

REPUBLIC OF AZERBAIJAN

On the right of the manuscript

ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

PROSPECTS FOR THE IMPLEMENTATION OF ELECTRONIC MUNICIPAL GOVERNANCE IN AZERBAIJAN

Speciality: 5308.01 – General economy

Field of science: Economic sciences

Applicant: **Elkhan Adil oghlu Salayev**

Baku – 2025

The dissertation was completed at Department of Economy of Azerbaijan State University of Economics.

Scientific supervisor: Candidate of economic sciences,
ass. Professor
Miragha Maharram oghlu Ahmadov

Official opponents: Doctor of Economic sciences,
Professor
Khatira Mail gizi Huseynova

Doctor of Economic sciences,
ass. Professor
Rasim Amir oghlu Nabiyev

Doctor of philosophy in economics
Ali Zeyni oghlu Akbarli

Dissertation Council ED 2.10 of Supreme Attestation Commission under the President of the Republic of Azerbaijan, operating on the basis of the Azerbaijan State University of Economics.

Chairman of the Dissertation council: Doctor of economic sciences,
Professor
Yashar Atakishi Kalbiyev

Scientific secretary of the Dissertation council: Doctor of philosophy
in economics, ass. Professor
Sugra Ingilab Humbatova

Chairman of the scientific seminar: Doctor of economic sciences,
Professor
Rasul Anvar Balayev



THE WORK'S GENERAL CHARACTERISTICS

Relevance of the topic and degree of development. Since the establishment of municipalities in Azerbaijan, new laws and regulatory legal acts have been adopted aimed at increasing the efficiency and accountability of municipal activities. It can be noted that currently, there are 685 municipalities (74 cities, 99 settlements, 512 villages) operating at various levels in Azerbaijan, including city, town and village municipalities¹. Currently, municipalities are responsible for a range of activities, including waste management, public transport, social services and infrastructure development.

We can justify the relevance of the dissertation work as follows:

- A picture of the current municipal activity can be used to describe the problems faced by municipalities in bridging the gap between theoretical knowledge and practical application. Another problem is that the practical aspects of municipal operations can be quite complex and constantly changing, which can make it difficult for employees to keep up with the latest trends and best practices. This can lead to ineffective decision-making. Professional artificial intelligence programs are needed to bridge this gap in municipal staffing.

- The phenomenon of globalization is leading to an increase in digitalization practices, thereby forcing countries to adapt to emerging trends. One of the important problems currently facing municipal authorities in Azerbaijan is the adoption of new technologies and digital environments. The current state of municipalities does not meet modern requirements. There is a growing need for municipalities to respond to the expectations of their citizens in a more innovative and operational manner. This requires concerted action to modernize the infrastructure and services offered by municipalities, while also promoting transparency, accountability, and inclusiveness in decision-making processes. Ultimately, the effectiveness of municipalities depends on their ability to adapt to changing conditions and use new technologies.

¹ “Azərbaycan Bələdiyyələrinin Milli Assosiasiyası”nın saytı, <https://abma.gov.az/abmaxeber/azerbaycan-respublikasinda-novbeti-belediyye-seckileri-2025-ci-il-yanvarin-29-na-teyin-edildi>

- The role of municipalities in shaping the future of their territories is crucial, and for this role to remain a key factor in an evolving environment, it is essential that they embrace innovative perspectives. One of the most important advantages of innovative perspectives in municipalities is the ability to address complex social, economic, and environmental problems from a single location. With the help of new technological applications, municipalities can find innovative solutions to problems that concern residents.

- The level of success that municipalities will achieve by digitizing their services depends on their interaction with the population, as well as the availability of social and economic opportunities. Therefore, in order to study the impact of the socio-economic status of municipalities on the promotion of digitalization, the active activities of municipalities were compared in the study. This also reflects the relevance of the dissertation work.

- Management of information processes in local self-government bodies is an important issue. It is also necessary to analyze citizens' use of technology to facilitate these processes. In this direction, a survey was conducted in the research study to study civic attitudes, and both quantitative and qualitative parameters were evaluated. The above increases the relevance of the topic.

Extensive economic research has been conducted aimed at solving problems in the field of municipal governance. In these studies, researchers focused on a number of aspects related to the development of municipalities. Research scientists of our republic, including N.Y. Mikayilova, K.A. Shahbazov, H.S. Hasanov, H.S. Gurbanov, Y.N. Balakishiyeva, S.Q. Hajiyeva, Z.Z. Habibova, X.M. Huseynova, Sh. Khuduoglu, F.P. Rahmanov, E.B. Suleymanov, M. Salimzadeh, G. Khalilov, M. Gulaliyev, E.M. Efendiyev, E. Abdullayev, S. Hasanova, A. Ismayilova, X. Ismayilov and others, have conducted extensive research in this direction. Foreign researchers O. Sherif, M. SHEN, C. Cakir, A. Acilar, A. Shahin, A. Geymen, I. Karas, R. P. Hill, D. L. Stephens, H. Druke, V. Delitheou, M. Maraki, L. A. Kirichuk, S. V. Radchenko, T. M. Rezer, V. I. Korobko and others have also conducted various types of research on the development of municipal administration. The scientific works of

these scholars reflect a number of topical issues of local self-government, including the activities of municipalities. However, research shows that the scientific study of municipal governance across the country is not comprehensive.

Taking into account the above-mentioned factors, the topic of the prospects for the implementation of electronic municipal (e-municipality) management in Azerbaijan can be considered a topic open to scientific research. This emphasizes the relevance of the research topic.

In the context of Azerbaijan's economic transition to innovative development, it is necessary to address the problems associated with the implementation of e-municipal governance, as well as identify and propose effective solutions to these challenges.

The object and subject of the research. The object of the study was the management of the activities of municipalities in Azerbaijan. The subject of the study is the issues of electronic implementation of municipal governance in Azerbaijan.

Research goals and objectives. The main goal of the dissertation is to conduct a theoretical study of the creation of e-municipalities and their prospective development. Based on this analysis, the purpose of the study is to develop methodological foundations and practical recommendations aimed at improving the management of e-municipalities in the Republic of Azerbaijan in accordance with modern conditions.

The following tasks were identified in the study to achieve effective implementation of e-municipal governance in Azerbaijan:

- Conduct an analysis of the governance principles and e-government integration that form the basis of local self-government;
- Identify the characteristics of municipal services and public relations;
- To clarify the importance of the information society in the development of local self-government;
- Determining the formation and development stages of e-municipalities;
- To conduct a comparative analysis of the current situation regarding the active activities of municipal bodies;

- To conduct a comparative analysis of the expenditures related to activities in the information-related group areas of municipalities;
- Identifying possible solutions to potential obstacles that may arise in the process of digitizing municipal operations;
- Studying the positions of citizens regarding e-municipal services;
- Identify the potential for using international practices to improve e-municipal governance;
- Proposing substantiated arguments for improving e-municipal services.

Research methods. The methodological basis of the dissertation work is an economic empirical analysis to examine the current state of municipal governance, and an analytical analysis to examine the future development of electronic services. The methodology used in the analysis, using the Eviews 10 econometric software package, included unit root test (Augmented Dickey Fuller - ADF), Johansen Cointegration test, FMOLS, DOLS and CCR estimator, Granger causality test, in addition, empirical methods such as factor analysis, Chi-square test and T-test were used using the IBM SPSS23 statistical program.

The main provisions submitted to the defense. E-municipality involves the use of technology in locally important services. The main provisions defended on this subject are:

- The classification of the service structure of municipalities creates the basis for a flexible and systematic approach to areas of activity.
- Analysis of the active activities of municipalities justifies the assessment of budget management and the efficient allocation of resources.
- Although the information sector has become the cornerstone of the global economy in the modern digital age, there is no interdependence between the expenditures of municipalities on information-related group areas and subsidies and subventions provided from the state budget of the Republic of Azerbaijan, other revenues of municipalities, and non-tax revenues.

- Digital transformation enables better data management and operational efficiencies. In this context, digital transformation is dominant in the provision of municipal services.

- E-municipality is a platform designed to involve all citizens in the services provided. In this regard, the “user-friendly” project supports inclusivity, and the platform creates a basis for all residents and other business entities living in the area to instantly exchange notifications about updates and participate in decision-making.

- The benefits associated with e-municipalities are manifested in enhanced communication and improved collaboration. The benefits of implementing e-municipalities include accelerated and more efficient communication, increased transparency, as well as opportunities to simplify processes and reduce costs.

- Replacing the activities of municipal employees in document management with technological integration (using artificial intelligence research) through software can increase the efficiency of the service provided.

- The programming of operations through artificial intelligence in e-municipal management has been justified.

Scientific novelty of the research. The scientific novelty of the study consists of the following:

- Classification areas have been identified for the optimization of municipal services;

- The organization of outsourcing services for the purpose of cost savings in e-municipal management is scientifically justified;

- The theoretical aspects of the “Case study” approach to increasing the efficiency of decision-making in e-municipal governance have been identified and its importance has been justified;

- An infrastructure framework model for e-municipality application has been formulated;

- The features of the “User Friendly” project have been identified in order to ensure accessibility among citizens;

- The innovative platform “Co-creation” is based on joint collaboration, the development of new ideas and solutions.

Practical significance of the study. The theoretical significance of the research work is its contribution to improving the theoretical basis for e-municipal governance in Azerbaijan and its further development. In addition, it aims to systematize and expand the existing body of scientific knowledge related to e-municipality.

The provisions and conclusions of the dissertation can be used in the process of teaching local self-government.

The practical significance of the research work lies in the applicability of its methodological approaches and policies related to e-municipal governance in government bodies. In addition, the results of the study can be used by municipal authorities and help increase the range and quality of municipal services provided.

Approval of research results. Between 2017 and 2023, a total of 15 scientific works were published, including 1 article in a prestigious foreign scientific journal, 4 articles in periodicals on the list of scientific publications recommended by the Higher Attestation Commission, and 13 theses at international and republican-level scientific conferences.

The researched issues and findings on the topic of the dissertation were submitted to the “Online Service Center of Municipalities” within the National Associations of Municipalities of Azerbaijan.

The name of the institution where the dissertation work was performed. It was performed and discussed at the Department of Economics of the Azerbaijan State University of Economics.

The structure of the research work. The dissertation consists of an introduction (10951 characters), 3 chapters (Chapter I – 85984 characters, Chapter II – 52498 characters, Chapter III – 58150 characters, conclusion (7918), and a list of 170 references. The research paper contains 9 images, 25 tables, and 2 graphs. The dissertation consists of 161 pages (215,501 characters) in total.

STRUCTURE OF THE DISSERTATION WORK

Introduction

CHAPTER I. Theoretical foundations of informative interaction of local self-government bodies with the population

1.1. The concept of local self-government and e-government management

1.2. Classification of municipal services and features of citizen relations

1.3. The role of the information society in the formation of local self-government

1.4. Formation and development stages of e-municipality

CHAPTER II. Assessment of municipal performance and citizens' attitudes towards e-municipal governance in Azerbaijan

2.1. Assessment of the current situation regarding the active activities of municipalities

2.2. Comparative analysis of information-related group areas by municipalities

2.3. Analysis of citizen attitudes towards e-municipal governance in Azerbaijan

CHAPTER III. Directions for improving e-municipal governance in Azerbaijan

3.1. Problems arising in the implementation of e-municipal governance in Azerbaijan and methods for their solution

3.2. Opportunities for applying international experience in improving e-municipal governance in Azerbaijan

3.3. Future expectations for the implementation of e-municipal governance in Azerbaijan

Conclusion and suggestions

List of references

Appendices

Abbreviations and symbols

MAIN PROVISIONS PROVIDED FOR DEFENSE

1. The classification of the service structure of municipalities creates the basis for a flexible and systematic approach to areas of activity.

The activities of the municipal body are organized in accordance with paragraph 4 of the Law of the Republic of Azerbaijan No. 709 dated October 15, 1999 “On Approval of the Model Charter of the Municipality”. According to this law, the municipality has the right to recognize the powers of municipal members and terminate their powers in cases specified by law. These powers include approving the municipality's charter, electing the mayor and his deputies, making decisions on reducing local taxes, and approving the local budget draft. The municipality also has the authority to manage its own property, adopt and implement local social protection, social development, and local environmental programs².



Figure 1. Classification of infrastructure service areas of municipal farms

Source: Prepared by the author.

² Xuduoğlu Ş. “Bələdiyyələr haqqında sənədlər toplusu”. Bakı - Qanun, 2007, s.100 / 620 s.

E-municipal governance is a set of digital tools and processes that allow local governments to streamline their implementation procedures and provide citizens with better access to services. This allows municipalities to increase efficiency, reduce costs, improve service delivery, and encourage greater public participation. This can be achieved through the use of digital tools such as online forms, automated document processing, mobile apps, and interactive websites. Through these tools, municipal officials can help improve communication with citizens, reduce paperwork and bureaucracy, and provide citizens with better access to information about services. In addition, e-municipal governance can help increase transparency in governance by making it easier for citizens to track information related to their activities. Another advantage of the concept is that it allows municipalities to reach a larger population and provide services faster and more conveniently. People save time by being able to access all the necessary services without having to go to the municipal building. Citizens' motivation for using e-municipal services is shown in Figure 2.

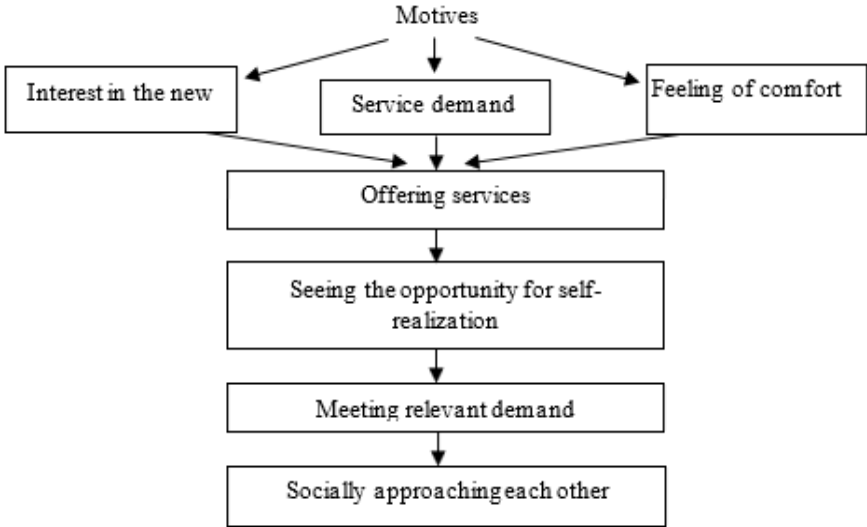


Figure 2. Visual representation of access to e-municipal services
Source: Compiled by the author.

Classification of municipal services refers to the process of grouping services that share similar characteristics. This can be done

for various reasons, such as making it easier to manage different types of services or to allow comparison between different types of services.

The classification of municipal services is shown in the table below by separate categories. (Figure 3.)

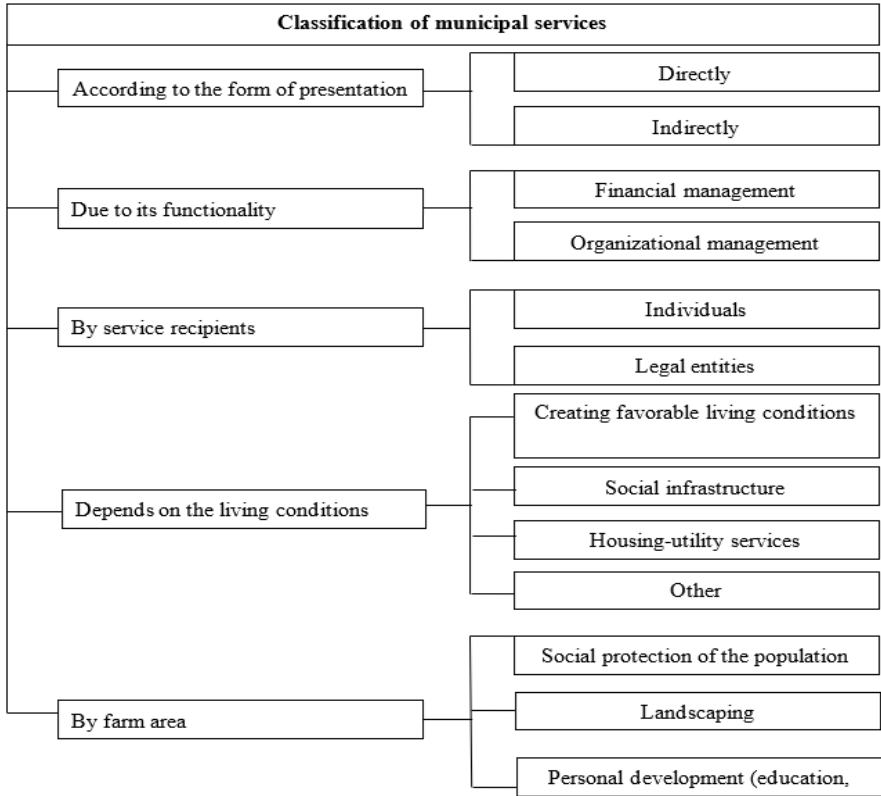


Figure 3. Classification of municipal services by functional areas

Source: Prepared by the author.

2. Analysis of the active activities of municipalities justifies the assessment of budget management and the efficient allocation of resources.

Municipalities play an important role in the lives of citizens by providing services within their territorial boundaries, so it is quite easy to feel the impact of these services on daily life. Waste disposal, green space maintenance, and a variety of other services that directly impact how

citizens live, work, and relax are provided by municipalities. The active services of municipalities can also range from providing basic infrastructure such as roads and bridges to offering recreational services such as libraries and recreation centers. The following issues were raised in order to investigate the active activities of municipalities:

1. Determining the impact between the total revenues of local budgets and the volume of subsidies and subventions provided from the state budget of the Republic of Azerbaijan;
2. Determining the impact between the total revenues of local budgets and the volume of expenditures incurred on the maintenance of local self-government bodies;
3. Determining the impact between non-tax revenues and the amount of expenses incurred on the maintenance of the local self-government body;
4. Determining the impact between local budget expenditures and the volume of subsidies and subventions provided from the state budget of the Republic of Azerbaijan;
5. Determining the impact between the volume of subsidies and subventions provided from the state budget of the Republic of Azerbaijan and the volume of social security expenditures.

The results of the FMOLS test based on the analyses performed are shown in Table 1.

Table 1. Results of the FMOLS estimator

| $YBGC_{it} = \alpha + \beta_1 ARDS_{it} + \beta_2 IG_{it} + \varepsilon_{it}$ $YBGC = 0.0772436481587 * ARDS + 0.660762479685 * IG + 5.41277037527$ | | | | |
|---|-------------|----------------|-------------|-------------------|
| Variables | Coefficient | Standard error | t-statistic | Probability value |
| ARDS | 0.077244 | 0.009110 | 8.478895 | 0.0000 |
| IG | 0.660762 | 0.176619 | 3.741185 | 0.0008 |
| C | 5.412770 | 0.868585 | 6.231712 | 0.0000 |

Source: Calculated by the author using the Eviews 10 software package.

FMOLS ARDS → YBGC: R-squared 0.566178; Adjusted R-squared 0.535191 (moderately interpreted)

The volume of subsidies and subventions provided from the state budget of the Republic of Azerbaijan and the inflation indicator included in the model can be considered statistically significant. A 1 percent increase in the volume of subsidies and subventions provided from the

state budget of the Republic of Azerbaijan will increase the variable reflecting the total revenues of the local budget by 0.07 percent, if the other variable, the inflation indicator, remains constant. A 1 percent increase in the inflation indicator variable will increase the variable reflecting the total revenues of the local budget by 0.66 percent, if the volume of subsidies and subventions from the state budget of the Republic of Azerbaijan, which is another variable, remains constant.

Table 2. Results of the FMOLS estimator

| $YBGC_{it} = \alpha + \beta_1 YOIS_{it} + \beta_2 IG_{it} + \varepsilon_{it}$ $YBGC = 1.37313169358 * YOIS - 0.891609870809 * IG + 1.61917761334$ | | | | |
|--|-------------|----------------|-------------|-------------------|
| Variables | Coefficient | Standard error | t-statistic | Probability value |
| YOIS | 1.373132 | 0.041489 | 33.09647 | 0.0000 |
| IG | -0.891610 | 0.081680 | -10.91591 | 0.0000 |
| C | 1.619178 | 0.414605 | 3.905352 | 0.0005 |

Source: Calculated by the author using the Eviews 10 software package.

FMOLS YOIS → YBGC: R-squared 0.735956; Adjusted R-squared 0.717096 (explanation is moderate)

The volume of expenditures on the maintenance of the local self-government body and the inflation indicator in the model shown in Table 2 can be considered statistically significant. A 1 percent increase in the volume of expenditures incurred on the maintenance of local self-government bodies, while holding the other variable, the inflation indicator, constant, will increase the variable reflecting the total revenues of the local budget by 1.37 percent. A 1 percent increase in the inflation rate will decrease the variable reflecting the total revenues of the local budget by 0.89 percent, while the volume of expenditures on the maintenance of the local self-government body, which is another variable, remains constant.

Table 4. DOLS the results of the evaluator

| $YOIS_{it} = \alpha + \beta_1 VOG_{it} + \beta_2 IG_{it} + \varepsilon_{it}$ $YOIS = -0.514542849937 * VOG + 1.30673714676 * IG + 6.48728490993$ | | | | |
|---|-------------|----------------|-------------|-------------------|
| Variables | Coefficient | Standard error | t-statistic | Probability value |
| VOG | -0.514543 | 0.120436 | -4.272343 | 0.0027 |
| IG | 1.306737 | 0.127333 | 10.26239 | 0.0000 |
| C | 6.487285 | 0.914130 | 7.096675 | 0.0001 |

Source: Calculated by the author using the Eviews 10 software package.

DOLS VOG → YOIS: R-kvadrat (R-kvadrat) 0,966062; Tənzimlənmiş R-kvadrat (Adjusted R-squared) 0.898185 (izahı yüksək səviyyədədir)

In the model presented in Table 3, non-tax revenues and inflation indicators can be considered statistically large. A 1 percent increase in non-tax revenues will reduce the cost of maintaining a local government by 0.51 percent, holding other variables such as inflation constant. A 1 percent increase in the inflation rate will increase the variable reflecting the costs of maintaining local government by 1.3 percent, if the volume of other non-tax revenues remains constant.

Table 4 shows the calculation of the impacts on local budget expenditures using the FMOLS estimator.

Table 4. Results of the FMOLS estimator

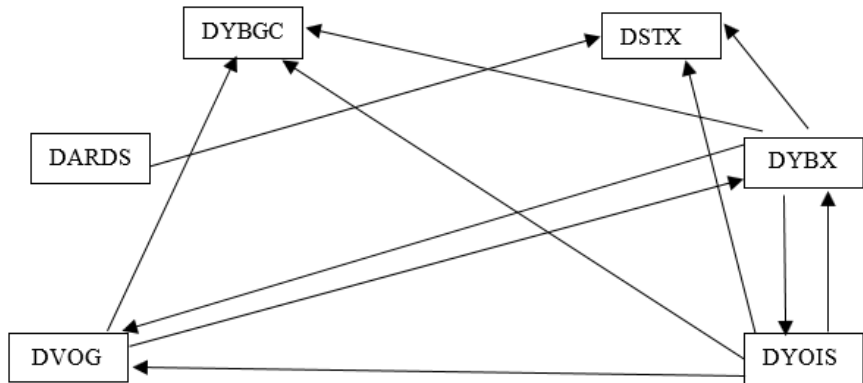
| YBX _{it} = α + β ₁ ARDS _{it} + β ₂ IG _{it} ε _{it} YBX = 0.0685079238269*ARDS + 0.698539461498*IG + 5.2805548755 | | | | |
|--|-------------|----------------|-------------|-------------------|
| Variables | Coefficient | Standard error | t-statistic | Probability value |
| ARDS | 0.068508 | 0.007549 | 9.074865 | 0.0000 |
| IG | 0.698539 | 0.146357 | 4.772848 | 0.0001 |
| C | 5.280555 | 0.719763 | 7.336522 | 0.0000 |

Source: Calculated by the author using the Eviews 10 software package.

DOLS ARDS → DYBX: R-squared 0.566178; Adjusted R-squared 0.535191 (explanation is moderate)

In the model in Table 4, the volume of subsidies and subventions provided from the state budget of the Republic of Azerbaijan and the inflation indicator can be considered statistically significant. A 1 percent increase in the volume of subsidies and subventions provided from the state budget of the Republic of Azerbaijan will increase the variable reflecting the total expenditures of local budgets by 0.06 percent, if the other variable, inflation, remains constant. A 1 percent increase in the inflation indicator will increase the variable reflecting the expenditures of local budgets by 0.69 percent if the volume of subsidies and subventions from the state budget of the Republic of Azerbaijan, which is another variable, remains constant.

The directions of influence according to the results of the Granger causality test are given in the graph below.



Graphic 1. Variable directions of mutual influence based on the results of the Granger causality test.

Source: Calculated by the author using the Eviews 10 software package.

In paragraph 2.1 of the dissertation, according to the results of the Granger causality test, it was observed that there is a correlation between the expenditures of the local budget and the costs of maintaining a local self-government body. This is the right equality for municipalities. During the analysis, it appears that budget expenditures are mainly directed towards the municipality's current expenses, and it is highly likely that attention is not paid to directing financial resources to areas that generate potential income. However, in certain cases, maintaining a local government body may be costly. This situation indicates the possibility of future problems within the municipality. For example, if salaries, benefits, office space, equipment, and other expenses are increased in a short period of time, this will also increase municipal expenses and may create financial problems for local governments. To solve this problem, the municipality may need to implement cost-saving measures or find new sources of revenue. This may include reducing employees or services, attracting grants or loans, and increasing taxes or fees.

3. Although the information sector has become the cornerstone of the global economy in the modern digital age, there is no interdependence between the expenditures of municipalities on information-related group areas and subsidies and subventions provided from the state budget of the Republic of Azerbaijan, other revenues of municipalities, and non-tax revenues.

During the study, analyses were conducted on the following issues:

1. To determine the impact between subsidies and subventions provided from the state budget of the Republic of Azerbaijan and expenses related to activities in the fields of culture, art, information, and physical education;

2. To determine the impact between the costs of activities in the fields of culture, art, information, and physical education and the costs incurred for the maintenance of the local self-government body;

3. To determine the impact between non-tax revenues and expenditures related to activities in the fields of culture, art, information, and physical education.

The results of the DOLS test conducted between MIIBDX and ARDS indicators using the Eviews (10) software package are as follows.

Table 5. Results of the DOLS estimator

| $MIIBDX_{it} = \alpha + \beta_1 ARDS_{it} + \beta_2 IG_{it} + \varepsilon_{it}$ | | | | |
|---|-------------|----------------|-------------|-------------------|
| $MIIBDX = 0.422938212243 * ARDS - 2.1582426638 * IG + 12.1786399398$ | | | | |
| Variables | Coefficient | Standard error | t-statistic | Probability value |
| ARDS | 0.422938 | 0.148800 | 2.842318 | 0.0217 |
| IG | -2.158243 | 0.802420 | -2.689665 | 0.0275 |
| C | 12.17864 | 4.212476 | 2.891088 | 0.0202 |

Source: Calculated by the author using the Eviews 10 software package.

DOLS ARDS → MIIBDX: R-squared 0.849147; Adjusted R-squared 0.547441 (moderately interpreted)

According to the model shown in Table 5, the volume of subsidies and subventions provided from the state budget of the Republic of Azerbaijan and the inflation indicator are statistically

significant. Based on the analysis, it can be concluded that if the volume of subsidies and subventions provided from the state budget of the Republic of Azerbaijan increases by 1 percent and other variables, such as inflation, remain constant, the total expenditure on activities in the fields of culture, art, information, and physical education will increase by 0.42 percent. A 1 percent increase in the inflation indicator variable causes a 2.15 percent decrease in the variable reflecting the expenditures of local budgets, while the volume of subsidies and subventions from the state budget of the Republic of Azerbaijan, which is another variable, remains constant.

Table 6. Results of the DOLS estimator

| $MIIBDX_{it} = \alpha + \beta_1 YOIS_{it} + \beta_2 IG_{it} \varepsilon_{it}$ | | | | |
|---|-------------|----------------|-------------|-------------------|
| $MIIBDX = 18.3750547295 * YOIS - 15.9628153171 * IG - 73.9419650646$ | | | | |
| Variables | Coefficient | Standard error | t-statistic | Probability value |
| YOIS | 18.37505 | 5.070347 | 3.624023 | 0.0152 |
| IG | -15.96282 | 5.079226 | -3.142765 | 0.0256 |
| C | -73.94197 | 18.95302 | -3.901330 | 0.0114 |

Source: Calculated by the author using the Eviews 10 software package.

Based on the analysis results shown in Table 6, the variables reflecting the amount of expenses incurred on the maintenance of local self-government bodies and the inflation indicator variables can be considered statistically significant. In particular, it can be concluded that if the volume of expenditures incurred on the maintenance of a local self-government body increases by 1 percent and the inflation rate remains stable, its expenditures related to activities in the fields of culture, art, information, and physical education will increase by a total of 18.37 percent. In addition, if the inflation rate increases by 1 percent and the amount of expenses incurred on the maintenance of local self-government bodies remains constant, the total expenses related to activities in the fields of culture, art, information, and physical education will decrease by 15.96 percent.

Table 7. Results of the DOLS estimator

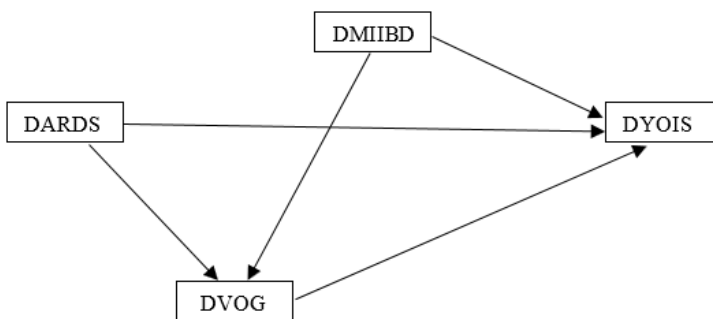
| $MIIBDX_{it} = \alpha + \beta_1 VOG_{it} + \beta_2 IG_{it} \varepsilon_{it}$ $MIIBDX = 6.06510575702 * VOG - 4.31453199133 * IG - 26.276611777$ | | | | |
|--|-------------|----------------|-------------|-------------------|
| Variables | Coefficient | Standard error | t-statistic | Probability value |
| VOG | 6.065106 | 0.486748 | 12.46048 | 0.0064 |
| IG | -4.314532 | 0.308648 | -13.97881 | 0.0051 |
| C | -26.27661 | 3.021635 | -8.696158 | 0.0130 |

Source: Calculated by the author using the Eviews 10 software package.

DOLS VOG → MIIBDX: R-squared 0.999204; Adjusted R-squared 0.991243 (high level of explanation)

According to the model presented in Table 7, which reflects the results of the DOLS estimator, non-tax revenues and the inflation indicator are statistically significant. According to the results of the analysis, if the volume of non-tax revenues increases by 1 percent and the inflation rate remains stable, the volume of expenditures related to activities in the fields of culture, art, information, and physical education will increase by 6.06 percent. Also, if the inflation rate increases by 1 percent and the volume of non-tax revenues remains unchanged, then the total expenditures related to activities in the fields of culture, art, information, and physical education will decrease by 4.31 percent.

The directions of influence according to the results of the Granger causality test are shown in graph 2.



Graph 2. The directions of mutual influence that change according to the results of the Granger causality test

Source: Calculated by the author using the Eviews 10 software package.

In paragraph 2.2 of the dissertation, during the analysis of economic indicators, it became clear that there is a positive relationship between the increase in the maintenance costs of local self-government bodies and the increase in the revenues of municipalities. It is normal that as local governments continue to generate more revenue, their maintenance costs tend to increase as well. Thus, the more financial resources local governments have, the more they are interested in spending on maintaining and improving infrastructure and public services. Let's explain the current situation with an example: as revenues increase, local governments can undertake more renovation projects and invest in infrastructure improvements. This, in turn, leads to an improvement in the quality of life of citizens and attracts more businesses to the area, ultimately leading to further increases in revenues. Therefore, the increase in revenues of local governments and the costs of maintaining them are interdependent and have a cyclical relationship. It can be concluded that the current situation in municipal governance is an indicator of positive progress.

4. Digital transformation enables better data management and operational operations. In this context, digital transformation is dominant in the delivery of municipal services.

The “Infrastructure Framework Model” proposed in the e-municipality application serves as a comprehensive platform that strategically covers various aspects of citizen-government interaction, including service delivery, public engagement, and information dissemination. The infrastructure framework model serves as the foundation of e-municipality applications, ensuring their seamless operation and reliability. This model is an integrated system consisting of various components, including operations, interoperability, territorial data, and e-municipality presence. The infrastructure framework model for implementing e-municipality can be presented in an academic context as follows:

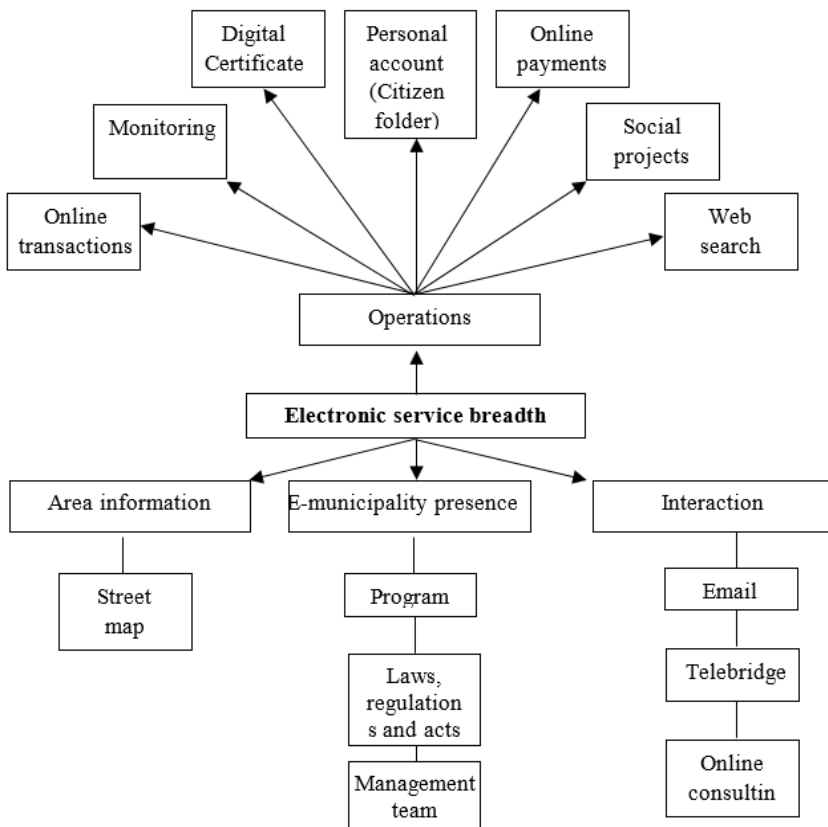


Figure 4. Infrastructure framework model of e-municipality application

Source: Prepared by the author.

5. E-municipality is a platform designed to involve all citizens in the services provided. In this regard, the “user-friendly” project supports inclusiveness, the platform creates a basis for the exchange of instant notifications about updates and participation in decision-making by all residents and other economic entities living in the area.

As technology continues to develop in Azerbaijan, municipalities may increasingly turn to e-services to streamline their operations. There is a two-pronged approach to the problems that may

arise in the implementation of e-services in municipalities: providing e-services in a way that is clearly understandable for counterparties and properly conducting the conjuncture transformation of transactions. E-services should be designed in a way that can be easily accessed and used by all residents, including the disabled, the elderly, and those who are not tech-savvy, living in the area. Providing assistance and support to residents who have difficulty using e-services inevitably creates additional workload problems. To solve this problem, local governments can implement initiatives aimed at increasing the accessibility of e-services through the implementation of user-friendly social projects. One of these initiatives could be to promote a “user-friendly” project. A user-friendly project can be presented in the form of explanatory videos or subtitles to provide a digital understanding of operations.

One of the problems that may arise during the implementation of e-municipality is the problem of conjunctive adaptation. The problem of conjunctive adaptation can arise when integrating new technology into existing systems and processes. This can be particularly challenging for local governments with outdated systems and limited resources. To solve the listed problem, municipalities must carefully plan and implement e-government systems. This may include investing in new software, training employees on how to use new systems, and ensuring that all data is properly integrated across different structures.

6. The benefits associated with e-municipalities are manifested in enhanced communication and improved collaboration. The benefits of implementing e-municipalities include accelerated and more efficient communication, increased transparency, as well as opportunities to simplify processes and reduce costs.

Collaboration with citizens is essential in the development and implementation of e-municipal services. One of the ways I facilitate civic engagement is through Co-Creation. The term “co-creation” has gained significant popularity in recent times, as it signifies a shift towards a collaborative process where individuals as well as

organizations come together to create and refine ideas. This approach emphasizes the importance of collective efforts in creating meaning and value³. Based on current thinking, it is concluded that co-creation is a process in which citizens and municipal officials work together to design and implement municipal services. In the context of e-municipal governance, this partnership provides greater access to information, promotes communication, and strengthens participation, facilitated through digital technologies. This involves a participatory approach in which citizens are invited to participate in the decision-making process of any project, from the initial planning stages to the implementation of services.

The “Co-Creation” project in e-municipal governance is an innovative platform where joint collaboration, new ideas and solutions are developed. The foundation of this platform is to ensure the active participation of citizens and support the creation of services tailored to their needs and desires. Through this structured approach, the platform aims not only to improve the quality of services, but also to make citizens feel valued and empowered to contribute to the development of their living conditions, and to develop a culture of civic participation.

7. Replacing the activities of municipal employees in document circulation with technological integration (using artificial intelligence research) through software can increase the efficiency of the service provided.

The main reason for the failure of the authorities to implement the mandate is related to the lack of seriousness in the implementation process. In fact, they are capable of doing their own work, but delegating authority effectively can be beneficial to both the organization and the people⁴. From this, it can be concluded that the transfer of authority through artificial intelligence-based programming of the services offered can lead to a reduction in workload and

³ Ind, N. Coates N. The meanings of co-creation //European business review. – 2013. T. 25. №1., p.87

⁴ Cəfərova, Z. “Harvard Business Review”. Menecerin əl kitabı: Liderlərin malik olmalı olduğu 17 bacarıq, (ingilis dilindən tərcümə), TEAS Press, Bakı 2022, s144.

additional time savings. This process can be realized through the application of artificial intelligence (mobile) solutions for e-municipal management. At the same time, this process can be described as the transfer of some of the powers. It can be assumed that artificial intelligence can help reduce the time required to process large volumes of data, allowing municipal services to operate more conveniently and with fewer errors. AI can also help automate routine tasks, freeing up time for more important tasks that require human judgment and interaction. Artificial intelligence can also help reduce costs by helping to identify areas of inefficiency and find ways to streamline processes. Additionally, AI can be used to develop more accurate predictive models that can be used to predict the outcomes of certain actions or events. This can help municipalities better plan for the future and make better decisions when it comes to spending resources.

CONCLUSION

The main results of the research conducted within the framework of the dissertation on the formation of e-municipality can be expressed as follows:

Based on advanced world experience, it can be noted that in modern times, the application of electronic technologies in municipal institutions has become an important component of administrative procedures. It is possible that digitalization will greatly assist municipal activities. Based on real situations, it can be noted that it is possible to create a potential infrastructure for the transition to e-municipal services in our country.

According to the research conducted, the results of the active activities of municipalities in Azerbaijan, as well as their analysis, are as follows:

- With an increase in the inflation rate, there is a stronger impact on the variable reflecting the total revenues of the local budget. Thus, as inflation increases, the value of the local currency decreases, leading to a decrease in the real value of local budget revenues. To ensure efficient allocation of resources, it is necessary to increase the costs of maintaining local budgets accordingly.

- As the expenses incurred for maintaining a local self-government body increase, the total revenues of the local budget increase further. This situation can be attributed to factors such as attracting investments and promoting a favorable environment for entrepreneurship.

- An increase in the volume of non-tax revenues reduces the costs of maintaining local self-government bodies. Thus, directing non-tax revenues as investments diversifies funding sources, resulting in the sustainability of funding mechanisms. When financial sustainability is ensured, there is no need to increase the costs of maintaining a local government.

- The increase in the volume of subsidies and subventions provided from the state budget of the Republic of Azerbaijan does not have a noticeable positive impact on the total expenditures of local budgets. As an initial hypothesis, this influx of funds could stimulate economic growth and create an additional revenue stream for the municipality. This multiplier effect can contribute significantly to the overall financial health of the municipality, leading to a reduction in the burden on the local budget and ultimately reducing any potential negative impact on overall spending.

- The increase in the volume of subsidies and subventions does not have a noticeable positive impact on social security expenditures. This idea can be explained as follows: if subsidies and subventions are directed towards employment, it can lead to a decrease in social security expenditures. This upward trend could reduce social security costs in the future.

- With the increase in the volume of subsidies and subventions provided from the state budget of the Republic of Azerbaijan, it increases expenses related to activities in the fields of culture, art, information, and physical education. This can be attributed to the potential benefits that financial support can bring. Thus, we can show that there is a role for discretionary subsidies and subventions in the development of the aforementioned areas.

- The increase in expenses incurred for the maintenance of local self-government bodies significantly increases the expenses related to activities in the fields of culture, art, information, and physical education. These advances allow municipal authorities to provide

efficient services, improve transparency, and effectively communicate with their residents.

- The increase in the volume of non-tax revenues increases the volume of expenses related to activities in the fields of culture, art, information, and physical education. The issues of improvement in the aforementioned areas remain continuously relevant. At the same time, these costs are assessed as capital investments and combine the features of increasing civic engagement, improving service delivery, and promoting transparency.

Regarding the effectiveness of municipalities' transition to electronic services, it can be noted that, as can be seen from the analysis results, an increase in a municipality's revenues increases its maintenance costs. The study also found that the implementation of e-municipal services reduces overall costs. It can be concluded that while the implementation of e-municipality can reduce maintenance costs, the additional funds generated in the budget can be directed to the development of other areas.

The implementation of e-municipal governance offers new perspectives for citizens living in the area. The following are the prospects for implementing e-municipality:

1. *Improving management.* Electronic solutions (artificial intelligence) program many administrative processes, which reduces the need for manual intervention, saving resources, time and money;

2. *Increasing transparency in management.* E-municipal governance allows citizens to access information about local government activities, budgets, and decision-making processes;

3. *Residents' participation in governance.* Creating a basis for citizens' participation within the framework of electronic services in resolving any issues that may arise in the area, obtaining their opinions, and encouraging the improvement of solutions. In addition, e-municipal services increase civic solidarity and encourage the implementation of joint initiatives. Thus, local governments will create a more inclusive digital society by developing a collaborative approach among residents.

Various problems may arise during the implementation of e-municipal governance in Azerbaijan. The following suggestions are put forward to overcome these problems:

- Inclusion of legal bases for e-municipality management in the collection of “Forms and rules for creating Internet information resources of state bodies and municipalities”. The “Forms and Rules for Creating Internet Information Resources of State Bodies and Municipalities”, approved by the Resolution No. 33 of the Cabinet of Ministers of the Republic of Azerbaijan dated February 16, 2007, does not reflect provisions related to e-services. The creation of legal foundations for e-services in the activities of municipalities is necessary to legitimize the integration of digital solutions.

- Providing services in a form that is clearly understandable for counterparties and ensuring proper conjuncture conversion of transactions. Providing assistance and support to residents who have difficulty using e-services inevitably creates additional workload problems. One of the initiatives aimed at increasing the accessibility of e-services is the “user-friendly” project. A user-friendly project can be presented in the form of explanatory videos or subtitles to provide a digital understanding of operations.

- Strengthening staffing for the professional provision of electronic services. The first step to solving this problem is to allocate resources for self-development initiatives within municipal departments and involve employees in the program.

- One of the problems encountered in establishing e-municipal services is the lack of financial resources. There are 4 ways to solve this problem: Financial allocations from a higher government agency; crowdfunding; social impact bonds; microfinance.

- Increasing trust in e-municipal services. In this regard, municipalities should implement strong security measures, organize correct and clear information, and ensure transparency in data management. In addition, it is possible to increase trust in electronic services by involving influential residents in the organization of these services.

Our research on e-municipal governance shows that these services are capable of overcoming the shortcomings of traditional governance and can ultimately promote more efficient management of municipal finances.

The following scientific publications have been issued based on the dissertation's primary scientific findings:

1. Elektron bələdiyyə sistemində idarəetmə siyasəti/ “Heydər Əliyev irsi və Azərbaycan Respublikasında innoativ idarəçiliyi islahatları” Mövzusunda doktorant və dissertantların elmi-praktiki konfransı. 2017, s.215-223
2. Sosial-idarəçilik sistemində elektron bələdiyyə ilə vətəndaş arasında münasibətlərin dayanıqlılığı / UNEC Elmi Xəbərləri. Azərbaycan Dövlət İqtisad Universiteti (UNEC) iyul - sentyabr 2017 s. 74-91
3. Elektron bələdiyyə sistemi əsasında yerli özünüidarəetmə institutunun təkmilləşdirilməsi / “Ümümmilli Lider Heydər Əliyevin anadan olmasının 94-cü ildönümünə həsr olunmuş “Səmərəli islahatların uğurlu nəticələri, reallıqlar və perspektivlər” mövzusunda beynəlxalq elmi-praktiki konfransın materialları. 2017, s. 772-76
4. Bələdiyyə idarəetməsində informasiya texnologiyalarından istifadənin vəziyyəti və inkişaf imkanları / IV. Uluslararası Türk Kültür Coğrafiyasında Eğitim ve Sosyal Bilimler Sempozyumu TURKCESS 2018. 27-30Haziran 2018 / Bakü- Azərbaycan, s. 487-498
5. Azərbaycanda e-bələdiyyə xidmətlərindən istifadənin mövcud vəziyyəti / İqtisadi təhlükəsizlik mövcud vəziyyət və perspektivlər beynəlxalq elmi konfransın materialları. Azərbaycan Respublikası Təhsil Nazirliyi Sumqayıt Dövlət Universiteti. 2-3 may 2018-ci il, s. 78-80
6. E-bələdiyyənin tətbiqində beynəlxalq təcrübənin öyrənilməsi / II International scientific conference of young researchers. Baku Engineering University. 27-28 April 2018, s.929-932
7. E-bələdiyyə xidmətlərinin tətbiqində yaranan problemlər və strateji hədəflər / Conference book Baku 2nd International Conference Of Science BAKU/AZERBAIJAN Bilim Evi. 1ST OF APRIL, 2018, s. 291-296
8. E-bələdiyyə xidmətlərində daşınmaz əməkə idarə edilməsinin təşkili xüsusiyyətləri / Müasir təbiət və iqtisad elmlərinin aktual

problemləri beynəlxalq konfrans. Gəncə Dövlət Universiteti. 03-04 may 2019, s. 55-58

9. Салаев Эльхан Адил оглы Шахбазов Камиль Агазаман оглы, Реальное состояние e- трансформации в азербайджане и ее влияние на муниципальное управление / Теория и практика управления государственными функциями и услугами. Тарифное регулирование. 2019, стр.162-167
10. Problems and solutions in civil relations within the implementation of e-municipality in the republic of Azerbaijan / Economic and Social Development: Book of Proceedings. Azerbaijan State University of Economics (UNEC) 18-19 June 2020, s. 695-702
11. Assessment of current status of establishment of e- services in azerbaijan and problems regarding electronic informationsupport / “Rəqəmsal iqtisadiyyat: müasir çağırışlar və real imkanlar” mövzusunda Beynəlxalq konfransın materialları. Bakı: UNEC-2020, 13-14 fevral 2020, s.54-55
12. Bələdiyyə idarəçiliyində rəqəmsallaşdırılmanın zəruriliyi və kommunikasiya proseslərinin qiymətləndirilməsi / AMEA-nın Xəbərləri. İqtisadiyyat seriyası 2022 (yanvar-fevral) Region və sahə iqtisadiyyatı. s. 63-70
13. Elektron bələdiyyə idarəetməsində tətbiq edilən informasiya sistemlərinin konseptual əsasları / İqtisadi artım və ictimai rifah elmi jurnal. 2022, №4, s.185-191
14. “Анализ активной деятельности муниципалитетов в Азербайджанской Республике и возможности применения электронного муниципалитета” / Экономика и управление: проблемы, решения - 1, том 3 (133) 2023 январь. ISSN 2308-927X, ISSN 2227-3891, стр 117-124.
15. E-citizen model at the digital municipality level and macroeconomic analysis of internet services / Qərbi Kəspı Universitetinin Elmi xəbərlər jurnalı. İctimai elmlər seriyası № 1, 2023, s. 234-243

The defense of the dissertation will be held at the meeting of the ED 2.10 Dissertation Council operating under the Azerbaijan State University of Economics on “19” March 2025 at 14:00.

Address: AZ 1001, Baku city, Istiglaliyet street, 6

It is possible to get acquainted with the dissertation in the library of the Azerbaijan State University of Economics.

Electronic versions of the abstract are posted on the official website (www.unec.edu.az) of the Azerbaijan State University of Economics.

The abstract was sent to the necessary addresses on “17” February 2025.

Signed for print: 14.02.2025

Paper format: 60x84 1/16

Volume: 36190 characters

Number of copies: 20

“Tabib” publishing house