DEVELOPMENT OF A UNIFIED INFORMATION SYSTEM FOR PAYMENT OF TRANSPORT SERVICES

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Received 12 March 2024, www.isma.lv

Abstract
The article discusses the prospects for the development of a unified information system for payment of transport services throughout Kazakhstan. The main problems of using various information systems for payment of transport services for the population, business and the state. The analysis of passenger traffic for 2022 in all major cities of Kazakhstan, where various payment systems for transport services are used, is given. The advantages of using such a system and the expected results that will be obtained after the implementation of this system are also considered.

***Key words*:** *Information systems, transport, information technology, transport services, information systems design.*

1. Introduction

In the modern world, the development of technology and science leads to the emergence of new opportunities in various spheres of life, including in the field of transport services. One of such opportunities is the development of a unified information system for payment of transport services in the Republic of Kazakhstan. This is a project that can bring significant benefits to the residents of the country and increase the efficiency of using public transport [1–3].

2. Problem statement

To begin with, you should pay attention to the fact that currently there are a number of different payment systems for public transport in Kazakhstan. This leads to difficulties for both passengers and carriers. Passengers are forced to carry cash with them or use various cards, each of which is linked to a specific carrier. Carriers have to spend significant funds on the installation and maintenance of various technical devices for paying for travel.

In 2022, in the Republic of Kazakhstan, with an average trip cost of 80 tenge, the annual turnover of the industry is about 400 million US dollars (fig. 1) [3].

Область	Население	Пассажиропоток/день ≈	Пассажиропоток/мес ≈	Система ЭСОП
Алматы	1 916 822	1 200 000	36 000 000	Онай
Нур-Султан	1 136 156	650 000	19 500 000	
Шымкент	1 038 152	800 000	24 000 000	Толем
Акмолинская	736 735	80 000	2 400 000	Kazintersoft / Kokshebus Tolem
Актюбинская	881 651	250 000	7 500 000	O-CITY
Алматинская	2 055 724	90 000	2 700 000	Тулпар
Атырауская	645 280	160 000	4 800 000	Смарт ЖКХ
Западно-Казахстанская	656 844	150 000	4 500 000	СМС Бас
Жамбылская	1 130 099	210 000	6 300 000	
Карагандинская	1 376 882	700 000	21 000 000	
Костанайская	868 549	250 000	7 500 000	Алем ПЭЙ
Кызылординская	803 531	150 000	4 500 000	Алем ПЭЙ
Мангистауская	698 796	100 000	3 000 000	O-CITY
Туркистанская	2 016 037	70 000	2 100 000	
Павлодарская	752 169	300 000	9 000 000	O-CITY
Северо-Казахстанская	548 755	120 000	3 600 000	Алем ПЭЙ
Восточно-Казахстанская	1 369 597	380 000	11 400 000	IBA Group
18 631 779	**5 660 000**	**169 800 000**		

Figure 1. Passenger traffic in the Republic of Kazakhstan for 2022

The main problems when using various ticketing systems are:
a) for the population:
1. Diversion of public funds to closed specialized transport cards.
2 Difficulties for preferential categories – lack of unified approaches, in some regions, the need to purchase even the carriers themselves.
3. Difficulties with replenishing cards.
4. Cost of cards.
b) for business (carriers):
1. High rate of ticket operators.
2. Lack of transparency for the carrier.
3. Low fare.
c) for the state:
1. High rate of ticket operators
2. Lack of transparency for the carrier
3. Low fare
4. Abuse in subsidizing trips and routes
5. Lack of uniform standards and expertise
6. Still high volume of cash settlements in the field of micropayments
7. Creation of stand-alone payment systems – risks and control mechanisms.

8. Separated development of regional solutions – creates barriers to the development of more universal, effective and convenient solutions for the population.

In this context, the development of a unified information system for payment for transport services can significantly simplify the lives of both passengers and carriers. The system will allow passengers to pay for public transport in one universal way – for example, using a special card that can be purchased at any service point. For carriers, this means reducing the cost of installing and maintaining technical devices for paying for travel, as well as reducing the likelihood of fraud on the part of passengers.

3. Stages of creation of a unified electronic ticketing system

Despite the difficulties that may be encountered when developing a unified information system for payment of transport services in the Republic of Kazakhstan, we present an algorithm for creating this system [1]:

I. Creation of a single national operator of electronic ticketing in public transport on the basis of the bank.

II. Formation of a single standard – reuse of existing banking infrastructure.

III. Providing users with a convenient mechanism for using the bank's products and services on a regular basis (by offering the sphere of micro-payments, using the example of public transport.

IV. Offering a completed ready-made service to transport enterprises, akimats (cities and regions).

4. Advantages, expected results and application prospects of the unified system of payment for transport services

Thus, the development and implementation of a unified information system for the payment of transport services will provide huge advantages for both business, government, carriers, and ordinary users.

For example, for business, these will be:

– increasing the customer base: individuals – by providing a payment instrument for daily use, legal entities – by attracting enterprises involved in public transportation;

– increasing the frequency of using banking services and products is a transactional flow.

For the state it will be:

– transparent subsidy mechanism, targeting – reduction of corruption in the allocation of subsidies and abuse of statistics;

– reduction of off-bank cash turnover, digitalization of the economy;

– moving the transportation segment from "gray" to "white", increasing the collection of taxes and fees.

For carriers, of course, this is:

– the opportunity to legally and transparently receive subsidies for services rendered for socially vulnerable segments of the population;

– timeliness and efficiency of receiving funds to accounts;

– a ready-made solution that covers all the needs for electronic ticketing for the enterprise.

And, of course, for the population:

– the ability to use a regular bank card, including an existing one issued by a Bank, with automatic determination of the passenger status to determine benefits;

– there is no need to divert funds to separate closed wallets, you can use the existing banking infrastructure;

– "Roaming" services – regardless of the city.

Thus, the implementation of this system will allow to obtain the following results:

1) The bank's offer on the market of a ready–made service/tool for collecting micropayments, both to the corporate segment – carriers, and to the public sector – akimats, as well as to individuals – consumers.

2) Increasing the use of banking products due to daily use.

3) Automatic accounting of the preferential category of a citizen when purchasing a service.

4) A single center for cashless processing of micropayments on the example of public transport: convenience to residents, increasing the comfort of the urban environment.

In the future and further development of the unified system, it can be proposed to cover and involve related industries, such as urban economy (parking lots, toll roads, etc.), entertainment (cinemas, parks, museums, etc.) and tourism with the introduction of a single key / tourist ticket with a set of available services.

7. Conclusions

However, the development of a unified information system for payment of transport services in the Republic of Kazakhstan may face certain difficulties. First of all, this is due to the need to organize interaction between different carriers and ensure compatibility of payment systems. In addition, a high degree of information protection is necessary for the successful implementation of the project, since the system will process confidential passenger data.

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