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CREATION OF USERS' SCREEN FORMS OF THE FINANCIAL MONITORING AUTOMATED INFORMATION SYSTEM FOR ECONOMIC DEVELOPMENT AND ECONOMIC GROWTH

Abstract. The processes of intellectualization and informatization of society have necessitated the development and application of screen forms of automated information systems in various fields by the subjects of the national economy for sustainable growth and economic development. The article is devoted to the development of screen forms, which are designed to organize interaction between users of automated financial monitoring systems and relevant modules for verifying financial transactions, entering regulatory information, working with variable-intermediate and variable effective, serve as a starting point for simulation of automated financial monitoring. The created screen forms with the help of the Bizagi Studio program reflect a prototype of the automated system of the bank's business process, which contains the relevant attributes that are subject to verification in the financial monitoring procedure. The Bank's Clients directory is a key form. A directory «Constituent Documents» has been created for legal entities. Financial documents of individuals are entered in the appropriate forms («Financial documents», «Passport data»). All client transactions are generated in the «Array of transactions» screen form. Information on customer accounts is stored in the appropriate form «Customer Accounts». Regulatory information on the types of banking products is entered in the directory «Product Category», and on the types of transactions — in the directory «Types of transactions», on the types of bank customers — in the directory «Types of customers», on the types of accounts — in the directory of the same name. It is also possible to organize data on the currencies with which the bank works in a directory «Currencies». Created on-screen forms for working with variable-intermediate information, in which part of the information is entered using calculations of the system's business logic, and part with the user, and the variable, which reflects the results of inspections, allowed simulations using automated financial transactions of bank customers. The graphic map of the business process was created in the software product «Bizagi Studio» using the component «Model Process».

Keywords: economic development policy, financial access, access to banking, financial monitoring, normative and reference information, bank clients, screen forms, automated financial monitoring system.

JEL Classification G14, G18, G21, O16, P17

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РОЗРОБЛЕННЯ ЕКРАННИХ ФОРМ КОРИСТУВАЧІВ АВТОМАТИЗОВАНОЇ ІНФОРМАЦІЙНОЇ СИСТЕМИ ФІНАНСОВОГО МОНІТОРИНГУ ДЛЯ ЕКОНОМІЧНОГО РОЗВИТКУ ТА ЕКОНОМІЧНОГО ЗРОСТАННЯ

Анотація. Процеси інтелектуалізацій та інформатизації суспільства зумовили необхідність розроблення та застосування екранних форм автоматизованих інформаційних систем у різних сферах суб'єктами національної економіки з метою її стабільного розвитку та економічного зростання. Присвячено розробленню екранних форм, які призначені для організації взаємодії між користувачами автоматизованої системи фінансового моніторингу та відповідними модулями перевірки фінансових трансакцій, внесення нормативно-довідкової інформації, роботи із змінною проміжною і змінною результативними, слугують точкою відліку для можливості проведення процедури симуляції автоматизованого фінансового моніторингу. Створені екранні форми за допомогою програми «Bizagi Studio» відображають прототип автоматизованої системи бізнес-процесу банку, що містить відповідні атрибути, які підлягають перевірці у процедурі фінансового моніторингу. Довідник «Клієнти банку» є ключовою формою. Для юридичних осіб створено довідник «Установчі документи». Фінансові документи фізичних осіб заносяться у відповідні форми («Фінансові документи», «Паспортні дані»). Усі операції клієнта генеруються в екранну форму «Масив трансакцій». Інформація щодо рахунків клієнта зберігається у відповідній формі «Рахунки клієнтів». Нормативно-довідкову інформацію щодо типів банківських продуктів заносять до довідника «Категорія продуктів», а щодо типів трансакцій — у довідник «Типи трансакцій», щодо типів клієнтів банку — у довідник «Типи клієнтів», щодо типів рахунків — у довідник з однойменною назвою. Також є можливість організації даних про валюти, з яким банк працює, у формі довідника «Валюти». Створені екранні форми для роботи із змінною проміжною

інформацією, у яку частину інформації заносять за допомогою розрахунків бізнес-логіки системи, а частину — за допомогою користувача, і змінною результативною, яка відображає результати перевірок, дозволили провести процедури симуляції з використанням автоматизованої системи фінансового моніторингу фінансових трансакцій клієнтів банку. Графічну карту бізнес-процесу створено у програмному продукті «Bizagi Studio» з використанням компоненти «Model Process».

Ключові слова: політика економічного розвитку, фінансовий доступ, доступ до банківської діяльності, фінансовий моніторинг, нормативно-довідкова інформація, клієнти банку, екранні форми, автоматизована система фінансового моніторингу.

Формул: 0; рис.: 13; табл.: 0; бібл.: 26.

Introduction. Three kits that determine the quality and efficiency of automated information system development are friendly user interface, flexibility and adaptability. User interface development is an integral part of the information systems design process, which should contain a graphical description of communication processes, areas of interaction between system users and automated information system modules using broad-based object-oriented programming languages (UML, IDEF0, IDEF3, DFD) [1—3] and screen forms that provide a dialogue between system users and the corresponding automated modules of the information system [4]. Software objects that allow the user to interact with the automated system in real time are screen forms. As a rule, the user enters information into them, and also by means of inquiries receives forms of the effective data which are partially not subject, or are not subject to editing by the user [5].

Research analysis and problem statement. The origins of publishing activity on the need to develop and use screen forms began in the late 20th century, due to the development of high-level object-oriented programming languages. Thus, the authors in their work [6] analyzed the decision-making processes of staff during the verification of application forms using the formal TYPAG method, which allows to identify frequent decision-making rules in the predictor data. The study is based on estimates of 331 real questionnaires compiled by staff of 23 German companies. Many works of scientists around the world is devoted to the use of screen forms in various fields, including financial and economic relations for accounting, auditing, marketing activities, integration into management decision support systems. 2,926 publications indexed by the Web of Science database in the last five years have been found for the screen forms application. The number of publications by industry in excess of 50 is presented in *Fig. 1*.

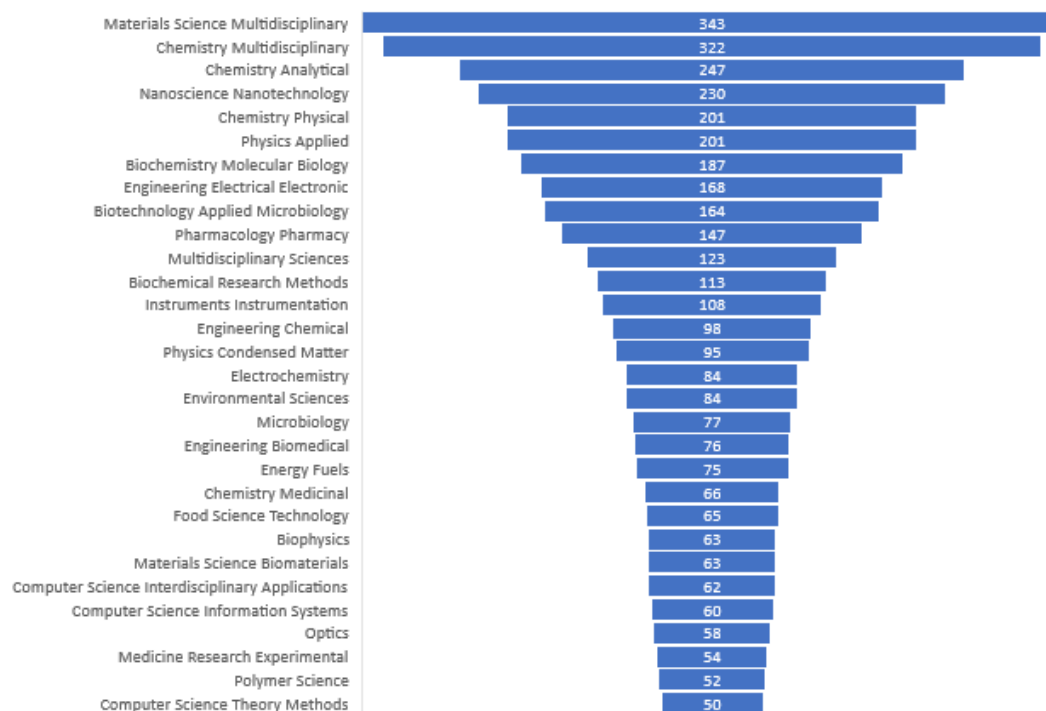


Fig. 1. Number of publications by category Web of Science

The results of the bibliometric analysis of the relevance of the study are presented in *Fig. 2*, which shows the names of scientists around the world who noted the content of the use of screen forms. *Fig. 2* is based on the first 1000 records of the array of the 2926 found over the past five years. Each work is marked with separate clusters, where the minimum number of authors is 2.

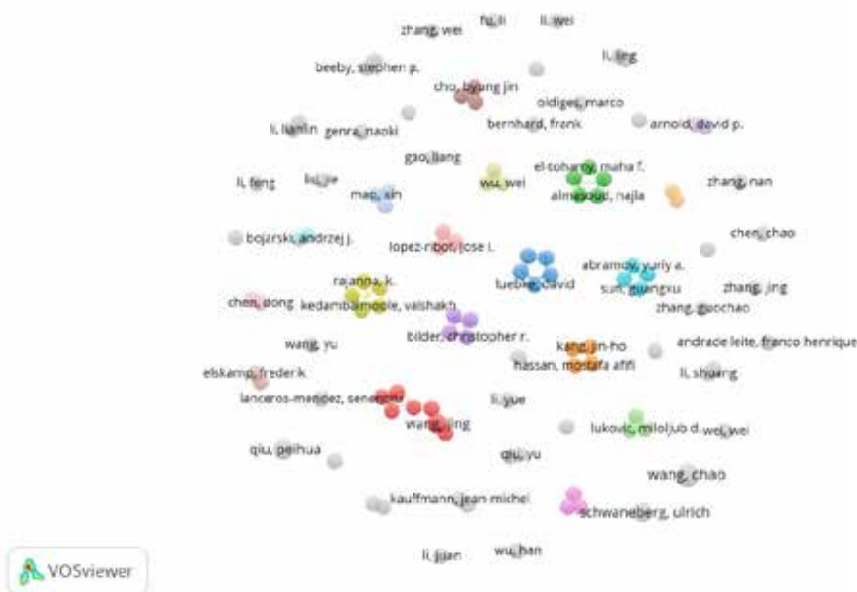


Fig. 2. Bibliometric analysis of publications using screen forms

Source: developed by the authors on the Web of Science data base and VOS viewer 1.6.15 tools.

Results. The development of screen forms of the main users of the system of the automated financial monitoring module was carried out in the software product «Bizagi Studio» using the component «Define Forms» [7].

As a result, screen forms were created for entering normative-reference information, work with variable-intermediate and variable effective. The key form is the Bank’s Clients directory, which is designed to collect a complete set of customer data (*Fig. 3*).

Fig. 3. Screen form of the directory «Bank customers»

Source: developed by authors.

As a rule, it is formed by the bank’s automated system. To implement the business process of automated monitoring, a prototype was formed with the attributes required in the verification process [8]. The form provides for the user to enter the following data: «ID_Client» (customer ID in the banking system); «Client_Name» (PIP of an individual or the name of a legal entity); «Client_Type» (client type — natural or legal person); «Contact_Mobile_Phone» (mobile number of the client or contact person); «Contact_E-Mail» (e-mail of the client or contact person); «Main_Account» (client’s main account number); «Card_Account» (customer’s card account number); «Credit_Account» (client’s credit account number); «Deposit_Account» (client’s deposit account number); «Currency_Account» (client’s currency account number); «Identification_Code» (individual tax number of the client); «Passport» (passport data of an individual client); «Financial_Statement» (financial documents of the client-legal entity); «Supporting_Documents» (constituent documents of the client-legal entity); «Client_History» (client history file); «Financial_Monitoring_History» (file with the client’s history of his transactions, which were subject to financial monitoring).

Separately, a directory «Constituent documents» is created for verification of legal entities, which uploads all the information related to the founding activities of the client (Fig. 4). That is, the form provides for the entry of the following data: «ID_Client» (customer ID in the banking system); «Charter» (statute of the legal entity); «Statutory_Agreement» (founding agreement); «Model_Charter» (model charter); «Decision_About_Creation» (decision on creation of a legal entity-enterprise); «Changes_To_Statutory_Documents» (changes to the statute of the legal entity); «Corporate_Agreement»; «Description_Of_Documents»; «Ownership_Structure» (ownership structure of the entrepreneur); «Decision_On_Election_Of_Officials» (decision on election of officials); «Regulation_On_Governing_Bodies» (regulations on governing bodies); «Appointment_Order» (appointment order); «Card_With_Sample_Signatures» (card with sample signatures and its compliance with the owners of the company); «Labor_Contract».

Fig. 4. Screen form of the guide «Constituent documents»

Source: developed by authors.

Fig. 5 shows the screen form for entering information about the financial documents of the client an individual [9]. The following data is entered: «ID_Client» (customer ID in the banking system); «Balance» (client’s balance sheet); «Transcript_Of_Balanc_Sheet_Items» (transcripts of

balance sheet lines); «Statement_Of_Financial_Performance» (report on financial results of the legal entity-client of the bank); «Declaration»; «Account_Statement» (statements from the client's accounts); «Certificate_Of_Debt» (reference to existing customer debts); «Certificate_Of_Cash_Flow» (information on the client's cash flow); «Agreements_With_Buyers» (agreements with buyers and the existence of receivables); «Certificate_Of_No_Debt» (certificate on absence of client's debt); «Income_Statement» (income statement); «Agreements_With_Suppliers» (agreements with suppliers and the existence of accounts payable); «Patents_Verification» (patents, licenses, permits, certificates, certificates); «Credit_Agreement» (credit agreements, guarantees, avals, letters of credit and loans); «Security_Agreements» (collateral agreements, pledges, mortgages); «Lease_Agreements» (lease agreements); «Reference-Explanation_Of_Losses» (explanation of the existence of losses of the legal entity-client); «Staff_Adequacy_Certificate».

ID_Client:	123		
Balance:	No files uploaded		
Transcript_Of_Balance_Sheet_Items:	No files uploaded	Declaration:	No files uploaded
Account_Statement:	No files uploaded	Certificate_Of_Debt:	No files uploaded
Certificate_Of_Cash_Flow:	No files uploaded	Agreements_With_Buyers:	No files uploaded
Certificate_Of_No_Debt:	No files uploaded	Income_Statement:	No files uploaded
Agreements_With_Suppliers:	No files uploaded	Patents_Licenses:	No files uploaded
Credit_Agreements:	No files uploaded	Statement_Of_Financial_Performance:	No files uploaded
Lease_Agreements:	No files uploaded	Staff_Adequacy_Certificate:	No files uploaded
Reference-Explanation_Of_Losses:	No files uploaded	Security_Agreements:	No files uploaded

Fig. 5. Screen form of the directory «Financial documents»

Source: developed by authors.

Fig. 6 shows the screen form for the user to enter information about the passport data of the client an individual. This process involves entering such data as: «ID_Client» (bank customer ID in the bank's automated information system); «Passport» (client's passport data: series, number, by whom, when issued, photocopies of the passport); «ID_Card» (identification card: series, number, by whom, when issued, photos of the card); «Place_Of_Residence» (photocopy of the passport page with the place of registration of the client); «ID_Tax_Payer_Card» (photocopy of the taxpayer's account record); «Unified_State_Register_Of_Entrepreneurs» (extract from the Unified State Register of Legal Entities, Individuals — Entrepreneurs and Public Associations).

The screenshot shows a web form with the following fields and values:

ID_Client:	123
Passport:	No files uploaded
ID_Card:	No files uploaded
Place_Of_Residence:	No files uploaded
ID_Tax_Payer_Card:	No files uploaded
Unified_State_Register_Of_Entrepreneurs:	No files uploaded

Fig. 6. Screen form of the directory «Passport data»

Source: developed by authors.

Fig. 7 shows the screen form of the transaction array. It is formed automatically by the system based on data entered by the client, and contains information on all operations of the client, as well as their main characteristics [10]. The following data will be entered: «ID_Client» (bank customer ID in the bank’s automated information system); «Data_Transaction» (date of the transaction by the bank’s client); «ID_Transaction» (transaction record code in the program database); «ID_Currency» (currency code in which the transaction was performed); «IP_Address_Transaction» (IP address of the device from which the transaction was performed); «Amount» (transaction amount); «Type_Transaction»; «Amount_Of_PDV» (amount including VAT); «PDV» (amount including VAT); «Transaction_Purpose» (purpose of the operation); «Cash» (cashless or not); «Counterparty_Account (IBAN)» (counterparty account number to or from which funds are transferred); «Remote_Service» (operation related to remote access or not).

The screenshot shows a web form with the following fields and values:

ID_Client:	123
Data_Transaction:	M/1/2020
ID_Transaction:	123
ID_Currency:	123
IP_Address_Transaction:	abc
Amount:	\$123
Type_Transaction:	
Amount_Of_PDV:	\$123
PDV:	<input checked="" type="radio"/> Yes <input type="radio"/> No
Transaction_Purpose:	abc
Cash:	<input checked="" type="radio"/> Yes <input type="radio"/> No
Counterparty_Account (IBAN):	123
Remote_Service:	<input checked="" type="radio"/> Yes <input type="radio"/> No

Fig. 7. Screen form of the array «Transactions»

Source: developed by authors.

The screen form of the directory «Customer accounts» is designed to store and maintain information about the accounts that the customer may have in this banking institution [12]. It states: «Client_ID» (bank customer ID in the bank’s automated information system); «Account_Type» (account type: basic, currency, etc.); «Account_Number» (customer account number, which will be used to further identify both the customer and his transactions) [13] (Fig. 8).

Client_ID:	123
Account_Type:	abc
Account_Number:	123

Fig. 8. Client Accounts Directory Screen Form

Source: developed by authors.

The directory «Product Category» (Fig. 9) is designed to store regulatory information on the type of products that the bank can offer to customers. It contains «Product_Category_ID» (identifier of the product category in the banking system); «Product_Category_Name» (decryption of the product category in the banking system); «Additional_Information».

Product_Category_ID:	123
Product_Category_Name:	abc
Additional_Information:	abc

Fig. 9. Product Category Guide Screen Form

Source: developed by authors.

The directory «Types of transactions» (Fig. 10) is designed to enter and store information on all types of transactions that can be performed by customers in this bank. It contains «Type_Transaction_ID» (identifier of types of transactions occurring in this bank in the automated banking system); «Type_Transaction_Name» (decryption of types of transactions occurring in this bank); «Additional_Information» (additional information on transaction types).

Type_Transaction_ID:	123
Type_Transaction_Name:	abc
Additional_Information:	abc

Fig. 10. Transaction types directory screen form

Source: developed by authors.

The «Customer Types» directory (Fig. 11) is designed to enter and store information on all types of customers that the bank may deal with. It contains «Type_Client_ID» (identifier of types of clients served in this bank in the automated banking system); «Type_Client_Name» (decryption of types of clients served in this bank); «Additional_Information» (additional information on customer types).

Type_Client_ID:	123
Type_Client_Name:	abc
Additional_Information:	abc

Fig. 11. Client Types screen form

Source: developed by authors.

The directory «Types of accounts» (*Fig. 12*) is designed to enter and store information on all types of accounts that the bank can open to the client. It contains «Account_Type_ID» (identifier of account types in the automated banking system) [15]; «Account_Type_Name» (deciphering the types of accounts that the bank can open to its own customers); «Additional_Information» (additional information on account types) [17].

Account_Type_ID:	123
Account_Type_Name:	abc
Additional_Information:	abc

Fig. 12. Screen form of the «Account types» directory

Source: developed by authors.

The «Currencies» directory (*Fig. 13*) is designed to enter and store information on all types of foreign currencies, transactions with which the bank can carry out [18]. It contains «Currency_ID» (currency identifier of the automated banking system); «Currency_Name» (decryption of names of currencies that the bank can open to its own clients); «Additional_Information».

Currency_ID:	123
Currency_Name:	abc
Additional_Information:	abc

Fig. 13. Currency directory screen form

Source: developed by authors.

Screen forms for working with variable-intermediate information were also created, in which part of the information is entered using the business logic calculations of the system [19; 21], and part with the help of the user, and the variable variable, which reflects the results of inspections. These forms are used in the prototype created by the authors of automated internal financial monitoring, which is carried out by its subjects — banks, to simulate the business process. The start of the business process simulation is carried out in the form of a request to identify the transaction and the client. The logic of all the following stages is presented in the sequence of the following actions [21]: initiation of the process of financial monitoring of the client's transaction; verification of the amount of the bank's financial transaction [22]; choice of client type («Individual» — for an individual, «Legal» — for a legal entity); verification of identification documents of the client — an individual; verification of financial and constituent documents of the client — legal entity; system notification on recording data on risky transaction [23]; checking the regularity of cash receipts and cash withdrawals from the client, checking the user's regularity of cash receipts; user check of regularity of money expenses; verification of the client's deposit funds; verification of the client's transaction for illegal spending of deposit funds; checking the client to avoid financial monitoring [24]; checking the status of the recipient; checking the client for payments for remote services; checking the client for royalty payments; verification of financial transactions for currency risks [25]; checking the client's credit transactions for the purchase of high value items [26]; verification of the IP address of the client who carries out the financial transaction; display of the form of results of the carried-out check of transactions for financial monitoring and definition of existence of risks on each criterion of check; display of the form for formation of letters and messages on the results of financial monitoring; formation of letters to the client, on the transaction of which a negative conclusion was made on the results of financial monitoring; notification of a financial transaction; filling in the form of the letter-notification on freezing/thawing of the client's assets; completion of the process of internal verification of transactions for the risks of money laundering and terrorist financing.

Conclusion. Developed screen forms using modern software allowed to implement a prototype of an automated system of financial monitoring of financial transactions of bank customers and to carry out the procedure of financial monitoring simulation with detailed analysis of all stages of business process, considering regulatory information, certain internal banking and international organizations. The obtained results can be used by the financial monitoring services of economic agents to strengthen their system of protection against criminal money laundering, prevent the risks of their legalization and counter the financing of terrorism.

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