

PART III

DIGITAL TRANSFORMATION OF THE PENSION PROVISION SYSTEM IN UKRAINE

CHAPTER 7

DIGITAL TRANSFORMATION OF THE STATE PENSION SYSTEM IN UKRAINE

DOI: <https://doi.org/10.30525/978-9934-26-537-2-7>

7.1 Electronic Services of the Pension Fund of Ukraine

The rapid leap in the digital development of society has marked the beginning of the "fourth industrial revolution," also called Industry 4.0. In a broad sense, Industry 4.0 describes the current trend of automation and data exchange, including cyber-physical systems, the Internet of Things, and cloud computing. Industry 4.0 represents a new level of production organization, represents a new level of production organization and value chain management throughout the entire life cycle of manufactured products [271]. Industry 4.0 is best characterized by the digitalization of all economic and social processes in society. Digitalization is the saturation of the physical world with electronic and digital devices, tools, systems and the establishment of electronic communication exchange between them, which actually makes it possible to integrate the interaction of the virtual and physical, i.e. creates a cyber-physical space [272].

In recent years, the Pension Fund of Ukraine has made significant progress in this area, launching a number of important services on its web portal for all categories of people it serves. The developers and administrators of the portal are not resting on their laurels; the electronic platform is constantly being modernized to meet the needs of consumers [272].

To use the website, users need to register in one of the following ways:

- registration by application involves a personal visit to the Pension Fund, where, based on the completed application, the user is provided with the code required for initial registration on the web

portal. To register on the web portal, select the "Registration" item in the "Registration by application" tab, fill out the registration form and receive a registration confirmation letter to your email address. Online registration is convenient for persons subject to declaration, managers and accountants of enterprises, private entrepreneurs who report with an EDS. In addition, any citizen can obtain an EDS at their own request at the Key Certification Centers.

– online registration with an electronic digital signature. The EDS key can be found on any media or on the electronic pension certificate (EPC). To authorize with EDS from a USB flash drive, you need to: on the "Login" screen form, select the "EDS" tab in the "Login" main menu and log in to the Portal for the first time. When using an EDS, the login to the web portal is more secure than the login, and information from the Register will be displayed with personal data [273].

The insured person's electronic cabinet is an important online service that provides convenient access to personal data and other information from the register of insured persons. The first step in creating an electronic taxpayer account in Ukraine is to collect the necessary documents. The list of such documents includes

- Passport;
- Registration number of the taxpayer's account card;
- Electronic signature;
- Certificate of registration.

After collecting the necessary documents, you must submit an application for creating an electronic taxpayer account on the website of the State Tax Service or fill out the form provided by this website. When you first log in to your personal account, you must provide your personal data, such as name, surname, date of birth, address, contact phone number, and attach scanned copies of the required documents.

The next step is to confirm your identity, which involves visiting the nearest branch of the Pension Fund of Ukraine to confirm your identity, for which you must provide the original documents that were provided during registration. Once the identification is confirmed, the citizen will have access to his or her electronic account and will be able to view his or her data, control the payment of insurance premiums, submit applications and receive other services.

You can access your personal account on the Pension Fund of Ukraine's electronic services web portal using the following digital tools:

1. Sign in using Diya.Pidpys or a qualified electronic signature (QES):

- Diya.Pidpys is an online service that allows you to log in using your mobile phone or other device.

- A qualified electronic signature (QES) is a digital signature issued by special organizations. It guarantees you as a person and allows you to perform various actions in the electronic environment.

2. Login through the Integrated Electronic Identification System – ID.GOV.UA:

- Passport;
- Registration number of the taxpayer's account card;
- Electronic signature;
- Certificate of registration.

– ID.GOV.UA is a system that combines various methods of electronic identification, such as MobileID and BankID.

- MobileID is an opportunity to log in to your personal account using your mobile phone.

- BankID is the ability to use bank data for authorization.

The insured person's personal account can be used both in the web version and through the Pension Fund mobile application, which runs on smartphones and tablets with Android and iOS operating systems.

The personal account of the insured person on the web portal of electronic services of the Pension Fund of Ukraine has the opportunity:

to access the available data of the insured person's personal electronic account card and other information from the register of insured persons of the State Register of Compulsory State Social Insurance (personal data, information on salary (income, financial support), insurance premiums paid in favor of the person, and insurance experience);

- control the payment of insurance premiums by policyholders;
- access the available information in the Electronic Labor Record Book;
- provide information on labor activity;
- access their sick leave certificates and other data in the Electronic Register of Sick Leave Certificates;
- access the data of their electronic pension file;

- apply for the appointment or recalculation of a pension (without a personal visit to the Pension Fund of Ukraine);
- apply for a pension certificate;
- submit data to make changes to the pension file;
- submit a request for preparation of documents and upload the required document;
- submit an appeal (request, proposal);
- review the status of processing of their appeals to the Pension Fund of Ukraine, including the documents attached to the appeals;
- receive and view messages from the Pension Fund of Ukraine;
- calculate the estimated amount of your future pension using the Pension Calculator service.

Although the availability of an e-cabinet greatly simplifies citizens' access to the necessary information and interaction with the Pension Fund, there are a number of shortcomings and areas for further improvement, namely:

- The complexity of authorization. A qualified electronic signature (QES) or other identification tools are required to log in to the account. Some users with insufficient digital literacy may have difficulty setting up these tools;

- Insufficient information transparency. The e-cabinet may not always provide sufficient information about the status of a pension case, pension amount, or payments. Users may feel the need for more detailed information on calculations and payments;

- Limited functionality and navigation. For some people with a low level of digital literacy, it may be difficult to navigate between different sections. This can make it difficult to get the information they need or to perform certain actions.

To eliminate the above shortcomings and further improve the functionality of the insured person's electronic cabinet, the following recommendations are offered:

- Simplify authorization. Consider using more convenient login methods, such as one-time passwords or SMS codes. Provide support for biometric authentication (fingerprint, face recognition);

- Increase information transparency. The e-cabinet should provide users with detailed explanations of pension calculations, including insurance

contributions, length of service, and other factors. Create a frequently asked questions (FAQ) section where users can find answers to the most common questions. Conduct information campaigns on the capabilities and benefits of the electronic cabinet. Provide users with detailed instructions on how to use the service;

- Improve the interface and usability. Simplify the e-cabinet interface and make it more intuitive for users. Introduce surveys and collect user feedback on the e-cabinet. Take into account the suggestions and wishes of users when developing new features.

The conversion of documents into electronic format ensures high reliability of data storage and efficiency of public services. The concentration of pension files in a single electronic database allows citizens to apply to any service center regardless of their place of residence and registration. This has become especially important in the current difficult conditions of war, when many Ukrainians had to temporarily move from dangerous areas as a result of the fighting. Specialists' quick access to the documentary information of residents of all regions of Ukraine contributes to the prompt resolution of issues with which they are contacted.

An electronic pension file is digitized data that can be used to assign, recalculate, or pay a pension. Most often, this includes the pensioner's passport data, place of residence, copies of documents on the basis of which the pension is granted and paid, and other information that may affect the amount of the pension. Thanks to digitization, pensioners can access their documents at any service center of the Pension Fund of Ukraine or on the Fund's electronic services portal. The set of information processed on the basis of centralized information technologies in the form of electronic data to ensure the appointment/recalculation and payment of pensions is formed and maintained in accordance with the requirements of the Laws of Ukraine "On Electronic Documents and Electronic Document Management", "On Electronic Trust Services" and "On Personal Data Protection", including mandatory information on the pensioner's passport data and place of residence; copies of documents on the basis of which the pension was appointed (monthly lifetime allowance, burial allowance, etc.) and its payment; other information that is used to determine the amount of the pension granted and the amount of the pension payable from the date of its granting until the closure of the pension file [274].

Today, a significant percentage of electronic pension files are formed by retroconversion, i.e., each paper pension file is scanned and a digital version is created. The documents are scanned using technical means, certified with a qualified electronic signature and stored in the electronic pension file as copies of the documents on the basis of which the pension was granted. Specialists check the completeness of the documents in the file. If the pension file does not contain copies of the required documents, measures are taken to obtain them. The retroconversion process includes 5 stages of processing a paper pension file:

1. Scanning the documents of the pension file.
2. Editing scanned files.
3. Entering metadata.
4. Creating an electronic document.
5. Checking the pension file.

The data obtained as a result of the inventory will need to be reconciled with the information stored in the register of insured persons of the state register of compulsory state social insurance. Only after the pension file is fully completed and verified, it is transferred for scanning and creating an electronic pension file. The pension file in electronic format allows:

- Providing pensioners with access to their pension file at any service center or remote workplace (service point) of the Pension Fund of Ukraine;
- Receiving services online via the Internet using the web portal of electronic services of the Pension Fund of Ukraine. An extract from the pension file becomes available for generation within approximately three days after registration on the web portal. The statement is further updated in the first decade of each following month;
- Creating an opportunity to provide services regardless of a person's place of residence;

Using the vacated premises of the Pension Fund of Ukraine, which are currently allocated for storing the archive of pension files, to improve the conditions for servicing citizens;

- Ensuring end-to-end automated control of the relevance and authenticity of documents on the basis of which pension funds are paid.

The electronic pension file contains online information about:

- Passport details of the pensioner and his/her place of residence;

CHAPTER VII

- Copies of the documents on the basis of which the pension (monthly lifetime allowance, funeral benefit, etc.) is granted and paid;
- Information that is used to determine the amount of the pension granted and the amount of the pension payable from the date of granting it until the pension file is closed;
- Pension file / personal account number, date of opening a personal account;
- Type of pension, Pension Fund authority granting the pension, date of granting;
- Address data (address of registration and address of actual residence);
- A salary certificate taken into account when assigning/recalculating a pension;
- Certificate of service taken into account for determining the right to a pension;
- Certificate of service taken into account for pension calculation.

The transition to the Electronic Pension File will soon provide an opportunity for all citizens applying to the pension service to experience its benefits, as it will simplify the procedure for receiving services, reduce service time and improve the quality of reception. Once the centralized system is fully implemented, a person will be able to apply for a pension regardless of their place of registration. The process of processing pension documentation will be automated as much as possible. Modern web-based technologies allow for the automatic entry of data from the personalized accounting system on the insured person's insurance record and salary into the electronic pension file and the calculation of pensions. The new system has the ability to analyze pension allocations for all options to which a person is entitled and choose the most favorable one. The information about a person contained in the electronic pension file is securely protected, making it impossible for it to leak. Therefore, with the introduction of a citizen service system based on centralized information technology, in the future, special service centers will be located not only in the Fund's offices, but also in banks, post offices, and in the territories of communities, if they wish [275].

Other e-services of the Pension Fund of Ukraine should be divided by type of user. The e-Services Portal offers services for pensioners, insured persons and policyholders. Pensioners and insured persons can receive the following services: 1) Voluntary payment of insurance contributions for

obligatory state pension insurance (Accession Agreement). 2) Application for a pension. 3) Application for pension recalculation. 4) Application for a housing subsidy or benefit, namely:

- applications for entering information into the Unified State Automated Register of Persons entitled to benefits;

- applications for the appointment and provision of housing subsidies;

- applications for benefits for housing and communal services, purchase of solid fuel and liquefied gas;

- applications for recalculation of previously assigned housing subsidies;

- applications for recalculation of previously granted benefits;

- applications to change the method of payment of housing subsidies or benefits;

- applications for termination of housing subsidies or benefits;

- applications for the appointment and provision of housing subsidies under the pilot project.

5) Submission of applications for the appointment (recalculation, extension) of insurance payments in connection with an industrial accident (occupational disease), namely

- applications for the appointment/calculation/extension of insurance payments in connection with an industrial accident (occupational disease);

- applications for the appointment/calculation/extension of insurance payments in connection with the death of the breadwinner;

- applications for reimbursement of expenses for the burial of the victim and related funeral services;

- applications for insurance payment;

- applications for reimbursement of expenses.

6) Obtaining data from the Pension Fund's Register of Insured Persons, in particular:

- data on the person's salary – information is provided by year by year by insured. For each year, the total amount of salary for the year and the total amount of salary taken into account for pension calculation are additionally determined;

- data on the person's insurance record – data on the number of days of work for which the insured paid insurance premiums for the person; information is provided for all years and months of work.

7) Pension calculator. The user has the opportunity to determine the conditions for calculating the pension, namely:

- choose a calculation algorithm – both based on the entered data and taking into account the length of service that will be acquired on the date of retirement age;
- if necessary, update the employment data – add the periods of employment with the determination of wages and edit the amount of monthly earnings.

Insured persons can use the following services: 1) Submission of claims for payment of sick leave benefits for insured persons – employees of the insurer; 2) Obtaining insured data from the Unified Register of Insurers; 3) Reviewing insured statements; 4) Obtaining data from the Electronic Register of Sick Leave Certificates.

Users can also use the following services common to all categories:

- Make an appointment;
- Request for preparation of paper documents;
- Request for electronic documents;
- Registration of requests, proposals, complaints, and petitions.

It is worth noting that the above list of services available on the Pension Fund's e-Services Portal is not exhaustive, as new services are being developed, such as notifications of the need to legalize labor relations, an electronic employment record book, and many others.

7.2 Implementation of Digital Technologies in the Activities of Pension Fund Bodies

The introduction of digital technologies into modern administrative systems is a necessary component to ensure the efficient and cost-effective operation of social security agencies, including the Pension Fund. The creation and improvement of digital management and data processing tools helps to increase the availability of services, optimize workflows, and ensure the accuracy and reliability of pension payments [276].

In response to the challenges of modernity and the requirements of effective management, the Pension Fund bodies are actively implementing digital technologies in their activities. The key innovations include the following:

– Automated data processing system: the creation of a centralized data processing system allows collecting, storing and analyzing information on pension payments, changes to pension reports and other important information. This system enables quick access to data for management decision-making.

– Electronic services: development of online platforms for organizing the receipt of pension payments, checking the status of pension accounts, and other administrative services simplifies the process of interaction between the pension fund and citizens, reducing bureaucratic barriers and the time required to receive services.

– Analytical tools: the use of analytical software tools allows for in-depth analysis of pension data, identifying trends and patterns, which helps to improve fund management strategies and optimize resource allocation.

– Information protection: development and implementation of cybersecurity measures is an integral part of digital transformation. Ensuring the confidentiality and integrity of personal data of pensioners is a priority for the Pension Fund authorities.

The introduction of digital technologies in the work of the Pension Fund has a number of advantages:

– Increased efficiency: automation of routine processes and quick access to information reduce the time required to process data and resolve administrative issues.

– Increased accessibility of services: online platforms provide access to pension services at any time and from any location, which is especially important for residents of remote regions.

– Increased accuracy and reliability: the use of digital systems avoids human error and ensures more accurate and reliable pension payments.

– Resource savings: digital technologies reduce data processing and management costs, which leads to optimization of the Pension Fund's budget.

The Pension Fund of Ukraine uses the Integrated Comprehensive Information System of the Pension Fund of Ukraine (ICIS PFU) as a *software solution for pension administration*, which automates virtually all key PFU processes, including collection, accumulation and expenditure of pension funds, including their personalized accounting, appointment (recalculation) and payment of pensions, and maintenance of the register

of insured persons). ICIS PFU also provides automation of other processes related to the above-mentioned core functions of the Pension Fund of Ukraine, such as providing visitor services, informing citizens, analysis and forecasting, and comprehensive information security [278].

The main functions of the Pension Fund's ICIS are:

- Pensioner data management: involves the storage and processing of personal data of pensioners, such as name, address, date of birth, information on pension payments and other important information.

- Calculation of pension payments: the information system automatically calculates the amount of pension payments based on the relevant parameters and standards.

- Management of pension contributions: the system allows you to account for and control pension contributions, perform operations with their accounting and provide reliable reporting.

- Electronic services for pensioners: ICIS contains an electronic communication module that allows pensioners to apply for pension benefits and receive information online.

- Ensuring data security and confidentiality: protecting personal data of pensioners from unauthorized access and ensuring confidentiality of information.

- Analytical tools and reporting: the ability to analyze and generate reports on the performance of the pension fund, statistical reporting and other analytical tasks.

- Integration with other systems: the ability to integrate the Pension Fund's ICIS with other systems, such as taxation, social security, health insurance, and others.

The Pension Fund's document *flow automation* is implemented on the basis of the Pension Fund of Ukraine's ICIS subsystem, the Centralized Automated System of Electronic Document Flow of the Pension Fund of Ukraine (ASEDF). The main functions of ASEDF are:

- Accounting for the volume of the organization's document flow;
- Registration of incoming documents, citizens' appeals, internal documents, and outgoing documents;
- Manage the transfer of documents and identify their executors;
- Support for electronic resolution;
- Differentiate access to documents;

- Maintain links between documents;
- Maintaining shipping registers;
- Maintaining archival files;
- Preparation of draft electronic documents;
- Support for the operation of a qualified electronic signature;
- Approval and approval of draft electronic documents;
- Signing of draft electronic documents;
- Maintain a version of draft electronic documents and individual attachments;
- Generating a QR code;
- Information and reference work with electronic documents;
- Generating statistical and analytical reports;
- Search for documents by attributes.

The electronic document management and execution control software automates the processes of the electronic document lifecycle, monitoring and control of executive discipline, group processing of documents, and their exchange both within a multi-level corporate structure and with other organizations.

Another step in the direction of digitalization was the Pension Fund electronic mobile application, which allows users to receive information about their own pension insurance and benefits from smartphones and tablets at

The mobile application offers three authorization options:

- by login;
- with an electronic digital signature;
- using the GovID.

The Pension Fund of Ukraine is actively implementing measures to improve digital technologies in order to increase efficiency and ensure convenient access to administrative services for citizens and policyholders. Thus, according to the Pension Fund of Ukraine, in the first half of 2024, a number of measures were taken to develop the Fund's web portal as an electronic service resource [279]. Remote services provided through personal accounts of insured persons and policyholders have been improved.

In particular, the following measures were implemented:

1. Improvement of personal accounts of insured persons and policyholders:
 - The possibility of applying for a pension has been introduced.

CHAPTER VII

- The function of requesting the preparation of paper documents has been added.

- Access to the data of the electronic register of insured persons and the register of sick leave certificates was provided.

- The possibility of making changes to the electronic pension file has been introduced.

- Integration of an electronic pension calculator has been implemented.

2. Transfer of services to electronic form:

- Electronic services have been created to request and receive documents without visiting the Pension Fund.

- Citizens' appeals, including questions, suggestions, complaints and petitions, are now accepted via an electronic form.

3. Implementation of automation of administrative processes:

- The transfer of data on citizens' labor activity through electronic resources was organized.

- The processing of insurance and pension applications has been optimized.

4. Creation of tools for employers (insurers):

- Access to registers for verification of employee data is provided.

- The procedure for submitting reports through electronic services has been simplified.

The main functions of the personal account include submitting an application for a pension, requesting the preparation of paper documents, accessing data from the register of insured persons, making changes to the electronic pension file, using an electronic pension calculator, etc. In addition, citizens can send inquiries, receive data from the electronic register of sick leave certificates, and make payments using the resources provided. For policyholders, the functionality that allows them to interact with the Pension Fund's registers, submit reports and verify data was developed. Improvements to these services are aimed at minimizing the time required to submit documents and improving the accuracy of information.

The visualized list of the service's functionalities demonstrates the Pension Fund's commitment to simplifying access to administrative services and ensuring the comfort of users in the process of receiving them.

Thus, by introducing digital technologies into the Pension Fund's operations, citizens and employers have convenient access to online

services, which minimizes the need for personal visits and reduces the time required to process applications. These changes have significantly improved the efficiency of the Pension Fund's operations and the quality of service delivery.

Mechanisms have been developed to implement a pilot project aimed at improving the procedure for registering war veterans and providing them with benefits for housing and communal services, as well as for the purchase of solid fuel and liquefied gas. A system of applications through the Pension Fund's web portal was introduced to appoint and pay benefits to people with outstanding work and special services to the country, war veterans, and those working in special conditions.

The software for interacting with housing and utility service providers via accounts on the web portal was updated. This made it possible to implement a data processing and storage system to implement a pilot project to optimize the mechanism for providing subsidies to the population. As of July 01, 2024, the database contains information from 964 housing and utility service providers for 13.67 million subscribers.

The electronic services available in the insured person's account on the Fund's web portal, in particular for the allocation and payment of housing subsidies and benefits, continue to be improved (Table 7.1).

Table 7.1 – Updated electronic services provided in the personal account of the insured person on the Fund's web portal for the appointment/payment of housing subsidies and benefits.

Applications for housing subsidies or benefits		
Application for entering information into the Register of persons entitled to benefits	Application for recalculation of previously assigned housing subsidy	Application for housing subsidy or benefit termination
Application for the appointment and provision of housing subsidies	Application for previously granted benefits recalculation	Application for granting and provision of housing subsidies under the pilot project
Application for benefits for housing and communal services, purchase of solid fuel and liquefied gas	Application to change the method of housing subsidy or benefit payment	Application for war veterans registration and provision of benefits under the pilot project

Source: developed by the author

In 2024, the Pension Fund of Ukraine established information interaction with the Administration of the State Border Guard Service of Ukraine and the Foreign Intelligence Service of Ukraine through the web portal services. Cooperation was also ensured with the Ministry of Defense of Ukraine to update the database of the Unified State Register of Conscripts, Persons Liable for Military Service and Reservists.

As of July 01, 2024, 20.54 million users were registered on the Pension Fund's web portal, including 16.00 million using a qualified electronic signature. In the first half of 2024, the number of new users increased by 2.4 million, of whom 2.28 million used a qualified electronic signature.

The number of users of the Pension Fund mobile application exceeded 1.3 million, with the growth of new users amounting to about 300 thousand in January-June 2024.

During the first half of 2024, 3.64 million certificates with QR codes were generated through the Fund's web portal, 32.6 thousand applications for pensions and 42.0 thousand applications for their recalculation were submitted, as well as 29.9 thousand questionnaires of insured persons to clarify or enter data into the Register of Insured Persons.

In the reporting period, 1,039.9 thousand requests for digitalization of employment records were received, of which 27.9 thousand were from insurers covering 609.7 thousand employees, and 430.2 thousand were from insured persons.

From 10.06.2021 to 01.07.2024, 61.4 thousand pensions were automatically granted under provisions of the legislation on automatic granting of old-age pensions (without the need to apply).

From March 2023 (since the launch of the service) to the reporting date, 5094 agreements on voluntary participation in the compulsory state pension insurance system were concluded, under which about 17 thousand payments amounting to more than UAH 35.4 million were made.

Since June 2021, the Electronic Register of Sick Leave Certificates (ERSLC) has been in operation, where the relevant certificates are generated automatically based on electronic medical reports. As of July 01, 2024, 23.9 million electronic certificates were created in the register, and information from them is transferred to the electronic offices of insured persons and policyholders on the Fund's web portal.

In order to correctly calculate the amount of temporary disability benefits, the insurer can independently obtain electronic "Certificates of Employment and Insurance Service" of its employees, and for each insured person who is in an employment relationship with it, it is possible to generate the OK-7 form.

Centralized mechanisms for processing data and financing insurance payments, housing subsidies, and benefits continue to be improved. In particular, the software of the application subsystems "Appointment and Payment of Certain Social Benefits" and "Financial Reporting" was upgraded, and the first stage of the new automated subsystem for dispatching and controlling mass operations was launched.

Large-scale digitalization of the pension file archive continues. As of 01.07.2024, 8.19 million out of 9.47 million files have been digitized, of which 5.51 million have already been validated.

One of the key priorities of the Foundation's activities is the introduction of paperless technologies by integrating services with the Unified State Web Portal of Electronic Services "Portal Diya".

The Pension Fund interacts with 21 information and communication systems, including those of the Ministry of Social Policy, the Ministry of Health, the Ministry of Finance, the Ministry of Justice, the Ministry of Education and Science, the State Migration Service and the State Tax Service of Ukraine.

Work is ongoing to expand the possibilities of providing services in a remote format through personal accounts of insured persons and policyholders on the Pension Fund of Ukraine web portal. Measures are being taken to optimize and automate processes through integration with other state registers, which contributes to a significant reduction in the volume of paperwork in the provision of services.

Particular attention was paid to information interaction with the Unified State Web Portal of Electronic Services "Portal Diya", which allows for convenient access of citizens to the Pension Fund's services in an integrated digital environment.

During the first half of 2024, the Pension Fund of Ukraine took comprehensive measures to ensure technical protection of information, cybersecurity, cyber defense and general information security of its information and communication system (ICS). Particular attention was

paid to preventing cyber threats, promptly responding to information security (IS) incidents, and implementing modern data protection solutions.

The Monitoring Center for Control of Functional Processes and Data Protection of the Pension Fund's ICS operates 24/7 on the basis of the State Enterprise Information Center for Personalized Accounting of the Pension Fund of Ukraine (Figure 7.1). This center ensures monitoring of critical processes, analysis of information security incidents, and prompt coordination of actions in case of threats.

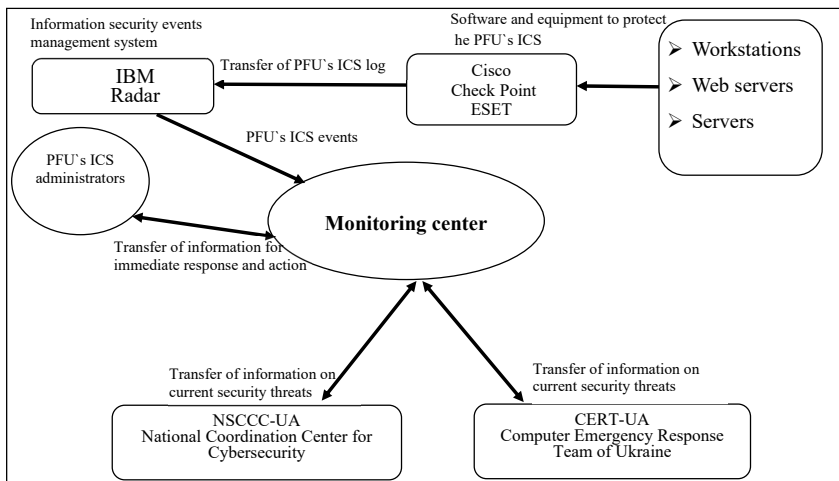


Figure 7.1 – The Fund’s system for monitoring information security and responding to cyber incidents

Source: developed by the author

Figure 7.1 shows the architecture of the system for monitoring and protecting the information system of the Pension Fund of Ukraine (PFU), which is an integral part of ensuring information security and the smooth functioning of this institution. The system consists of several key components, each of which performs clearly defined functions.

The workstations used by the system administrators perform information infrastructure management tasks. These workstations are equipped with specialized software, in particular from Cisco and IBM, which allows for

efficient system administration. Servers play a key role in the system's functioning, providing data storage, supporting operational processes and providing services to users. Databases accumulate significant amounts of information about insured persons, pension payments and other transactions, which is the basis for decision-making and service provision.

One of the central components of the system is the information security event management system, which collects and analyzes data on events in the information system. This allows us to identify potential threats at an early stage and minimize their impact. All processes are controlled by a centralized monitoring center, where specialists monitor the current state of the system, analyze information about events and respond promptly to possible incidents.

The system's functioning is based on the integrated interaction of all its components. Data on events occurring in the system are collected, analyzed and checked for signs of cyber threats. If an incident is detected, the information is immediately sent to administrators and the monitoring center, which ensures timely response and elimination of threats.

The Pension Fund of Ukraine actively participates in the national system of information exchange on cybersecurity incidents. Real-time information exchange is carried out with the Governmental Computer Emergency Response Team of Ukraine (CERT-UA), the National Coordination Center for Cybersecurity under the National Security and Defense Council of Ukraine, and the Situation Center for Cybersecurity of the Security Service of Ukraine.

Thanks to this interaction, the Pension Fund ensures timely response to cyber incidents, minimizes the risks of their impact on the functioning of the information and communication system and implements measures aimed at preventing possible future threats. Implementation of modern approaches to information security ensures the stability and reliability of the Fund's information services, protecting personal data and other confidential information.

The overall goal of the system is to ensure stable and secure operation of the Pension Fund of Ukraine's information system. This includes protection against cyberattacks, timely detection of vulnerabilities, ensuring confidentiality, integrity and availability of data, and effective response to possible incidents. An integrated approach to information security helps protect the personal data of insured persons and guarantee uninterrupted service delivery, which is an important element of the pension system.

Thus, the presented architecture demonstrates the high level of preparation of the PFU for cybersecurity, which is a key factor in creating public trust in electronic services and digital public administration technologies.

One of the key areas of digitalization in the activities of the Pension Fund of Ukraine is the introduction and popularization of modern electronic services.

One of the priority tasks of the Pension Fund of Ukraine is to raise awareness of the public and employers about the functionality of modern electronic services. To this end, a set of measures is being implemented to popularize remote forms of service and increase the level of their use among different categories of users.

The main activities include awareness-raising campaigns covering both traditional media and digital platforms. In particular, social media, the Pension Fund's official web portal, and email newsletters are actively used to disseminate instructions, demonstration videos, and step-by-step guides explaining in detail how to use the services.

An important aspect is the organization of training seminars and workshops for employers and individual entrepreneurs, which emphasize the benefits of electronic document management, the availability of data on insured persons, and the promptness of receiving answers through a personal account. Such events are often held with the support of local authorities or in cooperation with professional associations.

In addition, special attention is paid to the development of technical support for users. Hotlines and online consultations are available to help quickly resolve issues related to the use of the web portal.

One of the successful examples of popularization was the introduction of incentive programs, such as discounts on administrative services or acceleration of their provision for those who use electronic services.

Systematically informing the public about the benefits of electronic services not only contributes to the growth of their popularity, but also increases the level of digital literacy of citizens, which is an important step towards the realization of the concept of "the state in a smartphone."

The aforementioned set of measures is an important element of the modernization of the digital infrastructure of the Pension Fund of Ukraine, which helps to increase the level of public confidence in the state's electronic services.

CONCLUSIONS

Summarizing the theoretical approaches of scholars, own definition of "pension provision" has been formulated. The authors suggest to understand it as a set of actions envisaged by national legislation, including organizational measures, legal procedures and provision, and other actions which allow creating the prerequisites for the formation of social funds (as a system of accumulation of resources for cash payments to disabled citizens. The author also identifies the principles of pension provision (accessibility of the right to a pension, differentiation of pension provision conditions, multiple types of pension provision, etc.) and the main functions that characterize its general features (distributive, reproductive, and social).

Pension provision occupies a significant place in the social insurance system, since the contributions paid within this insurance system keep the system functioning and developing. The author substantiates the need for further reform of the pension system in Ukraine, which is related to the demographic situation and the Pension Fund deficit.

The process of reforming the pension system and its development in independent Ukraine can be divided into five stages, namely: the establishment, development and improvement of pension provision in the first years of Ukraine's independence (1991-2002); approval of a new three-pillar pension system at the legislative level (2003-2010); increase of the insurance period and retirement age for women (2011-2014); optimization of the pension system in view of the difficult economic situation in the country (2015-2016); reform of the pension system.

Analyzing the experience of the world's leading countries, it was found that in most countries pension systems are universal, i.e., they consist of three levels: the pay-as-you-go system – state pension provision, the funded system – occupational pension provision, and the system of individual pension provision, which is based on personal contributions to non-state pension funds. In recent years, most of the pension systems have undergone certain changes, such as raising the retirement age, increasing contributions and encouraging later retirement.

The analysis shows that the average pension is increasing annually in nominal terms, while the number of people receiving pensions at or below the officially established subsistence level is decreasing. Thus, as

CONCLUSIONS

of January 1, 2022, there were 1241.8 thousand such persons, in 2023 – 372.6 thousand, and at the beginning of 2024 – 325.5 thousand. At the same time, the share of pensioners with pensions above UAH 10 thousand is growing, as is their number. It was also found that the share of people whose pension payments are lower than the actual subsistence level is more than 50% and is growing every year, which in turn negatively affects the purchasing power of pensioners and reduces the level of trust in the government. The situation is not improved by the significant differentiation in the amount of pension payments, which is expressed in the ratio of 1:18.5 between the average old-age pension for most Ukrainian pensioners and the lifetime allowance of judges.

The timely and full payment of pensions directly depends on the performance of the revenue side of the Pension Fund of Ukraine's budget, the main sources of which are its own revenues and the State Budget of Ukraine. In 2018-2023, there was a steady upward trend in both total revenues to the Pension Fund of Ukraine and own revenues. At the same time, revenues from the State Budget of Ukraine in 2020-2021 were lower than in previous years. However, in 2022-2023, there was an upward trend again, indicating a deterioration in the Pension Fund's financial stability. This is confirmed by the large size of its budget deficit.

The study found that the effects of the pension system reform do not fully reflect the expected results. Among the positive aspects are the following: reduction of the Pension Fund of Ukraine deficit compared to 2016, increase of the average pension, abolition of special pensions (except for judges), introduction of a private pension insurance system and approval of a three-pillar pension system at the legislative level. However, a number of problems have been identified that still remain. Among them: the minimum pension is more than 50% lower than the actual subsistence level, which indicates a low level of pension payments for a significant number of pensioners, the budget deficit of the Pension Fund of Ukraine, and a significant differentiation between the minimum and maximum pensions, which is unjustified.

The main directions for improving the pension system in Ukraine are as follows: creating conditions for increasing the amount of pensions in order to ensure a decent standard of living for pensioners; raising the pension awareness of the population; developing additional pension

programs; introducing a flexible retirement age based on profession and length of service; improving the pension system for self-employed persons; increasing the financial stability of the Pension Fund; developing the second funded pillar of the pension system in Ukraine and developing a system of non-directed.

It is stated that in order to introduce the second (funded) level of pension provision in Ukraine, a number of measures should be taken, including: ensuring the sustainability of economic growth and the country's political system; ensuring a decent level of wages; reducing corruption and implementing measures to increase the level of trust in public institutions, raising the level of financial literacy of the population; stimulating and encouraging businesses to participate in pension insurance programs, etc.

The NPP system is an important component of the overall pension system of Ukraine; it allows individuals to receive additional pension benefits alongside the state pension. It is based on the principles of voluntary participation, individualization, funded accumulation, transparency, effective management and protection of pension savings. The key elements of the system are non-state pension funds, banking and insurance institutions, investment companies, and other financial intermediaries. Compared to the state pension system, the NPP system is more flexible and focused on individual needs, but has a higher level of risk. Participation in private pension programs can have advantages, such as the possibility of increasing the size of the pension, protection against inflation, and contributing to economic development. The system faces a number of challenges that need to be addressed as part of Ukraine's post-war recovery to ensure its sustainability.

NPIFs are an important element of the NPP system that complements the state pension system. Their operating mechanisms include procedures for establishment and registration, accumulation of participant contributions, investment of funds, active management of pension assets, formation of individual accounts for participants, and payment of pensions. NPIFs are regulated by the state through licensing, reporting and financial stability requirements, restrictions on investment activities, and other regulations. The key challenges that will determine the development of NPIFs are to increase their role in the PP sector, expand investment opportunities, and develop active pension asset management. The mechanisms of the

CONCLUSIONS

NPIF functioning need to be further improved and adapted to the current conditions in order to increase the efficiency of the NPP in Ukraine.

Global trends in the development and operation of NPIFs in the world are the search for the sustainability of pension systems in response to demographic changes, such as population aging. Countries are implementing reforms aimed at adapting their systems to new conditions. There is a growing focus on responsible investment, taking into account social and environmental impacts. Pension funds are investing in green projects and sustainable development. There is a tendency towards flexibility of pension options, individualization and expansion of the offer of additional products in the pension market. Technological innovations, such as digital platforms, cloud services, and mobile applications, are being actively used to improve the efficiency and accessibility of pension fund services. Interaction between stakeholders to ensure the sustainability of pension systems and raise public awareness of pension issues is intensifying.

The operation of NPFs in Ukraine is regulated by special legislation, in particular the Law of Ukraine "On Non-State Pension Provision". The main regulatory authority for NPFs in Ukraine is the National Securities and Stock Market Commission (NSSMC), which is responsible for issuing licenses, controlling financial activities, protecting the rights of depositors, etc. NPFs are subject to licensing. Licenses are issued by the NSSMC. The license contains requirements for financial stability and reporting of funds. Funds must comply with financial regulations, which include requirements for capital, liquidity, investment strategy, etc. to ensure reliability. NPFs are required to report on their activities on a regular basis. Their activities are also subject to audit and state supervision. Prudential standards have been introduced for NPF administrators, including the equity capital adequacy ratio and the operational risk coverage ratio. These regulatory mechanisms are aimed at ensuring stability and protecting the interests of participants in the private pension system. Indirectly, it is worth focusing on some potential problems and shortcomings of the existing NPF regulatory system, namely: imperfection of certain regulations governing NPFs, as the text refers to the need to amend the Regulation on Prudential Standards; insufficient regulation of certain aspects, for example, until recently, prudential indicators for NPF administrators were not defined; complexity and confusion

of legislation in this area, as regulation is scattered among different regulations; unresolved issues.

Trends in the development and operation of non-state pension funds in Ukraine are characterized by the following indicators. The number of non-state pension funds in Ukraine is 63, most of them are concentrated in Kyiv. There has been a slow but steady increase in the number of pension contracts and the number of fund depositors. Individuals prevail. The total assets of the funds increased by 7% in 2022 compared to last year, reaching UAH 4.1 billion. The volume of pension contributions increased by 7.7% in 2022, amounting to UAH 2.8 billion. More than 80% of contributions come from legal entities. The investment portfolio of the funds remains conservative, with the bulk of investments in government securities and bank deposits. The amount of pension payments increased by 13.5% in 2022, amounting to UAH 1.46 billion. About 10% of fund participants receive payments. There are challenges in the areas of coverage of the population by the funds' services, attracting contributions from individuals, investment diversification, and cost efficiency. The war poses significant risks and challenges for the funds, including economic instability, possible financial losses, inflation, and social tensions.

The activities of the Corporate Non-State Pension Fund of the National Bank of Ukraine, which has been successfully operating since 2004, providing pension services to NBU employees and contributing to the development of the non-state pension system, have been analyzed. The number of participants in the Fund remains stable at around 12,500-13,000, but only about 2,500 of them are individuals. The main contributor is the NBU, whose share in contributions is more than 99%, while contributions from individuals are insignificant. The total assets, pension contributions and investment income of the Fund show positive growth dynamics. The volume of pension payments is also growing, mainly due to periodic payments for a certain period of time. The investment portfolio is conservative, with a large share of low-risk but low-yielding assets. The Fund is actively introducing the latest financial and information services, improving the quality of service for its members. The NBU's CNPF has some problems and shortcomings, namely a small share of contributions from individual depositors (about 0.5% of total pension contributions in 2022), which indicates insufficient involvement of individuals in the

CONCLUSIONS

Fund; high dependence of the Fund on pension contributions from the sole founder and depositor – the NBU, which creates risks in case of possible financial difficulties of the NBU; conservative investment policy with a large share of low-yielding financial instruments (government bonds, deposits), which limits the growth of the value of pension assets a relatively high share of administrative expenses (about 20% of the fund's total expenses in 2022) reduces the efficiency of using pension assets; lack of information on the level of participant satisfaction with the quality of the fund's services and assessment of its trust by participants; no data on the average amount of savings per participant and the dynamics of this indicator, which makes it difficult to assess the fund's efficiency. Overall, the NBU's CNPF successfully performs its functions, although it has some room for improvement, particularly in attracting retail deposits and improving investment efficiency. The main problems are insufficient involvement of individuals, high risks of dependence on a single depositor, insufficiently effective investment policy, and relatively high administrative costs.

The main areas of improvement of the NPP system in Ukraine in the context of post-war recovery are: increasing the accessibility of NPP for citizens, increasing the return on pension assets, and strengthening the protection of the rights of NPF participants. Specific measures include: reducing the cost of participation in NPP, information campaigns, digitalization of processes, expanding investment opportunities for NPFs, and improving the regulatory framework. It is important to stimulate the investment of pension funds in infrastructure and social projects for economic development. It is necessary to promote the labor activity of citizens, support small and medium-sized businesses, which will provide additional resources for pensions. It is important to develop individualized pension products, introduce flexible options for retirement, and ensure the digital transformation of the NPP system. The proposed areas will help ensure sustainable development and increase the efficiency of the NPP system in the process of the country's post-war recovery.

When developing recommendations for improving the operation of non-state pension insurance funds in Ukraine, the author identifies the following main areas of improvement: strengthening regulation, expanding investment opportunities, and protecting the rights of participants. Specific measures are proposed, including amendments to legislation, expanding access to

investment instruments, and creating a system for protecting the rights of participants. The importance of digital transformation and technological development of funds is emphasized – measures for digitalization, use of software and creation of a digital ecosystem are proposed. Recommendations for the use of technologies for interaction with fund participants, including electronic communications, digital platforms, and pension dashboards, have been developed. A draft of the optimal pension dashboard of the NPIF proposed and its potential positive effects are identified, including increased transparency, ease of monitoring indicators, optimization of processes and communications. In general, the article provides balanced and practically applicable recommendations for improving the NPP system in Ukraine in the face of current challenges.

According to the proposals for the development of the NPIF in Ukraine for 2024-2025, the following main conclusions can be drawn: the proposed strategy is aimed at creating a sustainable and innovative NPP system in Ukraine that will ensure the protection of pensioners and economic development; key areas of the strategy: product range expansion, technological development, partnerships, social responsibility, marketing, evaluation and adjustment; the strategy includes specific measures for implementation – development of new pension products, introduction of digital xml-ph The strategy includes measures to ensure social protection of vulnerable groups, especially in the post-war period. It is balanced, practically oriented and socially responsible to ensure the sustainable development of the Ukrainian pension system.