

**THEORETICAL FOUNDATIONS OF THE DEVELOPMENT OF  
INNOVATIVE BANKING SERVICES**

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In order to create the necessary conditions for the wide introduction of technologies in the strategy of reforming the banking system for 2020-2025, automation of business processes of commercial banks and expansion of the range of remote banking services, a number of key tasks have been identified in the field of introduction of modern information and communication technologies in the process of corporate transformation:

expand the number and coverage of contactless payments, including remote banking services;

automated scoring system, racket identification and extensive use of credit conveyors;

strengthening information security of banking information and systems;

wide introduction of new concepts and technologies in the banking industry (fintex, digital banking).

The purpose of the implementation of these tasks is to increase the financial and legal literacy of the population in the field of development of the digital economy in the Republic, to accelerate the integration of our country in the international arena. It is known that the process of digitalization of banks is the establishment of relations between the bank and the client on the basis of digital information and communication technologies. In this process, financial services to clients of the bank are carried out in a convenient, high-quality and fast manner, and operational costs are important in the reduction.

In the banking system of Uzbekistan in recent years, a number of works have been carried out to increase the quality and scale of banking services. But the changes taking place in the world, the globalization process, the excessive development of competitiveness, the further activation of the transformation process of commercial banks, the need to bring the banking services provided to customers to a new level.

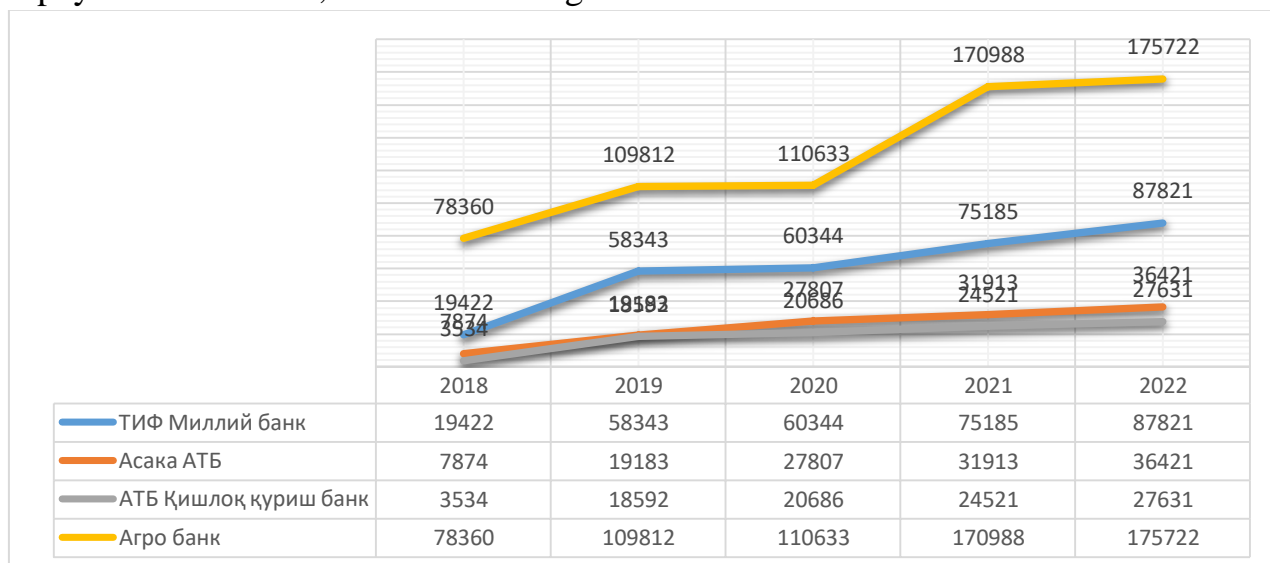
In this regard, our President Sh.M. Mirziyoyev noted in the appeal to the Oliy Majlis that " in 2021, work will be carried out to transform 32 large enterprises and networks of strategic importance.

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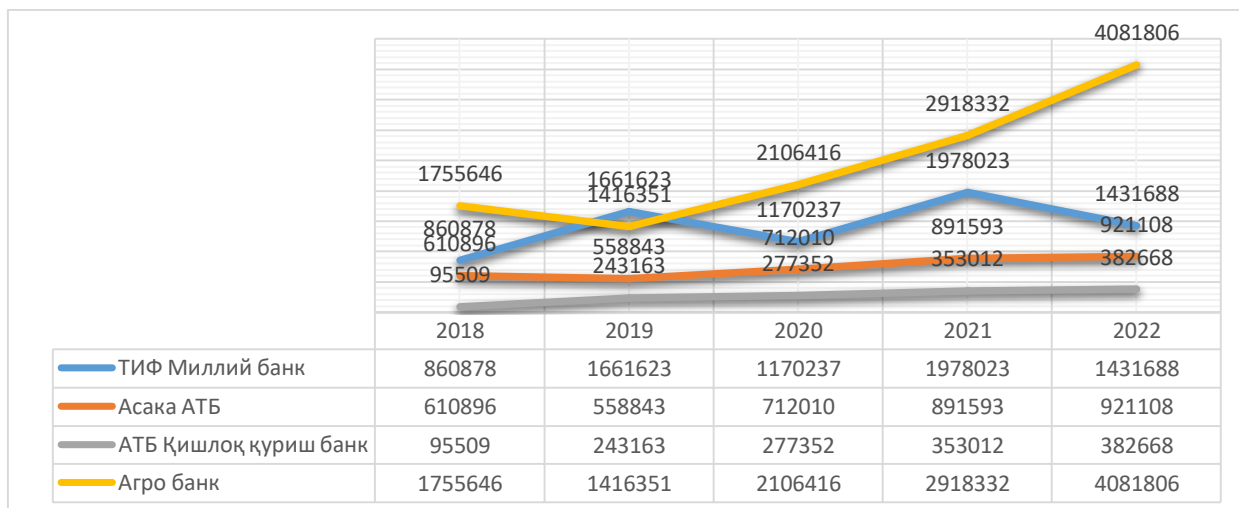
The wide introduction of digital technologies into the activities of banks will be the focus of our attention. In 2021, we will prepare the privatization of "Industrial Construction Bank", "Asaka bank", "Mortgage bank", "contact bank", "Turan bank" and "Rural Construction bank". The state share in at least one large bank is fully sold to strategic investors. Negotiations are underway with leading European banks in this regard." At the same time, there are some shortcomings in this direction "another serious drawback is that measures are not being taken to optimize the number of employees and work processes at the expense of the widespread introduction of digital technologies."

Particular attention is paid by the central bank to the automation of banking business processes and the provision of services through digital channels in the framework of work on the development of the national payment system and increasing the popularity of financial services. In particular, the number of users of the services of remote control of bank accounts increased by 1.4 times and as of January 1, 2022 by 20.2 mln.ga did. At the same time, 974.1 thousand of the users were business entities, while the number of individuals was 19.3 million. taga became equal. Due to the increasing use of digital services by business entities, in 2021 they carried out a total of (761.8 trillion. sum) about 83% of payment orders (629.8 trillion. som) carried out remotely without visiting the bank.

The volume of operations carried out remotely online by individuals in the mobile application applications of banks is 58.1 trillion. reached som. In this case, online deposits made through mobile application applications – 15,8 trln.so m, conversion practices-7,8 trln.so 'm, online microcontrollers – 3,6 trln.so m, loan repayment volume-2,3 trln.so' mni organized.



**1-Fig- Users of remote banking services legal entities and individual entrepreneurs**



**2-Fig- Users of remote banking services are individuals**

Payments received through payment terminals in the reporting year. In the period from 2018 to 2022, the number of bank cards in the Republic of Uzbekistan, the number of installed payment terminals, the number of installed ATMs and the number of receipts in payment terminals are given (Table 1).

**1-table**

y	Bank cards number	Built-in payment number of terminals	Installed ATMs Number	Payment terminal receipts
t	bcn	Bpnt	Ian	Ptr
2018	17976200	245191	6770	56413204
2019	20143038	375127	8706	64284503
2020	26087048	437163	11621	72412896
2021	26544713	432842	12814	99259596
2022	33549913	429156	20291	158457932

Here, in order to facilitate our work later, we mark the quantities seen with their initials and see them as variables. First of all, in the MS Excel program, we can conduct correlation analysis between these magnitudes. The values of correlation coefficients are presented in Table 2.

Correlation coefficient

	<i>t</i>	<i>Bcn</i>	<i>BPNT</i>	<i>IAN</i>	<i>Ptr</i>
<i>t</i>	1.00				
<i>bks</i>	0.97	1.00			
<i>o'tts</i>	0.83	0.77	1.00		
<i>o'bs</i>	0.95	0.98	0.68	1.00	
<i>ttr</i>	0.91	0.93	0.55	0.98	1.00

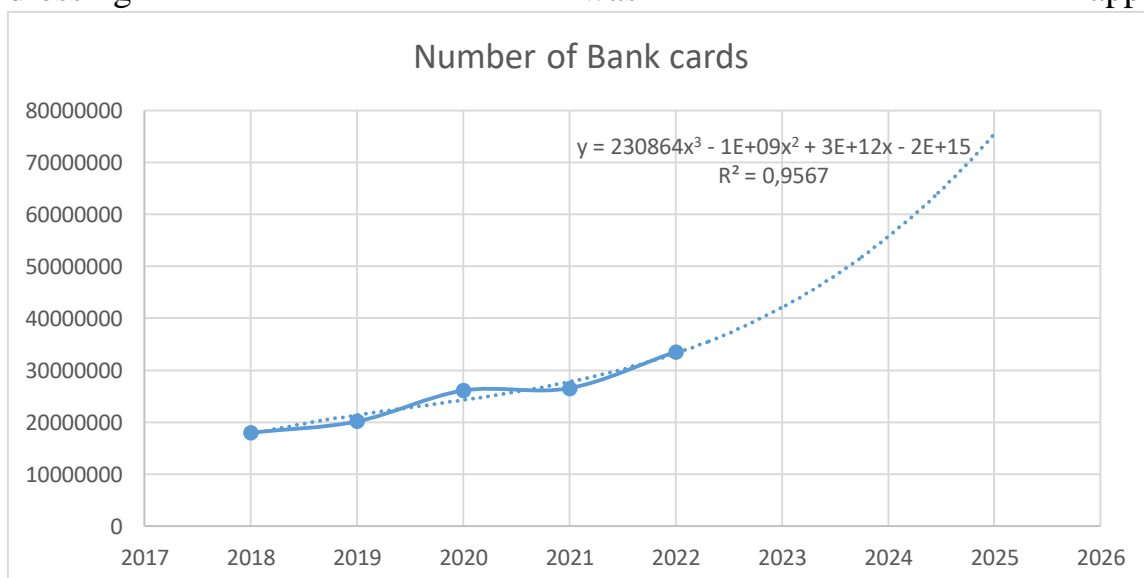
From the table, it can be seen that there is a very strong correlation (binding) between the studied quantities and the years of observation. From the table, it can be seen that the links between the number of installed payment terminals and the number of installed ATMs (correlation coefficient 0.68) and such parameters as the number of installed payment terminals and receipts from payment terminals (correlation coefficient 0.55) are relatively weak.

Since our goal is to analyze and forecast the change of each parameter over the years, we determine the individual mathematical connections between these parameters and years.

Figure 3 shows the change in the number of bank cards over the years. In this case, a continuous line is the data given, and a dotted line is a trend line. In the MS Excel program, it is possible to build different trend lines, we selected the one where the determinant coefficient (R2) came out closest together. For the condition being seen, this is the link:

$$bks = 230864 \cdot t^3 - 10^9 \cdot t^2 + 3 \cdot 10^{12} \cdot t - 2 \cdot 10^{15}$$

dressing was apparently.



3-fig. Change in the number of Bank cards

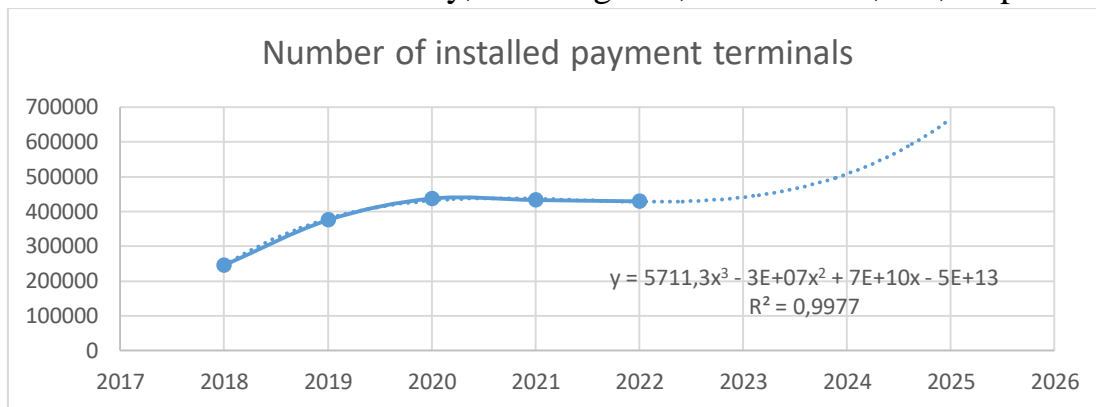
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According to the modeling results, it turned out that the number of bank cards can go to the end of 2023 and be estimated at 41000000, at the end of 2024 – 56000000, and at the end of 2025 – 750000000 units.

Figure 4 shows the change in the number of installed payment terminals over the years, in which this link:

$$o'tts = 5711,3 \cdot t^3 - 3 \cdot 10^7 \cdot t^2 + 7 \cdot 10^{10} \cdot t - 5 \cdot 10^{13}.$$

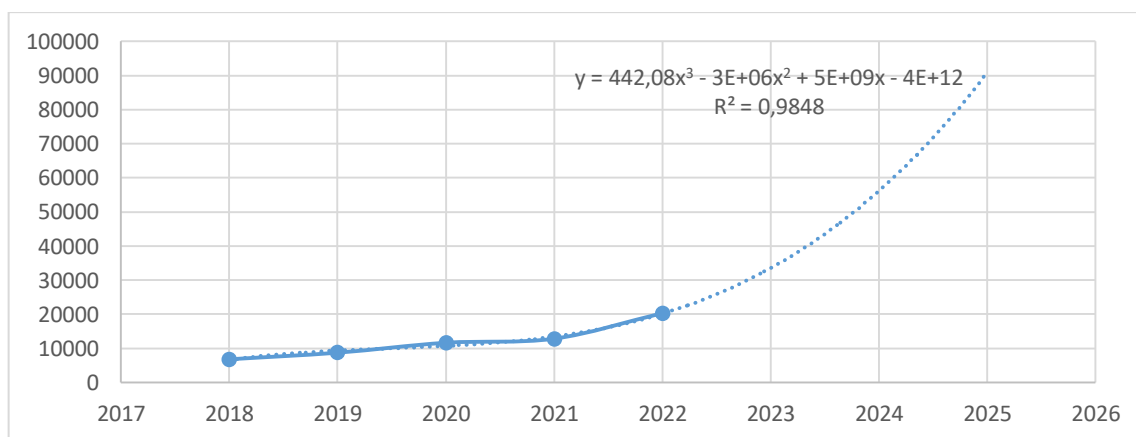
According to the modeling results, the number of installed payment terminals practically unchanged in 2023, around 435,000, in 2024 and 2025 this amount increased dramatically, reaching 510,000 and 650,000, respectively.



**4 – Fig. Number of installed payment terminals**

5 – the figure shows a change in the number of installed ATMs over the years, where, too, this link has the appearance of a polynomial of the third order, the determinative coefficient  $R^2=0,9848$ :

$$o'bs = 442,08 \cdot t^3 - 3 \cdot 10^6 \cdot t^2 + 5 \cdot 10^9 \cdot t - 4 \cdot 10^{12}$$



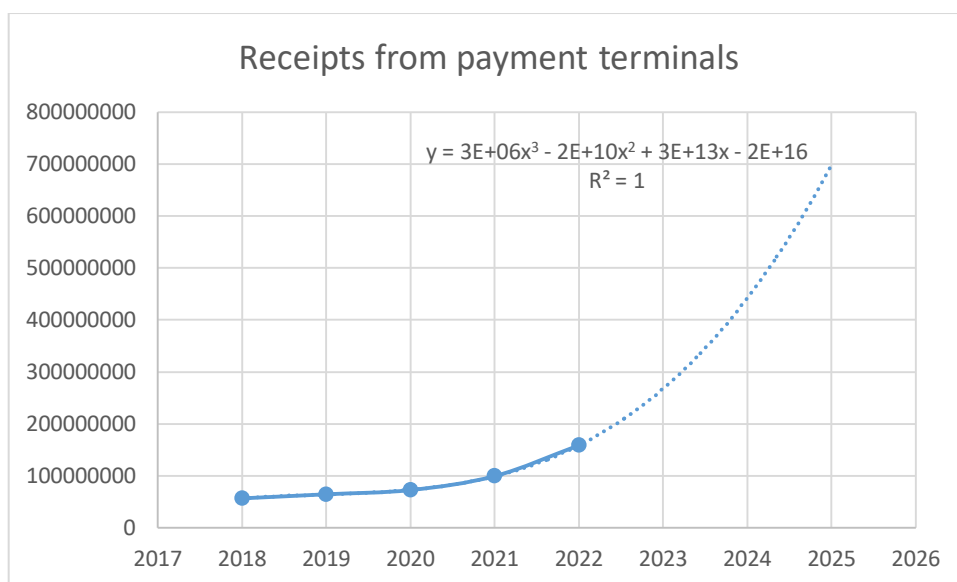
**5 – Fig. Number of installed ATMs**

According to the modeling results, installed ATMs can increase from year to year and amount to almost 32,000 in 2023, about 57,000 in 2024 and 90,000 in 2025.

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Figure 6 shows the change in receipts from payment terminals over the years, where, too, this link has the appearance of a polynomial of the third order, the determination coefficient  $R^2=1$

$$ttt = 3 \cdot 10^6 \cdot t^3 - 2 \cdot 10^{10} \cdot t^2 + 3 \cdot 10^{13} \cdot t - 2 \cdot 10^{16}$$



**6 – Fig Receipts from payment terminals**

According to the modeling results, receipts from payment terminals can also increase from year to year and amount to almost 270000000 in 2023, 440000000 in 2024, and 700000000 in 2025.