UNIVERSITY OF NATIONAL AND WORLD ECONOMY

INTERNATIONAL CONFERENCE ON APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGY AND STATISTICS IN ECONOMY AND EDUCATION

(ICAICTSEE-2012)

OCTOBER 5 - 6th, 2012
UNIVERSITY OF NATIONAL AND WORLD ECONOMY
SOFIA, BULGARIA

CONFERENCE PROCEEDINGS
dWare    Microsoft
ICAICTSEE-2012 PROGRAM COMMITTEES

CONFERENCE CHAIR

Dimiter G. Velev  
University of National and World Economy  
Bulgaria

PROGRAM COMMITTEE

Evangelii Andronov  
University of National and World Economy  
Bulgaria
César Correa Arias  
Universidad de Guadalajara  
Mexico
Sajj Baby  
GEO Environmental Consultation  
Kuwait
Venelin Boshnakov  
University of National and World Economy  
Bulgaria
Donald T. Chang  
Metropolitan State College of Denver  
USA
Sonia Chipeva  
University of National and World Economy  
Bulgaria
Sérgio Manuel Serra da Cruz  
Universidade Federal Rural do Rio de Janeiro  
Brazil
Vladimir Dimitrov  
Sofia State University  
Bulgaria
Cascini Gaetano  
Politecnico di Milano  
Italy
Valentin Goev  
University of National and World Economy  
Bulgaria
Christopher Khoo Soo Guan  
Nanyang Technological University  
Singapore
James K. Ho  
University of Illinois at Chicago  
USA
Aytekin Isman  
Sakarya University  
Turkey
Sergey Ivanov  
University of the District of Columbia, Washington, DC  
USA
Masayasu Kanno  
Kanagawa University  
Japan
Madjid Malikovich Karimov  
Tashkent University of Information Technologies  
Uzbekistan
Hee Dong Kim  
Hankuk University of Foreign Studies  
S.Korea
Valentin Kisimov  
University of National and World Economy  
Bulgaria
Oleksiy E. Kovalenko  
Institute of Mathematical Machines and Systems Problems, NASU  
Ukraine
Ronald S. Laura  
University of Newcastle  
Australia
Patrick Letouze  
Universidade Federal do Tocantins  
Brazil
Havar Amir oglu Mammadov  
Azerbaijan Technical University  
Azerbaijan
A.K.Mishra  
Motilal Nehru National Institute of Technology  
India
Alexander N. Moiseev  
Tomsk State University  
Russia
Balakrishnan Muniandy  
Universiti Sains Malaysia  
Malaysia
Valentin V. Nechaev  
Moscow State Institute of Radiotechnics, Electronics and Automatics  
Russia
Serghei Ohrimenco
Laboratory of Information Security, AESM
Moldova

Veska Pavlova
University of National and World Economy
Bulgaria

David Nadler Prata
Universidade Federal do Tocantins
Brazil

A. M. Rawani
National Institute of Technology
India

Santhidran Sinnapban
University Tunku Adbul Rahman
Malaysia

Kamelia Stefanova
University of National and World Economy
Bulgaria

Dimiter G. Velev
University of National and World Economy
Bulgaria

A.F. Verlan
Pukhov Institute for Modelling in Energy Engineering, NASU
Ukraine

Parviz Ali-Zade
OKAN University
Turkey

LOCAL ORGANIZING COMMITTEE

Emil Denchev
University of National and World Economy
Bulgaria

Rosen Kirilov
University of National and World Economy
Bulgaria

Vania Lazarova
University of National and World Economy
Bulgaria

Alexandrina Murgeva
University of National and World Economy
Bulgaria

Monika Tzaneva
University of National and World Economy
Bulgaria

Ilko Velikov
University of National and World Economy
Bulgaria
## CONTENTS

**FORWARD**

15

**dWare OS**

17

Damian Ivanov  
*President of dWare Ltd*

**APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGY IN DEVELOPMENT OF E-EDUCATION**

19  
H. Mammadov, M. Babanli, Z. Jafarov, A. Suleymanov  
*Azerbaijan Technical University, Azerbaijan*

**FUNCTIONAL DESIGN OF THE CONTROL OF KNOWLEDGE ON BASE OF FUZZY LOGIC**

24  
H. Mammadov, S. Shahbazova, M. Babanli  
*Azerbaijan Technical University, Azerbaijan*

**REPORTING A CODE REFACTORING AND EVOLUTION OF AN ACADEMIC PROJECT MANAGEMENT WEB SYSTEM**

31  
Fernando Chagas, Glaubos Climaco, Mariwaldo G. Caetano, Ary H. M. de Oliveira, Patrick Letouze  
*Universidade Federal do Tocantins, Brazil*

**ORGANIZATION OF AN INTEGRATED SYSTEM OF INFORMATION SECURITY IN INFORMATION AND COMMUNICATION SYSTEMS**

39  
A.F. Verlan, M.M. Karimov, S.K. Ganiev, K.A. Tashev  
*Tashkent University of Information Technology, Uzbekistan*

**INFORMATION DISPLAY MANAGEMENT IN AUTOMATED SYSTEMS**

47  
A.F. Verlan, Yu.O. Furtat  
*G.E. Pukhov's IMPE NAS of Ukraine, Ukraine*  
Dimitr G. Velev  
*Dept. of Information Technology and Communications, UNWE*

**SYSTEM OF MONITORING SECURITY IN INFORMATION AND COMMUNICATION SYSTEM**

54  
Madjit Karimov, Miraziz Sagatov, Abdukhalil Ganiev  
Dilmurod Abdullaev  
*Tashkent University of Information Technology, Uzbekistan*
CONSTRUCTING THE DEFINITION OF THE CONCEPT OF "INFORMATION" 63
Oleg V. Malyshev
Institute of Mathematical Machines and Systems, NAS of Ukraine

INVESTIGATION OF THE HIGH INTENSIVE MARKOV-MODULATED POISSON PROCESS 72
Alexander Moiseev, Anatoly Nazarov
Tomsk State University, Russian Federation

MODELING OF INSURANCE COMPANY AS INFINITE-SERVERS QUEUING SYSTEM 78
Alexander Moiseev, Svetlana Moiseeva
Tomsk State University, Russian Federation

ASYMPTOTICAL RESEARCH OF THE OUTPUT PROCESS OF BMAP[M] QUEUE 84
Ivan Lapatin, Svetlana Lopukhova
Tomsk State University, Russian Federation

MODEL SUPPORT FOR INFORMATION SEARCH AT THE ONTOLOGY-ORIENTED PORTAL 88
F. Verlan, O. Oletsky
Kyiv-Mohyla Academy, Ukraine

QUASI-SMART CONSTRUCTION SYNCHRONOUS MACHINE WORKING WITH EXTENSIVE CYCLING LOAD 93
OKAN University, Electrical and Electronics Engineering Department, Istanbul, Turkey

THE SEARCH FOR ADAPTIVE METHODS FILTERING OUT HIGH-NOISES AND THEIR APPLICATION ON OIL COMPLEXES' CONTROL TELEMETRY SYSTEMS 102
OKAN University, Electrical and Electronics Engineering Department, Istanbul, Turkey

TECHNOLOGICAL PROTOTYPE OF THE NATIONAL WETLANDS INVENTORY - A MULTIDISCIPLINARY DEVELOPMENT 118
Lucia Patricia Carrillo Velázquez
INTERNATIONAL CONFERENCE ON APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGY AND STATISTICS IN ECONOMY AND EDUCATION (ICAICTSEE—2012), OCTOBER 5-6TH, 2012, UNWE, SOFIA, BULGARIA

Universidad Nacional Autónoma de México, Mexico

AGENTS KNOWLEDGE MODELS FOR SITUATION MANAGEMENT SYSTEMS
Oleksiy Kovalenko
Institute of Mathematical Machines and Systems, NAS of Ukraine, Ukraine

INTEGRATION OF INFORMATION SERVICES IN AGENT-ORIENTED SITUATION MANAGEMENT SYSTEM
Oleksiy E. Kovalenko
Institute of Mathematical Machines and Systems, NAS of Ukraine, Ukraine
Dimitar G. Velev
Dept. of Information Technology and Communications, UNWE

COMPARATIVE REVIEW OF THE CRM SOFTWARE'S SOLUTIONS AND DIRECTION OF FUTURE DEVELOPMENT
Pedja Milosavljevic, Milena Todorovic, Dragan Pavlovic
Faculty of Mechanical Engineering, University of Nis, Serbia

PROBLEMS OF SMALL PASSING EXAMS AT FACULTY OF MECHANICAL AND ELECTRONIC ENGINEERING
Pedja Milosavljevic, Milena Todorovic, Miroslav Milovanovic, Dragan Pavlovic
Faculty of Mechanical Engineering, University of Nis, Serbia

FACEBOOK AND TWITTER A PLATFORM TO ENGAGE IN POSITIVE LANGUAGE LEARNING
Saraswathy Thurairaj, Swagata Sinha Roy, Kavitha Subaramaniam
Universiti Tun Abdul Rahman, Petaling Jaya, Selangor, Malaysia

PRICE POLICY MODEL AT THE MODERN SHADOW MARKET OF INFORMATION TECHNOLOGIES
Sergei Ohrimenco, Agop Sarkisian, Grigory Borta
Academy of Economic Studies of Moldova, Moldova

AUTOMATION OF THE SYSTEM OF INTERNAL CONTROL - REASONABLENESS OF THE SOLUTION
Lilia Pavlova
Academy of Economic Studies of Moldova, Moldova
RISK BASED SOFTWARE TESTING 182
Oxana Storozh
Academy of Economic Studies of Moldova, Moldova

PRIMARY STUDY ON THE RELATIONSHIP OF INCOME DISTRIBUTION AND ECONOMIC GROWTH 187
Shi Yizhe
Sofia University “St. Kliment Ohridski”, Bulgaria

THE ANALYSIS OF INFLUENCE OF FDI ON INCOME DISTRIBUTION BASED ON SPECIFIC FACTOR MODEL 195
Shi Yizhe
Sofia University “St. Kliment Ohridski”, Bulgaria

REQUIREMENTS FOR BUSINESS INTELLIGENT PROJECT DEVELOPMENT 202
Kamelia Stefanova, Dorina Kabakchieva
Dept. of Information Technology and Communications, UNWE

APPLYING DATA MINING METHODS AND TECHNIQUES FOR STUDENT DATA ANALYSIS 208
Dorina Kabakchieva, Kamelia Stefanova
Dept. of Information Technology and Communications, UNWE

E-GOVERNMENT IN THE PUBLIC SECTOR - CHALLENGES AND PARADOXES 216
Rosen Kirilov
Dept. of Information Technology and Communications, UNWE

ANALYSIS OF CONFLICTS DURING THE INTEGRATION OF HETEROGENEOUS MULTI-DIMENSIONAL DATA MARTS 220
Alexandrina Murdjeva, Geno Stefanov
Dept. of Information Technology and Communications, UNWE

TESTING THE VOLUME AND QUERY PERFORMANCE IN RELATIONAL DATABASES IN CASE OF USING NATURAL OR NON-NATURAL KEYS 227
M. Radoev
Dept. of Information Technology and Communications, UNWE

OPPORTUNITIES TO INTEGRATE TECHNOLOGY INCOMPATIBLE BUSINESS APPLICATIONS 232
M. Tzaneva, S.Kouzmanov
Dept. of Information Technology and Communications, UNWE
INFORMATION SYSTEM FOR TAGGING, INDEXING AND SEARCH OF UNSTRUCTURED DATA
Maria Marzovanova, Teodora Tsойkova, Valentin Kisimov
Dept. of Information Technology and Communications, UNWE

ARCHITECTURE OF A BUSINESS INTELLIGENT SYSTEM FOR MONITORING THE PRESENT AND THE FUTURE STATE OF A DATABASE
Veska Mihova, Alexandrina Murdjeva
Dept. of Information Technology and Communications, UNWE

METADATA FOR GENERATING A SPECIFIC DATA WAREHOUSE
Veska Mihova, Alexandrina Murdjeva
Dept. of Information Technology and Communications, UNWE

STRUCTURED INTEGRATION APPROACH BASED ON LEVELS OF REUSABILITY
S. Kouzmanov, M. Tzaneva
Dept. of Information Technology and Communications, UNWE

INFORMATION ASPECTS OF LOCAL ADMINISTRATIVE POLICY
Katya Strahilova
Dept. of Public Administration, UNWE

METHODOLOGICAL ISSUES OF DYNAMISING DATABASE STRUCTURE IN MUNICIPALITIES
Plamen Milev
Dept. of Information Technology and Communications, UNWE

DEVELOPMENT OF METHODOLOGY FOR MEASURING THE ECONOMIC IMPACT OF ERP SYSTEMS IN SMALL AND MEDIUM ENTERPRISES
Natalia Futekova
Dept. of Information Technology and Communications, UNWE

MODEL OF INTELLIGENT SYSTEM FOR USER ACTIVITY MONITORING WITH DYNAMIC BEHAVIOR PROFILES
Anton Palazov
Dept. of Information Technology and Communications, UNWE

LOW-BENEFIT ANALYSES AS A MANAGERIAL ASPECT OF BI IMPLEMENTATION
Ivan Andonov
Dept. of Information Technology and Communications, UNWE
FORMULATION OF CRITERIA FOR COMPARISON AND ANALYSIS OF ANALYTICAL APPLICATIONS WHICH WORK IN REAL TIME
Mihail Konchev
Dept. of Information Technology and Communications, UNWE

PERFORMANCE BOTTLENECKS OF AN EDUCATIONAL SOCIAL NETWORK BUILT WITH ELGG
Venko Andonov
Dept. of Information Technology and Communications, UNWE

"CLOUD" BUSINESS OPPORTUNITIES FOR MOBILE DEVICES
Emil Denchev
Dept. of Information Technology and Communications, UNWE

MANAGEMENT INFORMATION SYSTEM IN BANKING SECTOR AS A PART OF CLOUD COMPUTING PLATFORMS
Silvia Trifonova
UNWE, Bulgaria

CLOUD COMPUTING STATISTICS AND LIKELY-HOOD-BASED DATA ANALYSIS OF INDIVIDUAL ALTERNATIVE TESTS WITH A SPHYGMOMANOMETER
Lubomir Lahtchev
ISER – BAS

CLOUD COMPUTING IN ENTERPRISE CONTENT MANAGEMENT
Veselin Popov, Angelin Lallev
D.A. Tsenov Academy of Economics, Bulgaria

MULTITENANCY IN CLOUD COMPUTING
Vanya Lazarova
Dept. of Information Technology and Communications, UNWE

CLOUD BUSINESS INTELLIGENCE SERVICES FOR SMALL BUSINESS
Anna Yordanova
Dept. of Information Technology and Communications, UNWE

WEB 2.0 AND BUSINESS PROCESS MANAGEMENT
Violeta Kraeva, Petja Emilova
D.A. Tsenov Academy of Economics, Bulgaria
TRENDS IN THE USE OF WEB SERVER SOFTWARE IN BULGARIAN BANKS
Pavel Petrov
*Faculty of Informatics, University of Economics - Varna*

EVOLUTION OF RELATIONAL DATA MODEL
Vladimir Dimitrov
*University of Sofia, Bulgaria*

FINITE STATE AUTOMATA SEMANTICS IN COMMUNICATING SEQUENTIAL PROCESSES
Vladimir Dimitrov
*University of Sofia, Bulgaria*

ASSESSING OF RISK OBJECTS
Juliana Karakaneva, Katya Petrova
*Bulgaria*

EXPOSING THE INTELLECTUAL ASSETS OF A UNIVERSITY DEPARTMENT
Juliana Peneva, Stanislav Ivanov
*Dept. of Informatics, New Bulgarian University*

SYSTEM FOR MONITORING OF THE UNIVERSITY COMPUTER NETWORK PERFORMANCE
Dimitar Dimitrov
*Todor Kableshkov University of Transport, Bulgaria*

UTILITY COMPANY ILLEGAL CONSUMERS CONSUMPTION PATTERNS
Andrey Bachvarov, Petko Ruskov, Kaloyan Haralampiev, Stefan Apostolov
*Balkans Investment Consulting Agency Ltd., Sofia University, CEZ Bulgaria*

ADVANTAGES OF MEASUREMENT SYSTEMS, BASED ON DIGITAL SENSORS TO ESTIMATE THE REAL EFFECT GIVEN OF AN ENERGY SAVING PROJECT APPLICATION
Hristo Dinkov, Nanko Bozukov, Ivan Gaytandzhiev, Marko Dimitrov
*University of Food Technology*

DATA AND METHODS FOR MEASUREMENT OF ENERGY SAVINGS
Nanko Bozukov, Marko Dimitrov, Hristo Dinkov, Ivan Gaitandjiev
*University of Food Technology*
STATISTIC AND LIKELY-HOOD-BASED EDUCATIVE DATA ANALYSIS FROM INDIVIDUAL TESTS ON ALTERNATIVE PARTS OF THE ARM WITH A NON-INVASIVE BLOOD PRESSURE MEASUREMENT DEVICE

Lubomir Lahtchev
ISER – BAS

IMPLEMENTATION OF WEB-BASED SYSTEM FOR SHORT-TERM FORECASTING OF ENERGY CONSUMPTION

Silyan Arsov, Kiril Sirakov, Denislav Arsov
University of Russe, Bulgaria

LATTICE-BASED CRYPTOGRAPHIC ALGORITHMS AND THEIR APPLICATIONS IN PROTECTION OF BUSINESS-RELATED DATA PROCESSING

Angelina Lalev
D.A. Tsenov Academy of Economics, Bulgaria

ANALYSIS OF A STEGANOGRAPHIC METHOD FOR HIDING AN IMAGE INTO COVER IMAGES USING MATLAB AND IMAGE PROCESSING TOOLBOX

Adriana Borodzhieva
Dept. of Telecommunications, University of Russe

SOFTWARE TOOL FOR IMPLEMENTING ENCRYPTION AND DECRYPTION PROCESSES USING CLASSICAL CIPHERS

Adriana Borodzhieva
Dept. of Telecommunications, University of Russe

TECHNICAL ENHANCED PERSONALIZED EDUCATION

Valentina Terzieva, Petia Kademova-Katzarova
Rumen Andreev
Institute of Information and Communication Technologies, Bulgarian Academy of Sciences

SOME SIMULATION MODELS OF PROCESS' SYNCHRONIZATION FOR EDUCATIONAL PURPOSE

Svetlana Vasileva, Konstantin Kapinchev
Shumen University „Bishop Konstantin Preslavski“, College – Dobrich, Bulgaria

GEONFORMATIONAL EDUCATION IN SOUTH-WESTERN UNIVERSITY - BLAGOEVGRAD

Galina Bezinska
South-Western University, Blagoevgrad, Bulgaria
MODEL FOR INFORMATION SECURITY AND ANALYSES IN INFORMATION SYSTEM
Nedko Tagarev
Dept. of National and Regional Defence, UNWE

IT-NOVATIONS AND MONETARY POLICY
Venelina G. Trifonova
UNWE, Bulgaria

APPLYING THE INFORMATION TECHNOLOGIES IN THE FINANCIAL AND BUSINESS ANALYSIS OF SMALL AND MEDIUM SIZE ENTERPRISES’ BUSINESS IN BULGARIA – PROBLEMS AND PERSPECTIVES
Rositza Ivanova
Dept. of Accounting and Analysis, UNWE

EFFECTS OF THE GLOBAL INTERNET SPACE ON CULTURAL IDENTITY
Tanya Parusheva
Dept. of Tourism, UNWE

THE CHANGES IN LEISURE CONSUMPTION INDUCED BY THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY
Maia Tzoklinova
Dept. of Tourism, UNWE

INTELLIGENT GROWTH - AN UNTAPPED OPPORTUNITY FOR BULGARIAN BUSINESS ORGANIZATIONS
Tsvetana Stoyanova
Dept. of Management, UNWE

TECHNOLOGICAL CHALLENGES FACED BY THE ORGANIZATION OF ACCOUNTING
Borislav Boyanov
Dept. of Accounting and Analysis, UNWE

BUSINESS DOWNTIME AND ITS IMPACT ON THE BUSINESS ORGANIZATIONS
Asen Bozhikov
D. A. Tsenov Academy of Economics, Bulgaria
DEVELOPING MARKETING STRATEGIES WITH A MARKETING SIMULATION TOOL IN A MASTER’S IT CLASS
Vanya Slantcheva-Baneva
College of Management, Trade and Marketing – Sofia

COMPARATIVE ESTIMATE OF THE SET OF FORMULAS FOR STRATIFIED REPRESENTATIVE SAMPLES
Andreana Stoykova-Kanalieva
Dept. of Statistics and Econometrics, UNWE

SOME APPLICATIONS OF NONPARAMETRIC TESTS ON SURVEY DATA
Ekaterina Tosheva
Dept. of Statistics and Econometrics, UNWE

ACCESS OF THE MAIN SOCIAL GROUPS IN BULGARIA TO THE MODERN COMPUTER AND COMMUNICATION TECHNOLOGIES AND SERVICES
Silviya Nikolova
Dept. of Statistics and Econometrics, UNWE

USING SOFTWARE TOOLS FOR ESTIMATION OF MONTHLY UNEMPLOYMENT RATES IN BULGARIA
Alexander Naidenov
Dept. of Statistics and Econometrics, UNWE

SYNERGETIC APPROACH TO ECONOMIC MODELS
Kostadin Sheyretski
Dept. of Mathematics, UNWE

THE USAGE OF MS EXCEL IN MATHEMATICS EDUCATION AND LINEAR PROGRAMMING
Miroslava Ivanova, Petq Valcheva
Dept. Of Mathematics, UNWE

ASPECTS OF INFORMATION SECURITY ACCORDING TO THE GROUP OF STANDARDS ISO 27 AND CRYPTOGRAPHY PROTOCOLS
Maria Nenova, Dessislava Georgieva, Vesselin Gueorguiev, Ivan Evgeniev
TU - Sofia, New Bulgarian University - Sofia

A CRM SYSTEM COMPATIBLE MODEL OF CORPORATE SUSTAINABILITY
Georgi Zabunov, UNWE, Bulgaria,
Plamen Zlateva, ISER - BAS
Automation of the system of internal control - reasonableness of the solution

Lilia Pavlova
Academy of Economic Studies of Moldova, “IT&IS Management” SRL, Republic of Moldova, Analyst of Business Process and Information Technology
wiz_lilia@mail.ru, liliapavel@gmail.com

Abstract. This article addresses the issue of internal control and expediency automation of system of internal control. It is realized the analysis of options for building an automated system of internal control, including the most popular information systems. The paper evaluated the difficulties that may arise in the process of automation, and also highlights factors that should be paid special attention in selecting solutions for automation of the internal control. At the end of are marked benefits of the implementation of information systems of internal control.

Keywords: automation, internal control, risk management, monitoring.

Internal control is always present in activity of companies, often informally and unconsciously. The increasing complexity of management in companies led to a complication of internal control and the fall of its effectiveness using informal or poorly organized approach.

Inspection and testing of controls, formation reporting on internal control is labor-intensive processes, which are time-consuming. Documented and implemented approach to organization of internal control system can be optimized to reduce time spent on repetitive tasks.

The internal control system is most effective when the control is built into the infrastructure of the company and is part of its core business. Execution of actions, provided by the system of internal control, ensures that all transactions are recorded in accordance with the requirements. Development of the system of internal control includes the performance of action for integrating the components of internal control in all business processes related to financial reporting, operation activity, training, asset management and the use of automated systems.

Information technology is a critical element in supporting reliable and effective system of internal control, taking into account the quickly cost recovery on information systems and equipment, as well as the costs and risks related to failure to automate control procedures.

Automation of internal control - is a phenomenon, that gaining more popularity in modern market and providing a business efficiency. It should be noted that automation of internal control does not resolve organizational problems, but is only a tool to reduce labor costs.
Necessity of automation caused by the fact that to satisfy the requirements of COSO (The Committee of Sponsoring Organizations of the Treadway Commission) need to control the risks of all business processes, which is very time-consuming and expensive to do without the implementation and use of integrated information systems for management and control. Automated system should provide assistance in monitoring the changes of the control environment, analysis and evaluation of internal control.

The competent automation system of internal control allows you to effectively manage risks of the company and control them. This process involves the creation of the logical and the information structure for risk management, and only then automation. Note the following options for the construction of an automated system of internal control:

- development and design own system - independent automation, or attraction to this process of third-party developers;
- implementation of existing solutions to automate the systems of internal control;
- building on the existing integrated information system.

Should take into account that every company has historically set of various systems and applications. This factor must be taken into account, not only in creation of a common information space, but also in the automation of internal controls. In choosing solutions for the automation of internal controls is necessary to generate functional requirements for the system, the package of general and technical requirements, security and monitoring requirements, requirements for integration and interoperability with existing IT infrastructure of the company.

There are many opportunities and solutions for the automation of internal controls. These opportunities can vary depending on the analysis tools, on the implementation of flexible solution and continuous monitoring, implementation of complex integrated systems, and that much important - return on investment.

Among the most popular solutions for automation systems of internal control are:

- Microsoft Office Solution Accelerator for Sarbanes-Oxley (MOSASO), operates on a technological platform of Microsoft;
- modulus of Oracle Internal Controls Manager, part of the Oracle E-Business Suite. Module integrates into a single system components of internal control, which are responsible for documentation, testing, and monitoring of internal controls and compliance with legal requirements;
- the solution of SAP Management of Internal Controls, representing a logical combination of different mechanisms SAP to build an automated system of internal controls;
- the solution of Workplace for Business Controls and Reporting, IBM, allowing company to optimize the control of financial indicators. This solution increases the transparency of the systems of internal control and business processes, allowing companies to more accurately comply with all legal requirements;
- solution Microsoft SharePoint Portal Server, directed at implementation of the law Sarbanes-Oxley, by creating single information space, workflow and tools for monitoring and control;
- solution Sarbanes-Oxley Corporate Assessment Accelerator, developed by Mercury, allows directories of business processes, control objectives, risks, control procedures to reduce the risks of misstatement of the financial reporting and to create different types of reports;
• solution Compliance's Internal Control Management (ICM) provides automation and risk management in the company, control and analysis of compliance. Structure of reduction the cost of implementation of the system of internal control and improving the effectiveness of controls with reflection of return on investment is shown in Fig. 1.

**Direction of Reducing the Cost of Control**

| Automation of System of Internal Control | Organization of System of Internal Control | Assurance Requirements of the Sarbanes-Oxley Act | Internal Audit |

**Directions of Increasing Efficiency of Control Mechanism**

Fig. 1. Direction of increasing the effectiveness of controls.

Necessary to note that the automation of control mechanisms will not only reduce labor costs and the cost of time, quickly analyze and assess the current and potential risks, but will also provide the company's management and reliable information in real time about the state of the system of internal control.

It should be noted that the choice between manual and automated control procedures are preferred automation, due to the fact that this type of control is more effective and efficient, less susceptible to manipulation and reduce the likelihood of errors, independent of human factors.

According to the report about of investigation «Thinking outside the SOX box» of "Ernst & Young", in April 2011, only 3% percent of managers to fully automate most of the key control functions. Over a third of managers noted the use of more than 1,000 controls, and 21% on an ongoing basis using advanced information technologies for the analysis and coordination of activities to ensure compliance with the Sarbanes-Oxley Act.

In process of the automation of systems of internal control may encounter the following difficulties:

- the need to build a conceptual model of internal control in conjunction with the development of technical specifications for the information system;
- consolidation of indicators of the effectiveness of internal controls for the companies having branch network, build related reporting;
- lack of skills, experience and knowledge of the staff in the company in the domain of internal control for participation in the project of automation;
the need for employees to rethink their activities in terms of risk and implementation.

Automated system of internal control and risk management must include an element of modeling of processes or integrated with the system of business process simulation. This factor will allow to analyze changes in the business processes of the company and to evaluate emerging risks, the need to change the control and monitoring procedures. It is important to ensure ongoing control and monitoring of the execution of control procedures not only automated, but manual.

Automated system of internal control should combine into one system all the components of internal control, such as documentation, monitoring, testing, assessment and reporting, provide the ability to actively monitor the internal control processes of business in real time, and to promptly report about the state of the system of internal control and the need for corrective action to correct deficiencies.

In selecting solutions for the automation system of internal controls must take into account the following factors:
- the ability to integrate with existing in company systems and applications;
- scalability and flexibility;
- efficiency of information exchange;
- simplicity to use;
- visibility of results;
- versatility as applicable to their system of performance, control, planning;
- reducing the cost of controls and eliminating duplication.

Automation of monitoring of internal controls provides efficiency and improved IT management, allowing you to more effectively analyze user behavior in the IT infrastructure, to monitor any changes, to ensure compliance with information security requirements, to control violations and generate the appropriate reports. Automation of processes of testing network equipment for compliance with approved policies also can significantly increase the overall level of information security and the effectiveness of control.

Process of automation of internal controls should provide the following capabilities:
- analysis of the completeness of control and benchmarking in business processes;
- capacity planning and test management of controls;
- optimization of workflow and centralized access to all documents;
- use of effective analytical tools and techniques for early warning for risk management;
- ensuring with more accurate information;
- monitoring of access to data to ensure control over leakage and distortion of data;
- improving the exchange of information about the risks and the critical parameters of the company's activity;
- formation of different statements relating to internal control, using powerful analytical tools and convenient tools;
- ensuring transparency of corporate processes, reporting, risk management and system of internal control.

Application of an automated approach to internal control provides senior management an adequate tool for the analysis and evaluation of factors that may affect the reliability of financial reporting, effectiveness and efficiency of operations, compliance with laws.
Optimization of internal control determines the motion of company from management issues of the actual results to preventive management, providing information in real time and providing continuously monitor the state of control procedures thus preventing possible problems.

Automation of internal control is the key to achieving the highest level of maturity of the system of internal control. This process aims at improving the effectiveness of control procedures and their monitoring in carrying out of business processes.

References
3. Ernst & Young: Thinking outside the SOX box. 2011;
5. Ernst & Young: Significant opportunities for improvements in the field of compliance with the requirements of the Sarbanes-Oxley Act. 2 September 2011.