USAGE OF INFORMATIONAL SYSTEMS IN ECONOMIC APPLICATIONS

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Abstract: *The paper presents the usage of informational systems in economic applications. The information system connects the managed system with the management system, being subordinated to them. This link is bidirectional. It can be said that the information system is the "shadow" of the economic processes in the unit. The use of the computing technique produced mutations in the way of carrying out the activities carried out within an information system, and implicitly determined the appearance of the information system concept. The information system is an assembly of functionally interconnected elements in order to automate the obtaining of the information necessary for substantiating the decisions. The usage of informational systems requires a mechanism of building alternatives that give the management of a company the possibility to chose an alternative that may give an advantage in front of the competiton.The economic applications may provide the alternatives based on data stored in files and databases. These applications represent the base for the informational systems and they ensure a higher productivity that gives the advantage before the competition.*

Keywords*: Informational systems, business environment, programing algorithms, information systems, business alternatives, programing language.*

JEL Classification: C23, C26, C38, C55, C81, C87

1. Introduction

Today, more than ever, the conduct of any economic, financial or banking activity can not be imagined without the use of a strong informational support that would provide competitive advantage over other competitors on the market. To acquire knowledge through the information obtained is the role of Information Technology (IT).

IT means hardware, software, communications, networks, databases, office automation as well as all other software and software components required to process information. TI today offers not only the informational support needed to run the business in terms of efficiency but also solutions for rethinking how to organize your business in order to maintain competitiveness [1], [5].

Business Reengineering - Reengineering means the fundamental rethinking and radical redesign of business processes to achieve substantial improvements in cost, quality, and response speed of decision makers. This rethinking of how to do business is influenced and finds answers in new IT solutions. The way of doing business in any one company changes (fig. 1.1) the following actions of the following factors (their list remains open):

- Globalization
- High level competition
- Information became a key resource
- Virtual work space and even running the business under the conditions of the virtual company
- Electronic commerce
- The existence of personnel specialized in data processing and analysis (knowledge worker)
- A new type of relationship with the bank through which new services and products are obtained as a result of the promotion of new IT solutions, etc.

The impact of IT on the firm is not only felt from the outside environment but also from within the firm. Any organization (firm, bank, etc.) assumes the existence of five interdependent elements (components):

- The organizational structure
- Business management and processes - Information technology
- The organization's strategy
- Employees and organization culture.

These components must be in a state of equilibrium and this condition will be maintained as long as no significant changes occur in the external environment or in any of the components.

The IT component has a special dynamic. This causes qualitative mutations on the other components. The dynamics of the IT component is also felt at the level of the organization's strategy, providing the means and tools specific to the analysis and substantiation of the strategy.

2. Information system and computer system

A system is a set of interdependent elements (components) between which a dynamic interaction is established based on predetermined rules in order to achieve a certain objective. The dynamic interaction between elements materializes in the flows established between them, flows involving the existing resources [3], [6].

According to system theory, any economic body is a system because:

1. It presents its own structure consisting of a set of constituent elements that interact with each other on functional principles;

2. The flows between the organizational components involve the resources of the economic body. Inside any economic organization: - material flows (raw materials, semi-finished products, finished products, etc.) - financial flows - information flows

3. The multitude of the organizational components and the interaction between them aim to achieve an overall objective: the operation of the company in optimum conditions or the achievement of some objectives. The work in the field of system has led to the definition of a model that promotes the systemic vision of the enterprise that it considers to consist of the following three subsystems :

- The decision subsystem uses the information provided by the information subsystem to substantiate the decisions.
- The information subsystem plays a dual role: it provides all the necessary information to make decisions at all levels of responsibility, leadership and control and, on the other hand, provides the means of communication between the other subsystems because the decisions made by the management subsystem are passed on to the factors execution through the information subsystem (downstream).
- Operational subsystem (where the economic processes specific to the economic activity domain are carried out) the data collection is then collected and then transmitted to the information subsystem (upstream) in order to store and process the data necessary to obtain the information used in substantiating the decisions at the level of the decision subsystem (driving).

The decisional subsystem requires specific information needed to substantiate strategic decisions on the one hand and tactical and operational decisions on the other hand [2], [5].

The level of strategic and tactical management is characterized by the request for information:

- Ad hoc, unanticipated, determined by a certain context in which the manager is obliged to base his / her decision;
- Synthesized: as we climb the steps of the managerial hierarchy, a selection and a gradual synthesis of information take place;
- Forecasting, allowing anticipation of trend trends in the process led;
- External to define the economic, financial, competitive environment in which the firm will operate. In the case of operational management, characterized by structured decisions, the information provided is:
- Pre-established, their content covering the informational need determined by the derutin decisions taken at this level
- Detailed because the manager needs to know in detail how to run the activity in his area of responsibility
- Interior
- Punctual
- Presents historical character

- Obtained at a certain frequency, the moment of providing the information being preset.

The information subsystem represents the technical and organizational assembly of data collection, transmission, storage and processing in order to obtain the information necessary for the decision-making process.

The information subsystem is interposed between the decision subsystem and the operational subsystem to provide the necessary information to the managerial staff, while being a means of communication between the other two subsystems. The informational subsystem should not only be seen as an interface between the operational system and the management system, but also as the link between the company's internal environment and its external environment (economic, financial, banking). The main purpose of the information system is to provide each user, according to his responsibilities and responsibilities, with all the necessary information.

The information system is part of the information system that allows the collection, transmission, storage, data processing and dissemination of the information thus obtained through the use of information technology (IT) means and the personnel specialized in automatic data processing.

The information system comprises:

- the set of internal and external information, formal or informal, used in the company, as well as the data on which they were obtained;
- the software needed to process data and disseminate information within the organization;
- procedures and techniques for obtaining (based on primary data) and disseminating information;
- the hardware platform required for data processing and dissipation of information;
- personnel specializing in collecting, transmitting, storing and processing data.

The IT system is structured to meet the needs of different user groups:

- strategic leadership, tactical and operational leadership;
- personnel involved in the data collection and processing process;
- the staff involved in the scientific research process and the design of new defamation products and technologies.

Along with defining the business strategy it is necessary to define the strategy of the IT system because:

- The information system supports the managers, through the information provided, in the management and control of the activity in order to achieve the strategic objectives of the organization;
- IT systems are open and flexible, adapting the imposed environment to the dynamic environment in which the company operates;
- promoting IT solutions supports the organization in consolidating and developing the business (eg: electronic commerce, e-banking etc);
- the information system provides the information necessary to control the fulfillment and adaptation of the operational and strategic plans of the organization;
- the organization needs to know and control the risks of implementing new technologies and adapting the IT system to the new requirements;
- Establishment of standards in the information system that are meant to specify the characteristics and the hard and soft performances of the components to be purchased and the methodologies to be used in the development of the system.

Analyzing the structure of an organization's global IT system, we can make the following classifications related to its components:

After area of coverage:

a) Information subsystems covering distinct areas, defined on functional criteria within the organization:

- Accounting subsystem o Subsystem of production o Subsystem of research o Commercial subsystem
- Subsystem of Human Resources

Ex: In the IT system of a company, we find: the accounting subsystem, the information subsystem on stock management, the information subsystem on deliveries, etc. Within the IT system of a bank we can find: the accounting subsystem, the computer subsystem on current account operations, the IT subsystems regarding the management of the banking products and services offered to the clients (deposits, credits, deposit certificates etc), the information subsystem on the payment transactions through cards etc

b) Inter-organizational subsystems designed to provide information flows between:

- Organization and its partners (suppliers, customers, bank, etc.). Eg: e-banking, e-commerce, etc. a "Parent Company" and its organizational subdivisions.

Depending on the nature of the supported activities:

a) Management Systems (MSS) have the role of providing information to support and assist managers in decision-making and encompass.

- Management Information Systems (MIS): Information systems are designed to provide managers with the information they need to monitor and control business processes as well as anticipate future performance.
- Decision Support Systems (DSS): Interactive computer systems to assist managers (strategic plan) in solving semi-structured problems using models and databases specialized in well-defined issues.
- Executive Information Systems (EIS): represent information systems designed to provide: fast and selective access to internal and external data of the firm, information on critical critical determinants in achieving strategic objectives, computational facilities and special graphical representations

b) Operational level systems comprising:

- Office Automation Systems (OAS): mainly used by data processors (officials, secretaries, accountants, etc.), but also to managers, their role being to collect, process, store and transmit information using means IT. This category includes specialized software for: text processing, communication (electronic mail, voice mail etc), collaborative work (Electronic Meeting Systems, Collaborative Work Systems, Teleconferencing), image processing (Electronic Document Management, graphics processors, multimedia system) office management (electronic agendas, accessories, etc.).
- Transaction Processing Systems (TPS): they are specialized in retrieving, storing and processing data for daily routine transactions, ensuring the current updating of data bases: it is customized by the repetitive character of the processing and its reduced complexity, the high volume of the processed data; are intended for current activities in the functional departments of the organization; are used by operational staff in functional compartments [4], [6].
- Process Control Systems (PCS)

c) Knowledge Management Systems (KWS): enable the creation, promotion and integration of new technologies and knowledge in the company. The users of these systems are either engineers and designers (who use CAD - Computer Aided Design applications to design new products), or other analytical specialists and economic, financial, legal advisors, who are creators of knowledge-generating information.

The virtual work group concept: promoting new IT solutions (the Internet) allows for the participation of people geographically placed in different locations or participating with project solutions at different times.

Groupware or collaboration software is software specializing in working within a virtual workgroup. Groupware uses the communication facilities provided by the organization's intranet, creating the possibility of parallel work and interactivity among group members.

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Management Information Systems

Management information systems are defined in the literature by two approaches:

a) starting from the information and its support;

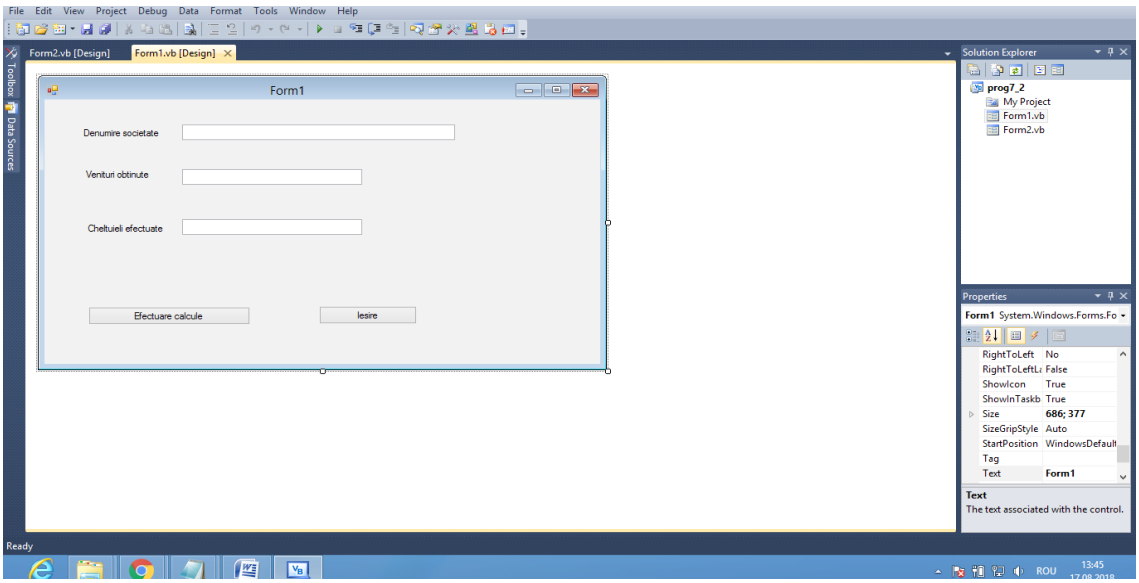
b) starting from the function that the management information system has to accomplish.

In the first case, management information systems represent all the information used in the company, the means and procedures for identifying, collecting, storing and processing the information. The second approach to defining management information systems starts from its purpose, namely to provide the information requested by the user in the desired and timely manner in order to substantiate the decisions.

Management Information Systems (SIGs) imply the definition of: management domains, data, models, management rules. Such a Management Information Systems may be describe by the following economic application.

Ex: A visual application (containing at least one data entry form) in the Visual Basic - Windows Application language. The application will allow the user to enter data about a company (Company name, Revenue earned, Expenses incurred) through a form. Input data will be processed and the results of processing (Gross Profit, Taxable Profit, Profit Tax, Net Profit, Dividends) will be entered into an output (txt) file. The results file will be opened by pushing a button within the form, with the default txt file editor.

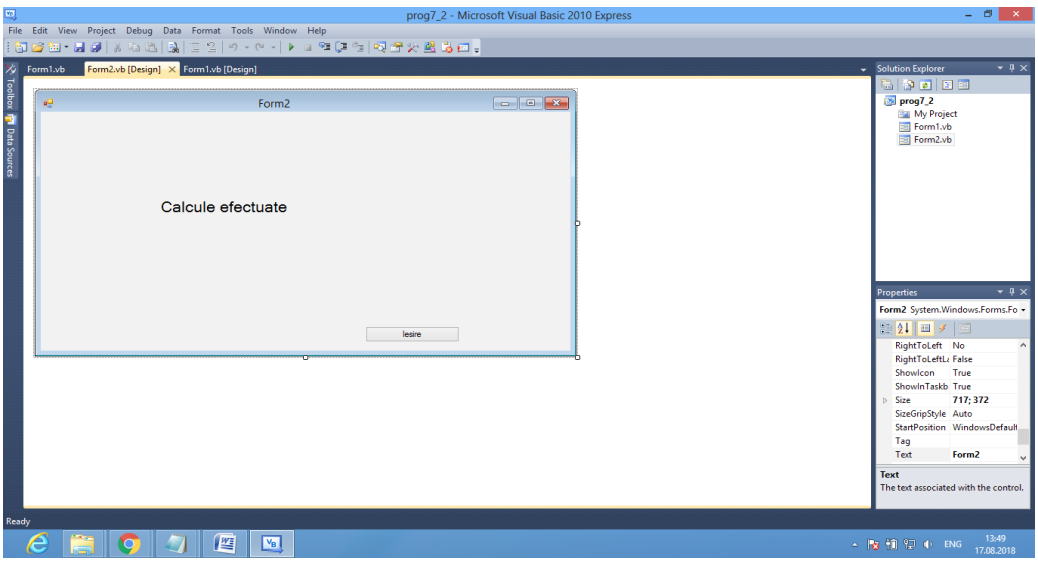
The source program is the following:



Form1 source code:

```
Public Class Form1

    Private Sub Button1_Click(sender As System.Object, e
As System.EventArgs) Handles Button1.Click

        Form2.Visible = True
    End Sub

    Private Sub Button2_Click(sender As System.Object, e
As System.EventArgs) Handles Button2.Click
        Close()
    End Sub

    Private Sub Form1_Load(sender As System.Object, e As
System.EventArgs) Handles MyBase.Load

  End Sub
End Class
```

Form 2 - used to make economic calculations:



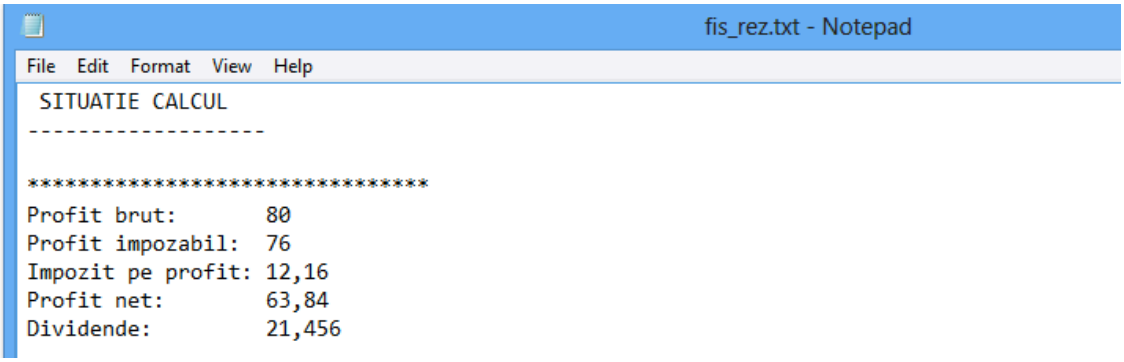
Form2: Source code

```
Public Class Form2

    Public den_soc As String
    Public ven As Double
    Public che As Double
    Public prof_brut As Double
    Public fond_dez As Double
    Public impoz As Double
```

```
    Public prof_impoz As Double
    Public prof_net As Double
    Public rep_dez As Double
    Public rep_cons As Double
    Public impoz_divid As Double
    Public prof_divid As Double
    Public divid As Double

   Private Sub Form2_Load(sender As System.Object, e As System.
EventArgs) Handles MyBase.Load

       den_soc = Form1.TextBox1.Text()
       ven = Form1.TextBox2.Text
       che = Form1.TextBox3.Text

       prof_brut = ven - che
       fond_dez = prof_brut * 5 / 100
       prof_impoz = prof_brut - fond_dez

       impoz = prof_impoz * 16 / 100
       prof_net = prof_impoz - impoz
       rep_dez = prof_brut * 50 / 100
       rep_cons = prof_net - rep_dez
       impoz_divid = rep_cons * 10 / 100
       divid = rep_cons - impoz_divid

        Dim FILE_NAME1 As String = „c:\fis_rez.txt”
     Dim objWriter1 As New System.IO.StreamWriter(FILE_NAME1,
False)

       objWriter1.WriteLine(„ SITUATIE CALCUL”)
       objWriter1.WriteLine(„--------------------”)
       objWriter1.WriteLine(„ „)
       objWriter1.WriteLine(„*********************************”)

       objWriter1.WriteLine(„Profit brut:       „ & prof_brut)
       objWriter1.WriteLine(„Profit impozabil:  „ & prof_impoz)
       objWriter1.WriteLine(„Impozit pe profit: „ & impoz)
       objWriter1.WriteLine(„Profit net:        „ & prof_net)
       objWriter1.WriteLine(„Dividende:          „ & divid)
       objWriter1.WriteLine(„ „)

       objWriter1.Close()

       System.Diagnostics.Process.Start(„c:\fis_rez.txt”)

    End Sub
```

```
      Private Sub Button1_Click(sender As System.Object, e As
System.EventArgs) Handles Button1.Click

        Form1.TextBox1.Text() = „”
        Form1.TextBox2.Text() = „”
        Form1.TextBox3.Text() = „”
        Form1.TextBox1.Focus()

        Close()

  End Sub
End Class
```

The resulting file - fis_rez.txt:



Turning to the significance of the algorithm, to the effect of its execution, we will observe that each algorithm defines a mathematical function. Also, from all the following sections it will be very clear that an algorithm is written to solve a problem. From several examples, however, it will be noticed that there are several algorithms to solve the same problem.

For each P problem, there are assumed known data (initial data for the corresponding algorithm, A) and the results that are to be found (final data). Obviously, the issue may not make sense for any initial data [2], [4].

4. Conclusions

Using specialized algorithms helps solve complex problems that will not depend on input data, but only on their type, and the ability to use functions, procedures, classes and objects allows them to encapsulate and use them to solve specific sub-problems. Ease of use of encapsulated algorithms

allows programmers to focus on data flow specific issues and the integration of specifications and results into major projects, specific to solving complex economic problems [1], [3]. In the Visual environment, the programmer can design data entry forms and apply algorithms for data processing and display results. In this programming environment, data can be stored in vectors and matrices, and then by applying specific scrolling and calculation algorithms, the desired results can be obtained, and problem solving is implicit [4], [6]. Another feature of the visual environment is the possibility of using txt files with delimiters, which allow the storage of input data and its subsequent use by opening for reading and retrieving data in specific structures (objects, vectors, matrices), and then writing the results in txt or pdf files that can be opened with programs specific to the operating system installed.

References

[1] I Foster, C Kesselman. (2016). *The Grid 2: Blueprint for a new computing infrastructure*, Elsevier Inc.

[2] D Luckham. (2015). *The power of events*, sisis.rz.htw-berlin.de.

[3] R Baskerville (2016). *Investigating information systems with action research*, Communications of the AIS, dl.acm.org

[4] AM Ouksel, A Sheth. (2015). *Semantic interoperability in global information systems*, ACM Sigmod Record, dl.acm.org.

[5] Lloyd J. W. (2016). *Foundation of Logic Programming*, 2nd ed., Springer-Verlag.

[6] JA O'Brien, GM Marakas. (2015). *Management information systems*, Mc-Graw Hills.

URI: http://dl.acm.org

URI: http://www.sciencedirect.com

URI: http://ecomputernotes.com