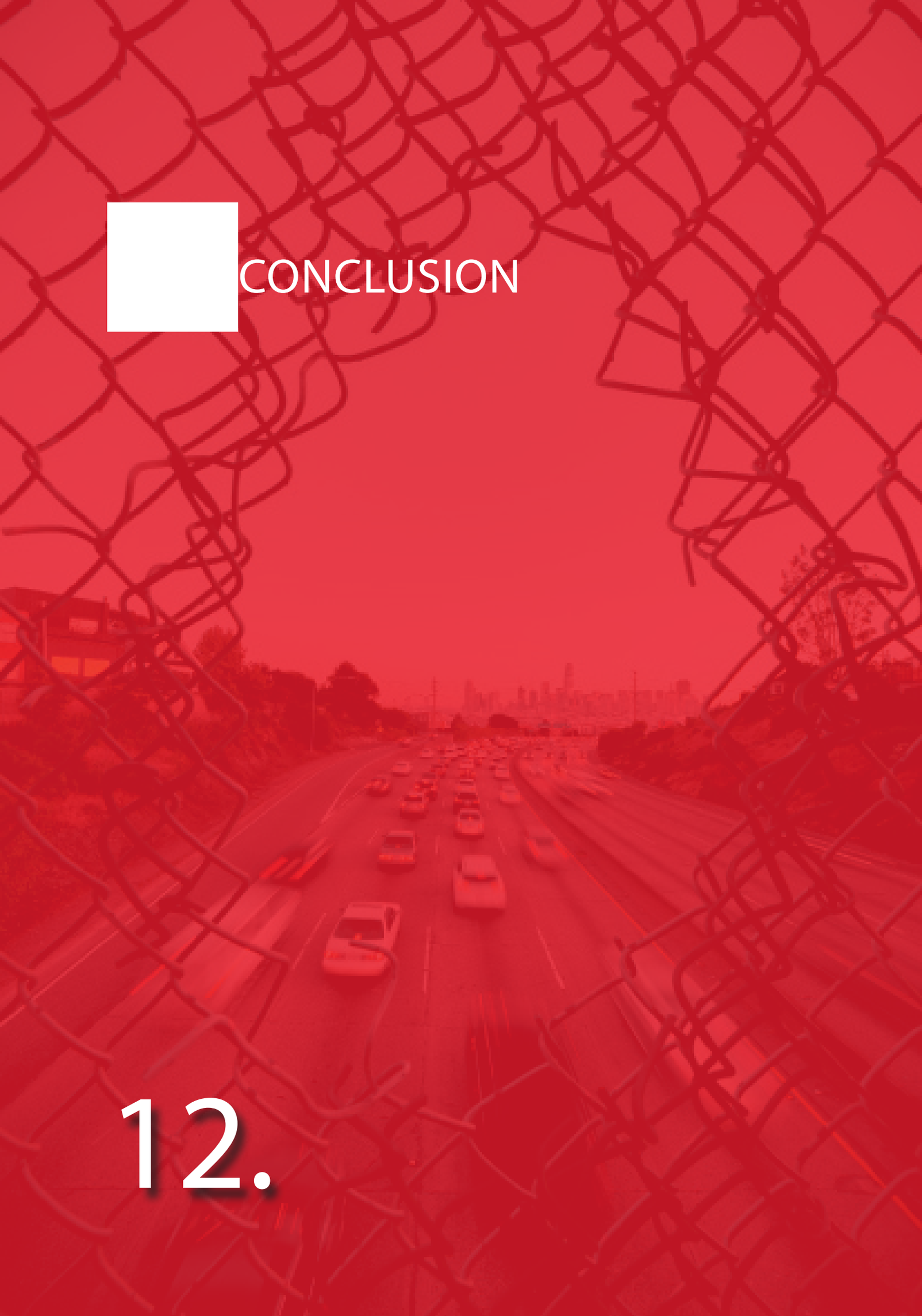
TABLE 11.3.
MAP OF LOCALIZATION OF NEW PROFESSIONS IN UNIVERSITIES OF THE RK



As we can see, not every university will be able to organize the necessary material, technical, educational, methodological and academic base for the localization of new professions. It will require a revision of educational programs and scientific and methodological convergence of various specializations that were previously either not studied together within the same specialty, or related subjects were not given due attention. They could take place in the form of additional training courses, electives, or



mandatory introductory-type disciplines. For the full integration of new professions, it takes time, which is not enough. Some professions are already de facto in demand to a limited extent. The industry is experiencing an acute shortage of qualified personnel. Therefore, it is necessary to start developing appropriate educational programs in the near future.



CONCLUSION

12.

CONCLUSION

Trying to lift the veil that hides the future, you can always make a mistake. How likely is an error? How accurate are the assumptions and forecasts? Should they be trusted if it is impossible to evaluate them now, and then it will be too late?

Finding an unambiguous answer seems impractical, since it simply does not exist. And you need to decide for yourself which way to go, not knowing exactly where it can lead.

When thinking about these questions, we should proceed from the simple logic of a lower risk. You can ignore the long - term transformation of the labor market, learn traditional professions, and not learn new skills. In this case, we will face a strong competition in the market, because there will be a lot of such specialists, both from among those who are already working, and those who have just finished their studies and are looking for employment opportunities. At the same time, the market itself will compress- automation, digitalization, and robotization are not abstract processes, but objective reality. With such a personal policy, the risks are very high.

The same applies to working highly qualified specialists who believe that automation and digitalization do not threaten them. However, it is worth noting that the three previous industrial revolutions led to the disappearance of many professions and professional occupations. And according to experts ' forecasts, the FOURTH INDUSTRIAL REVOLUTION will deactualize about 60% of modern ones. In other words, it is very risky to expect that extremely narrow - profile occupations that seem to be the patrimony of a person will not be at risk of transformation or disappearance.

Another way involves moving along the path of continuous formation. Taking into account the actual situation and focusing on the future, you significantly mitigate the risks of being out of work for a number of reasons.

FIRST. In one way or another, you will receive a specialized education, the basic competencies of which include several modern specializations. That is, instead of one specific one, you are aggregating a set of competencies. You won't just be an it specialist or a pure logistician. You will be able to combine these professions, and even if the situation in the labor market does not change, and new professions do not arise or are in limited demand, you will always be able to find work in either one or the other field.

SECOND. By developing soft skills, you can be sure that you will be in demand in many industries and will always be able to compete in any segment of the labor market. Experts directly say that in the future, soft skills may well prevail over hard ones. After all, the latter can be quickly learned using new formats for acquiring the necessary skills, such as online training or game modification, and practical skills can be honed right on the go. Skills such as critical thinking, empathy, cross-industry communication, or broad interaction with people, you need to work on yourself for a long time.

THE THIRD. Orientation to new professions is not a step forward or backward, but a step to the side. When you get out of the established rut of the educational process and look at it from the outside, it is easy to see how much it misses. How much it depends on changes, but hardly gives in to them. the XXI century is an era of permanent transformations. Mobility and dynamism will be the key to success. Now many professionals who pay great attention to improving their skills are beginning to understand that you need to work not only to develop their narrow-profile skills, but and develop areas that previously did not arouse interest or were not of practical use.
Creative thinking is combined with analytical thinking. Only such specialists will be competitive and in demand. Scientific and technological progress, the transition from the paradigm of personal consumption to the global economy, the growth of the quality of life, increased attention to environmental problems, the entry into the labor market of specialists of a new formation, and many other socio - economic and natural factors lead to a profound transformation of all sectors of the economy. This is a fact that cannot be denied. It is possible to adapt to new realities only by taking preventive measures and preparing ahead of time. After all, it is always better to get on the train when it is still at the station than to jump on the move.

> In the future, there will be no pure technicians or humanitarians. Natural and scientific knowledge is closely intertwined with the Humanities.

THE RESEARCH TEAM OF THE PROJECT

13.

THE RESEARCH TEAM OF THE PROJECT

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DAMU Logistics Group

Incide Travel LLP

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JSC «Airport Family»

JSC «Airport Ust-Kamenogorsk»

JSC «Airport Shymkent»

JSC «international airport Aktobe»

JSC «international airport Nursultan Nazarbayev»

JSC «NC «KTZ»

JSC «NC «KTZ» – «Directorate of backbone network»

JSC «NC «KTZ» – «Center of evaluation and development of railway transport»

JSC « NC « KTZ « «business transformation Center»

JSC «KTZ-Freight transport»

JSC Almaty international Airport»

JSC «national company «Kazakhstan Temir Zholy»

JSC «NC «Aktau international sea commercial port»

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PTC operator LLP

DHL logistics Kazakhstan

LLP MSC Central Asia LLP Garsan SCM LLP»

Turan University Goryachy University»

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