Simulated company as validation environment for the design methods and algorithms of informatics systems meant for the business environment

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Abstract: - The paper presents a method of validation of the informatics systems designed for the business environment, through their implementation and use in an exercise company. As opposed to the audit of administration informatics systems or the well-known software testing methods, the method we propose evaluates the manner in which the software applications adapt to the integral pass through an information processing flow, corresponding to some basic functions of the company (supply, production, distribution, etc.). In this manner we obtain complete and good quality results, at reduced costs of the evaluation process.

Key-Words: - Development informatics systems for business, Simulated company, Software testing.

1 Introduction

Both during the development of an informatics system, and especially after it has been elaborated, the control of its performances represents a high importance activity [1].

The system is a group of interconnected elements which interact for a purpose: human resources, hardware, software and data [2].

The model is a representation of a group of objects in a different form than that of the objects themselves. The models used in the informatics systems designed for the business environment have the following structure [3]:

- Introduction of data – which allow the users of the model to introduce the information;
- A logical sequence – in which there is the specification how the information introduced are transformed in result information;
- Report generation – which allows the user to arrange the processed information under the most useful form.

Simulation is the process through which a real system is conceived and experiments are made with that model for the purpose of understanding the functioning of the system and/or the evaluation of the different functioning strategies (Fig. 1) [4].

Fig.1 The place of simulation in system analysis

The simulated company can be defined as a practical preparation instrument in the field of informational process which uses procedures and means identical with those from the real company, with the exception of money and products, which are simulated.

The simulated company, before being a very well-endowed laboratory, is a pulse, a live organism, a concept which modifies the traditional instruction system.

The simulated company is built based on the IT systems, which facilitates fast data transfers,
reduced costs and coordination without geographical or temporal limits.
The flexibility of the simulated companies refers to the possibility of redefining the purposes and fast and competitive configuration of resources for a fast answer to the market opportunities.

2 Problem Formulation

The activities within an informatics system refer to processing the information and include:
- Introduction of data;
- Process of data for obtaining information;
- Exist of informational procedures;
- Preservation of information resources;
- Control of system performances.

Control of the informatics system performance takes into consideration the following aspects:
- An informatics system produces a response that refers to the entrances, processes and assets as well as to the storage activity;
- The systematic response must always be monitored and evaluated to determine if the system meets the purpose through its performances;
- Evaluation will be used to make adjustments in the activity of the system for the purpose of eliminating faults.

At the evaluation of an informatics system for the business environment, the main objective categories take into consideration:
- Examination of the functionality: through which it is ensured that the applications are stable and function correctly from the point of view of the developer;
- Validation of the utility: has as a purpose the acceptance from the beneficiary, respectively it ensures that the applications meet the requirements of the user.

2.1 Methods used in the present paper

2.1.1 Audit of the financial administration informatics systems

According to standard IFAC-IAPS 1008, audit in informational system consists in:
- Control of management of informatics system, within which the following are identified, evaluated and tested:
  - Organization of informatics system;
  - Design and implementation of the informatics system;
  - Procedures and operations from the system;
  - Organization and security of system;
- Ensure the quality of the system.
- Control of the informatics applications – the following are identified, evaluated and tested:
  - Integrity of data in the system (authenticity, accuracy, integrity);
  - Realization of transactions;
  - Exists of the system.

Audit techniques of the informatics systems are:
- Investigation techniques of the audited system:
  - interview;
  - questionnaire;
  - informational flowcharts (flowchart).
- Risk identification and evaluation techniques:
  - intuitive approach;
  - technique of scores;
  - quantitative method.
- Control testing techniques from the audited system:
  - accordance tests;
  - integrity tests;
  - test data technique;
  - integrated test technique;
  - parallel simulation.

Principles and architecture of the work frame COBIT (Control OBjectives for Information and related Technology) are [5]:
- Principle no. 1 - Control in IT is approached through the examination of the information necessary to sustain the objectives of the requirements of the business;
- Principle no. 2 - Information is regarded as being the result of combined application of IT resources, these being administrated by the IT processes.

2.1.2 Testing of software systems

Testing is the process of execution of the program with the purpose of highlighting the errors.

Software testing determines if a software system is finalized (ready for delivery) and also estimates its level of performance. A large part of the effort necessary for the development of software applications is allocated to the elaboration and developing of the testing models.

Also, the increase of the complexity of these systems has generated an increase of the budget allocated to this phase from the development process of a project (between 30 and 50%) [6].

Software testing follows a group of testing strategies. Generally, the testing methods are customized, respectively the majority of the projects create their own testing methods, specific to the certain products [7].
Methods for dynamic testing consist in the execution of the application using test data. These are built according to the specified functional requirements and the results supplied by the program compare to those provided in the specifications.

Static testing methods have as a purpose the analysis of the software system and deduction of its current operations as a logical consequence of the design decisions. This testing modality does not require the execution of the program.

They consist of the verification of the program, analysis of the anomalies, and inspection of the code. The verification of the code requires the stipulation of the preconditions at log in and post conditions at log out.

The analysis of the anomalies searches possible abnormal behavior of the program (for example, parts of the code, parts which are never executed) [6].

3 Problem Solution

We consider that a very good evaluation procedure consists in the implementation and use of the informatics systems within the simulated companies.

Use of the simulated company is generally used for:
- management simulation [8];
- instruction/training of students for the step from education to real systems [9].

The functions of the simulated company used by each of us for the testing of the developed applications are:
- supply and administration of material stocks;
- preparation, planning and follow up of production;
- sales and marketing;
- accounting.

3.1 Realization and implementation of the applications

The IT solution “Abstract Business Administration System” is organized on modules, corresponding to the functional areas existing in a commercial company, from merchandise or raw material supply to follow up of the production plan, sale, even up to the commercial analysis or optimization of the fabrication flow.

3.1.1 Structure “Abstract Business Administration System”

The application package Abstract Business Administration System is made of the following modules:
- Work Abstract – Business Simulation
  It is the module for the registration, highlighting and follow up of the acquisitions and transformation of merchandise and raw materials:
  - Registration and realization of primary administration documents regarding the takeover of merchandise from the supplier, transfer between administrations, transformation from raw material in byproducts and in final products, consumption of raw materials, invoicing, supplier and client accounts;
  - compelling record of merchandise and cash transactions, of stocks and balances from suppliers and clients;
  - Transmission of data between the working points located outside the city, as well as between the working points and headquarters of the company;
  - The complete set of records necessary for the coordination of the sale and distribution activity.
- Commercial Abstract – Business Simulation
  The module used for the purpose of distribution and sale of the final products:
  - fast and safe registration of transactions in the sale process;
  - connection of the most outspread equipment of fiscal marking;
  - issue of documents at the sale made;
  - system of fast stock-taking, directly on the computer and immediate evaluation of stock differences;
  - All set of reports necessary for the development and control of the sale activity;
  - Integration with the other application modules.
- Performance Abstract – Business Simulation
  Module destined to the commercial analysis:
  - Transformation of data obtained from the basic processes in the information necessary to the management of the commercial activity;
  - Stock analysis, merchandise acquisition, sales (structure and evolution), balance at the suppliers and clients, realization of targets.
- Book Abstract – Business Simulation
  Module for general book keeping of the company:
  - Registration of the accounting transactions;
  - Generation of accounting registrations corresponding to processing of information from
other application modules: merchandise inventory, balances, fixes assets and remuneration;
- All sets of reports necessary for the general accounting of a commercial company;
- Registration of the foreign currency equivalent amount of the accounting transactions as well as of the reports in two currencies.

4 Experimentations – case studies on the method used
The following flows of information procession from a commercial company [10], corresponding to the basic functions of a company have been taken into consideration:

4.1 Management of supply
Management of supply has as a purpose highlighting and optimization of the supply process of the company with raw materials, material and utilities.
- In the application module WORK ABSTRACT, the following operations are executed:
  - registration of orders to the suppliers;
  - registration of Goods Received Note at the supplier invoice based on the issued order;
  - Registration of cash balances;
  - Highlight and control of the informational flow through the following categories of reports:
    - orders for suppliers: supplier purchase notes, unsettled orders;
    - list of main documents: GRN at the supplier invoice, balances;
    - current lists: sheet of merchandise, sheet of partner, merchandise current stock;
    - operational situations: balances and due dates, purchase journal, overcoming limits of stocks (Minimum / Maximum).
- In the application module PERFORMANCE ABSTRACT the manner in which the supply has been made is underlined at the management level of the company:
  - Analysis of stocks: expressing quality, value and dynamics of their modification as well;
  - Analysis of the acquisitions made: under the structural and evolitional aspect, also quantitatively and from the value point of view.
- In the application module BOOK ABSTRACT, the specific supply functions of a company are interpreted from the accounting point of view:
  - Automatic transposition in accounting form of the merchandise transaction and money made;
  - Completion with the activities specific to the general book keeping activity;
  - Highlighting from the accounting point of view the process undergone through the elaboration of the following types of reports: Accounting notes, Accounting account sheets, Account counts balances, Operation registers, and VAT journals.

Similarly, case studies have been started for the following functions of the company:
- Production Management [11];
- Management of Distribution / Sale.

5 Conclusion
The simulated company, as a practical preparation instrument in the informational process field, that follows to use procedures and means identical to those from the real companies [12], can serve at the evaluation of the manner in which an informatics system destined to business environment responds. This instrument proves its efficiency most of all in case of complex business environments as well as in those dominated of incertitude.

Evaluation has as objectives the follow up of the manner in which the virtual commercial company responds to the economical purpose proposed as well as its reactions from the technical and organizational point of view.

As opposed to the audit of administration informatics systems or the well-known software testing methods, the method we propose evaluates the manner in which the software applications adapt to the integral pass through of an information processing flow, corresponding to some basic functions of the company (supply, production, distribution, etc.).

What is specific is that the evaluation is made by common users, who can introduce stress elements practically unpredictable for the applications. This leads to a higher quality of the results obtained.

Also a high degree of diversity is ensured, through the fact that for the purposes for which these techniques are used there are a large number of users participating, and also those following certain specialty or professional formation programs.

In this manner we obtain complete and good quality results, at reduced costs of the evaluation process.

The implementation of the informatics systems destined to the business environment in virtual companies can have the following consequences:
• the evaluation of the performances of the simulated company and their improvement;
• exercising some development strategies for them, fast, at reduced costs and without any risks;
• analysis of a high number of variants;
• more profound understanding of the business environment.

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