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Formation and Regulation of Development of Logistics System's Commodity Distribution Structure of Kazakhstan

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ABSTRACT

Logistical potential capacity of regional commodity distribution network development has the greatest influence on economic growth and structural development of branches of the economy. Despite the achieved results with development and improvement of methods and models for constructing the commodity distribution structure for a country that has a huge territory with sparsely populated regions and undeveloped distribution network infrastructure, further research and differentiation of approaches is needed in managing development of commodity distribution structure, while taking into account their investment attractiveness.

The estimation of investment attractiveness and logistical potential of the Kazakhstan regions is made by comparative analysis and ranking based on the proposed indicators characterizing the logistics infrastructure of the distribution network. In the course of the analysis there were established three types of territories, depending on the level of investment attractiveness and the potential for the logistics development.

To increase the efficiency of the logistics functioning and to stimulate its development there were proposed measures to support the development of the commodity distribution infrastructure in the regions, taking into account the mechanism of a differentiated approach for each selected group of Kazakhstan's macro regions.

JEL classification: O18, L5, L9, R1.

Keywords: Logistics, commodity distribution infrastructure, logistical potential, Kazakhstan.

1. INTRODUCTION

The effectiveness of logistics development in general affects the development of the country's economy, its competitiveness and ability to attract investment, and also reflects the levels of socio-economic development of the country's regions.

Therefore, the assessment of the potential for the distribution network infrastructure development is important, as it provides an opportunity to take measures for its further modernization and stimulation of development.

Analysis of international and domestic experience in the development of logistics and its infrastructure reveals the following tools for stimulating and developing logistics: the construction of infrastructure facilities at the expense of the state, the use of public-private partnership mechanisms, the provision of various benefits, as well as the creation of the necessary administrative conditions to attract private capital for the development of infrastructure facilities (Wilmsmeier et. al., 2011).

However, in order to determine the optimal instrument for influencing the development of logistics and the providing infrastructure of the commodity circulation system in the region, it is necessary to classify regions according to the extent of their economic attractiveness and the companies that work there, and then take actions to develop them.

2. LITERATURE REVIEW

The development of logistics and the infrastructure of commodity circulation in different countries, assessing and improving its development effectiveness are determined on the basis of its attractiveness and the investment potential of the country. These issues are considered in the following studies: (Ross et. al., 2012), (Brian et. al., 2010), (Ng et. al., 2009), (Bilovodska et. al., 2016), (Jevtic et. al., 2008), (O'Connor 2010), (Lean 2014), (Hesse 2004), (Tsamboulas 2013), (Roso 2008), (Wilmsmeier et. al., 2011).

Previously, the state was the owner and the responsible party for the infrastructure development, then since 1990 public-private partnership (PPP), especially in road projects, began to develop (Tsamboulas 2013), PPP started to be widely used in EU countries (Jevtic et. al., 2008).

Many factors influence the development of the logistics potential of commodity circulation, among them: infrastructure, land use, environment and rules (Ross et. al., 2012; O'Connor 2010) that limit the development of certain territories (Hesse 2004; Roso 2008) can be distinguished. The development of logistics and the priorities of its development through government support, PPP and other mechanisms are considered in studies (Ng et. al., 2009; Jevtic et. al., 2008; Wilmsmeier et. al., 2011).

In these studies, the emphasis is on assessing the development of logistics of the country or territory (city, district). The need to locate and develop the logistics of this region is determined by its economic potential, investment attractiveness and logistics environment.

At the moment, the countries of Western Europe and the developed Asian regions are taking the lead in logistics development level ("Global Rankings 2016" 2016). So, according to the Logistics Performance Index (LPI), determined by the World Bank, according to the overall level of logistics development in 2016, the world leader among 160 countries is Germany, with the index value of 4.23 points (Table 1), Luxembourg, Sweden and others.

Table 1
Data on the assessment of the logistics development level in the countries worldwide in 2016, in points

Countries	*Rank LPI*	*LPI Rating*	*Customs*	*Infrastructure*	*Inter-national transportation*	*Competence in logistics*	*Possibility of tracking the goods*	*Observance of delivery terms*
Germany	1	4.23	4.12	4.44	3.86	4.28	4.27	4.45
Luxemburg	2	4.22	3.90	4.24	4.24	4.01	4.12	4.80
Sweden	3	4.20	3.92	4.27	4.00	4.25	4.38	4.45
Holland	4	4.19	4.12	4.29	3.94	4.22	4.17	4.41
Singapore	5	4.14	4.18	4.20	3.96	4.09	4.05	4.40
…								
Kazakhstan	77	2,75	2,52	2,76	2,75	2,57	2,86	3,06
Ukraine	80	2,74	2,30	2,49	2,59	2,55	2,96	3,51
Russia	99	2,57	2,01	2,43	2,43	2,76	2,62	3,15
Belarus	120	2,40	2,06	2,10	2,62	2,32	2,16	3,04

Source: compiled according to the source "Global Rankings 2016"

Kazakhstan ranks 77th (with an LPI of 2.75 points) and is ahead of the former Union countries such as: Russia, Ukraine and Belarus. At the same time, the highest indicator of the existing logistics of our country, at the moment, is the observance of delivery terms (an estimate of 3.06 points).

The World Bank LPI evaluation methodology is not an ideal model for copying, since it is based only on the results of surveys of predominantly international (transnational) logistics companies. At the same time, there is no survey of the logistics services consumers. The peculiarities of individual countries, for example, the access to the sea, the area of the territory, etc., are not taken into account.

The Emerging Market Logistics Index developed by Transport Intelligence (UK) reflects the attractiveness of the logistics market for foreign investment. The index is determined on the basis of three intermediate indicators: the size and dynamics of market development, market compatibility, development of transport communications ("Agility Emerging Markets Logistics Index 2016" 2016).

According to data for 2016, out of 45 developing economies countries, Russia took 9th place (in 2015 - the 7th), Kazakhstan - 18th (in 2015 - 18th), Ukraine - 34th (in 2015 - the 38th). The first places in this ranking are occupied by China, the United Arab Emirates, India, Malaysia, Saudi Arabia, Brazil and Indonesia.

In terms of the logistics development level, Kazakhstan currently lags far behind developed countries. However, recently there has been a positive development trend in terms of the growth of state investment in the construction and rehabilitation of roads and railways throughout the country, modernization and expansion of the logistics system of postal services in Kazakhstan, the development of a regional logistics infrastructure through regional budgets and the private sector, etc.

A comprehensive analysis of the logistics formation and development in foreign countries shows the presence of the following options for state participation in its development (Wilmsmeier et. al., 2011): the state takes a direct part in its development (for example, Sweden); the private sector develops terminals and logistics centers, and the government encourages this process in every possible way through spatial

planning and financing (for example, Scotland); the state's participation share is insignificant (for example, the USA).

A successful model of regional logistics infrastructure development in the European Union is, first of all, provided by strong state support at all levels, which is based on federal laws and involves the involvement of the public sector both at the planning stage and the implementation of effective infrastructure development projects (Nyzhehorodtseva et. al., 2012).

The purpose of the work: Assessment of the commodity distribution network (transport, logistics and trade) infrastructure development potential of the Kazakhstan's regions and the definition of the optimal instrument for regulating the development of the commodity circulation network logistics infrastructure in the regions of Kazakhstan. The objectives of the study are: to carry out the classification of regions for a number of economic indicators that reflect the prospects for the distribution network infrastructure development, and to make the proposal for their development.

3. METHODOLOGY OF THE STUDY

As the methodology of the study the official statistical data of the Statistics Committee of Kazakhstan for 2014-2016 were used ("Statistical compilation" 2016), as well as expert methods of interviewing regional transport and logistics companies. The survey was carried out for indicators that are not available in statistical materials (respondents assess the logistics system of the region in which they work on a three-point scale). On their basis the integral index and the place among the regions of the country participating in the rating are calculated.

Groups of indicators are proposed, which, in our opinion, fully characterize the potential for the commodity circulation infrastructure development for a specific region. These include:

1. The investment attractiveness of the region from the point of view of developing the infrastructure of the commodity circulation system;
2. The potential for the infrastructure of the commodity distribution network development in the region. The indicators of the level and potential of the regional commodity distribution network logistics development consist of two groups.

I. Investment attractiveness (IA) of the commodity distribution network infrastructure in the region, including:

1. General economic indicators related to the transport-logistical and trade complex;
2. Entrepreneurial activity in the region associated with the use of transport - logistical and trade infrastructure.

II. The potential for the commodity distribution network infrastructure (CDNI) development of the region, consisting of a system of indicators that characterize; respectively, the performance of transport and logistics activity in the sector (2.1), the potential for the development of transport infrastructure (2.2), the potential for the development of a logistics infrastructure (2.3) (2.4), the production potential of the region (2.5), the institutional security potential of the sector (2.6).

Investment attractiveness of the distribution network infrastructure in the region:

1. General economic indicators include the population of the region; the purchasing power of the population of the region (rated from "low" -1 to "high" - n (where n is the number of regions); as well as the capacity of the market of transport and logistics services; the level of specialists qualification in the transport and logistics industry; provision of transport and logistics infrastructure (rated: 1-low, 2-medium, 3-high);
2. Entrepreneurial activity of the region is characterized by the region's gross regional product; investment in transport and storage; level of labor productivity (rated from: "low" -1 to "high" – n), and also: regional investment risks (rated 1-low, 2-medium, 3-high);

The potential of the commodity distribution network infrastructure (CDNI) development of the region is determined by the rating in ascending order from: "low" - 1 to "high" - n (where n is the number of regions).

1. Transport and logistics industry activity indicators (in %) are: the share of goods passing through transport and logistics centers, freight terminals; the share of modern transport and logistics centers, freight terminals in the regions to their total number; the share of employed in the industry to the average annual number of employed in the economy; the share of transport and logistics organizations implementing technological innovations in the total number of organizations.
2. The potential for the transport infrastructure development: the density of railway communication lines per 1000 sq. km. of territory; operational length of public railway lines; length of public roads; density of public roads with hard surface, km per 1000 sq.km, availability of airports, length of main pipelines, km.
3. Potential for the logistics infrastructure development: the area of modern warehouses of Class A, B; availability and capacity of cargo terminals; availability and capacity of the transport and logistics center; availability of information and logistics center and level of information support; capacity of warehouse equipment; number of logistic operators.
4. Potential for the trade infrastructure development: the number of wholesale and retail trade enterprises; the volume of retail and wholesale turnover; availability and area of the sales area; volume of foreign trade turnover per capita, USD.
5. Production potential: the volume of goods shipped, manufacturing; average range of 1 ton of cargo transportation; import into the region; transportation of goods and freight turnover by road; transportation of goods and freight turnover by rail; transportation of goods and cargo turnover by air transport; transportation of goods and cargo turnover by water transport; cargo transportation and pipeline turnover.
6. Institutional potential in the field of transport and logistics: the share of employed in small and medium-sized enterprises in the industry; number of forwarding companies, as well as: the unemployment rate in the transport and logistics complex; indices of tariffs for freight transportation by transport (rated from high -1 to low - n).

According to the above indicators, we calculate the quantitative values of the indicators that make up the potential of the CDNI of the region as the sum of the values of the corresponding indicators. The

integral index of the CDNI of each region consisting of six groups of indicators was calculated according to the following formula:

$$I_{int} = \sqrt[6]{I_{2.1} \cdot I_{2.2} \cdot I_{2.3} \cdot I_{2.4} \cdot I_{2.5} \cdot I_{2.6}} \quad (1)$$

4. THE MAIN RESULTS OF THE STUDY

The ranking of the regions is conducted by two groups of indicators.

The first group of indicators is the investment attractiveness of the region's infrastructure. The second group of indicators is the commodity distribution network infrastructure development potential in the region.

Ranking assesses the location of the region of the country according to the relevant indicators. The principle of ranking is presented more detailed in Table 2 on the example of the "population size" indicator.

The ranking of the region (Table 2) is determined by an increasing principle: the first place corresponds to the minimum indicator. This approach will allow further to maintain direct dependence: the largest indicators reflect the most optimal sales markets.

Similar approaches were used to rank the regions of Kazakhstan according to the indicators of the group that characterize the investment attractiveness (Table 2) and the potential for the development of the infrastructure of the commodity distribution network in the region (Figure 1, Table 2).

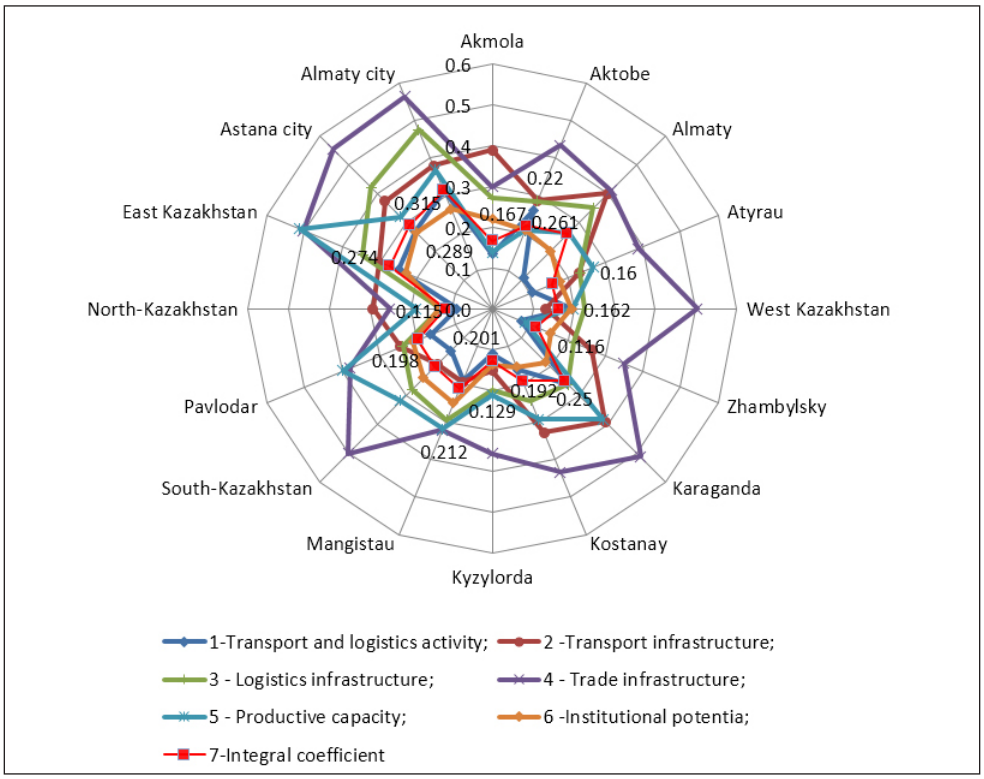

Figure 1: Integral potential of the commodity distribution network infrastructure of the Kazakhstan's regions, data for 2015
Source: **Authors' research data**

Table 2
Example of ranking regions by the "population size" indicator

Region	*Number of the population, people*	*Location of the region by indicator, in ascending order*	*Coefficient of the region by indicator*
Akmola	744386	6	0,006
Aktobe	834768	8	0,008
Almaty	1947481	15	0,016
Atyrau	594562	2	0,002
West Kazakhstan	636852	4	0,004
Zhambylsky	1110907	11	0,011
Karaganda	1384889	12	0,012
Kostanay	883640	10	0,010
Kyzylorda	765171	5	0,005
Mangistau	626793	3	0,003
South-Kazakhstan	2841307	16	0,017
Pavlodar	758479	7	0,007
North-Kazakhstan	569446	1	0,001
East Kazakhstan	1395797	13	0,014
Astana city	872619	9	0,009
Almaty city	1703482	14	0,015

Source: Authors' research data

As follows from Figure 1 the possibilities of the distribution network infrastructure in the regions of Kazakhstan are different. Regions that have a strategic export and raw materials orientation have a higher potential in comparison with agro-industrial regions. For example, the highest level of infrastructure potential is noted in Almaty, Aktyubinsk, Mangistau, East Kazakhstan and Karaganda regions. A high level of infrastructure growth is noted in Akmola, South Kazakhstan, and West Kazakhstan. Low potential is noted in Zhambyl, Kyzylorda, North Kazakhstan and Atyrau regions.

Table 3 presents summary results of Kazakhstan's regions ranking by the criteria of investment attractiveness and logistic potential.

Table 3
Summary results of ranking regions of Kazakhstan

Regions	*Integral indicator characterizing the investment attractiveness of the region*	*An integral indicator characterizing the potential of the distribution network infrastructure development*
Akmola	0,054	0,167
Aktobe	0,058	0,22
Almaty	0,087	0,261
Atyrau	0,043	0,16
West Kazakhstan	0,056	0,162
Zhambyl	0,021	0,116

(*Contd...*)

Regions	*Integral indicator characterizing the investment attractiveness of the region*	*An integral indicator characterizing the potential of the distribution network infrastructure development*
Karaganda	0,056	0,25
Kostanay	0,027	0,192
Kyzylorda	0,017	0,129
Mangistau	0,052	0,212
South Kazakhstan	0,076	0,201
Pavlodar	0,044	0,198
North-Kazakhstan	0,008	0,115
East Kazakhstan	0,054	0,274
Astana city	0,093	0,289
Almaty city	0,109	0,315
National average	0,053	0,203

Source: Authors' research data

Comparative analysis of individual indicators allows us to make the following conclusion: although the infrastructure indicators are distributed more evenly by region, with the exception of Almaty city, Astana city and Almaty region where the growth rate is high, the infrastructure potential is low in economically underdeveloped regions.

The most conspicuous summary of the region investment attractiveness and the potential for the commodity distribution network infrastructure development are presented in Figure 2.

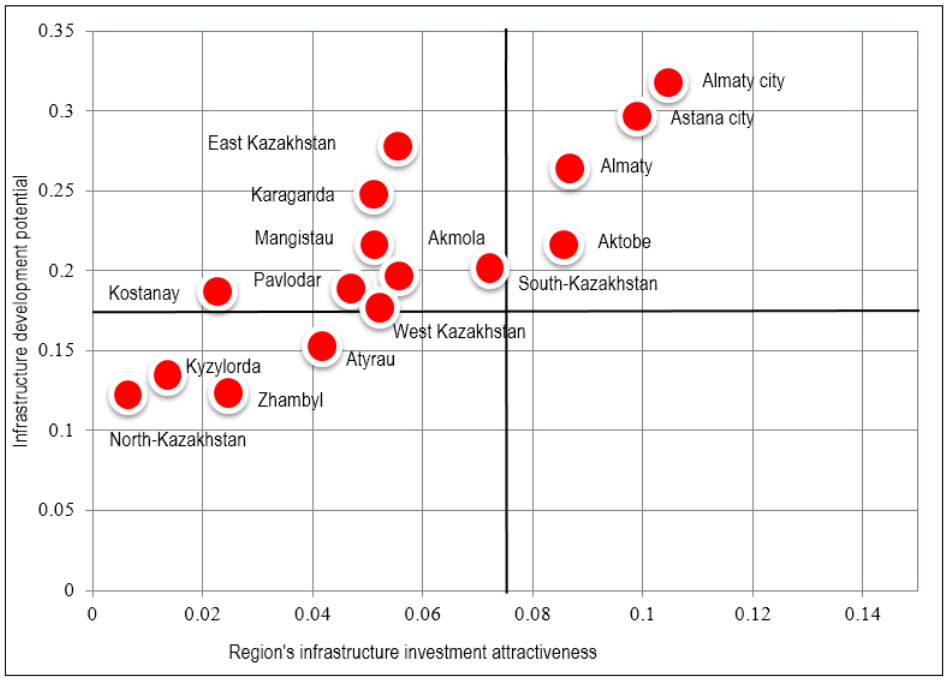

Figure 2: The distribution of the Kazakhstan regions in terms of investment attractiveness and the potential for the development of the distribution network infrastructure
***Source:* Authors' research data**

The typology of the Kazakhstan regions in accordance with the level of use and the potential for the commodity distribution network logistics development in the regions is presented by groups:

Group 1 - regions that have high investment attractiveness and are characterized by a high demand for the development of the distribution network infrastructure: Almaty city and Almaty region, Astana, Aktobe, South Kazakhstan region.

They can be attributed to investment attractive regions since they have developed infrastructure, characterized by high incomes of the population, high population.

Group 2 - regions with medium investment attractiveness and characterized by a high demand for the development of transport and logistics infrastructure: East Kazakhstan, Karaganda, Mangistau, Kostanay, Pavlodar, and Western Kazakhstan.

These regions are relatively attractive for business development as they are characterized by a fairly developed infrastructure, medium-high per capita incomes, medium-high density and population.

Group 3 - regions that have low investment attractiveness and are characterized by a low need for the development of transport and logistics infrastructure: North Kazakhstan, Zhambyl, Kyzylorda, Atyrau regions. These regions are unattractive from the economic point of view for private business. For such territories it is necessary either to organize infrastructure facilities at the expense of the state, or to provide direct subsidies for private companies doing business in these territories.

Thus, the study made it possible to classify the types of regions and assess the homogeneity of the population under study.

5. DISCUSSION OF THE RESEARCH RESULTS

Prospective programs to support the distribution network infrastructure development (transport, logistics, trade) by central and local governments for these groups should be presented differentially.

Let us consider the mechanisms of state influence in various regions of Kazakhstan.

First group regions do not require investments from the state as characterized by high investment attractiveness.

It proposes the introduction of a comprehensive program for the regions development, which includes both partial financing by the state of transport and transport logistics infrastructure construction, logistics and trade, and preferential incentives for transport and logistics infrastructure facilities projects. This is due to the fact that investors have a high degree of interest in developing the logistics infrastructure of these regions and can count only on partial state support at the first stages of development. A typical example is the cities of Almaty and Astana.

As the main instruments and measures to support and stimulate the distribution network infrastructure development of logistics that do not require the diversion of public funds, the following may be mentioned:

- Mandatory development of a program for the commodity distribution infrastructure development at the regional level;

- Mandatory urban planning, providing for the allocation of necessary land areas for trade, logistics and other similar organizations;
- Development at the state level of a uniform methodology for calculating the target population's supply of warehouse logistics facilities of various types and formats, depending on the population density, income level and other factors;
- At the regional level - development of town planning documentation in accordance with this methodology and ensuring its implementation;
- Provision of land and space for the construction of logistics facilities and transport-warehouse infrastructure facilities based on open tenders/auctions;
- Application of mechanisms related to public financing of the logistics infrastructure of goods movement development;
- Expansion of the border customs infrastructure clearance points; simplification of the goods customs clearance procedure, including the renewal of the ability to control documents in the regions - the location of the recipients of goods.

For the second group of regions the regional development program assumes the state's participation in the design and financing of the region's transport and logistics infrastructure.

It is advisable to coordinate the efforts and resources of this program within the framework of a single state program to support small businesses in the transport and logistics area. In this program, among other things, it is necessary to envisage the creation of a non-profit organization with branches in all regions of the second group, i.e. favorable for public investment. In this case, it is a large logistic system.

As the world experience shows, the creation of a national logistics organization that has all the characteristics of a 3-4PL provider is practically impossible without governmental support.

For the regions of the third group it is necessary to develop an integrated development program that is not limited to investments alone.

The program is based on incentives and other state support for already existing transport and logistics facilities.

The main tools of state stimulation of the development of the logistics infrastructure that do not require government investments in disadvantaged regions in terms of economic efficiency are:

- provision of land to the logistics companies on preferential terms or free of charge;
- inclusion in the condition of a tender for gaining access for a logistics company to an attractive market for the obligation to open service points at a remote and economically unattractive territory;
- provision of tax incentives for logistic companies and logistics players by the legislative (representative) bodies of state power of the Republic of Kazakhstan and representative local authorities: property tax relief and other regional and local taxes; transfer of the collected corporate tax back to the logistic player.

6. CONCLUSION

According to the proposed groups of indicators, an assessment of the Kazakhstan's regions potential on investment attractiveness and the distribution network infrastructure development was carried out.

Based on the classification of regions three types of territories were identified depending on the level of the logistics business attractiveness (attractive, relatively attractive, and unattractive) and the potential for the distribution network infrastructure development of the regions (high, medium, and low).

This approach has made it possible to divide the regions of Kazakhstan into three groups, for each of which differentiated measures of state and non-state support for the logistics infrastructure development of these regions are proposed.

The most important tools of state macro-logistical policy should be not only normative and legal documents development, but also programs for the development of regions in terms of their distribution network infrastructure development level and investment attractiveness, which allows introducing a differentiated system of taxation of logistics activities.

The recommended differential approach to state support and stimulation of the transport and logistics infrastructure development (taxation system) by central and local governments for these groups is based on taking into account the state of economic development and the transport and logistics potential regional development trend.

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